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AWASTER

INTERREG ITALY-CROATIA
PROGRAMME 2021 – 2027

AWASTER – Adopting WASTE as Resource

D.1.1.3 Regional secondary market report – Apulia Region

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1. Introduction

The present deliverable is one of the five regional reports foreseen by Activity 1.1 Regional background analysis, which is part of the WP1 Circular economy – current state analysis of the Interreg IT-HR AWASTER project.

The report assesses the functionality of secondary raw material (SRM) market in the Apulia region and contains information on the supply and demand side of the market.

The findings and challenges detected will be used to develop subsequent project activities, in particular A.1.2 Sustainable resources use guidelines and A.1.3 Joint Strategy and Action Plan development.

Together with D.1.1.2 Regional waste management report, the present deliverable represents a high-quality database on which stakeholders can base their requests for financing the measures provided for in the Joint Action Plan from EU funds and other sources.

Moreover, it will be used by the PP and AP in their daily work to reinforce the use of the circular economy principles also after the project end.

2. Separate waste collection system

2.1. Separate waste collection system in the Italian Republic/Republic of Croatia (national level)

Regulatory framework

- Legislative Decree No. 152 of 3 April 2006, *Consolidated Environmental Act* (Part IV)
- Law No. 60 of 17 May 2022, *Provisions for the Recovery of Waste in the Sea and Inland Waters and for the Promotion of the Circular Economy* ("Save the Sea" Law)
- Legislative Decree No. 196 of 8 November 2021, *Implementation of Directive (EU) 2019/904 of the European Parliament and of the Council of 5 June 2019 on the Reduction of the Impact of Certain Plastic Products on the Environment*
- Legislative Decree No. 197 of 8 November 2021, *Transposition of Directive (EU) 2019/883 of the European Parliament and of the Council of 17 April 2019 on Port Reception Facilities for the Delivery of Waste from Ships that Amends Directive 2010/65/EU and Repeals Directive 2000/59/EC*
- *Classification of Waste. SNPA Guidelines* No. 24/20: the documents provide a methodological approach for the agency system to classify waste according to procedural schemes by phases, operational indications, and useful examples for identifying the code and assessing the hazardousness of waste
- Ministerial Decree of the Ministry for the Environment, Land and Sea Protection No. 264 of 13 October 2016, *Regulation Laying Down Indicative Criteria to Facilitate the Demonstration of the Requirements for the Qualification of Production Residues as By-Products and not as Waste*
- Law No. 166 of 19 August 2016, *Provisions Concerning the Donation and Distribution of Food and Pharmaceutical Products for Social Solidarity Purposes and to Limit Waste*
- Prime Ministerial Decree of 10 August 2016, *Identification of the Overall Treatment Capacity of Urban Waste Incineration Facilities in Operation or Authorised at the National Level, as well as Identification of the Residual Need to be Covered by the Construction of Urban Waste Incineration Facilities with Recovery*
- Decree of the Ministry for the Environment, Land and Sea Protection of 26 May 2016, *Guidelines for Calculating the Percentage of Separate Collection of Municipal Waste*
- Decree of the Ministry for the Environment, Land and Sea Protection No. 134 of 19 May 2016, *Regulation Concerning the Application of the Climate Factor (CFF) to the Formula for the Efficiency of Energy Recovery from Waste in Incineration Plants*
- Decree of the Ministry for the Environment, Land and Sea Protection No. 101 of 12 May 2016, *Regulation Laying Down the Identification of Methods for the Collection, Disposal and*

Destruction of Explosive Products, Including Expired Ones, and Waste Produced by the Ignition of Pyrotechnic Articles of Any Kind, Including Those for Rescue Needs, Pursuant to Article 34 of Legislative Decree No. 123 of 29 July 2015

- Decree of the Ministry for the Environment, Land and Sea Protection No. 121 of 31 May 2016, *Regulation Laying Down Simplified Procedures for Carrying out Free Collection Activities by Distributors of Very Small WEEE (Waste Electrical and Electronic Equipment), as well as Technical Requirements for Carrying Out Preliminary Collection Storage Activities at Distributors and for Transport*
- Ministry of Environment Decree No. 132 of 2 April 2024 *Criteria and Methods for the Application of the Tax Credit for Enterprises that Purchase Recycled Materials Derived from Separate Collection* - Implementation of Article 1, Paragraph 690, of Law No. 197/2022 - Indication of Technical Requirements and Certifications Suitable for Documenting the Eco-Sustainable Nature of Products and Packaging

National Strategy for the Circular Economy[1]

In 2017, following a wide public consultation, the document ***Towards a circular economy model in Italy. Document of framework and strategic positioning*** has been published, with the purpose of providing a general overview of the circular economy as well as defining the strategic positioning of Italy on this matter, in consistency with the commitments adopted under the Paris Agreement on climate change, the United Nations 2030 Agenda on sustainable development, the G7 and the European Union. Also, on 2017 the context changed highlighting the urgency of an intervention in order to reduce gas emissions and tackle the effects of climate change. Thus, new Plans and Programs have been provided at European level in order to support the transition towards circular models. Moreover, a fast technological development allowed the identification of new production sectors which are capable of generating new value chains instead of the traditional ones maximizing the recovery and recycling of the waste. Also, recent circumstances such as the pandemic and the Ukranian crisis pointed out the need to turn to a national supply chain of energy and raw materials. **The transition to a complete circular economy represents a strategic goal for Italy which is deficient of raw materials and geographically marginal compared to the large markets of central Europe**, in order to deal with the major transformations that are affecting the global economy such as:

- the review of the globalization process which is causing new protectionisms aimed at the strengthening of the industrial bases of individual countries or geographical areas;
- the spreading of the effects of the new digital revolution;
- the environmental emergency and the need to start a green transformation process of the economy with the purpose to reduce gas emissions and the use of natural resources.

Therefore, it is necessary to update the strategic lines identified in 2017 to make them consistent with the new global challenges. For these reasons the "National strategy for the circular economy" is

a programmatic document providing actions, objectives and measures that are intended to be pursued as institutional policies with the purpose to ensure an effective transition towards a circular economy.
In particular, the *National strategy for the circular economy* intends to define new administrative and fiscal tools in order to strengthen the market of secondary raw materials with the purpose to make them competitive in terms of availability, performance and costs compared to virgin raw materials. To this end, the National Strategy produces its effects on the material purchase chain (Minimum Environmental Criteria for green purchases in the Public Administration), on the criteria on the basis of which a waste shall cease to be a waste (End of Waste), on the extended producer responsibility, on the role of the consumer and on the widespread of sharing practices and "product as a service". Furthermore, the Strategy represents an essential 12 tool in order to achieve the climate neutrality objectives and to define a roadmap of actions and measurable targets from now until 2035. On 30 September 2021, the Ministry for the Ecological Transition launched a public consultation on the "National Strategy for the Circular Economy: Programmatic Guidelines for Upgrading" which is a document structured in five main sections:

1. Reference framework of the national strategy for the circular economy
2. The national context
3. The Italian strategy
4. Measurement and monitoring of circularity
5. Strategic guidelines, areas of intervention and tools.

The public consultation expired on 30 November 2021 and allowed the Ministry for the Ecological Transition to gather over 100 contributions related to the five sections.
These contributions, where considered relevant, have been included in the text of this document.
In particular, the following topics have been introduced or implemented in the original text:

- eco-design;
- reuse and repair;
- end of waste;
- critical raw materials and development of a secondary raw materials market;
- green public procurement and minimum environmental criteria;
- strategic industrial supply chains;
- industrial symbiosis;
- extended producer responsibility;
- digitization.

In particular, the Strategy aims to achieve certain quantitative targets in terms of recycling for the following types of waste:

- 55% municipal waste

- 65 packaging waste
- 25% wood packaging
- 70 ferrous packaging
- 50% plastic packaging
- 50% aluminium packaging
- 70% glass packaging
- 75% paper and cardboard.

The National Waste Management Programme[2]

The *National Waste Management Programme (PNGR)* is the strategic guidance tool for the Italian Regions and Autonomous Provinces, setting macro-objectives, defining criteria, and outlining the strategic directions for the formulation of regional waste management plans. The PNGR, alongside the National Waste Prevention Programme, is one of the strategic and operational pillars of the National Strategy for the Circular Economy. It aims to ensure that planning criteria meet the objectives of EU legislation to prevent disputes and promote sustainability, efficiency, effectiveness, and cost-efficiency across waste management systems nationwide, in line with territorial cohesion objectives. Overcoming the gap in waste management facilities between regions is thus a priority. This objective is crucial to ensuring integrated waste management across the entire nation and complying with European targets on reducing final disposal. The National Waste Management Programme is one of the reforms under the NRRP (National Recovery and Resilience Plan), Mission 2 "Green Revolution and Ecological Transition", Component 1 "Sustainable Agriculture and Circular Economy". Component 1 addresses several topics, including the national programme for waste management, the establishment of new waste management facilities, and the modernisation of existing ones. The overall objectives of the National Waste Management Programme (PNGR), in adherence to the purposes, principles, and priority criteria defined respectively by Articles 177, 178, and 179 of Legislative Decree No. 152/2006, are as follows:

- to reduce the planning and facility gap between different regions, pursuing progressive socio-economic rebalancing and rationalisation of the facility and infrastructural system according to criteria of sustainability, efficiency, effectiveness, and cost-efficiency, in line with the principles of self-sufficiency and proximity;
- to ensure the achievement of objectives related to prevention, preparation for reuse, recycling and recovery of waste, and reduction of disposal, also considering producer responsibility regimes (EPR) for the waste produced;
- to rationalise and optimise the facility and infrastructural system through regional planning based on complete waste traceability and identification of pathways leading to the short-term bridging of the facility gap by describing existing systems and analysing flows; supporting the concurrent reduction of potential environmental impacts, which should also be assessed through the adoption of life cycle assessment (LCA) of integrated waste management systems;

- to ensure facility endowment with high-quality standards in both management and technology;
- to promote a waste cycle management approach that substantially contributes to achieving climate neutrality objectives;
- to define priority actions to enhance communication and environmental awareness regarding waste and circular economy.

National Waste Prevention Programme (NWPP)
Adopted and approved with DD of 7/10/13, based on EU Directive 2008/98, it must be updated every 6 years and can be included within the Waste Management Plan or be a standalone plan. The Programme sets prevention targets for 2020 compared to the values recorded in 2010:

- 5% reduction in municipal waste per unit of GDP;
- 10% reduction in hazardous special waste per unit of GDP;
- 5% reduction in non-hazardous special waste per unit of GDP.

Decree on Preparation for Reuse
The decree of 10 July 2023, No. 119 *Regulation laying down the conditions for exercising preparations for reuse in a simplified form, pursuant to Article 214-ter of Legislative Decree No. 152 of 3 April 2006* was published in the Official Gazette on 1 September 2023. The decree defines the operational methods, technical and structural equipment, and minimum qualification requirements of operators necessary to carry out such operations, the maximum quantities that can be used, the origin, types and characteristics of the waste, as well as the specific conditions of use under which products or components of products that have become waste are subject to preparation for reuse operations. To this end, the annexes to the Regulation specify the characteristics and technical equipment required for a preparation for reuse centre, the catalogue of acceptable waste, and the maximum quantities that can be used. The regulatory intervention, by allowing the opening of preparation for reuse centres through a simplified procedure, represents a tool that enables greater interception of those waste streams (e.g. WEEE) which, through repair operations, can regain market value, with the same functions and safety guarantees as the original product.

2.1.1. Categories, quantity and type of separated and collected waste at national level

According to the 4th ***SNPA Environmental Report 2023***[3], in Italy, the **amount of waste disposed of in landfills has been steadily declining**, with the percentage dropping from 63.1% in 2002 to 17.8% in 2022, although still far from the European targets (which propose reducing to below 10% by 2035). In parallel, in 2022, the trend of increasing separate waste collection continued, with a rise of 1 percentage point compared to 2021, reaching 65% at the national level. Regionally, in 2022, the lowest percentage of municipal waste disposed of in landfill was achieved by the Campania region

(1.1%), followed by Lombardy, Friuli-Venezia Giulia, Emilia-Romagna, and Trentino-Alto Adige, while the remaining Italian regions recorded percentages above the 10% threshold. The number of operational landfills in Italy, totalling 117 facilities in 2022, distributed across the North (50), Centre (25), and South (42), decreased compared to the previous year. In 2022, the highest percentage of separate waste collection was achieved by the Veneto region, with 76.2%, followed by Sardinia, with 75.9%.

The 2023 edition of the ***Urban Waste Report***[4], presented by ISPRA, also highlights that, despite the increase in GDP and household spending, **national municipal waste production decreased by 1.8% in 2022 compared to 2021**, while the percentage of separate waste collection increased (65.2% of total production). According to the data, Italy produces 29.1 million tonnes of municipal waste; this figure decreased by 544,000 tonnes (-1.8%) compared to 2021. According to ISPRA, the fluctuating trend in waste production can be attributed to various factors, including the introduction of new legislative provisions or health or socio-economic reasons, such as the 2020 pandemic and the 2022 international crisis. Except for 14 municipalities with a resident population over 200,000 inhabitants, where there was a slight increase (0.4%) between 2021 and 2022, the report highlights that waste production decreased in all major Italian geographical areas, specifically by 2.2% in the North and by 1.5% in the Centre and South. In absolute terms, Northern Italy produces over 13.8 million tonnes of waste, the Centre 6.2 million tonnes, and the South almost 9 million tonnes. In 2022, each Italian citizen produced an average of 494 kg of waste, with an average annual cost per inhabitant of €192.3 (it was €194.5 in 2021). According to the ISPRA Report, in 2022, separate waste collection increased (+1.2 points compared to 2021), accounting for 65.5% of total production. In quantitative terms, the dimension of separate waste collection remained stable (18.9 million tonnes), as did the existing gap between Northern and Southern Italy. In 2022, the recycling rate of municipal waste stood at 49.2%, an increase compared to 2021 (48.1%) but still insufficient to reach the target of 65% by 2030 set by the regulations. The waste management facilities operating in 2022 totalled 654. Over half of these are dedicated to the treatment of the organic fraction of separate collection, although not all regions yet have sufficient structures to handle the quantities produced. Regarding packaging and packaging waste, all the commodity fractions have already largely achieved the European targets set for 2025, except for plastic, which is nevertheless close to the target (48.9% against a target of 50%). Among separately collected waste, the organic fraction remains the most collected in Italy (38.3% of the total), followed by paper and cardboard with 19.3% of the total, glass (12.3%), and plastic (9%). The recovery of the organic fraction is mainly carried out in integrated anaerobic-aerobic treatment plants (50.8% of the quantities sent to organic fraction management facilities), followed by composting plants (44.4%); the remaining 4.8% is managed in anaerobic digestion plants.

Together with the annual Urban Waste Report by ISPRA, the ***Report on Energy Recovery*** from Waste in Italy was also published. According to the study, the number of facilities in Italy in 2022 totalled

188, including incinerators and anaerobic digestion plants for the organic fraction and sewage sludge, which produced approximately 7 million MWh of energy, enough to meet the needs of around 2.6 million households. The report also highlights a shortage of facilities in Southern Italy.

According to the 2023 ***Recycling Report in Italy***[5], the prices in the respective markets for secondary raw materials heavily influence the economic balance of companies, which have to navigate a climate of profound political and economic instability, complicating investments and future prospects. Despite this scenario, **Italy continues to be one of the European Union countries with the best recycling performance, reaching 72% in 2020**, **against a European average of 53%,** with peaks of excellence in packaging.

For Italy, according to the Foundation for Sustainable Development, the production of wastepaper (amounting to almost 7 Mt) saw a 6% decrease in 2022 compared to the previous year, mainly due to increased energy costs and geopolitical issues. This decline did not, however, dampen exports, with about 1.5 Mt of paper being sent abroad (nearly 10% more than in 2021). Asia remains the primary market, accounting for 55% of the total. Regarding plastic materials, the mechanical recycling market experienced a slight downturn in 2022 due to rising energy costs, fierce competition from virgin materials, and imports of polymers at competitive prices from Asian countries. Although separate collections are steadily improving, ensuring a good supply of recycled materials, the real challenge lies in the demand for recycled polymers. The significant increase in the selling prices of recycled materials has forced many sectors to resort to virgin polymers to stay competitive. This is particularly true for lower-added-value recycled polymers, for which the final markets would not be sufficient to absorb the quantities produced. In the glass sector, the production of bottles and jars increased in 2022 to meet consumer demands for safety and environmental sustainability. However, the price of glass cullet has risen to the point where many glassworks are returning to virgin raw materials. This discrepancy needs to be addressed, primarily by enhancing the demand for recycled glass. Overall, the amount of recycled glass used in the glass industry was 3.5 Mt, over 60% of the glass produced.

Italy is almost entirely dependent on foreign sources for both aluminium and copper and produce only secondary recycled aluminium. In 2022, Italy remained the leading European producer of electric arc furnace steel (with 85% of steel from scrap), contributing more than 30% to the EU's electric steel production. Due to the heavy reliance of the Italian manufacturing industry on metal imports, improving the collection of this fraction is increasingly strategic for our economy. For wood, energy recovery and recycling are in strong competition: out of the 50 Mt of wood waste generated in the European Union in 2020, 20 Mt were recycled, and the rest was incinerated. In Italy, 97% of recycled wood material is transformed into particle boards used by the furniture and furnishing industry. Today, panel manufacturers mainly use wood from the post-consumer recovery

chain. Regarding organic waste, over 2 Mt of compost was produced in 2021 from the transformation of organic matrix waste treated by composting plants and integrated anaerobic digestion facilities. The integration of composting with the anaerobic digestion process also made it possible to obtain over 400 million m³ of biogas, partly used for electricity production (around 440 GWh) and thermal energy (over 120 GWh), with a portion used to produce biomethane, which reached 136 million m³.

Regarding the textile sector, analysis by the Foundation for Sustainable Development shows that the only segment that has worked so far has been reuse, thanks in part to social cooperatives, generating a very active second-hand market, while textile waste recycling is still a challenge to be developed. As for recycled aggregates produced from construction and demolition (C&D) waste, experts from the Foundation suggest policy recommendations, such as using Minimum Environmental Criteria in public tenders to encourage their use, improving the performance of materials through new facilities, and streamlining the end-of-waste criteria to allow classification as secondary raw materials rather than waste.

According to the ***Circular economy report Italy 2024,*** the overall situation in Italy can be described according to some key numbers and a diagram of the materials flow.

Table 1 Key numbers of circular economy in Italy in 2023 in comparison to EU

Indicator	Italy	EU average
Overall recycling percentage (%)	52	58
Circular use of material rate (%)	18,7	11,5
PIL in relation to every kg of consumed resources (%)	3,7	2,5
Per capita use consumption of materials (t)	12,8	14,9

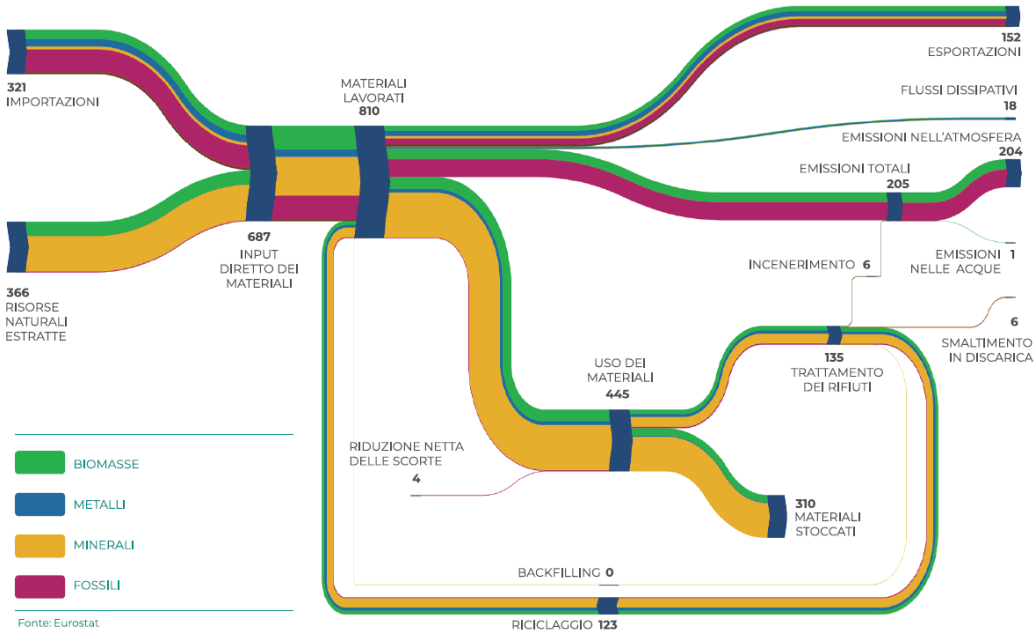

Figure 1 Flow diagram of materials in Italy in 2022 (Eurostat)

According to the latest data**, Italy has increased its municipal waste recycling rate from 37.6% to 49.2% over a decade** and is part of the group of 9 countries in line with European targets[a]. Even more positive data, both for the EU27 and especially for Italy, relate to the recycling rate of all waste, both special and municipal. The indicator shows a constant growth in our country, with an increase of 8 percentage points and a recycling rate of 72% for all waste, special and municipal, in 2020.

Also highly positive is the recycling rate of packaging which, in comparison at the European level, shows Italy achieving the best performance, with an overall packaging recycling rate of 71.7% compared to the EU average of 64%.

Finally, the issue of waste management must consider the WEEE (Waste Electrical and Electronic Equipment) sector, whose quantity is steadily increasing. The recycling of electronic and electrical waste allows for the recovery of various precious metals, including critical raw materials. Despite the high recycling rates of collected WEEE, the WEEE collection rate, compared to the average placed on the market in the preceding three years, remains very low relative to the EU target set at 65% since

[a] La normativa europea ha fissato specifici obiettivi per la preparazione per il riutilizzo e il riciclo dei rifiuti urbani (55% entro il 2025, 60% entro il 2030 e 65% entro il 2035) ed alcuni tra gli Stati membri sono vicini a raggiungere - o addirittura già hanno raggiunto - tali target. (Early Warning Report, European Commission, 2023)

2019. In Italy, the WEEE collection rate in 2021 was only 33.8%, significantly lower than the EU average, which is also low and far from the target but still at 46.2%.

Recycling rate of municipal waste[b]

The trend in the municipal waste recycling rate in Italy over the last available five-year period has grown by 3.4 percentage points. According to ISPRA[c] data, the recycling rate in 2022 stood at 49.2%, which is essentially in line with the target set by the Waste Framework Directive for 2020 (50%) and which must be increased to meet the further targets established by Directive 2018/851/EU.

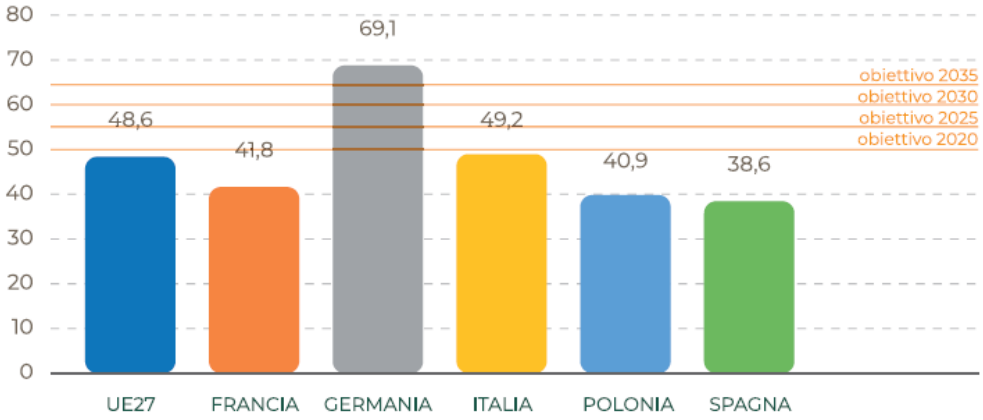

Figure 2 Recycling rate of municipal waste in five major EU countries in 2022 (in %) (Eurostat)

Rate of urban waste recycling[d]

Examining the five main countries of the European Union, Italy, with a 72% recycling rate, firmly remains at the top, while the other countries record performances below the EU average (58%).

[b] The indicator measures the proportion of urban waste recycled out of total urban waste production. Recycling includes material recycling, composting, and anaerobic digestion.

[c] For monitoring the indicator related to urban waste recycling, since last year ISPRA has been applying the new criteria established by Directive 2018/851/EU and the related implementing decision 2019/1004/EU. The new methodologies for accounting are more stringent for the new targets and have been designed to ensure that the calculated percentages are truly representative of the actual recycling capacity.

[d] The indicator measures the proportion of recycled waste (excluding landfill, energy recovery operations, and the category of inert waste) compared to the total quantity of waste treated. The recycling percentage allows monitoring the amount of material reintroduced into the economy derived from waste generated by households and businesses. The indicator covers both hazardous and non-hazardous waste.

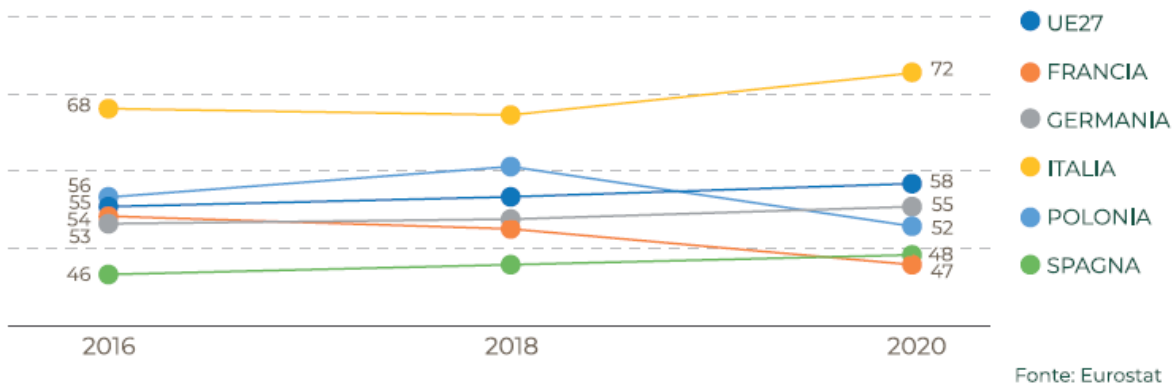

Figure 3 Waste recycling rate in the five major EU countries in the period 2016-2020 (in %) (Eurostat)

Recycling Rate of Specific Waste

- **Paper and cardboard, glass, steel, and wood**

Considering the Eurostat data for 2021, the latest available year, a diverse picture emerges. Italy is currently in an advanced stage of the journey towards achieving the European Union's packaging waste recycling targets, having already reached the 2025 targets in all five examined sectors. Particularly commendable are the results achieved in the recycling of glass, aluminium, and wood packaging waste, where the minimum recycling rate set as a target for 2030 has already been exceeded. The paper and cardboard packaging sectors are also very close to this target. Finally, regarding the recycling of steel packaging waste, our country records a recycling rate that surpasses the 2025 target.

- **Total packaging waste recycling rate**

Italy, which in 2017 recorded a figure below the European average, reached a recycling rate of 71.7% in 2021, almost 8 percentage points higher than the EU27 average (64%). In 2021, Italy achieved the highest recycling rate for all packaging waste among the five main European countries.

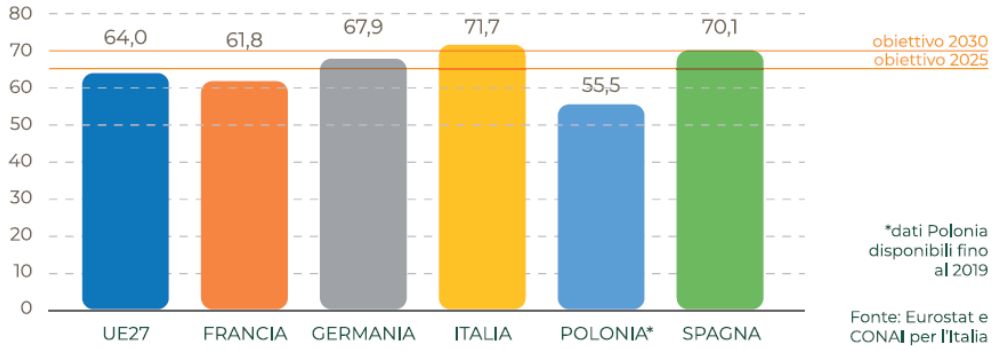

Figure 4 Packaging waste recycling rate in the five major EU countries in 2021 (in %)

- **Recycling rate of plastic packaging waste**

The European Union has set two minimum recycling targets for plastic packaging waste: 50% by 2025 and 55% by 2030. Over the past five years, Italy has achieved a 6-percentage point increase, raising its recycling rate from 41.8% in 2017 to 47.6% in 2021. Comparing the five main European countries, only Spain achieves a better result (56.4%). In third place is Germany with 48.4 percentage points. Poland (31.5% in 2019, the latest available year) and France (23.1%) report figures below the EU average and the lowest results among the countries examined here.

Recycling rate of WEEE collected separately [e]

The recycling of Waste from Electrical and Electronic Equipment (WEEE) has gained increasing prominence in recent years, not only due to the significant increase in the quantity of goods - such as cell phones, tablets, televisions, computers, and various other appliances - entering the market and reaching the end of their life cycle, but also because WEEE contains valuable and non-valuable materials, as well as critical raw materials, the sourcing of which is becoming increasingly complex and costly. It should be noted that the WEEE collection rate compared to the average placed on the market in the preceding three years remains very low relative to the EU target set at 65% by 2019. In fact, for Italy, this figure stood at 33.8% in 2021, while the EU27 average is 46.2%.

[e] The calculation of the recycling rate of WEEE collected separately is measured based on the percentage of WEEE, by weight, sent for recycling/preparation for reuse compared to the total WEEE, also calculated by weight, collected separately.

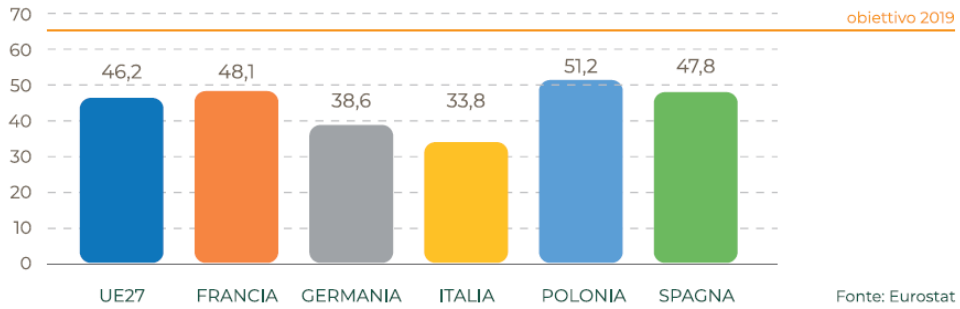

Figure 5 Rate of collection of RAEE waste with respect to the average consumption in the previous three-year period in the major five EU countries in 2021 (Eurostat)

Eurostat data shows that in 2021, Italy achieved a WEEE recycling rate of 87.1%, a slight decline of about two percentage points compared to the 2017 figure. This decrease is attributed to the disappointing performance during the 2017-2019 period, largely offset by the results achieved in the 2019-2021 period, which showed an increasing trend. In a European comparison, Italy's figure remains one of the highest, surpassing the EU27 average. Also, compared to the five main European countries, Italy regains the top position after the decline in the previous years.

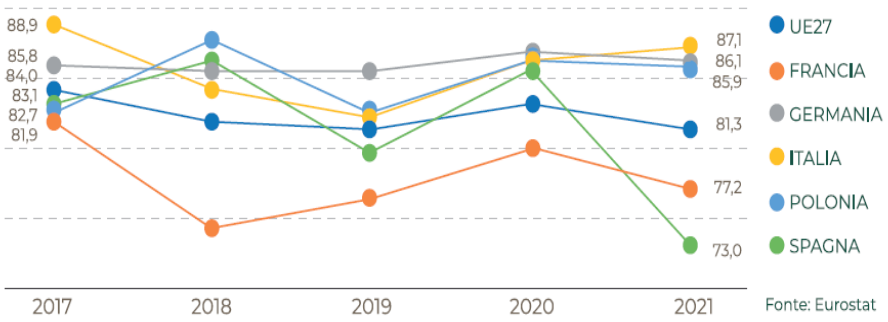

Figure 6 Recycling rate of RAEE waste subject to separate collection in the period 2017-2021 (in %) (Eurostat)

According to the dossier ***Comuni Ricicloni 2024***, in Italy in 2023 there will be 698 Waste Free Municipalities (i.e., those that contain the per capita production of undifferentiated waste sent for disposal below 75 kg/inhabitant/year) (69 more than in 2022, corresponding to about 11%), a not insignificant increase if compared to the data collected in the last 3 years, characterised by substantial stagnation. As a result, the percentage of waste-free citizens in relation to the total Italian population, which rose from 6% to 6.9%, also increased compared to the previous year, amounting in absolute terms to 539,590 more inhabitants served by an efficient waste management service. However, the incidence of Waste Free municipalities is in contrast to the number of inhabitants; in fact, the category of medium-sized municipalities (those with a population between 5,000 and 15,000

inhabitants) contributes 40%, those with more than 15,000 inhabitants 29%, and small municipalities 23%, with the capitals accounting for the remaining 8%. These figures show how crucial it is to invest even more in the most urbanised areas, where a large part of urban waste production is concentrated.

Table 2 Waste free municipalities according to territorial affiliation (years 2021, 2022, 2023, 2024)

Waste free municipalities according to territorial affiliation	2021	2022	2023	2024
North	423	391	423	434
Centre	38	32	30	33
South	162	167	167	231
Total	**623**	**590**	**629**	**698**

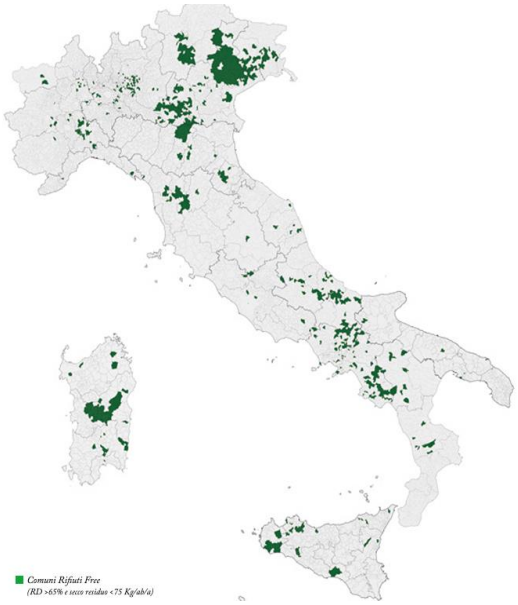

Figure 7 Map of waste-free municipalities in Italy in 2023

2.2. Separate waste collection system in the Apulia region

With D.G.R. 15/10/2021 no. 1651 the Regional Council of the Apulia Region adopted the Plan for the management of urban waste. The planning basis comes from the principles inspired

by the European “package of measures on the circular economy” and declines it by adapting it to regional needs.

The plan, in addition to being a programming tool, allows the Regional Waste Agency “AGER” - established by regional law no. 20 of 4 August 2016 - to achieve in an optimal way the objectives and activities set out in the regional law no. 20 of 4 August 2016. The aim of the plan is to ensure the active participation of trade associations and stakeholders with the method of co-planning and the consultation of subjects with environmental expertise within the framework of the strategic environmental assessment procedure.
European and National waste management policies have focused on respecting the "hierarchy of actions", which aims to promote, in order of priority, prevention, preparation for reuse, recycling, other types of recovery and disposal. The Urban Waste Management Plan of the Apulia Region is rooted in the conviction of strengthening the effort adopted by European policies, reflecting on the term “waste” itself, which is characterized by a negative connotation and leads to rejection.[6]

2.2.1. Categories, quantity and type of separated and collected waste at regional level

The waste separation system in the Apulia region has seen significant developments in recent years, aimed at improving waste management and promoting environmental sustainability. Recently, the region signed an important agreement with CONAI (National Consortium for packaging recovery) and ANCI Apulia (Apulian referent for the National Assosiation of Italian Municipalities) to strengthen the infrastructure needed to close the waste cycle and improve the quality of waste separation. This agreement includes the introduction of innovative waste tracking systems and the promotion of pay-as-you-throw schemes, which encourage citizens to better separate their waste in order to pay less, based on the amount of waste they produce.[7] In Apulia, some municipalities stand out for the effectiveness of their waste separation systems, with eight municipalities recognized by Legambiente as "waste-free," having exceeded the 65% waste separation target and showing a very low per capita waste production rate. However, the results are still uneven across provincial capitals, with some failing to reach the same efficiency.[8]

At the same time, the Apulia region has launched an initiative to upgrade municipal waste collection centers, with funding of 13 million euros. These centers are essential for the proper disposal of waste that cannot be managed through household collection, such as

pruning waste, textiles, and bulky waste, thereby further increasing waste separation percentages[9].

The Regional Plan for urban waste management provides that all the municipalities of Apulia adopt systems of differentiated collection at least of the following fractions: organic waste, paper and cardboard packaging, metal packaging, plastic packaging, glass packaging, wood packaging and textiles. The ISPRA Institute provides data about waste production originated both from domestic users (families) and non-domestic users (restaurants, supermarkets, cinemas, shops, museums, hotels, etc.) in Apulia Region in 2022. The following table provides the detail of the composition of separated waste by categories and by provinces in Apulia Region.[4]

Table 3 Detail of the composition of the separated waste by categories in Apulia Region Provinces - 2022 (ISPRA)

Detail of the composition of the separated waste by categories in Apulia Region Provinces - 2022 (ISPRA)												
Province	**Food Waste (tons)**	**Paper (tons)**	**Plastic (tons)**	**Metals (tons)**	**Glass (tons)**	**Wood (tons)**	**Furnitur esetc. (tons)**	**Electrica l Equipme nt (tons)**	**Clothing (tons)**	**Waste from construc tion (tons)**	**Street Sweepin g to recover (tons)**	**Others (separate d waste) (tons)**
Foggia	44.175,44	16.401,74	9.397,89	1.246,677	11.904,17	3.246,03	7.466,12	987,89	1.442,10	968,98	18.095,61	1.351,58
Bari	130.382,9	73.604,93	31.730,31	3.247,422	38.379,00	13.794,53	23.975,25	4.125,52	3.937,39	6.165,77	4.953,50	6.250,25
Taranto	58.469,56	24.182,72	12.837,01	1.459,514	16.273,40	3.912,63	14.509,94	1.666,48	1.071,17	3.125,65	7.338,54	3.494,50
Brindisi	50.768,83	20.206,19	13.476,75	1.296,934	8.453,38	4.216,18	7.026,54	1.437,79	1.246,62	3.278,25	387,16	2.721,29
Lecce	99.187,74	46.857,47	24.323,69	3.834,412	28.147,52	7.343,89	9.116,06	4.385,68	1.320,25	6.140,95	5.109,07	3.191,22
Barletta-Andria-Trani	49.491,32	18.061,00	9.077,94	679,728	11.220,23	6.183,230	7.045,080	935,87	1.611,46	2.894,24	1.774,60	1.568,75

3. Secondary raw material markets

3.1. Overview of the secondary raw material markets in the Italian Republic

Regulations

The rules regarding the recovery of residues, which are then transformed into secondary raw materials (so-called "MPS") or "End of waste" materials, are currently undergoing a legal evolution shifting from the historical discipline related to the production of "secondary raw materials" to the new European-based logic of "end of waste" (namely, the "cessation of waste qualification").

- *End of Waste. SNPA Guidelines*. Guidelines No. 41/2022 provide indications for carrying out checks on recovery plants that produce materials that cease to qualify as waste (the so-called "End of Waste").

- The legislative decree 77/2021 converted into Law No. 108/2021 amended paragraph 3 of Article 184-ter and introduced in the procedure for issuing authorisation measures, as provided for in Articles 208, 209, and 211, and in Title III-bis of Part Two of Legislative Decree 152/06, "a mandatory and binding opinion of ISPRA or the regionally competent environmental protection agency."
- Additionally, Law No. 128 of 2 November 2019, published in GU No. 257 on 2/11/19, converting Legislative Decree 3 September 2019, No. 101 (urgent provisions for labor protection and the resolution of company crises), introduced a system of controls on plants carrying out waste recovery operations resulting in authorized end-of-waste on a case-by-case basis, with competence entrusted to SNPA. It represents the revision of the "Guidelines for the application of the End of Waste discipline referred to in Article 184-ter paragraph 3 ter of Legislative Decree 152/2006" published in February 2020 and aims to ensure harmonization, effectiveness, and consistency of the System's action throughout the national territory.
- Decree 22 September 2020, No. 188 *Regulation governing the cessation of waste status for paper and cardboard, under Article 184-ter, paragraph 2, of Legislative Decree 3 April 2006, No. 152*
- Decree 27 September 2022, No. 152 *Regulation governing the cessation of waste status for construction and demolition inert waste and other inert mineral waste, under Article 184-ter, paragraph 2, of Legislative Decree 3 April 2006, No. 152*

In Italy, Secondary Raw Materials (SRM) are expressly excluded from the waste regime, whether they derive from recovery activities identified by specific decrees (DM 5/2/1998, DM 161/2002, DM 269/2005) or whether they are identified through ordinary authorisation procedures. Also excluded from the waste regime are SRMs that are already such without the need for treatment (so-called SRMs at the source, as per Circular 28 June 1999 no. 3402/V/MIN, known as the Ronchi Circular) up to 25 June 2011 (i.e., within six months from the entry into force of Legislative Decree no. 205/2010).
This is what the new paragraph 3 of article 184 ter provides regarding SRMs, or in the absence of community criteria, case by case for specific types of waste (paragraph 2 of article 184 ter). Therefore, a preliminary conclusion can be drawn. The national simplified procedures for SRMs can be updated both to take into account the community criteria for EOW and to simply adapt the simplified recovery procedures.
With reference to this last aspect, it is worth noting that Article 24 of Directive 98/2008 provides for the possibility of an exemption from the authorization requirement for entities and companies for the disposal of their non-hazardous waste at production sites and for waste recovery operations (both their own and third parties).

It is important to highlight that Italian SRMs are nothing but, in advance, an "end of waste" system. In fact, according to the procedures in place in Italy, a waste subjected to recovery activities becomes

a secondary raw material for use in a specific industrial activity excluded from the waste regime. According to paragraph 1 of article 184 TER, waste ceases to be such when it has undergone a recovery operation, including recycling and preparation for reuse, and meets specific criteria, to be adopted in compliance with the following conditions:
a) the substance or object is commonly used for specific purposes; b) there is a market or demand for such substance or object; c) the substance or object meets the technical requirements for specific purposes and complies with existing regulations and standards applicable to products; d) the use of the substance or object will not lead to overall negative impacts on the environment or human health. Regarding condition 2, it is noted that the absence of economic value or triviality is certainly different from the existence of a market or demand.

When the Ronchi Circular was no longer officially in force, many Secondary Raw Materials (SRMs) "transitioned" into the by-product regime (referred to with the section dedicated to it). It is only worth bearing in mind the definition (also new) of by-product as introduced by article 12 with a new article 184 bis.
It stipulates that a by-product, and not waste as defined in article 183, paragraph 1, letter a), is any substance or object that meets all of the following conditions:

- the substance or object originates from a production process, of which it is an integral part, and whose primary purpose is not the production of that substance or object;
- it is certain that the substance or object will be used, in the course of the same or a subsequent production or utilization process, by the producer or third parties;
- the substance or object can be used directly without any further treatment other than normal industrial practice;
- further use is legal, meaning the substance or object meets, for the specific use, all relevant requirements concerning products and the protection of health and the environment and will not lead to overall negative impacts on the environment or human health.

According to the ***Circular Economy Report 2024***, in 2022 recycled materials only satisfied 11.5% of the overall materials demand in the EU27. In Italy, this figure stood at 18.7%, making the country achieve one of the best performances in Europe. However, for a significant number of materials, including many essential raw materials, the contribution of recycled materials to meeting the demand for raw materials is still not sufficient. For instance, for some rare earth metals, the end-of-life material recycling rate is around 1%, although it reaches 16% for nickel and 22% for cobalt.
Gli scambi di materie prime seconde (MPS) sia all'interno dell'UE sia con i paesi terzi sono in aumento. Nel 2021, l'UE27 è stata nel complesso un importatore netto di materie prime seconde: 41 milioni di tonnellate importate contro le 38 esportate.
The trade of Secondary Raw Materials (SRMs) both within the EU and with third countries is

increasing. In 2021, the EU27 overall was a net importer of secondary raw materials: 41 million tonnes imported compared to 38 million tonnes exported.

The contribution of recycled materials to meeting the demand for raw materials is represented by the **Circular Material Use (CMU)** rate, defined as the ratio of the use of secondary raw materials generated through recycling to the total material consumption[f].
Italy, which has historically shown among the best performances in this indicator, confirmed its position in 2022 compared to 2018, albeit with a declining trend compared to subsequent years, with recycled secondary raw materials accounting for 18.7% of the total raw materials consumed. However, this indicator value has remained largely static in our country over the last five years, dropping by 0.1 percentage point compared to what was observed in 2018.

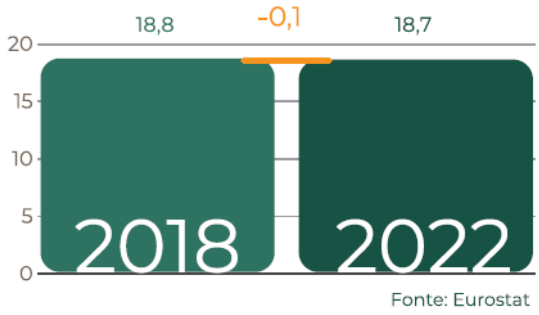

Figure 8 Circular use rate of material in Italy (2018-2022) (in %) (Eurostat)

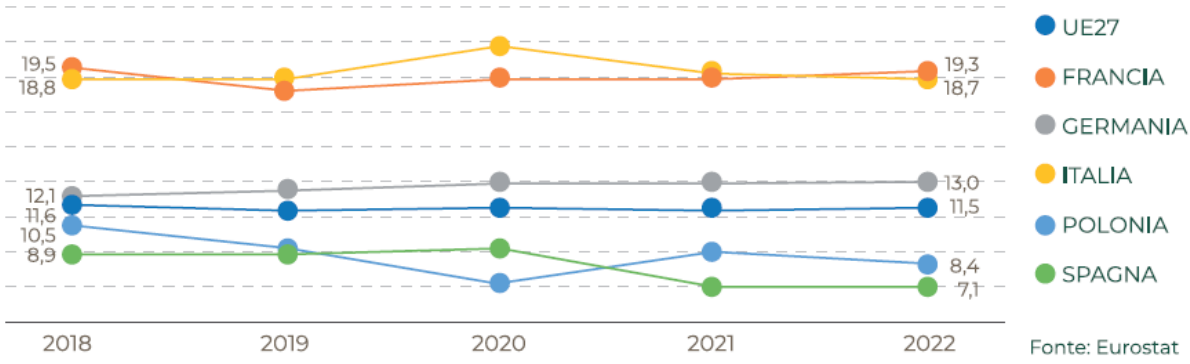

Figure 9 Circular use rate of materials in the five major EU countries (2018-2022) (in %) (Eurostat)

[f] The overall material usage is measured by adding the Domestic Material Consumption (DMC) and the Circular Material Use (U), representing the total quantity of material directly consumed at the national level as the sum of virgin raw materials extracted and recycled secondary raw materials reintroduced into production cycles. Circular Material Use (U) is determined by the quantity of waste recycled in recovery facilities within the national territory, minus imported waste destined for recycling, plus the quantity of waste exported for recycling abroad.

Trade of Secondary Raw Materials

In Italy, according to Eurostat[g] data, over the last five years, imports of secondary raw materials have grown by 6%, reaching 4 million tonnes in 2021. The most imported materials in Italy are organic and metallic types (iron and steel).

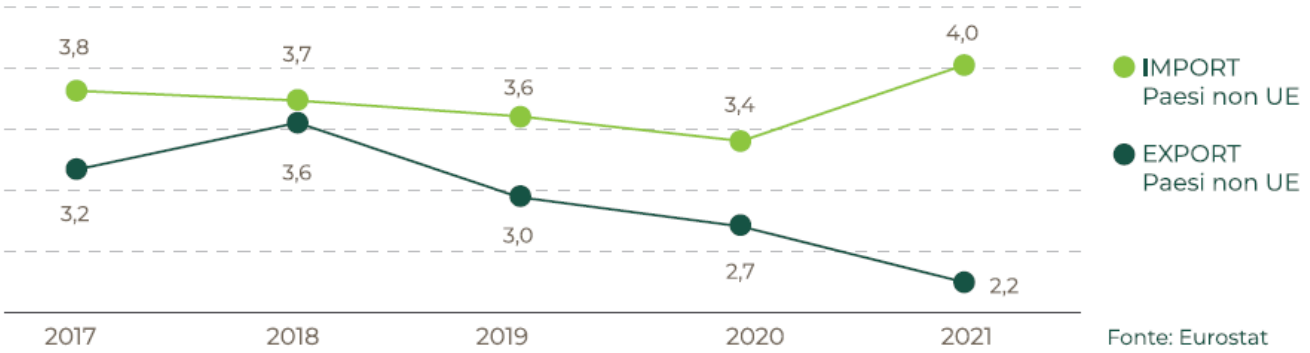

Figure 10 Import and export of Secondary Raw Material from and to outside-EU countries in Italy in the period 2017-2021 (in Mt) (Eurostat)

Conversely, exports to non-EU countries have declined since 2017 (with the exception of 2018), decreasing by approximately 30 percentage points in 2021 (2.2 million tonnes). Paper and cardboard materials are the most traded outside the EU, with their main destination being India and some countries in Southeast Asia.

[g] Statistics from the International Trade in Goods Statistics (ITGS), published by Eurostat

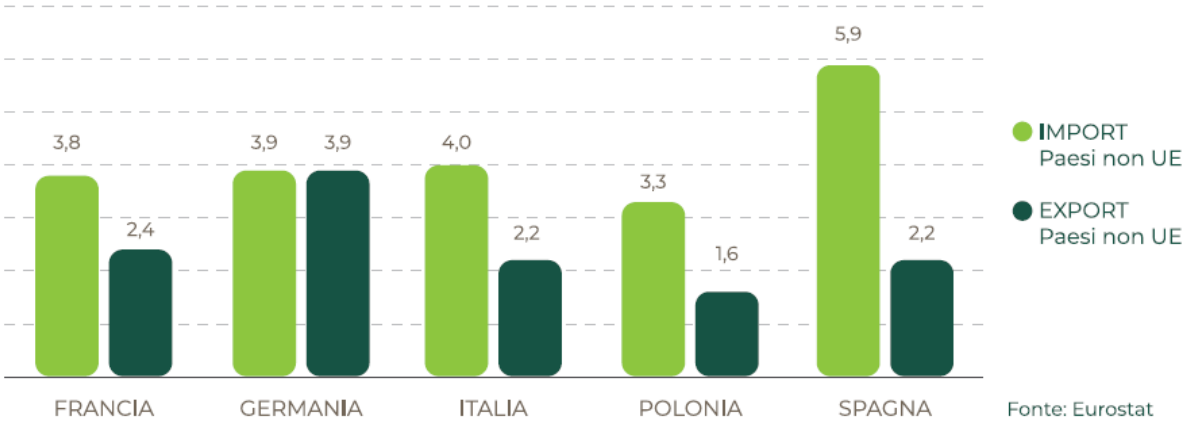

Figure 11 Trade of Secondary Raw Materials in the five major EU Countries in 2021 (in Mt) (Eurostat)

Intra-EU Trade of Secondary Raw Materials

Intra-EU imports of Secondary Raw Materials (SRMs) provide a good approximation of the market for these materials within the European Union. In the EU27, the exchange of secondary raw materials, calculated as imports between member countries, stood at around 92 million tonnes in 2021, an 8% growth compared to 2017. Italy's trend has shown a greater growth over the last five years compared to the EU27 average, increasing by over 10% to reach a value of 8.3 million tonnes of SRMs imported from EU countries. Particularly significant for Italy is the import of ferrous scrap (5.3 million tonnes): in fact, our country is the European leader in electric arc furnace steel production, contributing to over 30% of the EU's electrosteel production.

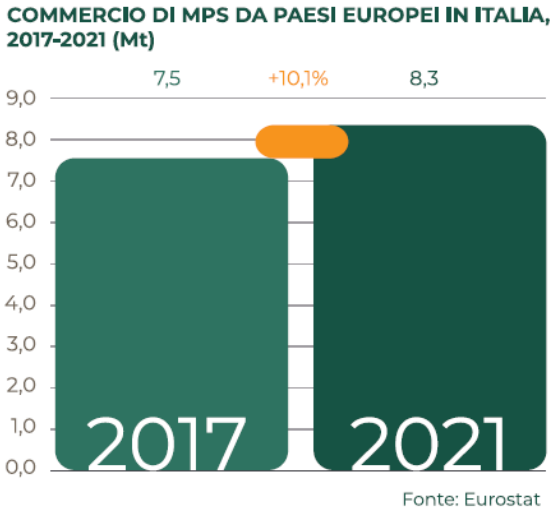

Figure 12 Trade of Secondary Raw Materials from EU countries in Italy in the period from 2017-2021 (in Mt) (Eurostat)

3.2. Secondary raw material system in the Apulia region

Differentiated waste sorting activities are only one of the multiple links in the recovery chains. All the chain's steps are closely interconnected and interdependent, each of them entailing costs and revenues so much that it is often more correct to assess the economic balance of the entire chain, rather than individual operations. The flow chart in Figure 1 below provides an idea of the factors that can affect the economic balance of a chain. Many of these factors also play a key role in the economic performance of the sorting plants.

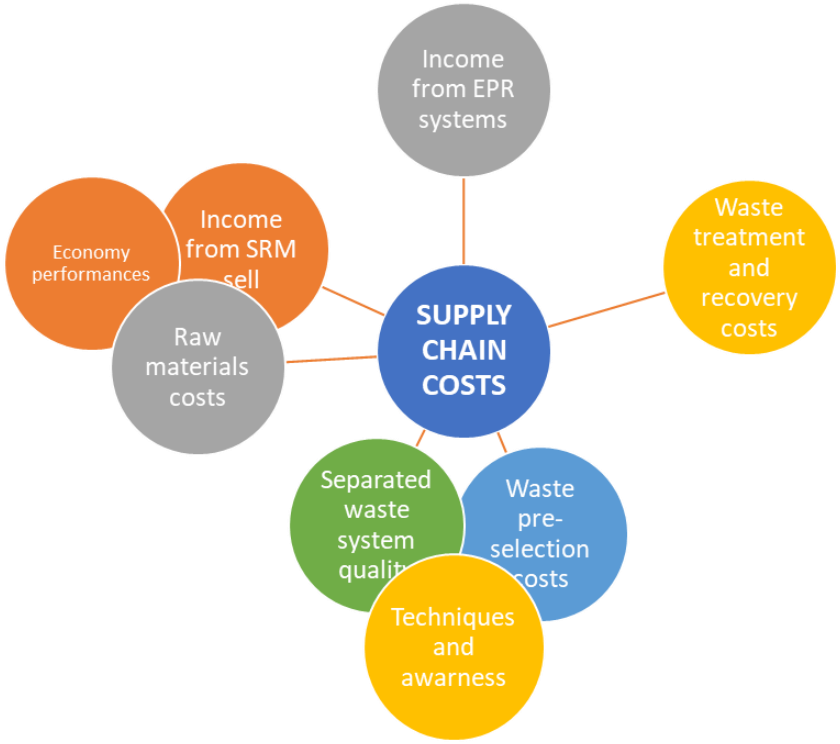

Figure 13 Main parameters affecting the cost/income supply chain in a waste recovery process

The management of secondary raw materials derived from waste in Apulia region is aligned with advanced principles of the circular economy, aiming to maximize resource efficiency and minimize environmental impact. The region's approach is outlined in several key documents, including the Special Waste Management Plan of the Apulia Region, which provides the framework for transforming waste into secondary raw materials.[11]

Key Aspects of the System:

1. Resource Recovery: Apulia has implemented strategies to recover valuable materials from waste streams, particularly from sectors such as electronics (WEEE), plastics, and organic waste. The region's facilities are equipped to handle complex waste types, extracting materials like precious metals, critical raw materials (e.g., cobalt, lithium), and high-quality polymers. These materials are then reintegrated into production cycles, reducing the need for virgin raw materials.

2. Technological Innovation: The region emphasizes the use of advanced technologies for waste processing. For example, hydrometallurgical processes are employed to recover metals from electronic waste, achieving high purity levels. This is particularly relevant given the increasing demand for metals like lithium and cobalt, driven by the growth of renewable energy and electric vehicles.[5]
3. Circular Economy Integration: The Apulia region's waste management policies are deeply integrated with circular economy principles. This involves not only recycling but also designing products and processes to minimize waste generation from the outset. The focus is on creating closed-loop systems where waste materials are continuously cycled back into production, reducing the environmental footprint and reliance on non-renewable resources.[1]
4. Sludge Management: A specific focus is placed on the management of sludge from wastewater treatment plants. The region has developed strategies to reuse this sludge, particularly in agriculture, thus converting waste into a resource. This aligns with the broader goals of reducing waste disposal in landfills and promoting sustainable practices in key regional industries.
5. Regulatory and Policy Framework: Apulia's system is supported by a strong regulatory framework that aligns with both national and EU directives on waste management and resource recovery. The region's policies encourage innovation and the adoption of best practices across all sectors involved in waste generation and processing.[1]

3.2.1. Recycling facilities (Apulia Region)

In the Apulia region, the infrastructure for recycling and processing waste has developed significantly to align with the broader goals of a circular economy and sustainable waste management. The region hosts a variety of advanced facilities that cater to different waste streams, including organic waste, recyclable materials, and special waste types like sludge from wastewater treatment.[10]

1. Organic Waste Treatment Facilities

Apulia has invested in facilities specifically designed to handle the Food Waste, which refers to the organic fraction of municipal solid waste. These facilities employ anaerobic digestion technology, a process in which organic waste is broken down by microorganisms in the absence of oxygen, producing biogas. This biogas can be converted into thermal or electrical energy, or further refined into biomethane, which is a renewable substitute for natural gas.

The region is actively expanding these anaerobic digestion facilities to both manage organic waste more effectively and contribute to renewable energy production. This approach is seen as essential in reducing the environmental impact of waste and supporting energy self-sufficiency.[10]

2. Material Recovery Facilities (MRF)

The Material Recovery Facilities (MRFs) in Apulia are crucial for the separation and processing of dry recyclable materials. These facilities use a combination of mechanical and manual sorting techniques to extract valuable materials such as plastics, metals, paper, and glass from the mixed waste stream. The recovered materials are then cleaned, sorted, and prepared for sale as secondary raw materials to manufacturers. Apulia has focused on upgrading these facilities to increase the efficiency and purity of the recovered materials, which is essential for maintaining the economic viability of recycling operations and ensuring that the materials meet market standards for reuse.

3. Waste-to-Energy Plants

Although waste-to-energy (WtE) plants are less prominent in Apulia compared to other waste management options, they play a role in dealing with non-recyclable waste. These plants incinerate waste to generate energy, which can be used to produce electricity or heat. The process also reduces the volume of waste, thus decreasing the need for landfill space. However, the expansion of WtE plants in Apulia is approached with caution due to concerns about air quality and potential health impacts, especially in regions already burdened by industrial pollution.

4. Sludge Treatment Facilities

A significant development in Apulia's waste management strategy is the inclusion of sludge treatment facilities that process sludge from wastewater treatment plants. These facilities have been authorized to recover and repurpose sludge under strict regulatory controls to avoid environmental contamination. The treated sludge can be used in various applications, including as a soil amendment in agriculture, provided it meets safety and quality standards. This initiative is part of a broader effort to integrate waste streams into the circular economy by finding productive uses for materials that were previously considered waste.

Despite these advancements, Apulia faces ongoing challenges, particularly in optimizing the cost-effectiveness of its waste management system and further reducing the amount of

waste sent to landfills. The region is actively working to address these issues by encouraging the development of additional recycling and recovery facilities, improving waste separation at the source, and enhancing public awareness of the importance of waste reduction and recycling. The goal is to achieve higher recycling rates and more sustainable waste management practices across all municipalities in the region.
The region's focus on developing a robust recycling infrastructure is essential not only for environmental sustainability but also for economic resilience, as it reduces dependency on external raw materials and creates local jobs in the recycling and waste management sectors.[10]

3.2.2. Users of the secondary raw material

In Puglia, several production facilities utilize recycled raw materials as part of their regular operations, aligning with the principles of the circular economy. These users can be broadly categorized into sectors such as manufacturing, construction, energy, and agriculture.

1. Manufacturing Sector
   - Plastic Recyclers: Facilities that produce plastic products often use recycled polymers sourced from local recycling plants. These materials include PET, HDPE, and LDPE, which are recycled into new products like packaging materials, containers, and other plastic goods. Companies in Puglia engage in closed-loop recycling, where waste plastic is reprocessed and reincorporated into production lines.
   - Metal Processors: Metal recycling facilities in Puglia recover ferrous and non-ferrous metals from waste, which are then supplied to manufacturing companies for use in producing new metal products. This sector includes companies that produce automotive parts, construction materials, and machinery.
2. Construction Industry
   - Construction Material Manufacturers: Companies in the construction industry utilize recycled aggregates from demolition waste, glass, and other inert materials in the production of new building materials, such as concrete and asphalt. This approach reduces the demand for virgin raw materials and lowers the environmental footprint of construction projects.
   - Green Building Materials: Some facilities in Puglia focus on producing eco-friendly building materials, including bricks and tiles made from recycled materials. These products are used in sustainable construction projects across the region.

3. Energy Sector
   - Biogas Plants: As part of the region's waste-to-energy initiatives, biogas plants use organic waste and sludge from wastewater treatment facilities to produce biogas. This biogas is either converted into electricity or purified into biomethane, which is used as a renewable energy source. The residual digestate from this process is sometimes used as a fertilizer in agriculture, closing the loop in organic waste management.

4. Agriculture
   - Organic Fertilizer Producers: Agricultural facilities in Puglia increasingly use organic compost derived from the processing of organic waste (FORSU) and treated sludge. These recycled materials are used to enhance soil fertility, contributing to sustainable agricultural practices in the region.
   - Sludge Utilization: Treated sludge from wastewater facilities, which meets strict safety and environmental regulations, is used as a soil conditioner or fertilizer, particularly in large-scale farming operations.

These production facilities not only help in reducing the environmental impact of waste but also contribute to the region's economic sustainability by creating new markets for recycled materials. The use of recycled raw materials is a growing trend in Apulia, supported by regional policies and investments aimed at enhancing the circular economy. The integration of these materials into production processes is essential for reducing dependency on virgin resources, lowering production costs, and minimizing waste sent to landfills.[10]

4. Measures and initiatives for the development and improvement of secondary raw material markets

The Apulia region has undertaken several initiatives aimed at developing or improving the market for secondary raw materials, focusing on enhancing recycling, promoting the circular economy, and supporting industrial innovation. Below is a list of some key initiatives:

1. Regional Plan for Waste Management
   - Objective: This comprehensive plan outlines the region's strategies for managing different types of waste, including promoting the use of secondary raw materials. The plan emphasizes reducing landfill use, increasing recycling rates, and developing markets for recycled materials.

- Initiatives: It includes investments in waste processing infrastructure, such as facilities for organic waste (FORSU) and material recovery facilities (MRFs), which are crucial for producing high-quality secondary raw materials.

2. Public-Private Partnerships
   - Objective: To foster collaboration between public authorities and private companies in developing recycling and material recovery facilities.
   - Initiatives: The region supports initiatives that bring together public and private entities to invest in recycling plants, particularly those focusing on high-value materials such as plastics, metals, and electronic waste (WEEE). These partnerships are designed to stimulate the market for recycled materials by ensuring a steady supply and demand chain.
3. Investment in Biogas and Biomethane Facilities
   - Objective: To convert organic waste into energy, thereby reducing waste and producing renewable energy sources.
   - Initiatives: The region is expanding its network of biogas plants that process organic waste into biogas, which is then used to generate electricity or refined into biomethane. This process creates secondary products, such as digestate, which can be used as a fertilizer in agriculture, promoting a circular approach to waste management.
4. Development of Green Procurement Policies
   - Objective: To encourage the use of products made from recycled materials in public procurement processes.
   - Initiatives: Apulia has been working on integrating green procurement policies that mandate the use of recycled materials in public infrastructure projects. This includes the use of recycled aggregates in construction and promoting the use of recycled content in products purchased by public institutions.
5. Support for Innovation in Recycling Technologies
   - Objective: To enhance the efficiency and effectiveness of recycling processes and the quality of secondary raw materials.
   - Initiatives: The region provides financial and technical support for research and development in new recycling technologies. This includes grants for startups and established companies that are innovating in areas such as plastic recycling, electronic waste processing, and the recovery of critical raw materials.
6. Educational and Awareness Campaigns

- Objective: To increase public and industrial awareness of the importance of secondary raw materials and encourage their use.
- Initiatives: The region has launched several campaigns to educate businesses and the general public about the benefits of using recycled materials. These campaigns also aim to improve waste separation at the source, which is crucial for producing high-quality secondary raw materials.

These initiatives reflect Apulia's commitment to fostering a robust market for secondary raw materials, contributing to both environmental sustainability and economic growth in the region.[10]

5. Conclusion

The secondary raw material (SRM) market in the Apulia region is an essential component of the region's circular economy, enabling the recovery and reuse of materials that would otherwise be wasted. The market for SRMs operates by reintegrating recycled materials into the production cycle, reducing the reliance on primary resources. However, the SRM market in Apulia faces both supply- and demand-side challenges that affect its functionality.

On the supply side, one of the key issues is the lack of consistent quality and availability of SRMs, which makes it difficult for industries to integrate these materials into their processes. In Apulia, as in other regions, technical specifications and the harmonization of "end-of-waste" criteria are needed to boost confidence in using recycled materials. The region has numerous recycling facilities, but there is a need for better coordination and standardization to ensure that SRMs meet industry standards consistently. This includes the recycling of materials such as paper, glass, wood, and biowaste, sectors where the circular economy has seen progress.

On the demand side, industries in sectors like construction, manufacturing, and agriculture are increasingly interested in incorporating SRMs into their production cycles. However, there is still a reluctance to invest in newer technologies that would allow for greater integration of recycled materials. This is exacerbated by uncertainties regarding the consistent supply of high-quality SRMs and economic drivers that do not always favor the use of recycled over primary materials.

To address these challenges, policies supporting market transparency, improving product design for recyclability, and introducing economic incentives (e.g., eco-modulated tariffs) are being considered both at the regional and EU levels. These measures aim to increase both

supply and demand, promoting a more efficient and competitive SRM market in the Apulia region.
The SRM market in Apulia, like elsewhere in Europe, is still evolving and can benefit from more robust governance structures, better market information, and increased confidence from industries to fully integrate SRMs into their processes.

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