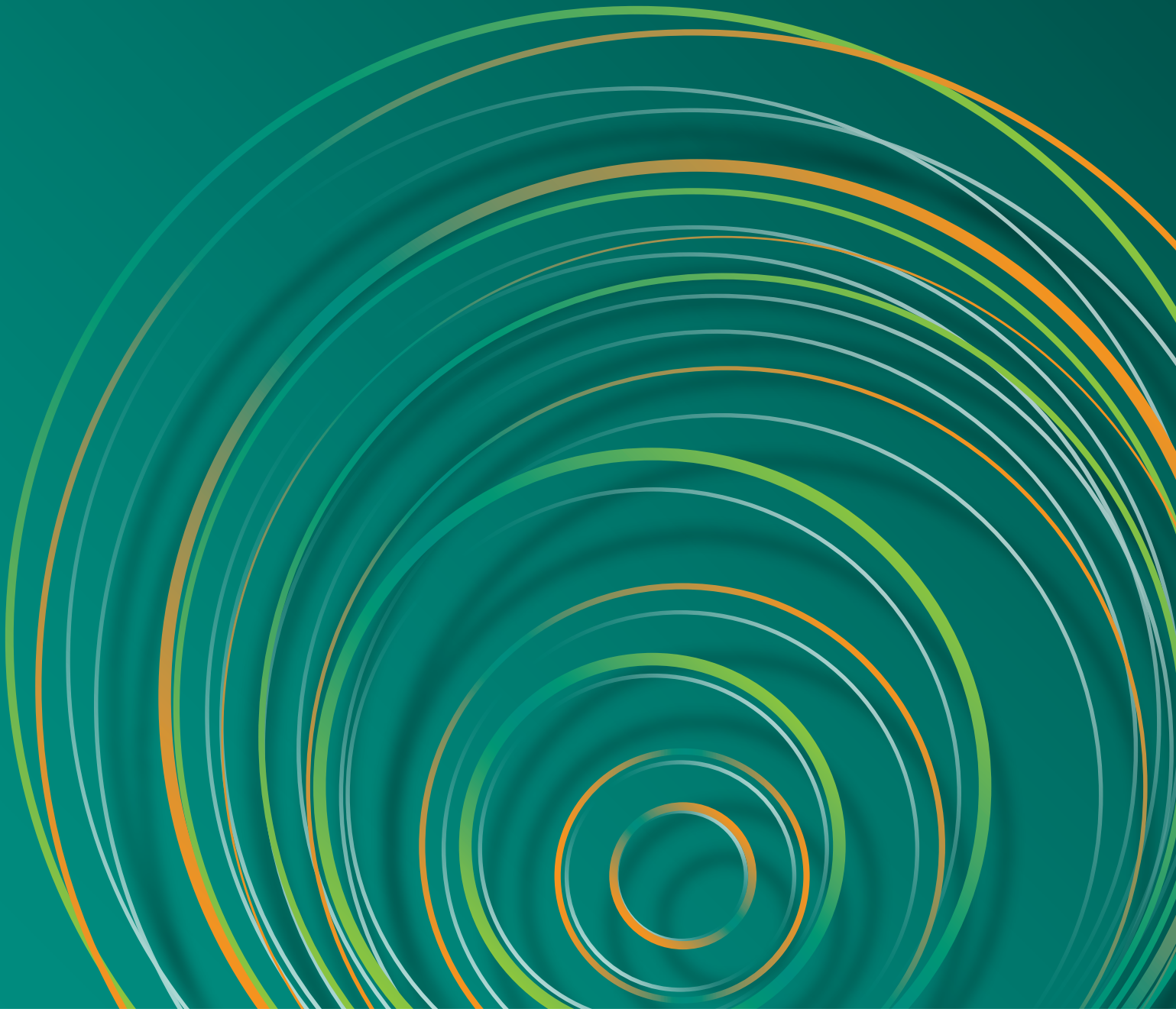
6TH REPORT ON CIRCULAR ECONOMY IN ITALY 2024

SUMMARY



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CIRCULAR ECONOMY NETWORK

ENEA
Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile

MINISTERO DELL'AMBIENTE E DELLA SICUREZZA ENERGETICA

Ministero delle Imprese e del Made in Italy

6TH REPORT ON CIRCULAR ECONOMY IN ITALY - 2024 / SUMMARY

By the Circular Economy Network

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CIRCULAR ECONOMY NETWORK

The Circular Economy Network, promoted by a group of enterprises and organizations in collaboration with the Sustainable Development Foundation, works to sustain the transition to a circular economy. To this end:

- it establishes a network of debate, exchange of information and good practices to strengthen a shared vision and a common action on various aspects of the circular economy;
- it analyzes criticalities and barriers that restrain the ecological transition; it elaborates proposals to enhance the potential of development of the circular economy in Italy;
- it provides studies and research on various aspects of the circular economy, being careful about the elaboration and about the European and international ventures. It also provides particular attention to the positive repercussions of the circular economy, for new prospects of development, wealth and employment for saving the natural resources, the climate, innovation and digitalization;
- it elaborates strategies' proposals, policies and measures addressed at policy makers, promoting a constant and constructive dialogue with the various institutional levels.

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Foreword

The 6th edition of the annual report on circular economy opens with ***a survey carried out by the CNA (National Confederation of Craft, Small and Medium-sized Enterprises) in collaboration with the Circular Economy Network on small-sized enterprises****, which play an especially relevant role in the Italian economy. This survey confirms the widespread awareness of the importance of the circular economy, specifically intended to save on the costs of raw materials and energy, minimize waste and increase recycling. The difficulties encountered by small-sized enterprises to implement measures designed to increase their circularity arise from the lack of skills and from a clear and user-friendly regulatory framework for the implementation of circular economy measures.*

The most important regulatory innovation that has been implemented this year is the ***new European Regulation on packaging and packaging waste.*** *Its final version has just been drafted, awaiting its forthcoming final approval. It is a broad and complex Regulation, whose main contents are summarized in this Report. In the Commission's initial proposal, along with positive points, there were also some aspects that needed to be revised. The review, especially during the whole Parliament debate, has led to important changes that make the final text a positive step forward towards the circularity of packaging and the management of packaging waste, which must now be duly implemented.*

The proposal for a Regulation to increase and diversify the supply of critical raw materials was approved last March. The new Batteries Regulation entered into force in August 2023. The amendment to the Directive on waste electrical and electronic equipment (WEEE) has also been published, in view of its implementation by October 2025. It should be noted that no report on the implementation measures of the National Strategy for the Circular Economy in 2023 is available yet, even though an annual report should be issued.

In this edition of the Report, a ***comparative evaluation of the circularity performance*** *of last year and of the trend of the last five years in the five main European countries that have been analysed (Italy, France, Germany, Spain and Poland)* ***was made for the first time, using the sets of indicators, published by the European Commission****, grouped into five dimensions: production and consumption; waste management; secondary raw materials; competitiveness and innovation; ecological sustainability and resilience. Even with the new European set of indicators, based on the data available from the last year,* ***Italy's primacy is confirmed*** *(45 points), followed by Germany with 38 points, then France with 30 points. Two countries close the ranking with 26 points on equal merit, namely Spain and Poland. Italy's excellent performance derives, above all, from the indicators related to waste management. The circularity trend indicators, based on the dynamics of the last five years, highlight a certain difficulty for Italy in maintaining its leadership position: it still remains in the lead, but with only 41 points, immediately followed by Germany and Spain at 40 points. However, Poland and France lag decidedly further behind, ranking in the fourth and fifth position respectively with 25 and 21 points.*

The 6th Report also provides an update, edited by ENEA (the National Authority for New Technologies, Energy and the Environment), on critical and strategic raw materials, with a focus on ***rare earths and copper****.*

Rare earths are regarded as critical and strategic raw materials, some of which are used in permanent magnets, also widely used in the renewables, electric mobility and electronics sectors in general. Globally, approximately 85% of light rare earths and all heavy rare earths derive from Chinese exports. In addition to focusing on the differentiation of supplies, it is necessary to reduce the dependence on imports by increasing the recycling of these materials. Copper has been included among the strategic raw materials due to its growing use in key electrification technologies. The greatest concentration of copper mineral reserves is found in a small number of countries: Chile (31%), Peru (11%) and the Democratic Republic of Congo (9%).

Europe owns just 3% of global reserves. Copper is recyclable and it is recycled in significant quantities to be maintained and increased.

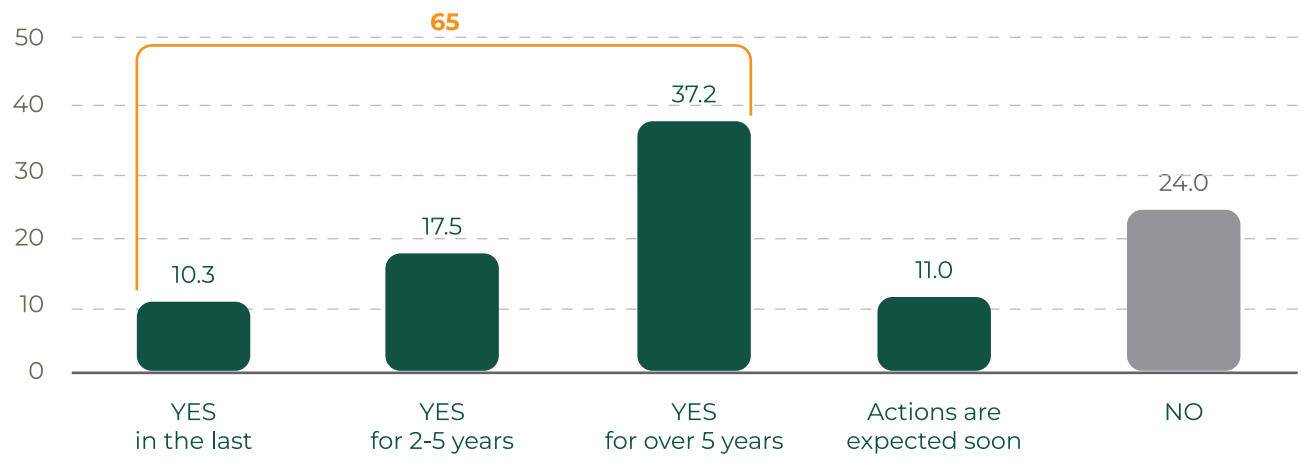
The role of small-sized enterprises in the transition to the circular economy

SMEs are a fundamental engine of the Italian economy. Enterprises with fewer than 250 employees make up almost the totality of all companies, and in turn are mainly made up of small and micro-businesses. Their role in the transition towards a circular economy is therefore essential.
SMEs - including small and micro ones - are increasingly aware of the need to play an active role in the ecological transition, not only to reduce their environmental impact but also to seize the economic opportunities connected to greater sustainability of products and production processes, to the reduction of energy and raw material supply costs, as well as the competitiveness of their products on the markets. SMEs are less aware of the key role played by sustainability, bound to become an increasingly relevant factor, even for SMEs, to access credit, participation in public tenders oriented towards green procurement, and public incentives opportunities. To participate in these innovative processes, it will also be essential for SMEs to know how to measure their performance, starting from the efficiency in the use of energy and raw materials, the reduction of emissions and circularity.
In general, the gap that small businesses are experiencing in this phase is not so much determined by a lack of awareness of the need to channel their activities towards environmental sustainability and circular economy, but rather by two different factors: on the one hand, the lack of adequate corporate tools and skills, and on the other hand, the need for a context that is capable of supporting the ecological transition of smaller businesses through effective industrial policies and a more suitable regulatory framework that proves to be more easily implemented.

The results of the survey on the circular economy in craft firms

The survey was carried out between December 2023 and January 2024 by CNA in collaboration with the Circular Economy Network in the framework of the Circular Economy Observatory. More than 800 enterprises were involved in the survey and they replied to a questionnaire sent to the CNA member companies. The sample composition is rather balanced in representing the macro economic sectors: 49% of firms work in the services sector while the remaining half work in the industrial sector (35.5% in manufacturing and 14.1% in construction). 65% of enterprises stated that they implemented at least one of the processes attributable to the circular economy. This percentage is more than twice compared to the one recorded in the previous 2021 survey (at that time only 30.2% of the interviewees stated that they implemented circular economy processes). It could increase even further: as a matter of fact there is an additional 10% of companies that expressed their intention to move closer to the circular economy model in the near future.

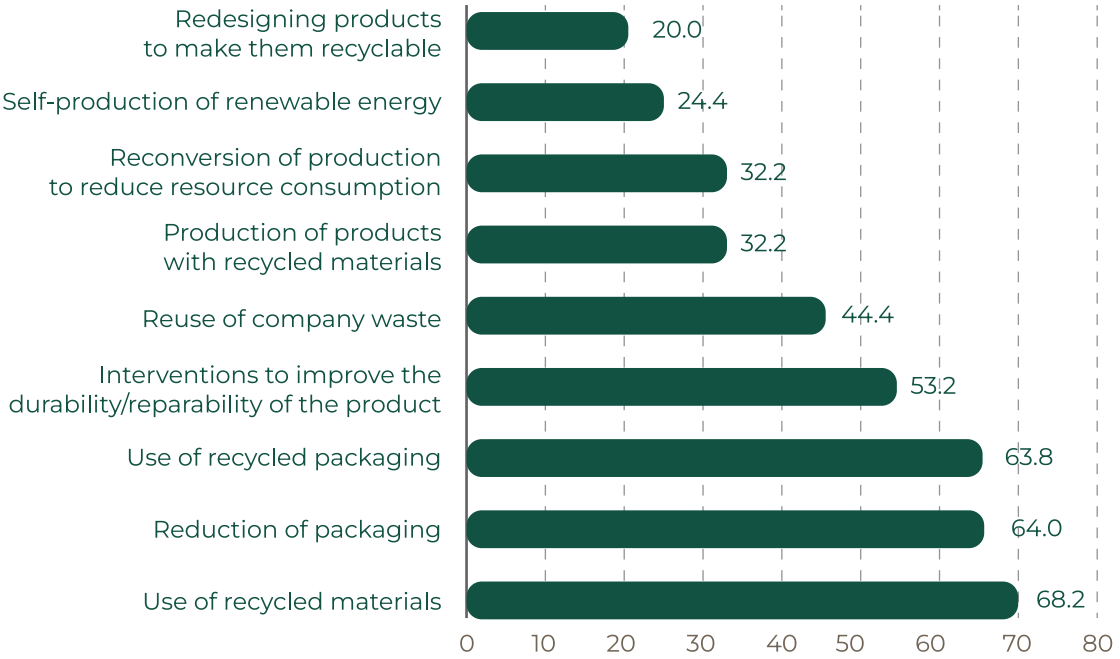
ENTERPRISES IMPLEMENTING CIRCULAR ECONOMY MEASURES
(replies expressed in %, as against the total sample)



Source: CNA

The most frequent actions concern the use of recycled materials (68.2%), packaging reduction (64%), product durability and repair (53.2%).

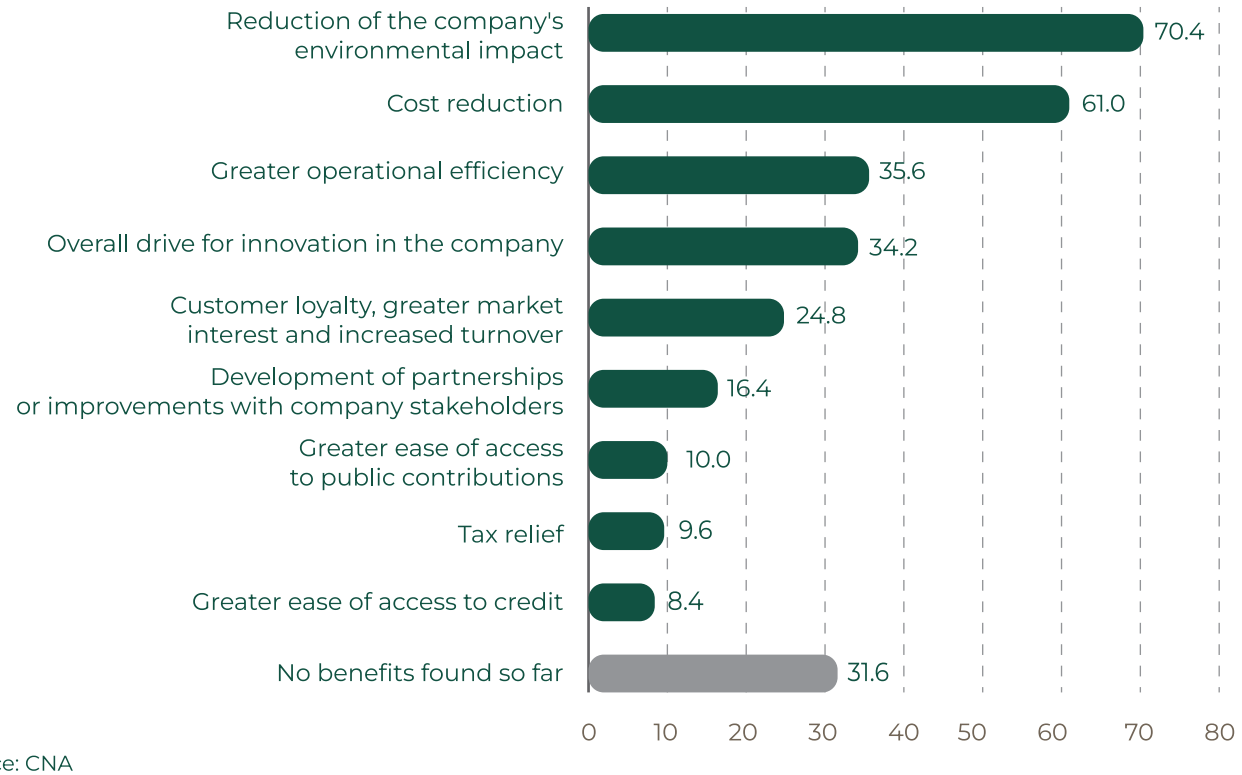
CIRCULAR ECONOMY MEASURES IMPLEMENTED BY ENTERPRISES
(replies expressed in %, as against the total sample)



Source: CNA

When asked to point out the main advantages deriving from the adoption of circular economy measures, 70.4% of companies indicated greater environmental sustainability, followed by the reduction of production costs (61%), greater efficiency (35.6%) and the drive for innovation (34.2%).

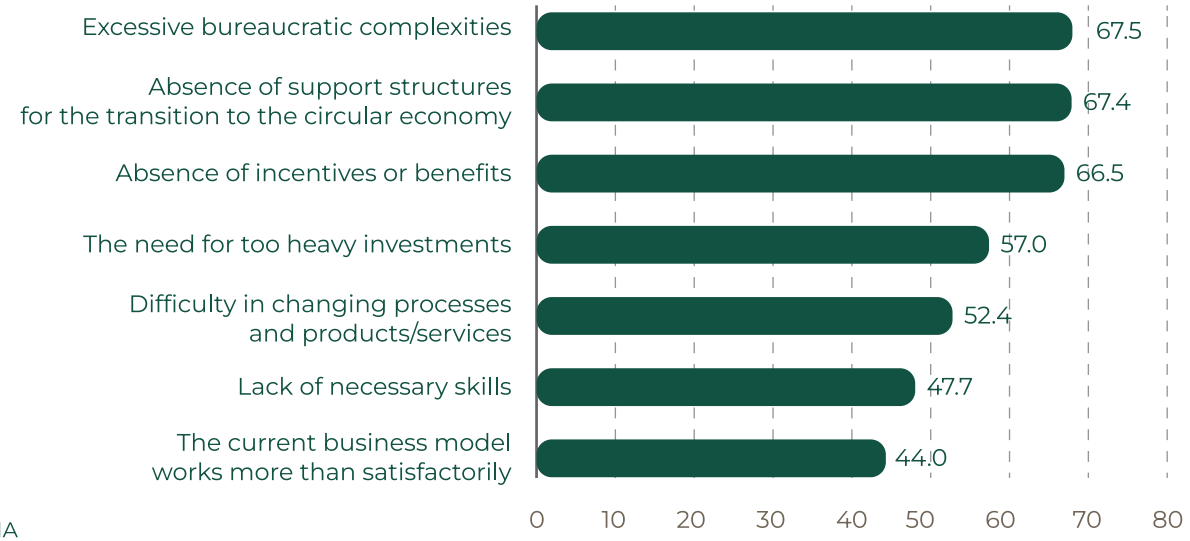
THE CONCRETE BENEFITS DERIVING FROM THE IMPLEMENTATION OF CIRCULAR ECONOMY MEASURES
(replies expressed in %, as against the total sample)



Source: CNA

According to entrepreneurs, however, several factors still continue to slow down the adoption of circular economy measures.

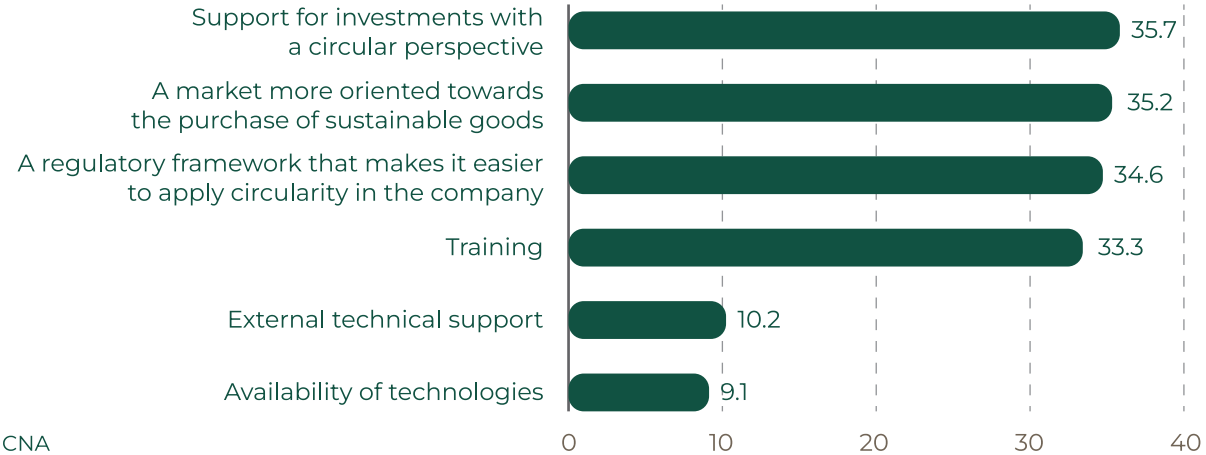
OBSTACLES AND BARRIERS TO THE IMPLEMENTATION OF CIRCULAR ECONOMY MEASURES (replies expressed in %, as against the total sample)



Source: CNA

What do enterprises need? According to the enterprises that took part in the survey, the measures necessary to remove the obstacles that are responsible for slowing down the transition towards the circular economy are of different nature.

WHAT ARE THE MOST IMPORTANT MEASURES TO FACILITATE CIRCULAR ECONOMY INTERVENTIONS IN YOUR BUSINESS (replies expressed in %, as against the total sample)



Source: CNA

Compared to the past, a greater awareness of the environmental value emerges from the survey, which becomes an equally strategic factor, just like other typically "corporate" factors, such as costs, in business decisions. At the same time, it is very significant that 61% of companies state that circular economy measures generate benefits in terms of cost reduction.

Seven steps to speed up the transition

The survey confirms that small enterprises can play a leading role in the transition to circular economy. The Italian manufacturing system - characterized by a longstanding and deep-rooted vocation for the efficient use of resources and by a unique expertise, such as manufacturing districts and craft consortia – is a fertile ground to unlock this potential. Yet, to this end, public policies must also be more oriented towards this direction. Below are some suggestions:

1. **Promote initiatives to support SMEs** in the use of available public resources (Transition 4.0, Transition 5.0, Sabatini green, etc.), to support investments for the transition towards a more circular economy.

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2. **Use the reform of environmentally harmful subsidies** to allocate resources for the financing of tax allowances in favour of SMEs using secondary raw materials or carrying out activities aimed at the prolonged use of goods and their reuse (maintenance, repair).

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3. **Promote industrial symbiosis platforms** for the exchange of by-products, freely accessible to SMEs.

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4. **Promote and finance training activities** on the circular economy for SMEs, at national and regional level, also involving trade associations.

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5. **Promote the dissemination of sets of indicators** to measure and evaluate the circularity of SME activities.

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6. **Increase funds for research and experimentation** for the development of the circular economy of SMEs.

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7. **Create an IT platform** for the dissemination of good circular economy practices accessible free-of-charge to SMEs.

An overview of the European and national legislation for the development of the circular economy

The European Parliament renewal elections will take place this year, followed by the renewal of the European Commission. This is, therefore, a good opportunity to take stock of the initiatives launched during the past legislature regarding the transition towards the circular economy.
This European legislature has given a strong impulse towards the circular economy, on the one hand by adopting the so-called Green Deal, which has placed the circular economy at the centre of policies on the ecological transition, on the other hand by updating the European Plan for the circular economy by proposing new ambitious goals.
This framework has led to an unprecedented rich regulatory production. Some measures have been approved and entered into force, others are in the process of being approved or at the beginning of their approval process.
An important innovation is the imminent approval of the new **Regulation on packaging and related waste**, which will amend the rules adopted so far by the Directive. The Regulation, once in force, will become an immediately binding law to be transposed in all legal systems of the EU Member States.
The Circular Economy Network (CEN) provided a significant contribution in defining the mediation point for the approval of the Regulation during the trilogue. In particular, regarding:

1. art. 7: the exclusion from the recycled plastic content objectives was requested in the case of use of other polymers, compared to PET, for the production of food and/or drink packaging. The approved text, in fact, provides for the exclusion of packaging intended for food products and/or drinks for children and for plastic packaging intended to come into contact with food in the event that the quantity of recycled content constitutes a threat to human health and leads to non-compliance of packaged products according to Regulation (EC) 1935/2004;

2. art. 7, paragraph 6: it was requested to modulate the environmental contribution taking into account the quantity of recycled plastic. The approved text accepted this request, by including the following wording: "rules concerning the modulation of financial contributions to be paid by producers to comply with their extended producer responsibility obligations set out in Article 45, based on the packaging recycling performance grade, and for plastic packaging, the percentage of recycled content used in the packaging. Any such modulation takes into account the sustainability criteria of the recycling technologies and the environmental costs of the recycled content";

3. the obligation to establish deposit and return systems for plastic or metal bottles for drinks, should 90% of separate collection of these packaging materials not be achieved. CEN required that, in the event of failure to achieve this objective, the entry into force of the obligation to establish deposit systems should be postponed to 2035. The approved text recognized the reasonableness of the proposal by setting forth that "Member States may be exempted from the obligation referred to in paragraph 2 under the following conditions:
   - (a) the separate collection rate required pursuant to Article 43 […] of the respective packaging format […], is greater than 80% by weight of such packaging placed on the market for the first time […] in 2026.
   - b) at least one year before 1st January 2029 the request for exemption is notified to the Commission and an implementation plan is submitted illustrating an action strategy, including a timetable for achieving a 90% separate collection objective of such packaging;

4. the draft regulation required that at least 20% by 2030 - and 80% by 2040 - of packaging for hot or cold drinks filled at the point of sale for takeaway, be reusable and reused in a reuse system (in the case of packages for the sale of food ready for reuse in a Horeca system, the objectives were respectively 10% by 2030 and 40% by 2040). CEN has requested to eliminate these rules or, alternatively, to allow

the possibility of using disposable packaging, provided that at least 85% of it is separately collected and channelled for recycling.
The approved text eliminated these provisions in the event that:
(a) the exempted Member State has achieved 5 percentage points above the packaging waste recycling targets per material to be achieved by 2025 and […] 2030;
b) the exempted Member State is on track to achieve the waste prevention objectives set out in Article 43 of the Regulation and can demonstrate that it has achieved at least 3% waste prevention by 2028 compared to the 2018 baseline;
(c) companies have adopted a corporate waste prevention and recycling plan that contributes to achieving the waste prevention and recycling objectives;

5. CEN has also requested the exclusion from the objectives of using reusable packaging for packaging made from renewable materials such as paper, cardboard and biodegradable and compostable plastics. The approved text limits the objectives of the use of reusable packaging to transport or sales packaging used for the transport of products within the territory of the European Union, including via electronic commerce, in the form of pallets, folding plastic boxes, plastic boxes, trays, crates, intermediate products such as bulk containers, buckets, drums and jerrycans of all sizes and materials, including flexible formats or pallet wraps or straps for stabilization and protection of products placed on pallets during transport. And it also excludes cardboard packaging from these obligations, in the case of use of packaging grouped in the form of boxes, used outside of sales packaging to group a certain number of products in order to create a storage or distribution unit.

The proposal for a **Regulation on the supply of critical raw materials** was approved in March. Its aim is to increase and diversify the EU's supply of critical raw materials, strengthen circularity - including recycling - and support research and innovation in resource efficiency and the development of substitutes. The supply must originate by 10% from the annual production from extractive activities and by 40% from processing activities of the Union; 25% of their annual EU consumption shall have to be met by recycling.
Further important initiatives taken by the EU concern: the entry into force of the new **Batteries Regulation** in August 2023; the publication of amendments to the Directive **on waste electrical and electronic equipment (WEEE)**, which are to be transposed by EU Member States by October 2025.

A proposal to amend the **Waste Framework Directive** was also put forward with reference to changes also concerning the textile sector and food waste.

In February the European Parliament approved the new EU waste shipment regulation which, among many new requirements, bans the plastic waste exports to non-OECD countries. The purposes underlying this provision are: to facilitate waste shipment for reuse and recycling within the EU; to ensure that environmental objectives regarding waste are not circumvented in the EU through its export; to combat illegal waste shipments.

A provisional agreement was reached in February between the European Parliament and the EU Council on the proposed **Directive on consumers' right to repair products.**

The Environment Committee of the European Parliament then voted on the proposal for a **Regulation on the eco-design of sustainable products** to create a market for more easily repairable, reusable products with a longer life cycle.

In July 2023, the European Commission submitted a **proposal for a Regulation on circularity requirements for vehicle design and on the management of end-of-life vehicles**. The provision will replace and repeal the Directive on end-of-life vehicles and the Directive on the approval of motor vehicles with regard to their reusability, recyclability and recoverability.

Among the main national circular economy initiatives, the Decree for the authorization of the preparation for reuse in a simplified form of certain types of waste was published in September 2023.

In December, **MASE (the Italian Ministry for Environment, Land and Sea Protection)** notified the European Commission of the draft National Regulation on the **cessation of waste status for C&D aggregates**, which will replace the Ministerial Decree 152/2022.

On 5 February 2024, MASE issued a decree on **incentives for waste recycling** which lists all materials (406) eligible for financing (tax credit provided for by the MASE decree) (decree no. 538 dated 14 December 2021). The overall grant amounts to 6.7 million euros. On 26 February 2024, the Government issued a Transition 5.0 law decree which provides tax incentives for businesses, in the form of tax credits, to support investments to promote the digital and energy transition.

A recent publication provides data on the **state of implementation of the National Recovery and Resilience Plan (PNRR)** regarding waste management. The regions that have been granted the largest funding are those that are better equipped to meet territorial needs. This means that the funded projects do not bridge the gap in terms of plant capacity between Northern and Southern Italy, indeed they rather widen it, thus failing to meet the targets set by the National Waste Management Plan, which instead aims at narrowing this gap. Furthermore, the Lazio and Campania regions, which suffer from a serious deficit in terms of staff processing capacity, have not obtained any funding in this regard.
Furthermore, it should be highlighted that the PNRR included the adoption of a national Strategy on the circular economy in its "missions", a task that was completed last year. However, given the amount of reforms adopted or in the process of being adopted by the EU, it would be necessary to update the strategy and timetable.

Italy's performance and comparison with the main EU countries

The implementation of the new monitoring framework confirms Italy's leading role

The comparative evaluation of the circular economy performance of the five main European countries (Italy, France, Germany, Spain and Poland) has been carried out on the basis of the new monitoring framework published by the European Commission, using a sets of indicators grouped into five dimensions: production and consumption; waste management; secondary raw materials; competitiveness and innovation; ecological sustainability and resilience.

Italy's leading role is confirmed (45 points). Germany ranks second with 38 points, followed by France with 30 points. Two countries close the ranking with 26 points on equal merit, Poland and Spain. Italy's excellent performance, which is seven points ahead of the second-ranking country, is due to the good result achieved in the area of waste management (18 points). Furthermore, the performance achieved in the production and consumption dimension (10 points) as well as competitiveness and innovation (10 points) should also be underlined.

OVERALL CIRCULARITY RANKING IN THE MAIN FIVE EUROPEAN COUNTRIES IN THE LAST AVAILABLE YEAR'S RESULTS

ITALY	45
GERMANY	38
FRANCE	30
POLAND	26
SPAIN	26

Circularity trends of the main five European countries in the last five years

The second ranking, which analyses circularity trends over the last five years, confirms Italy's leading role in this case as well (41 points). Compared to the previous analysis, the second and third ranking countries are closer to the leading one.

In fact, Germany and Spain both scored 40 points. Poland and France are decidedly further behind, in fourth and fifth position respectively with 25 and 21 points. Italy's leading role was mainly related to its excellent performance in the waste management indicators (14 points), and also in competitiveness and innovation indicators (14 points).

OVERALL RANKING OF THE CIRCULARITY TRENDS OF THE MAIN FIVE EUROPEAN COUNTRIES IN THE LAST FIVE YEARS

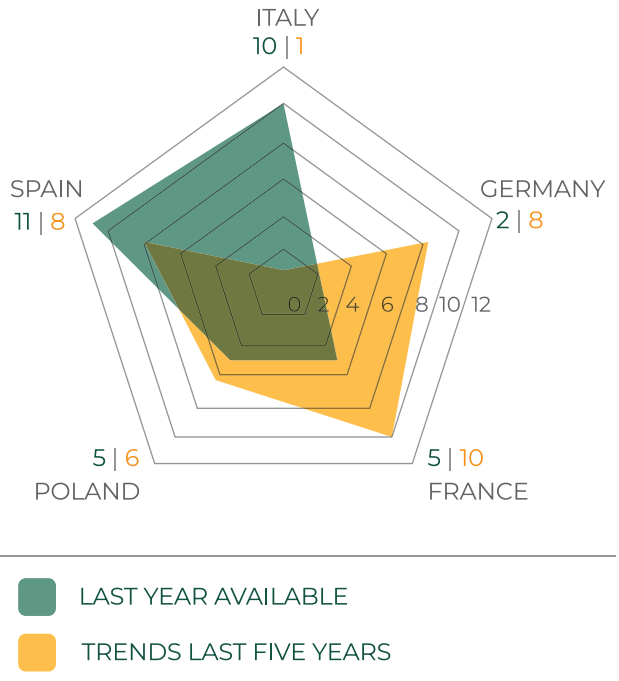
ITALY	41
GERMANY	40
FRANCE	40
POLAND	25
SPAIN	21

A summary of the main results achieved by Italy and by the main European countries in the five dimensions that determined the two overall circularity rankings is reported here below.

Production and consumption

In 2022, the **consumption of materials** in Italy was 12.8 t/inhabitant, lower than the European average (14.9 t/inhabitant), but growing (+8.5%) compared to 11.8 t/inhabitant in 2018.
The comparative analysis of the performance of the five main European countries in 2022 shows that only Spain, with a material consumption of 9.8 t/inhabitant is below the level of Italy, while Germany with 15.7 t/inhabitant and Poland with 19.9 t/inhabitant feature a much higher consumption of materials. France, with 13.2 t/inhabitant, is below the European average.
The per capita trend in the consumption of materials in the 2018-2022 five-year period, proved to be constant in the European average, while decreasing by 11.1% in Spain, by 3.2% in France and by 2.7% in Germany, whereas growing by 5% in Poland.
In 2022, the **resource productivity** in Italy generated 3.7 euros of GDP, for each kg of resources consumed, with a slight improvement (2.7%) compared to 3.6 euros/kg in 2018.
In 2022, the EU average was lower than the Italian one, standing at 2.5 euros/kg and the performance of the other European countries was also lower than that of Italy: three countries were very close, Spain being at 3.4 euros/kg, France at 3.2 euros/kg and Germany at 3 euros/kg, while Poland standing much lower at 1.5 euros/kg.
The trend of the last five years (2018-2022) of the performance for this indicator is very good at a European level, with an improvement of 16%. The trend looks also positive for the other countries:

PRODUCTION AND CONSUMPTION

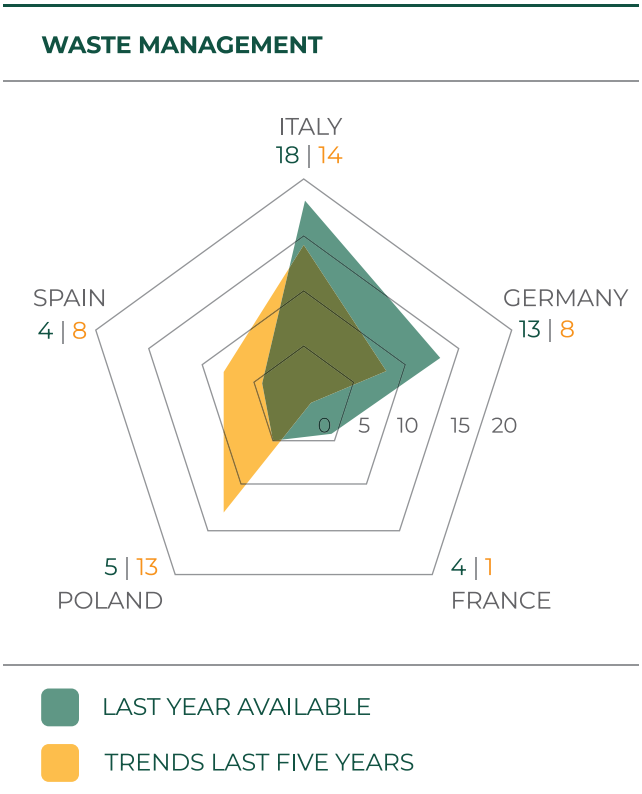


Germany +19%, Spain +16%, France +18% and Poland with an improvement of +27%, starting from a much lower level.
In the EU27, the **per capita production of municipal waste** achieved 513 kg/inhabitant in 2022. In Italy, the per capita production of urban waste decreased by 2.1%, dropping from 504 kg/inhabitant in 2018 to 494 kg/inhabitant in 2022.
Looking at the comparison with other countries, in 2022 the production of municipal waste per capita in Germany and France exceeded the EU27 average; the first ranking country achieved 593 kg/inhabitant, while the second ranking country recorded 439 kg/inhabitant. Italy ranked third with 494 kg/inhabitant, followed by Spain with 467 kg/inhabitant and finally by Poland, with 364 kg/inhabitant.
Over the last five years, in the EU, the per capita share of municipal waste has increased on average by 2.6%, while it has fallen slightly in the other main European countries: -3.2% in France, -2.1% in Germany, - 2.1% in Italy and -1.7% in Spain. In Poland it increased by 10.6%, but it started from a much lower level of municipal waste per inhabitant.

Waste management

The trend recorded in the **municipal waste recycling rate in Italy**, in the last available five-year period, has grown by 3.4 percentage points. In 2022 the recycling rate accounted for 49.2%, substantially in line with the target set by the Waste Framework Directive for 2020 (50%). It must be increased to reach the further targets set for 2025 (55%), 2030 (60%) and 2035 (65%) as provided for by Directive 2018/851/EU.
Comparing the performance of the five main European countries in 2022, Germany ranked well above the 48.6% EU average, reaching 69.1%, while Italy stood at 49.2%, whereas France was below the European average with 41.8%, Poland with 40.9% and Spain with 38.6%.

In 2020, taking into consideration the **waste recycling rate** in the five main European Union countries, Italy played a leading role by achieving 72%, while the remaining countries underperformed as against the EU average (58%). Germany ranked second, achieving a recycling rate of all waste by 55%, seventeen percentage points less than Italy. The performance of the other countries was worse: Poland (52%), Spain (48%) and France (47%).
In 2017 Italy's performance was lower than the European average. In 2021, it achieved a **packaging waste recycling rate** of 71.7%, almost 8 percentage points higher than the EU27 average (64%). In 2021, the Italian recycling rate reached the highest percentage value among the five main European countries. The second best performance was that of Spain (70.1%), followed by Germany with 67.9%. France and Poland, in the last two positions, were both below the European average, recording a recycling rate of 61.8% and 55.5% respectively.
In 2021, Italy achieved a **WEEE recycling rate** of 87.1%, down by approximately two percentage points compared to the 2017 figure.
If compared to the rest of Europe, Italy's figure was confirmed as the highest among those of the other countries analysed, as well as higher than the EU27 average (81.3%). Germany (86.1%) and Poland (85.9%) ranked second and third respectively. Finally, with a WEEE recycling rate lower than the European average, France and Spain achieved 77.2 and 73% respectively.
It should be underlined that the WEEE collection rate compared to the amount made available for

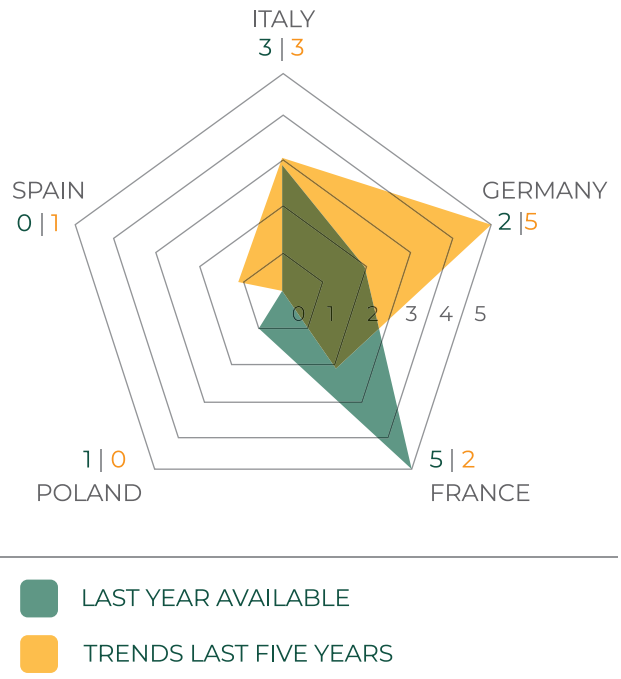


average consumption in the previous three years still remained very low, as against the EU target set at 65% by 2019. As a matter of fact, in 2021, Italy was stuck at 33.8 % compared to the EU27 46.2% average.

Secondary raw materials

The **circular material use rate (CMU)** is defined as the ratio between the use of secondary raw materials generated through recycling and the overall consumption of materials. Italy, which is historically very advanced in this field, confirmed its position in 2022 by recording a value of 18.7%. However, the value of this indicator has remained essentially static in the last five years, decreasing by 0.1 percentage points compared to the one recorded in 2018.
Even in the EU27, in the 2018-2022 period, this indicator maintained a constant trend. In fact, in 2018 the value accounted for 11.6%, as compared to 11.5% in 2022.
The best performance among the countries analysed was recorded by France (19.3%), despite a drop of 0.2 percentage points compared to 2018.
Germany (13%), just above the EU average, and Poland (8.4%) and Spain (7.1%) were further away, much below the European average.

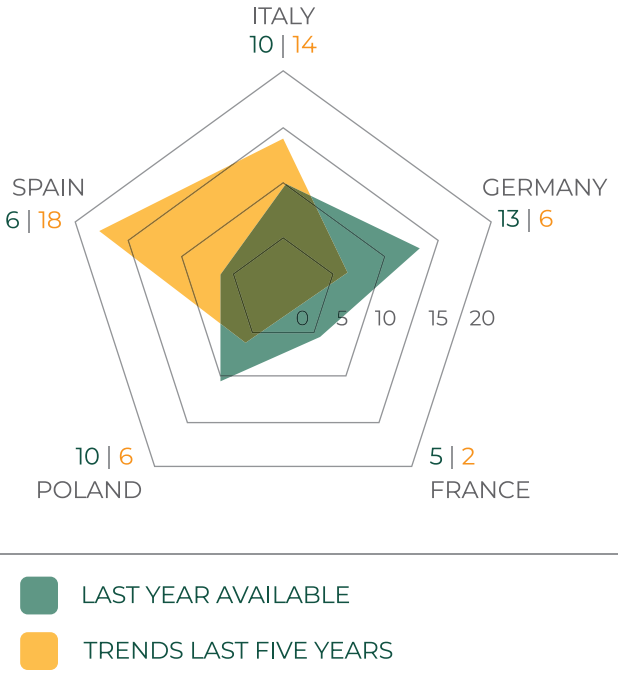
SECONDARY RAW MATERIALS



Competitiveness and innovation

In 2021, **gross investments** in some circular economy activities in the EU27 amounted to €121.6 billion, i.e. 0.8% of GDP. In absolute terms, Italy ranked third with 12.4 billion euros (0.7% of GDP), behind Germany (31.5 billion euros) and France (20.4 billion euros). Compared to 2017, a year in which investments amounted to 8.3 billion euros, Italy recorded a 14.5% increase in absolute terms. In relation to GDP, it shifted from 0.6% in 2017 to 0.7% in 2021.
As regards the comparison between the five main EU countries, in the 2017-2021 period, all of them, with the exception of France, recorded growth in investments, both in absolute terms and in relation to GDP.
In 2021, in the EU27, 4.3 million **workers** were employed in circular economy activities; in Italy 613,000, ranking second after Germany (785,000). However, if we analyse data as a percentage of the total number of employees, in the EU27, 2.1% of workers were employed in

COMPETITIVENESS AND INNOVATION

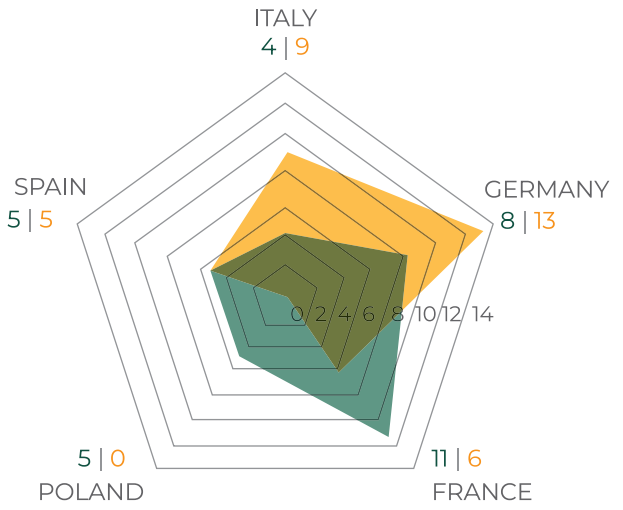


the circular economy sector, while in Italy they accounted for 2.4%, behind Poland (2.7%), but ahead of other countries. i.e.: Spain 2.3%, France 1.8% and Germany 1.7%.
In the period between 2017 and 2021, in the EU27 the number of employees grew by 5% (from 4.1 to 4.3 million employees). Among the five main countries, the largest number of employees was recorded in Germany (785,000, +12% compared to 2017), followed by Italy (613,000, +4%), France (524,000, +2%), Spain (454,000, + 9%) and Poland (441,000, +3%).
The **added value** of the entire European Union relating to some circular economy activities in 2021 was 299.5 billion euros, accounting for 2.1% of the total economy; in Italy 43.6 billion euros, 2.5% of the total, therefore higher than the EU figure. In the reference period (2017-2021) it can be observed that in Italy the added value grew from 2.1% in 2017 to 2.5% in 2021 (from 36.7 to 43.6 billion euros). In Spain and Germany the added value also increased, while in France and Poland it decreased.
In 2020, in the European Union, 0.46 **patents** related to waste management and recycling were filed for every million inhabitants, corresponding to a total of 206. During the same period in Italy, 0.36 patents were filed for every million of inhabitants, totalling 21 patents**,** down 25% compared to the figure recorded in 2016.

Ecological sustainability and resilience

In the EU27, the **consumption footprint** was equal to 104 in 2021, a value equivalent to that of Italy. Comparing the performances of the five main European countries, only France (98) and Germany (95) performed better than Italy in 2021. Poland reported a higher value (120). Spain, on the other hand, with 105, was slightly above the European average and the value recorded by Italy.
Observing the trend over the last five years, Italy (-3%), France (-2%) and Germany (-10%) have recorded a decrease in this indicator, while the other countries have increased it.
In 2022, in the EU27, **greenhouse gas emissions from production activities per capita** were equal to 6,481 kg CO2 eq., while in Italy they were 5,432 kg CO2 eq.. Comparing the performance of the five main European countries, in 2022, only France (4,861 kg CO2 eq.) and Spain (4,925 kg CO2 eq.) recorded a value of greenhouse gas emissions per capita lower than that of Italy. Poland and Germany, however, reported significantly higher values (9,587 kg CO2 eq. and 7,392 kg CO2 eq.).
Observing the trend over the last five years, all the countries analysed have recorded a decrease in this indicator, more evident for Germany (-15%) and Spain (-13%) and less significant for France (-8%), Italy (-1%) and Poland (-1%).
In 2022, Italy's **dependence on imports of materials** (46.8%) was more than double the European average (22.4%) but was decreasing (-3.8 percentage points) compared to the 2018 value (50, 6%). In 2022, of the five main European countries, only Poland reported a value for this indicator below the EU average (19.7%). France, Germany and Spain (36.1%, 36.5% and 42.8% respectively) were well above the average, but still recorded a more positive value than that of Italy.

ECOLOGICAL SUSTAINABILITY AND RESILIENCE



Strategic raw materials: rare earths and copper

According to the European Commission's Joint Research Centre (JRC), non-food and non-energy raw materials used in Europe need to be monitored not only from the point of view of their economic importance but also from the point of view of supply chains. Since 2011, the European Commission has drawn up a list of critical raw materials for the Union, updated every three years, ranking the raw materials exceeding the "criticality levels" both in terms of economic importance and in terms of supply risk.
The first list drawn up in 2011 contained just 14 Critical Raw Materials (CRMs), its fifth update contained 34. In its latest version **the list also includes 17 new strategic raw materials for the first time**.
Precisely following the ongoing ecological and digital transition, it is estimated that the demand for critical and strategic raw materials will continue to increase in the coming decades. For example, demand for rare earths could increase tenfold by 2050.
A summary is reported here below concerning technological and market aspects relating to two raw materials selected for their relevance in the (Italian and European) economic fabric and for the role they play in the green transition.

Rare earths

All rare earths are critical raw materials but some, those used in permanent magnets, are also considered strategic. Since 2023, some of these have also been included in the CRM's fifth list as strategic raw materials. These materials are used in the renewables sector, but also in the fields of electric mobility, defence and aerospace, as well as electronics in general.
Light rare earths are mainly used in magnets (53%) and catalysts (27%), and in other sectors such as, for example, the metallurgical sector (9%). Heavy rare earths are also used in magnets (54%) and in the metallurgical sector (2%), but they also have other uses, such as in ceramics (34%).
The world's reserves of rare earths are concentrated in China (44 Mt), Vietnam (22 Mt), Brazil (21 Mt) and Russia (12 Mt) but the main supplier of refined materials to Europe is China (around 80%). There are currently no substitutability hypotheses of these materials that are technologically and economically available. However, it is possible to recover rare earths from the recycling of end-of-life materials. This practice, which is still emerging, offers wide margins of future profitability since the secondary extraction of rare earths is less polluting than the primary one and at the same time allows access to sources with higher concentrations of rare earths than those found in nature.
To date, the only element of the 17 rare earths that has a positive recycling rate, albeit very low, is Neodymium (1%). The use of rare earths in the Italian manufacturing sector is in line with that of Europe and the rest of the world. In fact, the use of rare earths is fundamental in the automotive and energy sectors. The set of main economic activities that use rare earths is responsible for approximately 11.4% of the turnover of the whole Italian manufacturing industry.

Copper

Copper was included in the fifth list attached to the Critical Raw Materials Act (CRMA, 2024) among the strategic raw materials for the first time. In fact, although it does not exceed the criticality threshold, it is strategic for its use in key electrification technologies.
The highest concentration of reserves (copper ores) is found in Chile (31%), which is also the main producer of this raw material worldwide (41%), followed by Peru (11%) and by the Democratic Republic of Congo (9%). However, as regards the refining activity, this is concentrated in China, which produces approximately 42% of the refined material worldwide. Europe is not without reserves, but it has just 3% of global reserves (equivalent to 26.5 Mt). Domestic mining activity is concentrated in Poland (19% of EU needs), while refining is concentrated in Germany (17% of EU needs).
The limited possibilities of using a different raw material are offset by the use of so-called secondary copper. In fact, copper is a light metal with a high end-of-life recycling rate (30%).
The use of copper in the Italian manufacturing sector mirrors the European one. Copper is mainly used in the electronics, automotive and energy sectors. Overall, the activities listed above can achieve a turnover equal to approximately 6.6% of that of the manufacturing sector in Italy.

CIRCULAR ECONOMY NETWORK PROMOTERS

"In recent years, sustainability has become a global imperative, with more and more companies integrating ESG principles into their operations. Burgo Group has been pursuing these objectives for some time and last year the GO 2030 program was launched. Committing to a sustainability path means changing and transforming one's business model, acting on all the elements essential for the success of our business activities. Circularity is one of the cornerstones of the current transition."

Valerio Forti, HSE Director Burgo Group

Uliveto and Rocchetta waters, promoters of the Circular Economy Network, are committed to protecting the environment starting with the choice to use only 100% clean energy. All our water bottles are made of 100% recyclable PET and Uliveto, followed shortly by Rocchetta, has adopted a an eco-sustainable design cap, aimed at reducing the use of plastic. At the same time, we have started the "tethered cap" industrialization process. Furthermore, we care for the environment by protecting our water sources, which are located in pristine and protected contexts.

"Italy already ranks at the top in Europe for packaging recycling per capita rates. Our country has already achieved the overall packaging recycling goals set out by the European Union by 2030. These goals will become increasingly challenging and will require even more commitment from all the players in the supply chain: ranging from citizens to local authorities and to waste treatment plants, up to those engaged in research aimed at improving both recycling technologies and the eco-design of packaging".

Ignazio Capuano, CONAI President

"Circular economy is the key to our future, one that can provide effective responses to climate change and emerging economic, social and employment challenges. We are truly proud to hold the Italian flag high in Europe in our sector, and we are confident that our non-profit consortium model sets an example that other countries may also follow with interest."

Riccardo Piunti, CONOU President

"Supporting the circular economy of ELTs (end-of-life tyres) remains our key commitment, combining this objective with an effective collection management and responding to the mandate of our Members, by implementing a rigorous quality-based management, driven by efficiency and ethics. With this mandate in mind, we intend to continue to contribute to the evolution of the national ELT management system in the new emerging scenarios."

Giuseppina Carnimeo, General Director of Ecopneus

"We are a responsible operator, sustainability for us means commitment to the climate, creating value for customers and territories, and safeguarding natural capital. The decarbonisation paths we develop guarantee competitiveness and positive environmental, economic and social spin-offs, and place great emphasis on circular economy solutions. The latter represents a challenge of strategic importance both for the future of our country and to achieve the European climate neutrality goals."

Gianfranco Giolitti, Circular Economy Director Edison Next

"Erion is among the leading producers' organizations for "extended responsibility" management, with over 2,500 member companies and 240,000 tons of waste secured for efficient and environmentally virtuous recycling. The Erion System is a non-profit organization and counts on six Collective Schemes active in waste management related to electronic products, batteries, packaging, tobacco products, and textiles. Ethics, transparency, collaboration, efficiency and systemic innovation are the driving principles of the Erion Collective Schemes."

Danilo Bonato, General Director Erion Compliance Organization

"We are ready and we want to do our part: our companies are strongly committed to the path toward sustainability of production processes and we are already providing the market with products that integrate recycled materials, always guaranteeing quality and reliability to the construction supply chain, of which we are the most important link. But it is not enough, can we do more? How? With a clear and comprehensive regulatory framework allowing us to unlock our full potential, both in the area of energy resources and in the use of recycled materials: only in this way will we be able to make the principles underlying the circular economy even more concrete in our processes, for the benefit of all stakeholders."

Roberto Callieri, President of Federbeton

"Doing business and contributing to sustainability go hand in hand in our Group. This virtuous circle is demonstrated by the company's EBITDA shared value, generated by the Group's activities in response to the Global Agenda priorities: already above 50%, we are committed to reaching 70% by 2030. We have reached the main EU targets on recycling in advance, thus confirming our commitment to the circular economy. We aim at developing innovative systems for the production of biomethane from organic waste, the regeneration of rigid plastics and carbon fibre, and we also carry out projects for the reuse of waste water in agriculture."

Orazio Iacono, CEO of Hera Group

"Innovation has always been at the center of our work. Today, with our entry into Haiki+, Haiki Cobat looks to the future with new determination to achieve our usual goal: transforming waste into resources, respecting the environment and creating value. For this reason, we have worked hard on the creation of innovative solutions to serve our supply chains, such as in the recycling of lithium batteries, in photovoltaics and in the sector of management of end-of-life vehicles."

Claudio De Persio, CEO of Haiki Cobat

"If Italy represents a best case for Europe towards the ecological transition objective, it is because it has been able to create a competence framework encompassing companies, institutions, technicians, experts and decision makers, focusing on capacity building for managerial and technological innovation of services and products, All these players will meet again at Ecomondo 2024, a consolidated hub for discussion on the role to be played by the most advanced, cutting-edge state-of-the-art technological innovation towards the major global sustainability objectives, starting from artificial intelligence models".

Alessandra Astolfi

Global Exhibition Director Green & Technology division of Italian Exhibition Group Spa

"Waste is no longer a problem but it can be a precious resource – according to Luca Dal Fabbro, Executive President of Iren -, innovation and efficiency in the circular use of materials is the winning strategy of Iren's industrial model, thanks also to over 70 plants that guarantee autonomy in waste management, material transformation and energy production. Our next goal looks at critical raw materials: recovering them from waste will be of great help to our Country."

Luca Dal Fabbro, Executive President of Iren

"The decarbonisation goals, a fundamental pillar of European policy, can be concretely achieved by combining innovative technologies with consolidated processes, in full compliance with the Circular Economy. Montello SpA, active for over 25 years in the sector of recovery and recycling of municipal waste from separate collection, will continue its investment program with the aim of maximizing results in environmental, social and governance terms".

Roberto Sancinelli, President of Montello SpA

"Novamont started its journey in the field of bioeconomy, specifically in biorefineries for bioproducts, with the aim to decouple development from resource use, by learning "to do more with less". Today we continue our journey to integrate chemistry and agriculture for the production of bioplastics, biophytosanitary products, biolubricants, biodegradable ingredients for cosmetics, biochemicals, etc. We do this by rethinking processes, use and end-of-life, starting from local specificities, soil regeneration, integrated value chains, application of new technologies to enhance by-products, promoting participatory innovation and creating value for our communities."

Catia Bastioli, CEO of Novamont SpA

CIRCULAR ECONOMY NETWORK

6TH REPORT ON CIRCULAR ECONOMY IN ITALY 2024