

7° REPORT ON CIRCULAR ECONOMY IN ITALY

2025

Summary

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7° REPORT ON CIRCULAR ECONOMY IN ITALY - 2025/SUMMARY

By the Circular Economy Network

Circular Economy Network and Fondazione per lo sviluppo sostenibile

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The Circular Economy Network is an initiative promoted by the Fondazione per lo sviluppo sostenibile, with the participation of a group of leading companies and organizations, which carries out the following activities in the circular economy:

- of constant updating and information on regulations, national and European, technological and organizational innovations and best practices;
- of discussion with institutions at various levels, national and European, with various stakeholders, organizing meetings, thematic forums and an annual National Conference;
- of analysis, research and study, with the publication of an annual Report.

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FOREWORD

The transition towards greater circularity in the economy, in addition to playing a necessary role in decarbonization to tackle the climate crisis, appears to be not only necessary, but also undoubtedly useful to maintain and enhance well-being and economic development, with less waste and less consumption of raw materials. This proves to be even more relevant at a time when the globalization of development has reached the limits of available natural resources and during a phase of serious market difficulties.

The formula of circularity would seem obvious, to be taken for granted. Since there are now so many people living on the planet and since everyone wants to develop and be better off, we must all learn to do more and better with less. To waste less and consume wisely, to make products that last longer, shareable whenever possible, repairable, reusable, recyclable and made from materials derived from recycling. Much has already been done to increase the circularity of our economy, but much remains to be done that can still be improved.

Several European regulations have pushed and steered this transition towards greater circularity. During this difficult phase that several markets have been going through - caused by ongoing wars and geopolitical conflicts, aggravated by President Trump's protectionist policy based on tariffs - greater circularity also becomes a measure to reduce exposure to the volatility of raw materials markets and to improve industrial competitiveness. Italy, a manufacturing country, already a European leader in the circularity of the economy, can take advantage from its favourable position and its potential, accelerating the circular transition.

The European thrust towards the transition to a more circular economy

During the new legislature, the European Union still aims to maintain a strong initiative for the transition to a more circular economy. The **Clean Industrial Deal**, published in February 2025, sets the goal of doubling the circularity rate of the European economy, from 11.8% in 2023 to 24% by 2030. With the forthcoming launch of the **Circular Economy Act** in 2026, the European Union aims to accelerate the transition, increasing both the quantity and quality of secondary raw materials, as well as their use, and promoting greater circularity of production processes and products of the European industry.

The question of the financial resources and investments needed to fuel the transition, as well as the need for common debt instruments and direct savings to support investments for the transition, remains still open and without clear solutions, as highlighted in the Draghi report on competitiveness and in the Letta report on the single capital market.

All the more so, in a phase like the current one, marked by turmoil in global geopolitical balances, in which Europe must strengthen its strategic autonomous power.

At this stage it is all the more important to allocate adequate national resources for the implementation of a wide range of measures envisaged by the European **Circular Economy Action Plan**: i.e. the **Ecodesign Regulation**, the **Directive on the Right to Repair**, the **Regulation on packaging**, the **Critical Raw Materials Act**, the **"Greenwashing" Directive**, the **recast Urban Wastewater Treatment Directive (UWWTD)**, the **Construction Products Regulation (CPR)**, the **cross-border Waste Shipment Regulation (WSR)**, the **WEEE Directive**. Finally, the **Waste Framework Directive** on, the **"Green claims" Directive** and the **end-of-life vehicles Regulation**.

An effective national implementation of this comprehensive and challenging package of European measures will promote the growth of circularity of the economy, with significant benefits for savings and a more efficient use of resources, materials and energy, and a reduction in dependence and supply costs on foreign markets.

Greater circularity for the recovery of competitiveness of Italian manufacturing

In a context of declining industrial production in Italy for over two years now and of new emerging challenges, fuelled by the tariffs introduced by US President Trump and uncertainties about their future, an increase in the circularity of Italian industry - with an increase in materials and energy productivity, a waste and waste disposal reduction, a reuse and recycling increase as well as the use of secondary raw materials, leading to a lower dependence on the import of energy and raw materials - can make a significant contribution, in addition to improving not only the climate and environmental performance, but also enhancing competitiveness and relaunching Italian manufacturing.

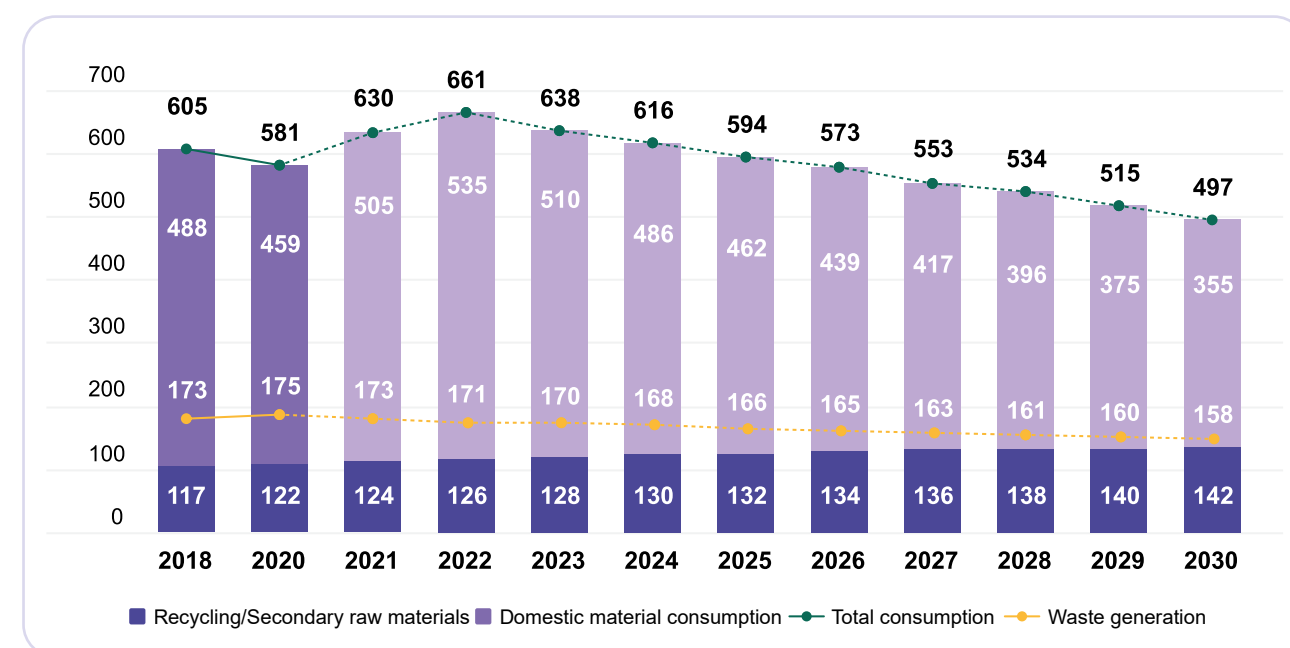
In 2023, Italy's dependence on imported materials accounted for 48% of its overall needs, i.e. a significantly higher value than that of the EU, which in the same year stood at 22%. The cost of Italy's imports rose from €424.2 billion in 2019 to €568.7 billion in 2024, amounting to a 34% increase, as against an imports decrease: from 310.9 Mt in 2019 to 286.7 Mt, reflecting a significant increase in the prices of imported raw materials. It should be noted, in particular, that despite the decrease in the quantity of imported fossil fuels (-30.1 Mt), price increases have boosted the overall cost of imported fossil fuels by almost 40% (from €90.5 billion to €126.9 billion). The heavy dependence on the import of large quantities of materials at rising costs is a major factor in the loss of competitiveness of the Italian manufacturing industry. According to the evaluations by *Cassa Depositi e Prestiti* in 2024 the adoption of circular economy practices has generated savings in production costs for manufacturing companies up to over €16.4 billion. In addition to that it should be taken into account that this figure accounts for 15% of the potential savings that could reach €119 billion by 2030, by optimizing circularity measures.

THE BENEFITS DERIVING FROM AN INCREASE IN CIRCULARITY BY 2030

Fondazione per lo sviluppo sostenibile has conducted a study on the costs and benefits deriving from the growth of circularity in the Italian economy. Two scenarios for 2030 were compared: one based on a "business as usual" scenario and the other on greater circularity. Following the current trend in the "business as usual" scenario, by 2030 the amount of recycled waste would reach 77% (up from 70% in 2020), waste production would increase by 4% and the amount of waste to be disposed of would decrease; domestic material consumption would grow from 459 Mt in 2020 to 611 Mt. The scenario based on greater circularity would feature a 3.5% annual reduction in material consumption from 2022, a 1.5% annual increase in the recycling rate from 2021 and a 1% reduction in waste production from 2021.

In the more circular scenario, the overall consumption of materials in 2030 would decrease by 14.5% compared to 2020, the amount of waste produced would drop (-17 Mt in 2030), the amount of recycled waste would increase (+18%), bringing the recycling rate up to 89.8% in 2030. The more circular scenario would significantly decrease Italy's dependence on foreign supplies with a 40 Mt reduction and a saving of €82.5 billion.

More circular scenario in Italy by 2030 (Mt)



Source: Analysis by Fondazione per lo sviluppo sostenibile based on Eurostat data

A greater circularity also contributes to achieving climate neutrality

As repeatedly pointed out, greater circularity in the economy would also contribute to achieving the greenhouse gas emission reduction targets: the more challenging the climate targets become, the greater is the value – including the economic value – attached to the circularity measures.

The EU Commission estimates that improvements in the circularity of the economy at European level can reduce the costs of the energy system by around 7% in the 2031-2050 period, corresponding to annual savings of €45 billion. To this must be added the savings on ETS allowing charges for each individual company subject to this scheme, affected by circularity measures leading to a reduction in energy consumption and in greenhouse gas emissions.

Increasing circularity by catching up on the delay in the recycling of critical and strategic raw materials

Despite their importance for Italian industry, supply difficulties and high prices, the contribution of recycled raw materials is still very limited: only lead and copper exceed the 50% threshold; silver, gold, cobalt and nickel are below 25%, while for lithium, gallium and scandium the contribution is almost zero. According to a study conducted by Erion in 2022, critical raw materials are relevant for multiple industrial sectors, they contribute to industrial production for approximately €564 billion and to Italian exports for approximately €444 billion. According to the Erion study, if Italy applied the European best practices for recycling, it could recover 7.6 thousand tons of critical raw materials.

Undertaking on the path towards greater circularity in Italy

The implementation of the **National Strategy for the Circular Economy** is a key factor for the development of the path towards a greater circularity in the Italian economy. Some steps in this direction have already been taken: such as Law 115/2024 on **critical and strategic raw materials**, Legislative Decree 131/2024 on **WEEE**, the **end-of-waste** Ministerial Decree 127/2024 on **inert construction and demolition waste**, new **Minimum Environmental Criteria** in a few specific sectors.

As far as industrial policies are concerned, it should be noted that the 5.0 Transition Plan, differently from the previous 4.0 Transition Plan, has not lived up to expectations, not only in promoting greater circularity but also in terms of the delays in issuing implementing measures and of the lengthy and complex process in accessing funding. Furthermore, uncertainties were encountered relating to the possibility of taking advantage of the incentives for investments in circularity in the 5.0 Transition Plan. Unlike the 4.0 Transition Plan, the new Plan does not make any explicit references to the circular economy. As a consequence, companies were not allowed to adequately benefit from the investment support opportunities. It would be desirable that unused funds could be reallocated for investments aimed at the digital and ecological transition in line with the guidelines of the Clean Industrial Deal, including measures for the efficient and circular use of resources and with a multi-year time horizon.

Circularity performance in EU countries: Italy is a leading country

According to the European indicators system, **Italy leads the way in terms of circularity among the main European economies** and it ranks second among the 27 European countries, preceded only by the Netherlands.

The circularity performance of the 27 EU countries is measured using a ranking methodology (heatmap, colour map) relating to the five synthetic indicators for the five reference dimensions of the *EU monitoring framework* and an overall index.

Circularity ranking among the 27 EU countries

	Circularity Index	Production and consumption	Waste Management	Secondary raw materials	Competitiveness and innovation	Ecological sustainability and resilience
The Netherlands	70,6	89	85	100	48	46
Italy	65,2	73	77	67	51	58
Germany	60,6	58	78	43	56	60
Belgium	59,6	47	92	63	54	44
France	58,7	63	58	56	44	71
Austria	58,7	34	77	44	67	64
Spain	56,9	77	60	25	44	63
Slovakia	56,4	62	72	32	28	76
Slovenia	55,5	46	80	26	41	70
Czech Republic	54,7	49	65	39	49	63
Latvia	54,6	49	69	13	51	71
Croatia	53,7	57	50	17	52	74
Estonia	52,9	43	49	57	51	66
Lithuania	52,2	48	67	9	52	64
Sweden	52,0	55	58	29	34	73
Poland	51,0	59	44	21	50	66
Hungary	50,2	57	40	16	34	87
Portugal	48,5	51	44	5	51	70
Ireland	47,1	59	51	3	61	39
Luxembourg	46,0	39	74	30	74	4
Malta	44,8	63	9	63	57	40
Bulgaria	43,8	43	31	12	33	83
Finland	42,0	22	61	4	41	62
Romania	41,8	44	16	0	31	97
Denmark	39,1	24	66	27	47	26
Cyprus	36,8	36	43	14	27	53
Greece	34,5	58	18	13	5	68

Source: Circular Economy Network data processing

The scores achieved by each country for each dimension and for the overall circularity index are graded according to colour coding: the highest scores are highlighted in green and the lowest in red. The best-performing countries are in dark green. Germany comes behind the Netherlands and Italy; while Belgium, France, Austria and Spain follow in the subsequent positions. Among the 27 EU countries, those with the worst circular economy records are either located in the Mediterranean area, such as Greece, Cyprus and Malta, and other countries in Eastern Europe, such as Romania and Bulgaria. Denmark and Finland are among the worst performers, mainly due to the high consumption of materials and a low use of secondary raw materials in production processes.

The circularity framework of the four main European countries, Germany, France, Italy and Spain, and the EU average

PRODUCTION AND CONSUMPTION

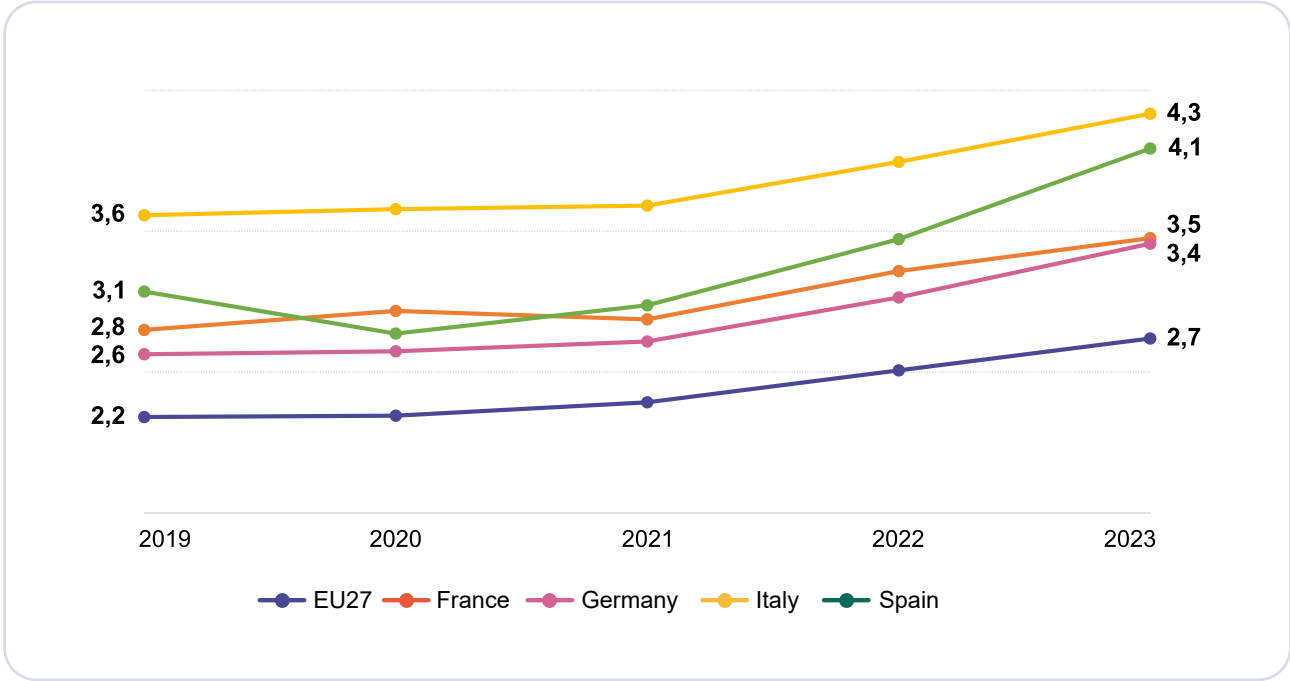
In 2023, **material consumption** in Italy was 11.1 t/inhabitant, lower than the European average (14.1 t/inhabitant), but growing (+5.5%) compared to 10.5 t/inhabitant in 2019. A comparison of the performances of the four main European countries in 2023 shows that only Spain, with a material consumption of 7.7 t/inhabitant, is below the Italian level. Germany and France, although being below the EU average, record higher values: 13.7 t/inhabitant and 13.1 t/inhabitant respectively.

The per capita material consumption trend in the 2019-2023 five-year period shows a reduction in value in the European average (-6.3%). The reductions recorded by France (-8.4%), Germany (-14.2%) and, above all, Spain (-20.9%) are even more significant. Italy is the only country, among the rest of the main European countries, whose material consumption has increased up to 5.5% over the five-year period under examination.

In 2023, **resource productivity** in Italy generated 4.3 euros of GDP, for each kg of resources consumed, with a clear improvement (+20%) compared to 3.6 euros/kg in 2019. The EU average, in 2023, was lower than the Italian one, standing at 2.7 euros/kg and the performance of other European countries was also lower than that of Italy: Spain was the closest with a figure equal to 4.1 euros/kg, while France (3.5 euros/kg) and Germany (3.4 euros/kg) were further behind Italy.

Over the last five years (2019-2023), the trend of the performance for this indicator at European level is positive, with an improvement of 26%. It is also positive for the other countries: Spain +33%, Germany +30%, and France +23%.

Resource productivity in the top four European countries, 2019-2023 (€/kg)



Source: Eurostat

In the EU27, **per capita municipal waste generation** stood at 511 kg/inhabitant in 2023. In Italy, per capita municipal waste generation decreased by 1.4%, from 503 kg/inhabitant in 2019 to 496 kg/inhabitant in 2023.

In comparison with other countries, in 2023 per capita municipal waste production in Germany and France exceeded the EU27 average with, respectively, 601 kg/inhabitant and 530 kg/inhabitant. Italy followed - below the European average - and finally Spain with 465 kg/inhabitant.

Over the last five years, the per capita share of municipal waste increased by 1.2% on average in the EU, while it decreased in the other main European countries: -4.5% in France, -1.5% in Spain and -1.3% in Germany.

WASTE MANAGEMENT

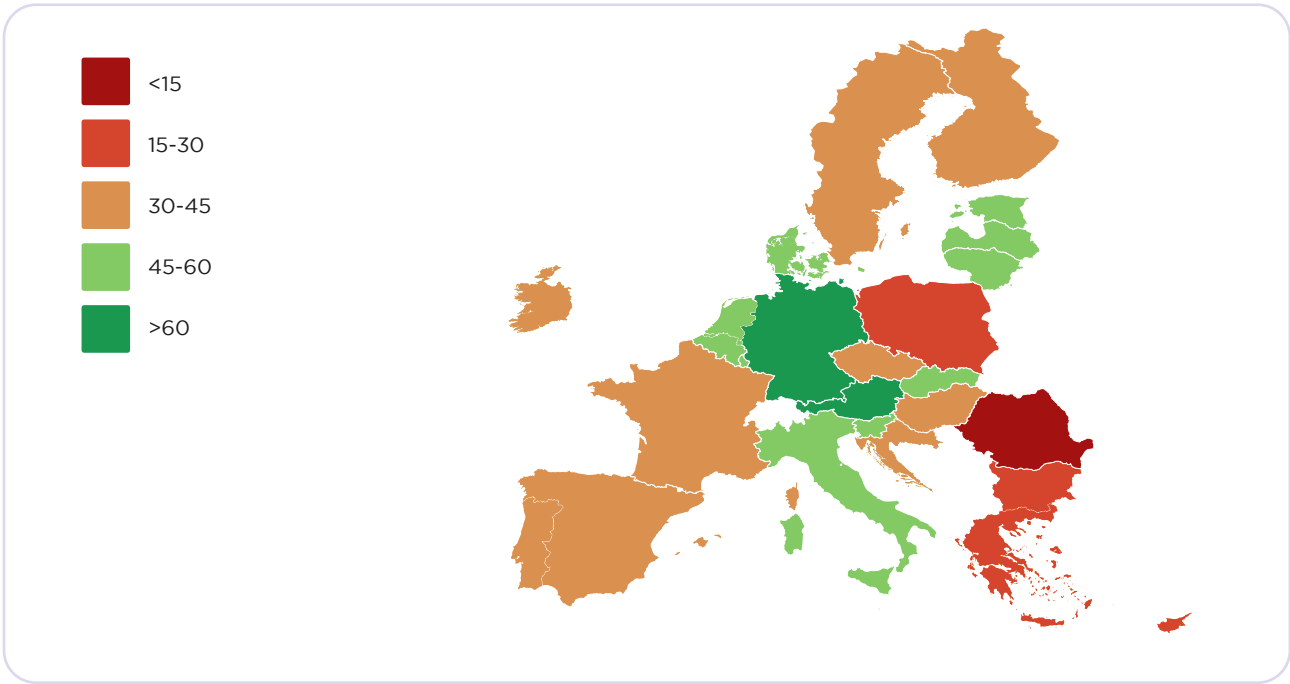
Over the last five years, the **municipal waste recycling rate trend** in Italy increased by 3.2 percentage points. In 2023 the recycling rate accounted for 50.8%, a percentage higher than the target set by the 2020 Waste Framework Directive (50%), which will have to be further increased to reach the additional targets set for 2025 (55%), 2030 (60%) and 2035 (65%), as provided for by Directive 2018/851/EU.

Comparing the performances of the four main European countries in 2023, as against the EU average of 48.2%, Germany reached a remarkably higher percentage at 68.2%, followed by Italy with a lower percentage at 50.8%, while France (42.2%) and Spain (41.4%) were below the European average.

The **waste recycling rate** allows us to monitor the amount of material reintroduced into the economy from waste generated by households and businesses. In 2020, taking into consideration the four main European Union countries, Italy remained firmly at the top with 72%, while the remaining countries recorded performances below the EU average (58%). Germany, ranked second, reaching a recycling rate of all waste of 55%, i.e. seventeen percentage points lower than Italy. Spain (48%) and France (47%) performed worse.

In 2022, Italy achieved a **packaging waste recycling** rate of 70.7%, not only more than 5 percentage points higher than the EU27 average (65.4%), but also higher than Germany, France and Spain. The latter recorded the second best performance (69.4%), followed by Germany with 68.5% and France (67.2%), ranking last among the main four European countries, yet above the EU average.

Municipal waste recycling rate in EU27 countries, latest available year (%)



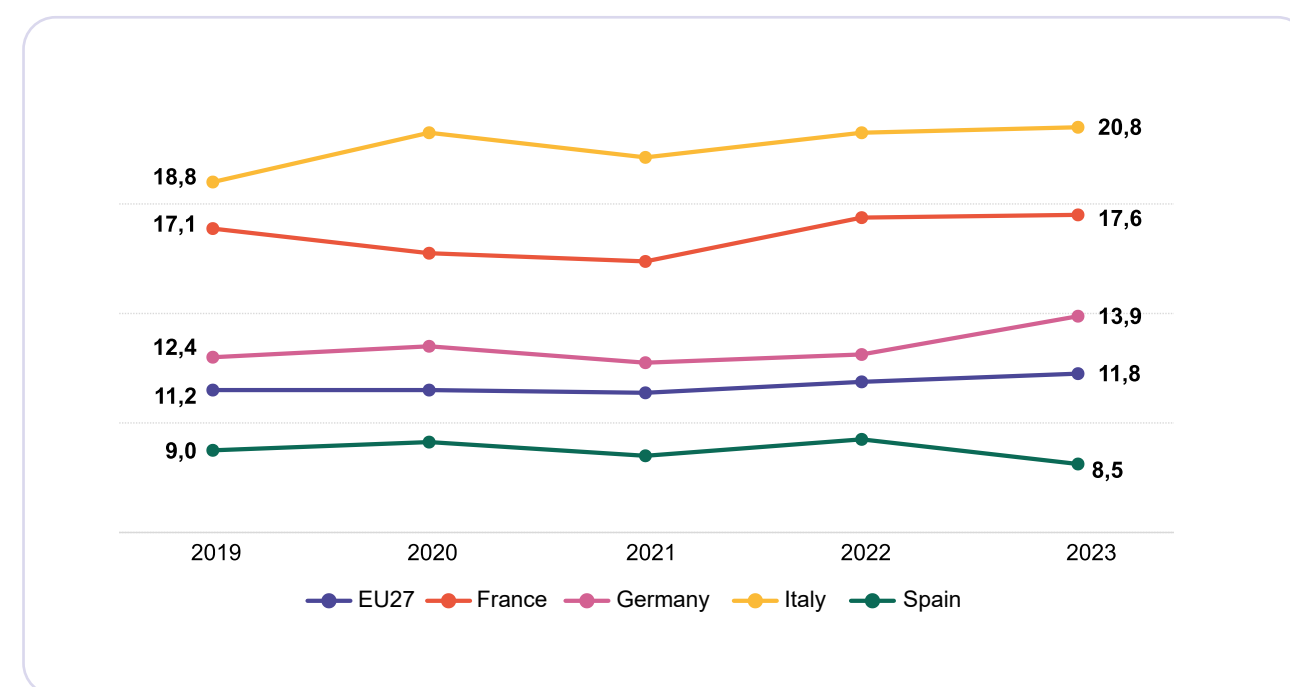
Source: Eurostat and ISPRA for Italy

SECONDARY RAW MATERIALS

The **circular material use rate (CMU)** is defined as the ratio between the use of secondary raw materials generated by recycling and the overall consumption of materials. Italy, which has historically been very advanced in this field, confirmed its position in 2023 by reaching 20.8%, with an increase of 2 percentage points compared to 2019.

This indicator has increased also in the EU27, albeit slightly and lower if compared to the Italian percentages, which rose from 11.2% in 2019 to 11.8% in 2023. Among the top four European countries that have been analysed, Italy is the best-performing country, followed by France (17.6%), and Germany (13.9%). Finally, Spain ranking last and below the EU average with a circular material use rate of 8.5%.

Circular material use rate in the top four European countries, 2019-2023 (%)



Source: Eurostat

COMPETITIVENESS AND INNOVATION

In 2023, **private investments** in some typical activities for circular economy in the EU27 amounted to €130.6 billion, accounting for 0.8% of GDP. In absolute terms, Italy, with €10.2 billion (0.5% of GDP), ranked third, behind Germany (€39.5 billion) and France (€22.5 billion). Compared to 2019, when investments amounted to €13.1 billion, Italy recorded a decrease of over 22% in absolute terms. In relation to GDP, it dropped from 0.7% in 2019 to 0.5% in 2023.

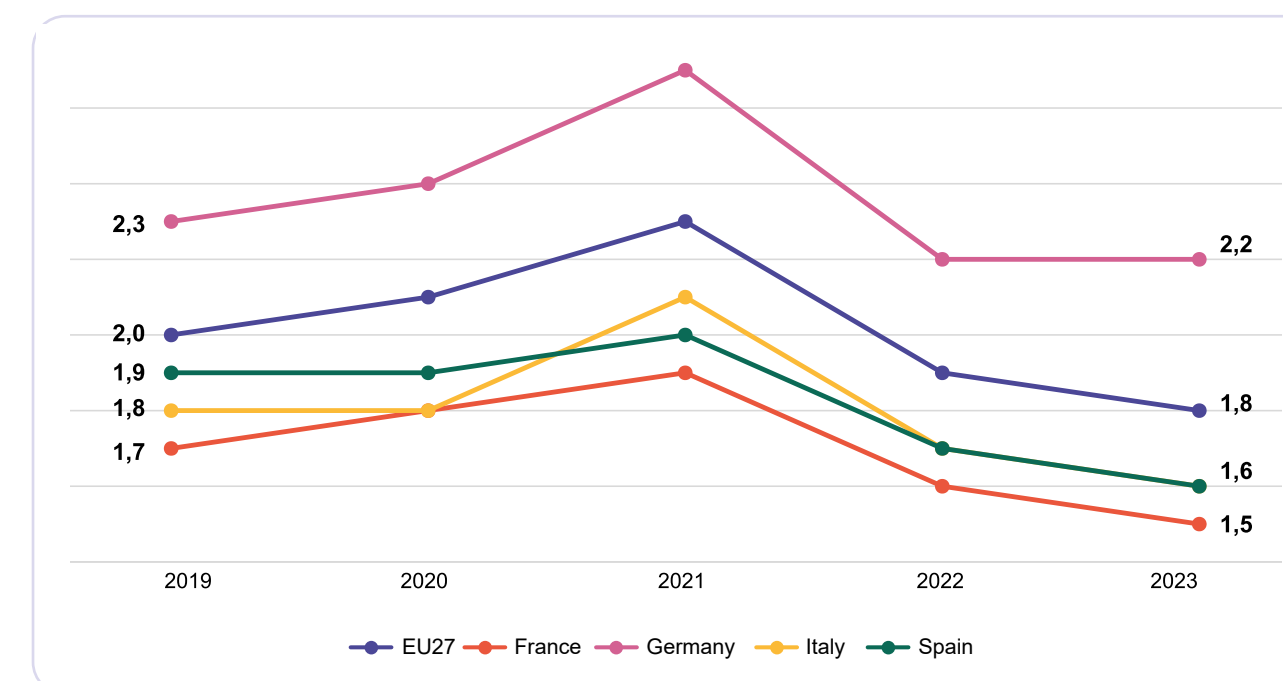
As regards the comparison between the four major EU countries, all of them, with the exception of Italy, recorded an increase in investments in absolute terms, in the 2019-2023 period. However, considering investments in relation to GDP, the only country examined to have recorded growth was Spain.

In the 2019-2023 period, the EU27 recorded a decrease by 2% in the number of **employed** people (from 4.5 to 4.4 million employed people). Among the four main countries, the largest number of employed people was recorded in Germany (772,000, +1% compared to 2019), then France (537,000, substantially unchanged compared to 2019), followed by Italy (508,000, -7%) and Spain (428,000, -7%). However, if the data is analysed as a percentage of the total employed people, taking into account people employed in certain typical activities in the field of circular economy in the EU27, it amounts to 2%, with Italy aligned with the EU27 average (2%), Spain being nevertheless higher than that of the other countries considered: France 1.8% and Germany 1.7%.

The added value of the entire European Union relating to some typical activities in the field of circular economy in 2023 was €316 billion, accounting for 1.8% of the total economy; Italy €34.5 billion, 1.6% of the total, therefore higher than the EU figure. Over the reference period (2019-2023) it can be observed that in Italy the added value grew in absolute terms (from €32.9 to €34.5 billion) but it decreased compared to GDP, dropping from 1.8% in 2019 to 1.6% in 2023. The downward trend of added value related to GDP also occurred in the EU27, as well as in Germany, France and Spain.

In 2020, in the European Union, according to the latest Eurostat data available, 0.46 **patents** relating to waste management and recycling were filed per million inhabitants, corresponding to a total of 206. During the same period, 0.36 patents were filed per million inhabitants in Italy, amounting to 21 patents, with a 25% decrease compared to 2016.

Added Value at factor cost in some typical activities of circular economy in the top four European countries, 2019-2023 (% of GDP)



Source: Eurostat

ECOLOGICAL SUSTAINABILITY AND RESILIENCE

In 2022, in the EU27, the **consumption footprint** was 109, while Italy's performance was 103, slightly higher than 2018 (+1%) but still below than the European average. Comparing the performance of the four main European countries, none of them did better than Italy in 2022. The highest value was recorded by Spain (116), with an increase compared to 2021.

Looking at the trend over the last five years, only Germany (-3%) recorded a decrease in this indicator, while the other countries increased it (Italy, +1%), Spain (+8%), or remained stable (France).

In 2023, in the EU27, the per capita **greenhouse gas emissions from production activities** amounted to 5,965 kg CO₂ eq., while in Italy they reached 4,990 kg CO₂ eq..

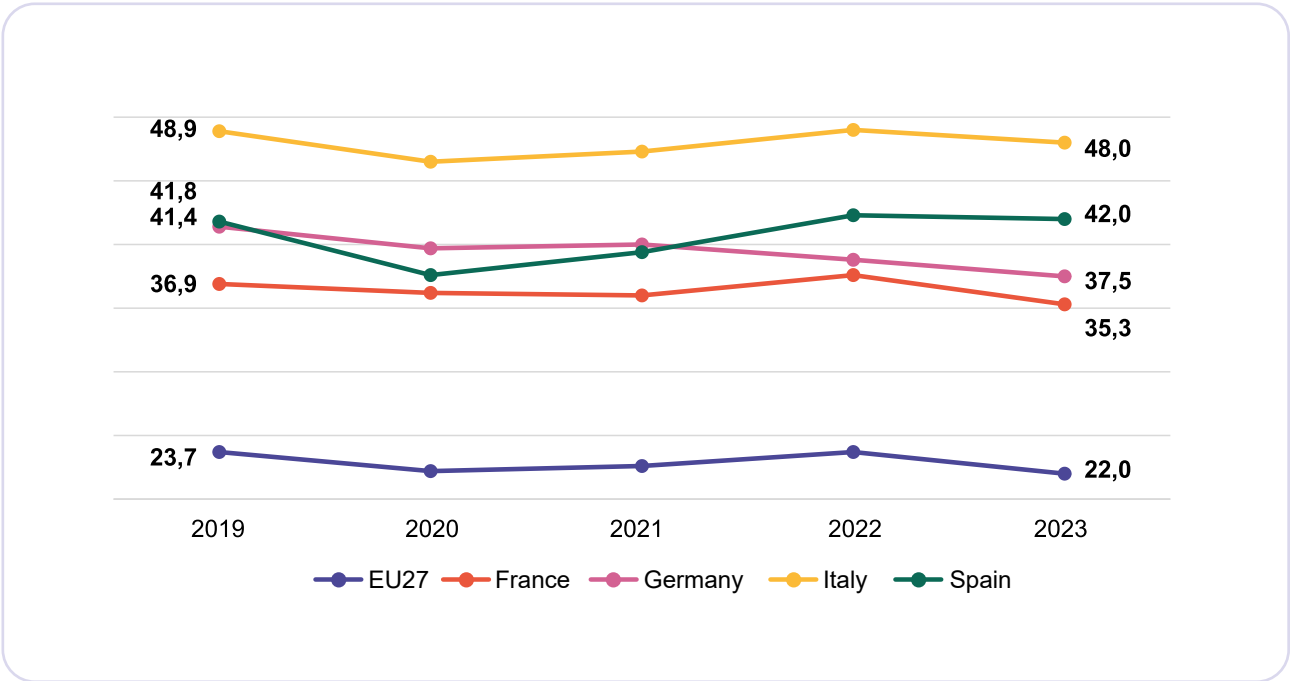
Comparing the performance of the four main European countries, in 2023 France (4,424 kg CO₂ eq) and Spain (4,591 kg CO₂ eq) recorded lower per capita greenhouse gas emissions than Italy. Germany, on the other hand, reported a significantly higher value (6,571 kg CO₂ eq).

Looking at the trend over the last five years, all the countries analysed recorded a decrease in this indicator, especially Germany (-16%), France (-14%), Spain (-14%) and slightly less significant in Italy (-7%).

In 2023, Italy's **dependence on imported materials** (48%) was more than double than the European average (22%) but slightly lower (-0.9 percentage points) compared to the 2019 value (48.9%).

In 2023, all four major European countries reported a value for this indicator above the EU average (22%). France, Germany and Spain (respectively 35.3%, 37.5% and 42%) although well above the average, still recorded a more positive value than Italy.

Dependence on imported materials in the top four European countries, 2019-2023 (%)



Source: Eurostat

Critical raw materials: aluminium, copper and phosphorus

ALUMINIUM

Aluminium is mainly derived from the bauxite sedimentary rock. In addition to aluminium production, bauxite is used in the production of refractories, cement, abrasives and chemicals. Due to its importance in the world economy and the geographical concentration of its reserves in tropical and subtropical regions, aluminium is considered a critical and strategic raw material.

World bauxite reserves are estimated to be around 30 billion tons, mainly located in Guinea, Vietnam and Brazil, 56% of the total.

Global demand for aluminium is driven mainly by traditional sectors but it is also supported by the development of ‘cleantech’ and electric vehicles. In the EU, aluminium is mainly used in the automotive (40%), construction (24%) and packaging sectors (19%).

According to the U.S. Geological Survey, the main producers of bauxite are Australia, Guinea, and China. China is also the leading producer of aluminium metal, nearly 60% of the world’s production.

Greece and Germany cover just 10% of EU needs. The EU is the world’s leading importer of aluminium, with Guinea being the main supplier of aluminium ore (62%), and Russia the main supplier of aluminium (17%).

The world’s large bauxite resources, estimated at between 55 and 75 Gt, are distributed between Africa (32%), Oceania (23%), South America and the Caribbean (21%), Asia (18%) and to a lesser extent in other countries (6%) and appear to be sufficient to meet global demand for aluminium even in the medium to long term. However, primary aluminium mining continues to raise environmental concerns due, for example, to red sludge, containing potentially hazardous substances. In this context, recycling and/or substitution of aluminium may be valid alternatives to primary extraction. Aluminium in Europe has an end-of-life recycling rate of 21%, which is still very low considering its characteristics. Aluminium, in fact, can be recycled an infinite number of times without losing its original properties. Aluminium recycling leads to a reduction in CO₂ emissions and requires less energy than needed to produce primary aluminium.

Aluminium can replace copper in some applications. Although it has different properties, it is a valuable substitute considering its price, up to 4 times lower than copper. Forecasts indicate that, for the aluminium market, the surplus could turn into a deficit as early as 2026.

COPPER

Copper is a strategic raw material for the EU and critical of high economic importance even if it does not cross the criticality threshold for supply risk.

Copper is essential to many economic sectors, including infrastructure, wiring, plumbing, transportation, and electrical and electronic equipment.

The Energy Transition Commission (ETC) estimates that cumulative demand for copper by 2050 would have to be 1,135 Mt, to meet the needs of all sectors. The increasing importance of copper brings with it considerable challenges mainly related to supply, but also to the quality of the mined copper ore, which is continuously decreasing and to the mining areas that raise multiple questions in terms of social and environmental impact.

Copper deposits (as a sulphide ore) are found worldwide in a variety of geological environments. Mining, refining, and producing copper is a high energy intensive activity. Water consumption is also relevant and it is important to note that some processing operations take place in countries where water stress is relatively high, such as Chile or Peru. Water scarcity is not only an environmental issue, but it also creates social tensions that have a direct impact on the security of copper supplies. Soil erosion and contamination are also significant impacts mainly related to open-pit copper mining.

According to the IEA, global demand for copper amounted to 25,855 kt in 2023, with cleantech demand accounting for 24% of the total and expected to reach 16,343 kt in 2040.

The main producer is Chile (23%), followed by the Democratic Republic of Congo (DRC) (14%) and Peru (11%). Ore purity is decreasing in Chilean mines, while the African sites of the DRC have the highest ore-grade in the world, pointing to an increase in the share of supply from the DRC at the expense of Chile in the near future.

Refining activity is concentrated in China (46%), followed by DRC (7%) and Chile (5%). China is the main exporter of refined copper and is becoming the most complex competitor to face globally in the refining sector, not only because it is investing in infrastructure but also because it is able to reduce the high costs of the refining process.

In Europe, 19% of the mining share comes from Poland, while 17% of the refining share comes from Germany. European companies hold about 20% of the copper refining share, although only 10% of European refining companies are geographically located in Europe.

Regarding supply risks, in addition to the concentration of supplies, disruptions due to extreme weather events have increased globally, suggesting the important role played by climate change.

In all scenarios, a risk of primary copper supply deficit has been highlighted, as demand increases exponentially. The greatest risk is expected to occur after 2030, when the increase in demand for 'cleantech' will be coupled with a reduction in mineral ore grade.

In this context, copper recycling and the direct use of scraps are expected to increase significantly. Copper does not degrade or lose its chemical or physical properties in the recycling process. Approximately 32% of global production comes from recycled copper, which, through pyrometallurgical and electrochemical processes, enables the production of wires, copper powder and copper alloys. The IEA estimates that by 2040, the volumes of critical raw materials recovered from used batteries could reduce overall copper demand by up to 10%. Through appropriate circular economy solutions, more than 7 Mt of copper can be achieved by 2050, which can meet over 40% of total energy transition demand.

Another solution to reduce dependence on primary copper, in addition to copper recycling itself, is the search for materials with similar chemical-physical properties that can replace it. But the properties of copper make it a unique material that is difficult to replace. Economic pressure has led to the search for alternative materials and, to date, aluminium is the most studied option, but it must be considered that aluminium is a strategic, and unfortunately also critical raw material.

PHOSPHORUS

Phosphorus has been included in the list of critical raw materials. However, since it does not meet the strategic criteria established by the European Commission, it cannot be considered strategic.

85% of global phosphorus production is used in fertilizers and consumption achieved 47.5 Mt in 2023. The growing trend in phosphorus consumption is mainly driven by fertilizer demand in Africa and South America. The demand for phosphorus is also influenced by the so-called hazardous applications, with reference to uses in the defence industry.

Phosphorus is also an essential component in the production of lithium iron phosphate (LFP) and lithium manganese iron phosphate (LMFP) batteries used in electric vehicles (EVs).

The main source of phosphorus is phosphate rock, with the largest exploitable deposits are located in North Africa, but also in China and Russia. The EU produces 0.5% of the world's phosphorus and holds just 0.8% of global reserves; it imports phosphorus from Morocco and Russia, and only partly internally from Finland. In 2024, a geological reserve of 3.4 Gt of phosphorus ore was found in Norway. This discovery could transform Norway into the main supplier of phosphorus for the EU in the coming years, which is currently almost entirely dependent on foreign sources.

A summary of the technologies available on the market has been produced by the Italian Phosphorus Platform. Non-conventional sources for phosphorus recovery include wastewater and sewage sludge, organic waste and/or by-products and other industrial matrices, including inorganic ones, mainly in the steel, pharmaceutical and WEEE sectors. In the case of inorganic industrial matrices, applications are sporadic and investigated only on a laboratory or pilot scale. Many technologies currently in use for phosphorus recovery are applied to the waste stream, and in particular wastewater.

Although several technologies are now applied on a full scale, phosphorus recovery has not yet found widespread application, but the new European urban waste water Directive could give a new boost. The obligation to remove phosphorus from urban waste water provides an important opportunity for the recovery of this critical element, as sewage sludge is one of the main potential sources of secondary phosphorus.

CIRCULAR ECONOMY NETWORK PROMOTERS



"The paper industry is at the forefront of the ongoing change. Sustainability is now a global imperative, with increasingly stringent regulations and even more demanding consumers. In this context, the integration of ESG principles is no longer an option, but a necessity to safeguard the future. Burgo Group, with its GO 2030 program, has undertaken on an ambitious path. The transformation of the business model, the adoption of circular economy practices, and the reduction of environmental impact require significant investments, technological innovation, and a radical change in mindset. The sector must face these challenges with determination and awareness because the future depends on the ability to adapt and innovate in a sustainable manner."

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 clean energy and 100% Italian solar sources. All our water bottles are made of 100% recyclable PET and feature a tethered cap, which reduces plastic use and is designed to remain attached to the bottle. Additionally, we take care of the environment by safeguarding our water sources, which are located in pristine and protected areas.



"CONAI's commitment to sustainability is not merely a matter of responsibility: it is an institutional mandate, and a vision for a future in which the planet's resources are used more efficiently. With over 75% of packaging being recycled, Italy stands as a leader in this sector of the circular economy. It is a position of excellence that we must safeguard and strengthen, by improving both the quality and the quantity of separate waste collection, promoting ecodesign, and encouraging the use of secondary raw materials."

Ignazio Capuano, CONAI President



"The CONOU management model represents an excellence in Europe, ensuring quality, sustainability, and innovation. Our supply chain is made up of stories and people who, with commitment and dedication, turn the circular economy into a tangible reality. Our work is an example of how responsible waste management can create value, promoting a more sustainable future for all."

Riccardo Piunti, CONOU President



"The system becomes stronger. We believe that a multi-consortium approach, overseen by a player capable of ensuring general values while respecting the specificities of each supply chain, is the best tool available to producers and importers for waste management. For us, the Extended Producer Responsibility (EPR) is not just a regulatory obligation; it is an opportunity to develop a fairer and more efficient system."

Michele Priori, Consorzi Cobat General Director



"In our ecosystem, allowing a complete and informed collaboration with users is essential for a valuable waste management: we offer a single access point to several services through the Junker app. Starting from the design of containers and delivery systems with user identification, we go on by tracing the entire collection process on a map, followed by the management of waste tariffs. All the information collected during the process goes back to citizens through the app. This is how we close the circle."

Alessandro Lazzari, Area Manager, DNA Ambiente



For Edison Next, the circular economy is one of the fundamental levers on which to act to meet the challenging objectives of the ecological transition. We stand alongside businesses and public administrations to ensure more efficient and sustainable management of waste and to transform materials that can no longer be used into resources, reducing the environmental impact along the entire production chain and generating value for the local community. We deliver concrete solutions, such as the management and energy valorization of waste and the management of water resources, to build together a more circular, resilient and competitive future."

Roberto Ronca, Circular Economy Director Edison Next



"Erion is one of Italy's leading Extended Producer Responsibility (EPR) organizations, with over 2,500 member companies and approximately 250,000 tonnes of waste managed in an environmentally excellent way, focused on recovering valuable and strategic raw materials. The Erion System is a non-profit organization made of six Producer Responsibility Organizations (PRO), each one active in managing waste linked to electronic products, batteries, packaging, tobacco products, and textiles. Ethics, transparency, social commitment, collaboration, efficiency, and innovation are the core values guiding the work of Erion's schemes."

Danilo Bonato, Development and Institutional Relations Director, Erion Compliance Organization



"Decarbonization is crucial for sustainability, but the supply chain must be protected from the risk of losing competitiveness compared to non-EU countries. Harmonized regulations, clear responsibilities regarding roles and controls, and certain timelines for authorizations are needed. Investments in innovative technologies are essential and must be supported: the competitive advantage of industry, in fact, benefits the entire socio-economic system."

Stefano Gallini, Federbeton President



"Italy ranks among the leading European countries in terms of expertise and know-how, and continues to be at the forefront of the ecological and energy transition. Its proven ability to innovate—both in management and technology—is reflected in world-class services and products. We at IEG are proud to play a key role in this challenge: Ecomondo 2025 reaffirms its position as a platform of excellence, connecting companies, institutions, and decision makers, and as a consolidated hub for dialogue on the role of advanced technological innovation in achieving global sustainability goals."

Alessandra Astolfi, Global Exhibition Director Green & Technology division di Italian Exhibition Group Spa



"In the current context, characterized by geopolitical instability and high volatility of energy prices, circular economy is the main road to develop a strategy able to contribute both to the energy transition of the country and to strengthen its independence. For Iren, being a leader in this sector also means innovating and anticipating change, for example focusing on key resources for the near future such as critical raw materials: with the launch of the first Italian plant for the recovery of precious materials and critical materials from WEEE in Tuscany, the Group is at the forefront in affirming this new paradigm of circular economy."

Luca Dal Fabbro, Iren Group Chairman



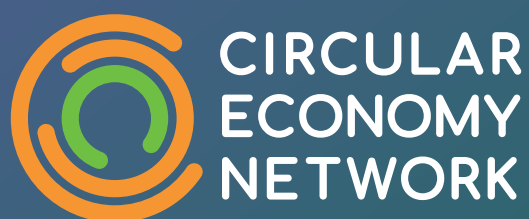
"The decarbonisation goals, a fundamental pillar of European policy, can be concretely achieved by combining innovative technologies with consolidated processes, in full compliance with the Circular Economy. Montello SpA, active for over 25 years in the sector of recovery and recycling of municipal waste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

Roberto Sancinelli, Montello SpA President



"For more than 30 years we have been working in the field of circular bioeconomy with the aim of rethinking processes, use and end-of-life of products. We have taken our proprietary technologies to an industrial scale, building biorefineries capable of using raw materials and by-products of plant origin and able to transform them into bioproducts that do not accumulate in water and soil. Today we are a Benefit Corporation and a B Corp that by statute has chosen to do business as a regenerative force, and we continue to integrate chemistry and agriculture, our technologies and supply chains toward greater sustainability by promoting participatory innovation and value creation."

Catia Bastioli, Novamont CEO



SUMMARY

7th Report on Circular Economy in Italy - 2025

By the Circular Economy Network
