

ITALY IS A LEADER IN BIOECONOMY

THE ECONOMY UTILIZING BIORESOURCES AS INPUTS PLAYS A KEY ROLE IN THE TRANSITION TOWARDS A MORE SUSTAINABLE SYSTEM. BIO-BASED INDUSTRY IS A SOLID REALITY IN ITALY, A COUNTRY WITH FAVOURABLE CONDITIONS FOR FURTHER GROWTH, WHICH IN TURN MAY MOBILIZE CAPITALS, PROMOTE RESEARCH AND DEVELOPMENT, AND CREATE JOBS.

Bioeconomy is an economy that uses renewable bioresources, such as waste, as inputs to produce food, products and energy (European Commission, 2016). The bioeconomy thus intends to promote the transition towards a more sustainable socio-economic system, based on a more rational use of bioresources. Advancements in bioeconomy can result in several benefits, including the reduction of fossil fuel dependence, the reduction of the environmental impact of primary production and along the production chains, the increase of competitiveness at international level, the creation of new jobs and new business opportunities. According to the European Commission, the sectors and sub-sectors (based on the Nace classification) that relate directly to the bioeconomy are agriculture, forestry, fisheries, food and beverages, wood processing, pulp and paper production, biofuel production, as well as parts of the chemical industry that use renewable resources (European Commission, 2012).

This statistical definition, however, runs the risk of simply labelling – with the term ‘bioeconomy’ – mostly mature businesses, while failing to grasp their innovative potentials. The bioeconomy, instead, entails a transition of huge parts of the production system towards new production methods, both in terms of processes and products.

Bioeconomy and bio-based industry in the EU

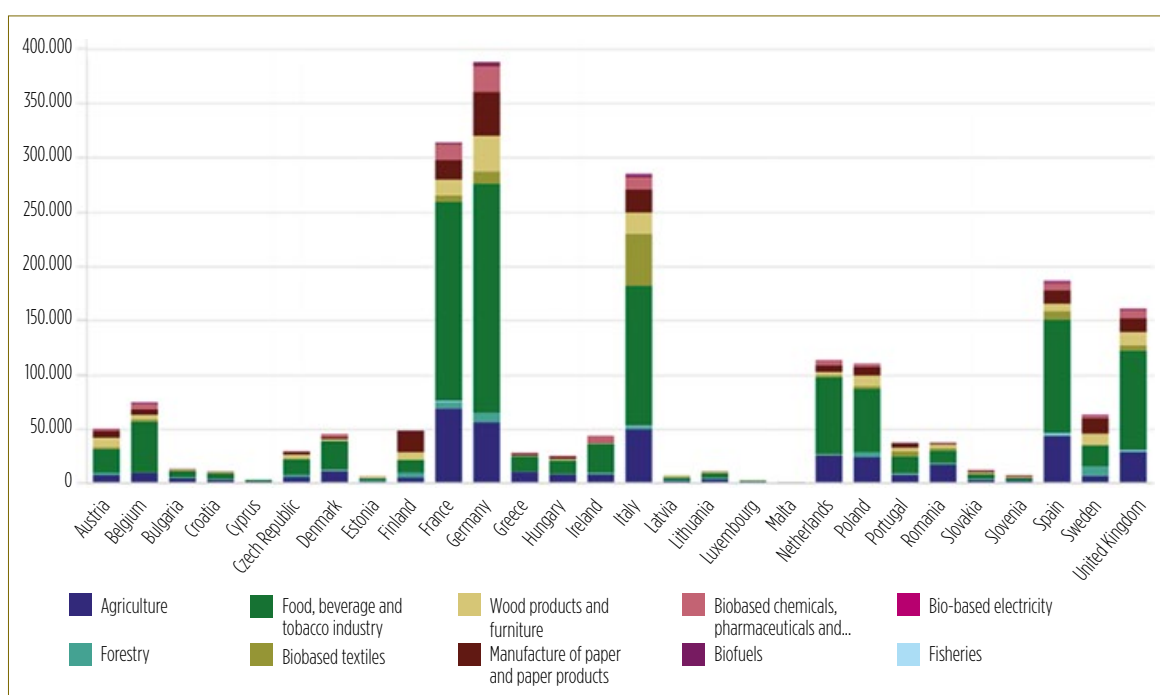
The EU's bioeconomy sectors are worth € 2 trillion in annual turnover and account for more than 22 million jobs and approximately 9% of the workforce (European Commission, 2013). As highlighted in *figure 1*, however, big differences between European countries still exist, and the leaders are Germany, France and Italy. Each euro invested in EU-funded bioeconomy research and development

is estimated to trigger € 10 of value added in bioeconomy sectors by 2015 (European Commission, 2013). In order to promote and support the growth of bioeconomy in the EU, the European Commission (2012) adopted the strategy “*Innovating for sustainable growth: a bioeconomy for Europe*”. The strategy has three pillars: promoting investments in research, innovation and skills through EU funding, promoting a greater interaction between policies and the stakeholders involved by means of an ad-hoc EU platform and observatory, promoting markets and competitiveness of sectors linked with the bioeconomy. The strategy also encourages the development of biorefineries, above all as substitutes for traditional chemical industries, based on supply chains as local as possible, as well as “*the development of standards and standardized sustainability assessment methodologies for bio-based products*” in order to improve information for final consumers and support the green public procurement.

FIG. 1
BIOECONOMY

European bio-economy turnover in 2013 (in millions of euros) per country and per production sector.

Source: DataM-Bioeconomics, European Commission, Jrc, 2015.



The key role of the bioeconomy for industrial growth in the EU was stressed in the package on circular economy “Closing the loop. An EU action plan for the circular economy” adopted by the European Commission in 2015. Biomass and bio-based products are among the five priority areas of intervention to increase the efficiency in the use of raw materials and reduce waste, according to the principles of circularity, whereby waste of one industry becomes inputs for another. In particular, the EU acknowledges that *“the bio-based sector has shown its potential for innovation in new materials, chemical and processes, which can be an integral part of the circular economy”*. However, it underlines that *“realising this potential depends in particular on investments in integrated bio-refineries, capable of processing biomass and bio-waste for different end-uses”*.

The situation in Italy

In Italy, the bioeconomy is a solid reality. Indeed, its production potential amounts to € 244 billion, 7.9% of the total value of national production (data from Intesa San Paolo, Assobiotech, 2015). As highlighted in *figure 1*, Italy is one of the leaders in the EU in terms of value of the production coming from bio-based sectors, above all food and agriculture, while biochemistry is constantly growing. At present, the bioeconomy sector in Italy accounts for almost 1.5 million jobs (Eurostat, 2015) and represents 13% of total Italian exports. Italy therefore ranks 10th in the world as for exports of bio-based products, with a share of around 3%. If we analyse in detail the biochemistry supply chain in Italy, it is worth mentioning projects for reconverting industrial sites in crisis into biorefineries for the production of bio-products and biochemicals from renewable sources (such as, for instance, in Porto Torres and in Porto Marghera). Italy today has 5 pilot installations in this sector, 2 demonstrative installations and 3 industrial sites with cutting-edge industrial productions. This sector engages 1,600 researchers, working in dedicated research centres in 9 Italian regions (Intesa San Paolo, Assobiotech, 2015).

Italy seems to have all the favourable conditions for a further growth of bio-based industry: highly-skilled human capital and leading industries at world level in terms of developed and patented technologies. In addition, concerning public policies, many



advances were recorded to support bioeconomy. Consultation is underway for the national strategy on bioeconomy *“La bioeconomy in Italia: un’opportunità unica per connettere ambiente, economia e società”* (“Bioeconomy in Italy: a unique opportunity to connect the environment, economy and society”) promoted by the Presidency of the Council of Ministers. The strategy aims to increase the current turnover and employment of the Italian bioeconomy by 2030, by € 50 billion and 350,000 jobs, respectively. In general, the strategic importance of bioeconomy is mentioned in several guidelines and legislative acts for the transition towards a sustainable economy. Bioeconomy is strongly supported by the Law Decree on the Environment, part of the Stability Act, which contains the obligation to include minimum environmental criteria (Mec) in purchasing procedures for some types of goods and in the assignment of certain services. This measure has encouraged the use of recycled materials after consumption, the management of specific waste fractions (both biological and non-biological) and products with environmental labels and certifications (Emas, Ecolabel, Environmental Footprint, etc.). Another policy instrument that supported growth was the *Strategic Plan for innovation and research in the agricultural, food and forestry sectors*. The plan fosters the sustainable use of bioresources for energy and industrial production purposes, through the development and rationalisation of biofuels and biomass supply chains, with suitable environmental and economic sustainability requirements, and the development of biorefineries for the production of industrial materials and

technical means from residues and agricultural waste. The final aim is to achieve proper remuneration of the agricultural sector.

The Italian Ministry for Education, University and Research also promoted the creation of national technological clusters capable of identifying drivers for a sustainable growth of territories and the whole Italian economic system. Eight clusters were identified, two of them related to bioeconomy. These are Spring (*National Technological Cluster of Green Chemistry*) and Clan (*Cluster agrifood nazionale - National Agri-food Cluster*). The aim of technological clusters is to promote a close link between industries, research institutions and national and regional institutions in order to trigger Italian top research and innovation entities. The ultimate goal is to achieve smart specialization of Italy as a country, in order to be competitive in the EU and the rest of world.

A new way to organize industrial production

Bioeconomy and bio-based industry represent both in the EU and in Italy, a solid industrial reality, capable of mobilizing capitals and research and development activities in many mature and innovative industrial sectors. However, social and environmental benefits of bioeconomy still need to be assessed, above all from the point of view of the reduction of negative externalities generated by industrial activities. Only after an objective assessment of such aspects will it be possible to consider giving incentives to bio-based activities.

An objective approach will also have to be adopted for the development of standards and standardized methods for assessing and communicating the sustainability of bioproducts. The bioeconomy, indeed, is not a new economic sector, but rather a new way to organize industrial production. A more sustainable and accountable way, that is relatively new and therefore in need of adequate safeguards for consumers and suitable policies.

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BEST PRACTICES

EURVEN REWARDS CITIZENS AND RETAILERS WITH RECYCLING INCENTIVE SCHEMES

Fostering the circular economy and achieving a virtuous waste chain, by giving incentives to citizens who do the separate collection correctly; fostering the recovery and re-use of materials: this is Eurven's philosophy. Eurven, based in the Veneto region, is a leading company in Italy in the field of research, design and production of systems to improve waste collection, also featuring incentive schemes.

Recycle machines that provide incentives

The Italian territory counts 1,800 innovative recycling points created by Eurven, with 450 recycle machines that reward virtuous citizens by supplying Eco-bonuses, coupons, discounts, and money. The collection systems – some supplying incentives and some not – are located in schools, factories, hospitals, supermarkets, airports, parks, shopping malls, markets, city halls and squares all over Italy. They can collect an average of 500 plastic bottles per day, therefore 15,000 per month, for a total of around 27 million bottles. In this way, around 810 tons of plastic per month are diverted from landfills. Recycled plastic bottles also bring benefits to the environment, in that they prevent the emission into the atmosphere of around 1,215,000 kg of CO₂ equivalent – 1 kg of recycled plastic corresponds on average to 1.5 kg of non-emitted CO₂.

How do these recycle machines work? The system is very simple: citizens only have to place recyclable waste into the machines and are rewarded in the form of discount vouchers to spend in affiliated shops. Alternatively, they can collect real money in their e-purse thanks to the partnership *Cash for Trash* with 2Pay, an app for smartphones that allows simplifying the payment process by cutting transaction costs considerably.

Projects in Italy

In Italy, numerous projects are taking advantage of Eurven recycle machines that provide incentives: the company holds 4 international patents registered in the compaction system, and custom-made machines according to specific needs, such as the type of material to treat (plastic, aluminium, oil, Weee), the treatment system required and the amount of collection



desired. A classic example can be found in the municipality of Gambatesa, in Molise, where incentives for recycling also reward retailers: thanks to the *Mon€y4Trash* project, residents receive discounts and eco-bonuses in exchange for waste sent to the Erven eco-compactors, and retailers can deduct from the tax for municipal waste management a part of the discounts they grant with this initiative.

With the project *Equaazione* implemented by Evergreen Recycle, residents of the municipalities of Conegliano, Vittorio Veneto and Oderzo who place waste into the recycling bins that supply incentives can save money on their tax for municipal waste management: the company Savno s.r.l. pays 1 eurocent for each bottle inserted into eco-compactors, and each month, the annual tax for municipal waste management is paid to the citizen who recycles the most in the three participating municipalities.

Schools are also being engaged: young students of Assisi, for instance, are participating in projects that teach environmental education in classes, with particular emphasis on the recycling incentive scheme by Eurven. This is a convenient and amusing way to teach children of all ages how to do separate collection correctly. In the two complexes of kindergarten, primary and middle schools of Assisi, Weee boxes were installed, and residents can leave their old electronic devices there, in return for discounts and other bonuses.