special **SURVEY** 

# **CIRCULAR ECONOMY:** BARRIERS, OPPORTUNITIES, AND INDUSTRIAL PRACTICES







# SPECIAL **SURVEY** 96 **CIRCULAR ECONOMY:** BARRIERS, OPPORTUNITIES AND INDUSTRIAL PRACTICES

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# **EXECUTIVE SUMMARY**

### INDUSTRIES THAT ADOPT CIRCULAR ECONOMY PRACTICES BELIEVE THEY CONTRIBUTE TO THE REDUCTION OF GREENHOUSE GAS EMISSIONS

Graphic 1 - Percentage of companies that believe circular economy actions contribute to reducing greenhouse gas emissions Percentage (%)



Recent global reports on resource trends reinforce the urgent need for society to shift away from the linear consumption and production model — characterized by extraction, use, and immediate disposal.

The Global Resources Outlook 2024<sup>1</sup> highlights that, since 1970, the extraction of natural resources has more than tripled, rising from 30 billion to 106 billion metric tons. Moreover, it projects that, without urgent action, resource extraction could increase by 60% by 2060 compared to 2020 levels, intensifying environmental damage and associated risks (IRP, 2024). The global consumption of materials such as biomass, fossil fuels, metals, and minerals is expected to double over the next four decades, while annual waste generation is projected to rise by 70% by 2050.

The circular economy represents a strategic shift to counter this trajectory. It aims to reduce resource use, minimize waste, and regenerate natural systems. This approach fosters systemic actions to address interconnected global challenges such as climate change, biodiversity loss, and the unsustainable use of resources.

The industrial sector plays a pivotal role in this context. As one of the largest consumers of natural resources and producers of waste, the industry holds the potential to reshape production and consumption models by implementing circular practices focused on adding, retaining, and recovering resource value — while also restoring nature. Findings from this Special Survey show that **6 out of 10 companies currently apply circular economy practices in their operations,** signaling not only compliance with regulatory requirements — such as reverse logistics — but also a proactive move toward a more efficient, resilient, and sustainable production model.

Understanding the barriers faced by organizations and identifying the measures needed to scale up these practices is essential. This diagnostic process helps pinpoint key bottlenecks and opportunities, informing public policies, business strategies, and investment decisions that can accelerate the transition to new business models.

<sup>&</sup>lt;sup>1</sup>Published by the International Resource Panel (IRP) and released by the United Nations Environment Programme (UNEP). Available at: <u>https://www.unep.org/resources/Global-Resource-Outlook-2024</u>. Accessed on April 13, 2025.

# MAIN BARRIERS TO THE IMPLEMENTATION OF A CIRCULAR ECONOMY IN BRAZILIAN INDUSTRY

The circular economy (CE) generates economic, environmental, and social benefits. However, the industrial sector — a central player in this transition — can face significant challenges. Among these are regulatory barriers, such as the lack of incentives for the use of secondary resources; economic barriers, involving the need for substantial upfront investment; technological barriers, involving infrastructure limitations and the lack of solutions for new processes; and cultural and educational barriers, including resistance to change and a lack of awareness of the benefits of the CE.

In this context, the main objective of this survey was to identify the barriers and opportunities to advance the circular economy in Brazil based on the perceptions of the industrial sector.

## **Cultural and educational barriers**

One of Brazil's main barriers to implementing a circular economy is related to cultural and educational factors. These barriers may arise internally within the company — organizational culture aspects that hinder the implementation of circular practices — or externally, on the demand side, where clients and end consumers show little engagement with this topic.

A significant portion of Brazilian industry (43%) still lacks the knowledge to assess which cultural or educational factors act as barriers to adopting circular practices. However, among the 57% of companies that were able to assess these factors, perceptions can be divided into two categories: internal and external to the organization.



Graphic 2 - Main cultural and educational barriers preventing circularity practices in your organization

\* Note: Percentages may not total 100% as companies could select more than one barrier.

The analysis shows a balanced distribution between internal and external factors. First, an external factor stands out: for 25% of respondents, the lack of consumer knowledge poses a barrier to the implementation of post-consumption practices. Second, 23% of companies reported lacking appropriate strategies to engage consumers and inform them about the benefits of the circular economy — an internal factor. Third, another external barrier is highlighted: 21% of respondents indicated that the negative perception of end consumers regarding repaired, reprocessed (refurbished, remanufactured, and reused), and recycled products is a significant obstacle.

It is also important to note the interconnection between internal and external factors. Companies that perceive low demand for circular products may feel discouraged from investing in innovation, assuming that such efforts will face limited consumer acceptance. On the other hand, companies' own lack of engagement in promoting circular economy practices reinforces these negative perceptions — making it harder to shift consumer demand and creating a self-reinforcing cycle in which both supply and demand for circular solutions fail to advance.

In this context, the **National Circular Economy Strategy (ENEC)**<sup>2</sup>, established in June 2024, emerges as an important tool to help break this cycle. Among its objectives are the creation of a favorable institutional and regulatory environment for the circular economy through the development of markets for reusable, refurbished, and recycled products; and the promotion of culture, education, and skills development — with an emphasis on environmental education, as well as fostering critical and innovative thinking for circularity. These objectives, supported by well-structured actions and targets to be defined in the National Circular Economy Plan (Planec), have the potential to transform this scenario by providing the necessary support to overcome barriers on both the supply and demand sides, thereby contributing to the advancement of the circular economy in Brazil.

# Technological and innovation barriers

Technological development is among the main factors that hinder the implementation of circular economy practices in the industrial sector. The survey reveals that, for a significant portion of the industry, it was unclear which technological or innovation related aspects act as barriers to implementing such practices. However, among respondents who identified these obstacles, the most frequently cited factor was the economic viability of the technologies required to improve production processes — cited by 30% of companies as the primary obstacle. Next, 26% of industrial firms pointed to the lack of a qualified workforce capable of implementing new technological solutions as a limiting factor.

Other challenges mentioned, in descending order of relevance, relate to research and development. For 23% of respondents, low collaboration between companies and Science and Technology Institutions (STIs) represents a significant barrier, while 21% cited low investment in research as a limiting factor. Lastly, the lack of knowledge about existing technologies — and the absence of technologies that meet companies' specific needs — were also mentioned as important barriers.

<sup>&</sup>lt;sup>2</sup> Decree Nº. 12,082 of June 27, 2024. Available at: https://www.planalto.gov.br/ccivil\_03/\_ato2023-2026/2024/decreto/D12082.htm. Accessed on April 6, 2025.

**Graphic 3 - Main technological and innovation barriers preventing the implementation of circularity practices**<sup>3</sup> *Percentage (%)* 



\*Note: Percentages may not total 100% as companies could select more than one barrier.

In addition, the survey revealed significant differences in how technological obstacles are perceived depending on company size. The main challenge for small- and medium-sized enterprises is the lack of a qualified workforce, reported by 29% of respondents in both groups. However, among large-sized enterprises, this factor ranks only fourth. Small-sized enterprises also frequently mentioned the lack of knowledge about available technologies, which ranked third for them, while this same issue ranked near the bottom for medium- and large-sized enterprises.

On the other hand, factors related to technology development — such as the need for investment and partnerships with STIs — are more relevant for medium- and large-sized enterprises, which tend to face greater challenges in this regard. These findings indicate that, in order to foster the transition to a circular economy, it is essential to account for the specific characteristics of each enterprise size. While the economic viability of technologies emerges as a shared priority across all groups, the solutions to other challenges vary depending on company size.

In general, small-sized enterprises require support in attracting qualified workers and gaining familiarity with the technologies available on the market. Medium sized enterprises face the same challenge regarding workforce qualification but also need assistance in establishing strategic partnerships and increasing their investment in innovation. Finally, largesized enterprises — while also prioritizing economic viability — must focus on advancing innovation and strengthening partnerships with STIs in order to overcome technological barriers and boost the implementation of circular practices.

<sup>&</sup>lt;sup>3</sup> A total of 40% of companies either did not know how to answer or chose not to respond to this question.

Objective II of the ENEC, which aims to create training programs for companies and promote workforce development, may help address the shortage of qualified workers — identified by 26% of surveyed companies, especially among small- and medium-sized enterprises. In addition, ENEC's proposal to foster research, development, and innovation to promote circularity is directly aligned with the challenges reported by companies that pointed to low collaboration with STIs and limited investment in research as barriers to advancing circular economy practices.

#### Graphic 5 - Main technological and innovation barriers preventing the implementation of circularity practices (Medium-sized enterprises)<sup>5</sup>

Percentage (%)



Graphic 4 - Main technological and innovation barriers preventing the implementation of circularity practices (Small-sized enterprises)<sup>4</sup> Percentage (%)



Graphic 6 - Main technological and innovation barriers preventing the implementation of circularity practices (Large-sized enterprises)<sup>6</sup> Percentage (%)



\*Note: Percentages may not total 100% as companies could select more than one barrier.

<sup>&</sup>lt;sup>4</sup> Among small-sized enterprises, 51% either did not know how to answer or did not respond.

<sup>&</sup>lt;sup>5</sup> Among medium-sized enterprises, 38% either did not know how to answer or did not respond.

<sup>&</sup>lt;sup>6</sup> Among medium-sized enterprises, 37% either did not know how to answer or did not respond.

Finally, a key difference across the sectors analyzed should be noted. While the extractive and manufacturing industries cited the economic viability of technologies for production processes as the main challenge, the construction industry identified the lack of qualified in-house workers as its most significant barrier.

Such analysis is essential to guide the development of sector-specific public policies taking into account the particular needs of each segment. For instance, in the extractive and manufacturing industries, policies to support research and innovation may be crucial to lowering technology costs, while in the construction sector, workforce training initiatives should be prioritized.

## **Economic barriers**

The survey also asked companies to identify the main economic barriers hindering the implementation of circular economy practices. These economic factors can directly affect the implementation of such practices — whether due to limited access to specific financing lines, the perception of insufficient demand for circular products and services, or the restricted economic viability of these practices. Understanding how companies perceive these obstacles is essential to inform and support the sector's positioning, contributing to the design of more effective public policies aligned with market realities and needs.

**Graphic 7 - Main economic barriers hindering the implementation of circularity practices**<sup>7</sup> Percentage (%)



<sup>&</sup>lt;sup>7</sup> Among medium-sized enterprises, 42% either did not know how to answer or did not respond.

The results show that the industrial sector identified high interest rates on financing as the leading economic barrier. For 22% of respondents, this was the most recurrent difficulty. The following two most cited barriers were related to the supply and demand of circular products and services: 20% of companies pointed to a lack of economically viable products and services, while 19% indicated a lack of demand for circular offerings. One important aspect explored in the survey was tax policy — specifically, whether the unequal tax treatment of recycled versus virgin materials could act as a barrier to advancing circular practices. This factor ranked fifth overall, mentioned by 17% of companies in the national industry.

However, the prioritization of these barriers varied significantly across the industrial sectors analyzed. The manufacturing and extractive industries had a different perception compared to the construction sector.

For the construction sector, high interest rates on financing ranked third. The main barrier identified by companies in this sector, cited by 22%, was the lack of economically viable products and services. The second most frequently mentioned challenge was the bureaucratic and slow application process for accessing financing, with 20% of construction companies identifying it as a key obstacle. Graphic 8 - Main economic barriers hindering the implementation of circularity practices (Manufacturing and Extractive Industries)<sup>8</sup> Percentage (%)



Graphic 9 - Main economic barriers hindering the implementation of circularity practices (Construction industry)<sup>9</sup> Percentage (%)



\*excessive documentation requirements, delays in the evaluation of submitted information, etc.

<sup>&</sup>lt;sup>8</sup> Among medium-sized enterprises, 41% either did not know how to answer or did not respond.

<sup>&</sup>lt;sup>9</sup> Among medium-sized enterprises, 47% either did not know how to answer or did not respond.

### **Government economic measures**

The government plays a crucial role in promoting economic measures to support a viable transition to a circular economy. It can implement tax policies, subsidies, and regulations encouraging industries to increasingly adopt circular practices. In addition, government support through investment in recycling infrastructure and research and technological development can facilitate the transition, making it more accessible and sustainable for companies.

The responses from the industrial sector primarily focused on two suggestions: (i) offering economic incentives for creating recycling and reverse logistics infrastructure and (ii) offering incentives for circular innovation projects.

Established by Brazil's National Solid Waste Policy (PNRS) in 2010, reverse logistics (RL) is a tool to regulate waste management in both the public and private sectors. Sectoral agreements and reverse logistics decrees set recycling targets for various industrial sectors. The industrial sector's commitment to recycling enables circularity in products and materials, allowing for the recovery of resource value and their reintegration into new production cycles. Despite these efforts, the implementation of reverse logistics systems still faces significant challenges, primarily due to high operational costs. These systems require adequate infrastructure, specialized transportation, and complex logistical planning — factors further compounded by Brazil's vast territorial size. As a result, their implementation remains costly and logistically complex.

Nonetheless, the Brazilian industrial sector has demonstrated a strong track record of engagement in recycling, as evidenced by post-consumer waste recycling rates published in the National Solid Waste Plan (Planares)<sup>10</sup>:



• Glass: 25.8% (2018)

Graphic 10 - What economic measures should the government implement to support companies in transitioning to a circular economy model?

Percentage (%)



<sup>10</sup> Available at: <u>https://portal-api.sinir.gov.br/wp-content/uploads/2022/07/Planares-B.pdf</u>. Accessed on April 14, 2025.

The second most frequently cited measure — economic incentives for circular innovation projects — was mentioned by 41% of respondents as a priority measure to be adopted by the government. This demand is directly linked to the two main economic barriers identified in the survey: high interest rates and the lack of economically viable circular products and services (see Figure 7).

The level of Brazil's benchmark interest rate (SELIC) directly influences financing rates. High interest rates can become prohibitive in the medium and long term, making it challenging to develop new business models from a circular economy perspective. Brazil has historically experienced high SELIC rates due to inflationary pressures, increasing the cost of credit and the opportunity cost of investments. For strategic issues such as the circular economy and sustainable development, a stable macroeconomic environment is essential — one that enables long-term investments without excessive financial burdens.

One in five companies reported facing difficulties in bringing economically viable products and services to market.

Additionally, one in five companies reported facing difficulties in bringing economically viable products and services to market. This situation highlights not only the need for economic incentive instruments to make circular solutions more competitive and accessible to final consumers but also the urgency of strengthening the technical and scientific foundation that supports this transition.

In this regard, the development of centers of excellence in circular economy can play a strategic role — not only by helping identify and overcome technological bottlenecks but also by training qualified specialists to assist companies throughout their transition.

## The role of regulations

Regulations play a key role in creating an enabling environment for developing and scaling new business models based on practices that promote adding, retaining, and recovering value from resources.

However, the relationship between regulations and the advancement of the circular economy must be carefully considered to avoid unintended consequences for the industrial sector. Overly rigid or poorly designed regulations may lead to increased operational costs and bureaucratic complexity, making it more difficult for companies to adapt to new requirements. Therefore, regulations must be developed in close partnership with industry, ensuring they are realistic and feasible and provide clear incentives.

In this context, it is crucial to understand how the industrial sector perceives current regulations — whether they are related to tax, environmental, economic, technological, or educational policies.

# **Tax regulations**

**Graphic 11 - Do current tax regulations encourage or hinder the implementation of circular economy practices?** *Percentage* (%)



Approximately 45% of companies in the national industrial sector reported that current tax regulations hinder the implementation of circular economy practices. While the overall perception is largely negative, it becomes more favorable among larger enterprises. The share of companies that consider current tax regulations to be supportive rises from 4% among small-sized enterprises to 9% among large-sized enterprises. The sector with the most negative perception of tax regulations is the rubber products sector, with 62% of companies indicating that current tax regulations hinder the implementation of circular economy practices. In contrast, the pulp, paper, and paper products sector showed the most positive perception, with 13% of companies stating that current regulations encourage implementation.

# Table 1 – Companies' perception of tax regulations, by sector Percentage (%)

Sector	Encourage	Hinder	No impact	NA/NS
Rubber products	5	62	0	33
Biofuels	12	59	12	18
Wood products	0	55	0	45
Plastic products	6	55	8	32
Pulp, paper, and paper products	13	52	6	29
Chemicals (excluding HPPC)	4	52	16	29
Footwear and parts	5	50	0	45
IT equipment, electronics, and others	4	50	19	27
Apparel and accessories	3	49	12	36
Infrastructure works	5	49	11	35
Non-metallic mineral extraction	12	47	5	35
Textile products	9	47	9	34
Metallurgy	5	47	13	34
Furniture	2	47	10	41
Beverages	6	45	18	30
Machinery and equipment	3	45	9	44
Food products	9	44	12	35
Leather and leather goods	11	44	17	28
Soaps, detergents, cleaning products, cosmetics, perfumes, and personal care products (HPPC)	4	43	13	39
Non-metallic mineral products	6	42	12	40
Metal products (excluding machinery and equipment)	7	41	9	43
Building construction	2	41	8	49
Printing and recorded media reproduction	2	39	6	53
Miscellaneous products	9	39	0	51
Specialized construction services	5	39	8	48
Electrical machinery, devices, and materials	12	35	9	45
Pharmaceutical and pharmaceutical-chemical products	13	33	7	47
Motor vehicles, trailers, and bodies	9	31	13	47
Maintenance, repair, and installation of machinery and equipment	6	29	12	53

## **Economic regulations**

Compared to tax regulations, the perception of current economic regulations is slightly less negative. Around 40% of companies reported that current economic regulations hinder the implementation of circular economy practices. Similarly, there is a correlation between enterprise size and a more favorable view of these regulations: the larger the company, the more likely it is to consider current regulations supportive of circular economy implementation.

The sector with the most negative perception of economic regulations is the rubber products sector, with 62% of companies indicating that current regulations hinder the implementation of circular practices. On the other hand, the non-metallic mineral extraction and electrical machinery, devices, and materials sectors showed the most positive perception, with 21% of companies in each sector stating that current regulations encourage circular economy implementation.



**Graphic 12 - Do current economic regulations encourage or hinder the implementation of circular economy practices?** *Percentage* (%)

Table 2 – Companies'	perception of economic regulations,	by sector
Percentage (%)		

Sector	Encourage	Hinder	No impact	NA/NS
Rubber products	5	62	5	29
Wood products	0	55	0	45
Biofuels	12	53	18	18
Apparel and accessories	4	47	12	37
Metallurgy	11	47	11	31
Furniture	7	47	9	38
IT equipment, electronics, and others	12	46	19	24
Pulp, paper, and paper products	13	45	13	29
Leather and leather goods	11	44	17	28
Chemicals (excluding HPPC)	7	43	14	36
Infrastructure works	5	42	17	37
Food products	11	41	12	35
Textile products	19	41	8	33
Plastic products	16	41	8	35
Soaps, detergents, cleaning products, cosmetics, perfumes, and personal care products (HPPC)	0	39	17	44
Metal products (excluding machinery and equipment)	7	39	10	44
				continue

Sector	Encourage	Hinder	No impact	NA/NS
Machinery and equipment	5	39	12	44
Building construction	5	38	7	49
Specialized construction services	6	38	6	50
Non-metallic mineral extraction	21	37	7	35
Printing and recorded media reproduction	12	37	4	47
Beverages	12	36	12	39
Non-metallic mineral products	9	36	12	43
Miscellaneous products	9	36	3	51
Footwear and parts	15	35	0	50
Maintenance, repair, and installation of machinery and equipment	12	29	12	47
Motor vehicles, trailers, and bodies	19	28	13	41
Pharmaceutical and pharmaceutical-chemical products	13	27	7	54
Electrical machinery, devices, and materials	21	26	15	39

## **Health regulations**

Approximately one in four companies in the industrial sector believe that current health regulations hinder the advancement of the circular economy. This perception is more common among medium- and largesized enterprises.

There are significant differences across industrial sectors regarding how health regulations are perceived and their impact on circular economy implementation. The biofuels sector had the most negative perception, with 41% of companies indicating that regulations are a barrier. In contrast, the printing and recorded media reproduction sector had the lowest rate, with only 14% considering regulations an impediment.

The beverages sector stood out for its positive perception, with 27% of companies stating that current regulations support circular economy practices. On the other hand, the soaps, detergents, cleaning products, cosmetics, perfumes, and personal care products (HPPC) sector had the lowest positive perception, with only 4% of companies believing that current regulations encourage circular practices. Graphic 13 - Do current health regulations encourage or hinder the implementation of circular economy practices? Percentage (%)



Given these differences, public authorities must analyze the specific characteristics of each sector and promote ongoing dialogue to build more realistic and effective public policies. Understanding the specific needs of each segment will enable the development of both efficient and fair regulatory solutions for the entire industrial sector.

#### Table 3 - Companies' perception of sanitary regulations, by sector

Percentage (%)

Sector	Encourage	Hinder	No impact	NA/NS
Biofuels	18	41	18	24
Soaps, detergents, cleaning products, cosmetics, perfumes, and personal care products (HPPC)	4	39	22	34
Pharmaceutical and pharmaceutical-chemical products	7	33	13	47
Chemicals (excluding HPPC)	16	32	13	39
Metallurgy	8	32	26	34
IT equipment, electronics, and others	15	31	23	31
Food products	20	29	16	35
Plastic products	20	29	15	36
Maintenance, repair, and installation of machinery and equipment	12	29	12	47
Textile products	20	28	19	33
Leather and leather goods	11	28	33	28
Wood products	6	27	9	57
Pulp, paper, and paper products	19	26	16	39
Rubber products	24	24	14	38
Metal products (excluding machinery and equipment)	11	24	16	48
Electrical machinery, devices, and materials	18	24	12	48
Furniture	14	24	16	47
Apparel and accessories	7	23	28	42
Non-metallic mineral products	11	23	21	45
Motor vehicles, trailers, and bodies	16	22	19	44
Miscellaneous products	15	21	12	51
Infrastructure works	14	20	23	43
Non-metallic mineral extraction	25	19	14	42
Machinery and equipment	12	19	27	42
Building construction	13	19	19	50
Specialized construction services	6	19	23	51
Beverages	27	15	18	39
Footwear and parts	10	15	10	65
Printing and recorded media reproduction	18	14	16	51

## **Technological regulations**

Unlike the other types of regulations analyzed previously, the prevailing perception is that technological regulations encourage the implementation of circular economy practices. Approximately one in four companies believe that current technological regulations support this transition. This figure rises to 30% among large sized enterprises, indicating that larger companies tend to view these regulations more favorably — possibly due to their greater capacity for adaptation and investment in technological innovation.

#### Approximately one in four companies believe that current technological regulations support this transition.

There are notable differences across industrial sectors regarding perceptions of technological regulations and their impact on circular economy implementation. The non-metallic mineral extraction sector stands out, with 39% of companies indicating that current regulations encourage the adoption of circular practices. In contrast, the pharmaceutical and pharmaceutical-chemical products sector had the lowest rate, with only 7% of companies expressing the same view.

Table 4 – Companies' perception of technological regulations, by sector Percentage (%)

Sector	Fncourage	Hinder	No impact	NA/NS
5000	Encourage	Innuci	no mpace	111115
Non-metallic mineral extraction	39	12	9	40
Biofuels	35	24	24	18
Electrical machinery, devices, and materials	35	9	15	41
Textile products	34	20	11	34
Beverages	33	9	21	36
Printing and recorded media reproduction	31	12	6	51
Motor vehicles, trailers, and bodies	31	6	13	50
Pulp, paper, and paper products	29	13	29	29
Rubber products	29	24	10	38
Maintenance, repair, and installation of machinery and equipment	29	24	0	47
Food products	28	21	15	36

Grraphic 14 - Do current health regulations encourage or hinder the implementation of circular economy practices? Percentage (%)



This sector also had the most negative perception: 33% of its companies stated that current regulations hinder the implementation of circular practices. On the other hand, the leather and leather goods sector reported the lowest negative perception, with only 6% of companies stating that current regulations hinder the implementation of circular economy practices.

These findings indicate that perceptions of technological regulations vary significantly across sectors, reflecting sector-specific challenges and differing levels of adaptation to circular economy requirements.

Sector	Encourage	Hinder	No impact	NA/NS
Leather and leather goods	28	6	28	39
Plastic products	27	24	14	35
Metallurgy	26	16	26	31
Footwear and parts	25	15	0	60
Infrastructure works	25	15	22	38
Furniture	24	21	10	45
Miscellaneous products	24	15	9	51
IT equipment, electronics, and others	23	19	27	31
Chemicals (excluding HPPC)	21	29	16	34
Metal products (excluding machinery and equipment)	21	17	15	47
Building construction	20	15	13	52
Machinery and equipment	19	19	19	44
Apparel and accessories	17	19	20	44
Soaps, detergents, cleaning products, cosmetics, perfumes, and personal care products (HPPC)	17	13	22	48
Specialized construction services	16	13	19	53
Non-metallic mineral products	14	22	16	48
Wood products	9	12	21	57
Pharmaceutical and pharmaceutical-chemical products	7	33	0	60

## **Educational regulations**

Following the trend observed in technological regulations, the prevailing opinion in the national industrial sector is that current educational regulations encourage the implementation of circular economy practices. According to 28% of respondents, current regulations support this transition. A variation is observed across enterprise sizes: the rate increases from 20% among small-sized enterprises to 31% among largesized enterprises.

There are also significant differences among industrial sectors. The sector with the most positive perception is the biofuels sector, with 47% of companies stating that current regulations encourage circular economy implementation. By contrast, the pharmaceutical and pharmaceutical-chemical products sector showed the lowest rate — only 7% of companies in that sector indicated that regulations support circular practices. This sector also had the most negative perception: 33% of its companies stated that current regulations hinder the Graphic 15 - Do current educational regulations encourage or hinder the implementation of circular economy practices? *Percentage* (%)



implementation of circular economy practices. In contrast, the soaps, detergents, cleaning products, cosmetics, perfumes, and personal care products (HPPC) sector had the least negative perception, with only 4% of companies indicating that current regulations hinder implementation.

#### Table 5 - Companies' perception of educational regulations, by sector

Percentage (%)

Sector	Encourage	Hinder	No impact	NA/NS
Biofuels	47	12	24	18
Rubber products	38	14	14	33
Non-metallic mineral extraction	35	12	12	40
Textile products	34	20	11	34
Beverages	33	9	15	42
Leather and leather goods	33	6	28	33
Food products	32	18	14	36
Pulp, paper, and paper products	32	13	23	32
Printing and recorded media reproduction	31	8	10	51
Furniture	31	12	16	41
Soaps, detergents, cleaning products, cosmetics, perfumes, and personal care products (HPPC)	30	4	22	44
Plastic products	30	23	9	38
Miscellaneous products	30	9	9	51
Electrical machinery, devices, and materials	29	15	18	39
Chemicals (excluding HPPC)	25	20	20	36
Motor vehicles, trailers, and bodies	25	6	19	50
Maintenance, repair, and installation of machinery and equipment	24	24	6	47
IT equipment, electronics, and others	23	15	35	27
Building construction	23	13	14	50
Machinery and equipment	22	20	15	44
Metallurgy	21	26	18	34
Apparel and accessories	20	20	19	41
Footwear and parts	20	5	10	65
Infrastructure works	20	15	23	41
Non-metallic mineral products	19	19	17	46
Metal products (excluding machinery and equipment)	19	20	14	48
Wood products	18	9	21	51
Specialized construction services	11	16	19	55
Pharmaceutical and pharmaceutical-chemical products	7	33	7	54

### Regulatory measures to be taken by the government

Based on companies' views regarding the impact of regulations on the implementation of circular economy practices, the survey identified the actions the government should take to help create a regulatory environment conducive to the transition toward a circular economy. Regulations play a key role in advancing the circular economy. For this reason, it is essential to understand how the industrial sector views the actions the government could take to support this transformation.



Graphic 16 - What are the main regulatory measures the government should take to support the transition of companies toward a circular economy model?<sup>11</sup>

Percentage (%)

Note: Percentages may not add up to 100% because companies could select up to three measures.

**First,** the top priority for more than half of the companies surveyed (53%) should be **simplifying regulations.** Complex and overly detailed rules hinder understanding and compliance, resulting in bureaucratic delays and high administrative costs. This makes it difficult for companies to adapt and often leads to disengagement. Clarifying and simplifying regulations is essential to facilitate compliance and encourage adoption.

Second, 31% of companies pointed to the harmonization of federal, state, and municipal regulations. Brazil's federal structure poses a significant challenge, as it allows different levels of government to create divergent rules, complicating compliance and hindering standardization. Cooperation among federal entities is essential to establish coherent regulations that enable the circular transition without overburdening companies needing to comply with multiple overlapping local frameworks. Unifying regulations would help create a more predictable and supportive environment for circular practices.

Third, 23% of companies cited the alignment of existing regulations as a necessary measure. Misalignment — especially among environmental, tax, and health regulations — can become a barrier to consolidating circular practices. Conflicting rules also generate legal uncertainty and additional costs for companies that must comply with contradictory requirements. Aligning existing regulations would help reduce such uncertainties and promote a smoother and more secure transition.

<sup>&</sup>lt;sup>11</sup> A significant share of respondents selected "No answer" or "Not sure" for this question. These options were chosen by 33% of participants.

# **2** CIRCULAR ECONOMY PRACTICES IMPLEMENTED BY BRAZILIAN INDUSTRY

# Six out of ten companies implement circular economy practices in their operations

Despite the barriers presented in the previous chapter, the survey shows that the national industrial sector has already begun its transition to a circular economy. Overall, 62% of companies report implementing at least one circular economy practice. This transition is more widespread among large-sized enterprises. Among small-sized companies, 47% adopt at least one circular practice. In the case of medium-sized companies, the figure exceeds half, reaching 61%. Seven out of ten large-sized companies implement at least one circular economy practice. Graphic 17 - Percentage of companies that implement at least one circular economy practice Percentage (%)



 Table 6 – Percentage of companies by sector that implement at least one circular economy practice

 Percentage (%)

86
82
81
81
80
79
76
76
74
74
74
74
71
68
82 81 81 80 79 76 76 76 74 74 74 74 74 74 74 74 68

Sector	% Companies
Metallurgy	68
Electrical machinery, devices, and materials	68
Textile products	67
Chemicals (excluding HPPC)	58
Metal products (excluding machinery and equipment)	57
Miscellaneous products	55
Food products	53
Wood products	52
Non-metallic mineral products	48
Apparel and accessories	47
Non-metallic mineral extraction	46
Specialized construction services	42
Printing and recorded media reproduction	40
Building construction	39
Infrastructure works	39
Pharmaceutical and pharmaceutical-chemical products	33

Table 7 – Percentage of companies by sector (Extractive and Manufacturing and Construction that implement circular economy practices

Percentage (%)

Practice	Extractive and Manufacturing	Construction	Brazil
Designs products to increase durability	37	18	34
Offers maintenance and/or repair of products during use	32	32	32
Performs reverse logistics for products and/or packaging	33	14	30
Ensures and/or performs product recycling	33	7	29
Incorporates recycled or recovered resources into products	32	7	28
Applies circularity criteria in supplier purchasing processes	24	16	23
Implements ecosystem regeneration practices	25	13	23
Designs products for future recovery	22	6	19
Recovers products after use to restore them to like-new condition, with full functionality and warranty	21	7	19
Offers product-sharing solutions during use (e.g., machinery, buildings, infrastructure)	14	18	15
Offers product-as-a-service (e.g., rental or performance-based contracts)	12	18	13
Engages in industrial symbiosis through material and energy exchanges between companies	15	17	8

The most widespread practice in Brazilian industry is product recycling, adopted by 34% of the responding companies. Next, the maintenance and/or repair service of products during their use stands out, present in 32% of the industries. The use of recycled or recovered materials in products ranks third, implemented by 30% of the companies. It is important to note that not all the practices listed above are directly applicable to the sectors covered by the survey. However, it is essential to highlight the diversity of practices that significantly contribute to the circular economy. These practices are increasingly being adopted across industrial sectors.

### Performs reverse logistics for products and/or packaging

Regarding reverse logistics practices, 32% of companies in the extractive and manufacturing industries report implementing reverse logistics. In extractive industries, where waste is typically generated in large volumes, the best practice is to reuse it as secondary raw material in other manufacturing activities or in construction, replacing virgin resources. Reverse logistics is still less prevalent among small- and medium-sized enterprises, mainly due to financial constraints or limited awareness of existing systems.

Graphic 18 - Performs reverse logistics for products and/or packaging (Extractive and Manufacturing Industries)



The National Solid Waste Policy (Law No. 12,305/2010) establishes the principle of shared responsibility for the product life cycle, including reverse logistics. However, its mandatory application currently applies only to specific sectors, including tires, batteries, fluorescent lamps, pesticides, lubricating oils, electrical and electronic products, and products sold in plastic, metal, or glass packaging. A sector-based analysis also reveals significant variation. The pulp, paper, and paper products sector ranks first, with 61% of companies reporting the implementation of reverse logistics. The beverages sector follows at 59%, and the footwear and parts sector is in third place at 48%.

 Table 8 – Percentage of companies by sector that performs reverse logistics for products and/or packagin

 Percentage (%)

Sector	% Implemented
Pulp, paper, and paper products	61
Beverages	59
Footwear and parts	48
Biofuels	41
Motor vehicles, trailers, and bodies	38
Miscellaneous products	36
Soaps, detergents, cleaning products, cosmetics, perfumes, and personal care products (HPPC)	35
Plastic products	34
Food products	33
IT equipment, electronics, and others	33
Leather and leather goods	32
Electrical machinery, devices, and materials	32
Textile products	30
Rubber products	29

Sector	% Implemented
Chemicals (excluding HPPC)	26
Apparel and accessories	24
Wood products	24
Metallurgy	20
Metal products (excluding machinery and equipment)	20
Non-metallic mineral extraction	19
Furniture	17
Non-metallic mineral products	14
Pharmaceutical and pharmaceutical-chemical products	13
Machinery and equipment	13
Maintenance, repair, and installation of machinery and equipment	12
Printing and recorded media reproduction	29

# Circular economy and greenhouse gas emissions reduction



# Six out of ten

companies implementing circular economy actions believe they contribute to reducing greenhouse gas emissions Among companies that implement circular economy practices or business models, 58% believe their actions contribute to reducing greenhouse gas (GHG) emissions. The extractive and manufacturing sectors show a more positive perception of this contribution, suggesting greater awareness of the environmental benefits associated with circular practices.

A study by the Ellen MacArthur Foundation and Material Economics shows that this transition could reduce GHG emissions by 39% by 2050<sup>12</sup>.

<sup>&</sup>lt;sup>12</sup> Available at: <u>https://www.ellenmacarthurfoundation.org/pt/completando-a-figura</u>. Accessed on April 13, 2025.

According to the 2023 Circularity Gap Report, integrating circular economy strategies into climate mitigation efforts could double the current global circularity rate (7.2%) while reducing global emissions by 39% and virgin resource use by 28%.<sup>13</sup>

Specific sectors — such as Biofuels, Metallurgy, and Pulp, paper, and paper products — stand out, with more than 70% of companies recognizing a direct link between adopting circular practices and reducing GHG emissions. This clearer understanding in certain segments may be related to the nature of their processes, increasing regulatory pressure, or growing demand from consumers and investors who are progressively making this connection.

Ultimately, these findings reinforce the growing recognition within industry of the strategic role of the circular economy in the climate agenda.

The alignment between circular economy practices and the reduction of GHG emissions is not only acknowledged by companies but also strongly supported by international studies.

**Graphic 19 - Percentage of companies that believe circular economy actions contribute to reducing greenhouse gas emissions** *Percentage (%)* 



Table 9 – Percentage of companies by sector that believe their circular economy actions contribute to reducing greenhouse gas emissions

Sector	Yes
Biofuels	79
Metallurgy	76
Pulp, paper, and paper products	72
Leather and leather goods	67
Food products	65
Chemicals (excluding HPPC)	64
Plastic products	63
Non-metallic mineral products	63
Non-metallic mineral extraction	62
Electrical machinery, devices, and materials	61
Printing and recorded media reproduction	60
Rubber products	60
Textile products	58
Motor vehicles, trailers, and bodies	58
Footwear and parts	56
Beverages	52

Sector	Yes
IT equipment, electronics, and others	52
Infrastructure works	52
Specialized construction services	52
Furniture	51
Miscellaneous products	50
Wood products	47
Soaps, detergents, cleaning products, cosmetics, perfumes, and personal care products (HPPC)	47
Metal products (excluding machinery and equipment)	46
Maintenance, repair, and installation of machinery and equipment	46
Machinery and equipment	41
Apparel and accessories	40
Building construction	38
Pharmaceutical and pharmaceutical-chemical products	20

<sup>13</sup> Available at: <u>https://www.circularity-gap.world/2023</u>. Accessed on April 13, 2025.

# **BENEFITS OF THE CIRCULAR ECONOMY**

# Among companies implementing circular economy practices, 35% report that reducing operational costs is the primary expected benefit

The circular economy goes beyond environmental gains and offers significant economic benefits for companies that adopt its principles. According to a study by McKinsey (2022), organizations that implement circular practices can reduce production costs by up to 20% and increase revenue by up to 15%.<sup>14</sup> Supporting this perspective, Accenture (2023) estimates that circular business models could generate up to USD 4.5 trillion in economic value by 2030, underscoring their potential to transform economic systems. In the Brazilian context, companies also strongly associate circular economy initiatives with economic gains. According to the survey, 35% of companies cited reducing operational costs as the primary expected benefit from implementing circular practices. This perception aligns with one of the core pillars of circularity: reducing dependence on virgin raw materials. By repurposing materials, by-products, and waste, companies reduce input acquisition costs and the energy required for extracting and processing natural resources.



Graphic 20 - Expected benefits for your company from implementing circular economy practices<sup>15</sup>



Note: The percentages may not add up to 100% because companies could select up to three benefits.

<sup>&</sup>lt;sup>14</sup> Available at: <u>https://www.mckinsey.com/capabilities/operations/our-insights/a-smarter-way-to-digitize-maintenance-and-reliability/pt-BR</u>. Accessed on

April 13, 2025.

<sup>&</sup>lt;sup>15</sup> A total of 36% of companies did not know or did not respond to this question.

Reducing reliance on virgin resources is one of the main factors contributing to lower costs. By recovering materials, companies reduce the need to purchase new inputs and lower the energy demand linked to raw material extraction and processing. Additionally, strategies such as valorizing by-products and waste, optimizing resource use, and improving energy efficiency often lead to substantial operational savings.

A practical example of this logic was presented in a study by the Getúlio Vargas Foundation (FGV), which examined pallet sharing between distributors and retailers — particularly in the beverage, grocery, and cleaning sectors. The initiative resulted in operational cost savings of up to 38%.

Beyond cost reduction, companies also expect other benefits. Enhancing corporate image ranks second, cited by 32% of companies, followed by stimulating innovation in products, processes, and services, identified by 30%. These findings reinforce that the circular economy represents a tangible opportunity for innovation, brand positioning, and greater competitiveness in the marketplace.





#### **TECHNICAL SPECIFICATIONS**

Sample profile:

- 1,411 companies in the extractive and manufacturing industries, of which 573 were small-sized companies (10 to 49 employees), 504 were medium-sized companies (50 to 250 employees), 334 were large-sized companies (250 or more employees).
- 297 companies in the construction industry, 105 of which were small-sized companies (10 to 49 employees), 131 medium-sized companies (50 to 250 employees) and 61 large-sized companies (250 or more employees).

Data collection period: February 3–13, 2025.



#### **LEARN MORE**

More information about this research at: <u>www.cni.com.br/sondespecial</u>



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