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Bioplastics in Europe

Market update

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Reserved to: ASSO BIOplastiche

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1. Introduction
2. Market Evolution
3. Future trends
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Privately owned independent company since 1979

40° plastic consult

Who are we and what we do

Consulting and business intelligence for the plastic and petrochemical industry

- Market and marketing research at national and European level;
- Assessment of production structures, manufacturing statistics;
- Continuous monitoring of the Italian market;
- Recycling and environment-related studies;
- Advisoring for M&A operations;
- Identification and evaluation of market opportunities;
- Identification and evaluation of industrial and commercial partners.

How we do it

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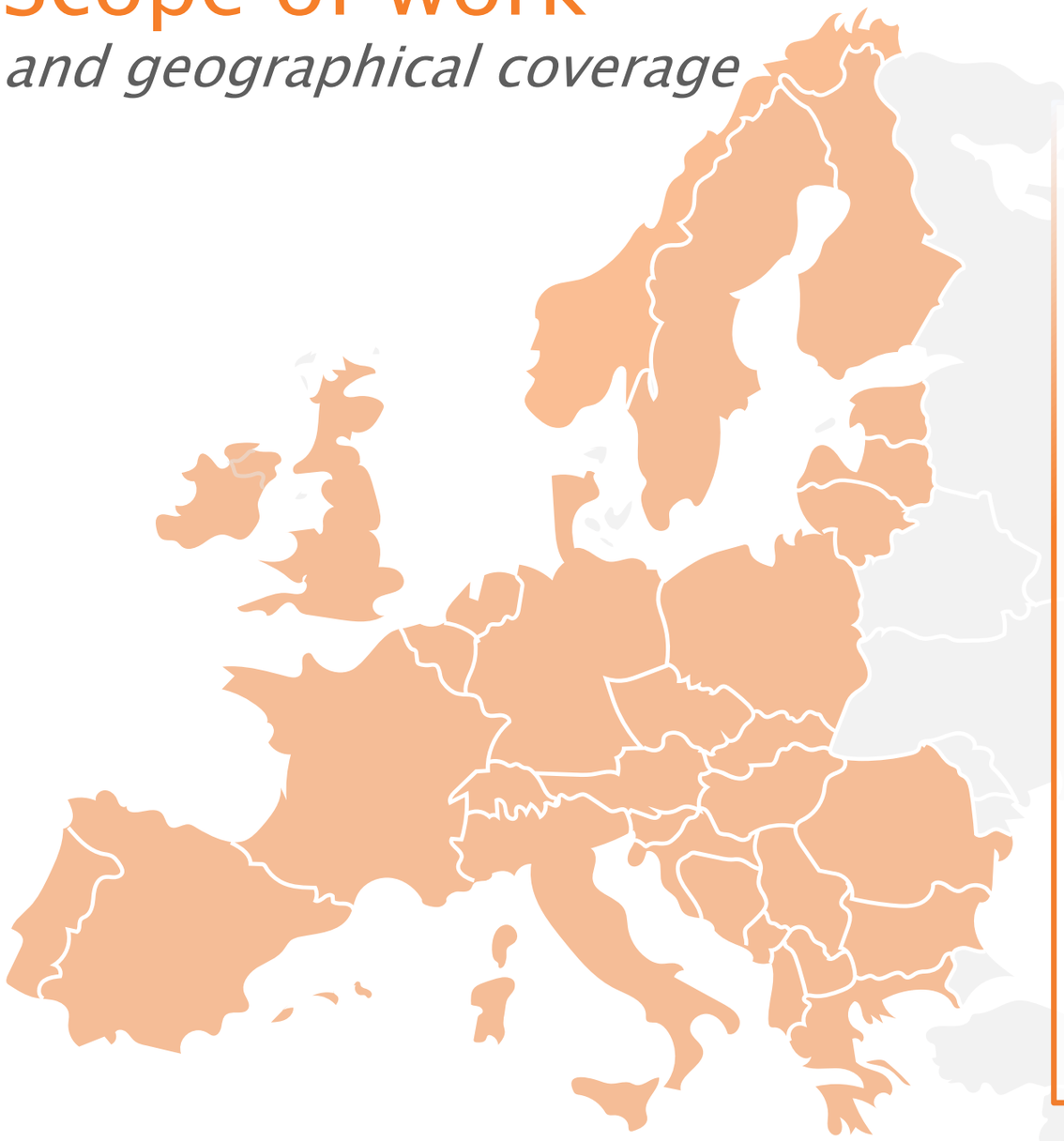
Our services are based on direct relationship with industry professionals.

We are the source of information in the industry and we develop internally all of our data, carrying out on an annual basis over 3,000 call with the value chain:

- Raw materials manufacturers
- Distributors, brokers and polymer resellers
- Plastic processors
- Converters
- Distributors and end-users of finished and semi-finished plastic goods
- Waste management companies and recyclers
- Machines and equipment suppliers

Scope of work

and geographical coverage



MAIN PROJECT OBJECTIVES

The scope of the study is to assess the overall European bioplastics market, both biobased and compostable, defining market size and development trend for different clusters of polymers.

GEOGRAPHICAL COVERAGE

Geographical perimeter has covered the EU27 + UK, Switzerland and Norway + other Balkan.

MEASURING UNITS

All data have been expressed in metric tons and:

- **for biobased plastics, in weight of renewable content**;
- for compostable plastics, in weight of ready-to-use polymer / compound.

Scope of work

perimeter of analysis – polymers and applications

Thermoplastic polymers **considered** are the following:

- Fully or partially biobased conventional plastics, such as Polyethylene from sugar cane, Polyamides, Polyurethanes, PET, etc;
- Bio-attributed conventional plastics such as Polyethylene, Polypropylene, PS, ABS, PC, etc., obtained in conventional petrochemical reactors with the “mass balance” process and certification;
- Compostable bioplastics, totally or partially biobased, such as PLA, PHA, thermoplastic starches and their typical intermediates, such as PBAT or PBS and PBST.

The perspective is the industrial one, with coverage related to polymers and products **already industrialized** on large scale facilities, recognizable and **circulating on the European market**.

Scope of work

perimeter of analysis – polymers and applications /2

Out of scope remain the following polymers and end uses:

- Thermosets, such as epoxy resins;
- Natural rubber;
- Cellulose, cellulose acetate and other non-plastic biobased and/or compostable polymers or goods (e.g. from natural fibres);
- Polymers which are still at R&D level, laboratory scale or into marketing newsletter and press releases only (e.g. PEF and alia);
- Polymers which find end use in outlets / applications different than the plastic industry (e.g. textiles, fuels, AgroSciences, etc.).

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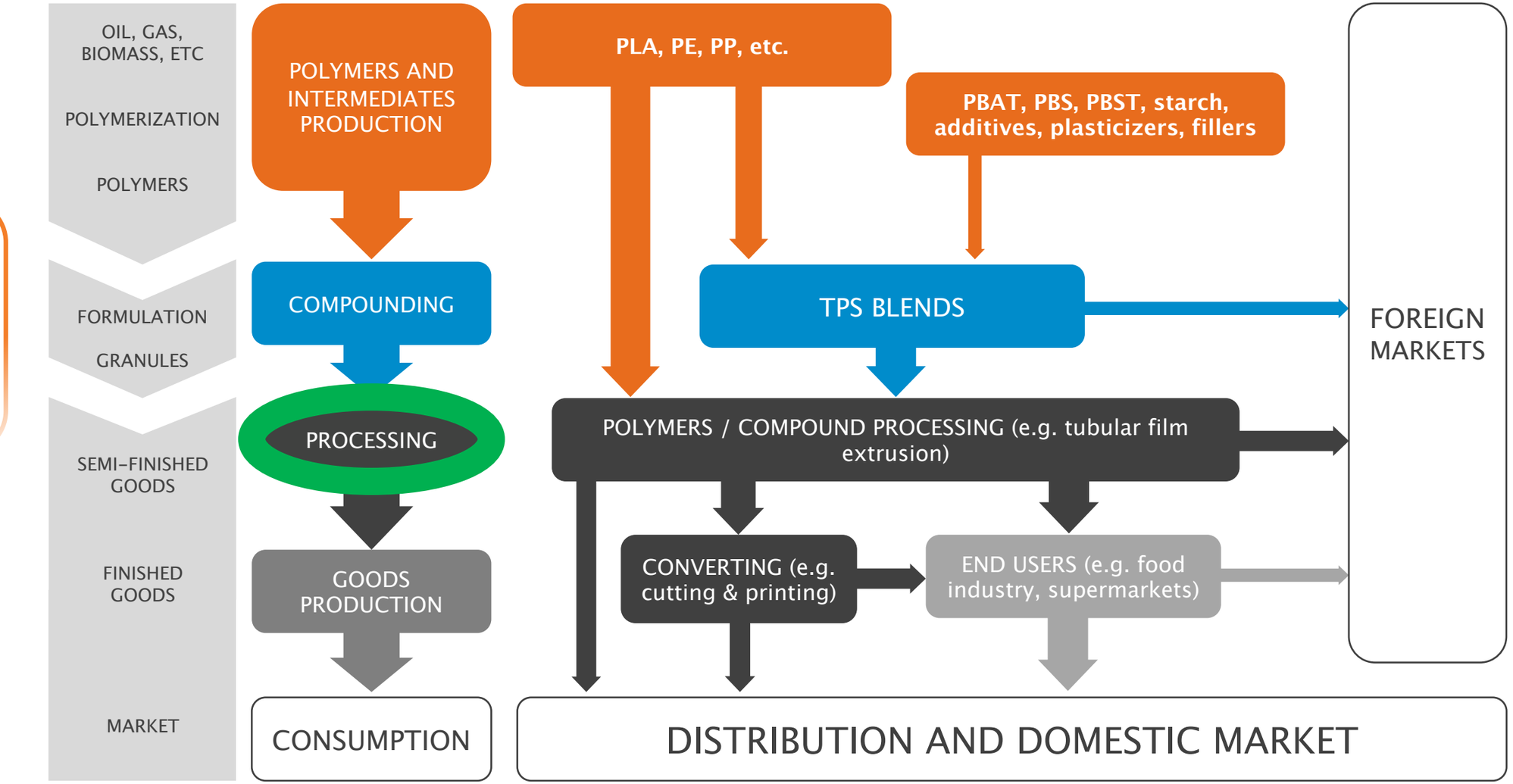
Scope of work

Level of the analysis: processing

Simplified supply chain flows



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Bioplastics

Why biobased? Why compostable?

BIOBASED PLASTICS

(Incl. partially and mass balance)

BEST DROP-IN CHOICE TO REDUCE CARBON FOOTPRINT / EMISSIONS

COMPOSTABLE PLASTICS

BEST DROP-IN SOLUTION FOR ORGANIC RECYCLING

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Bioplastics

Main applications of biobased and compostable plastics

Biobased plastics

(incl. partially and mass balance)

As a rule of thumb, same applications as conventional plastics. Still, due to the average higher cost than fossil based, faster development in high end / sensitive (e.g. packaging) end uses:

- Packaging: both rigid (e.g. personal / skin care) and flexible (food-contact);
- Durable and semi/durable goods (toys, furniture, etc.);
- Other end uses involving transportation, building & construction, agriculture, etc.

Compostable plastics

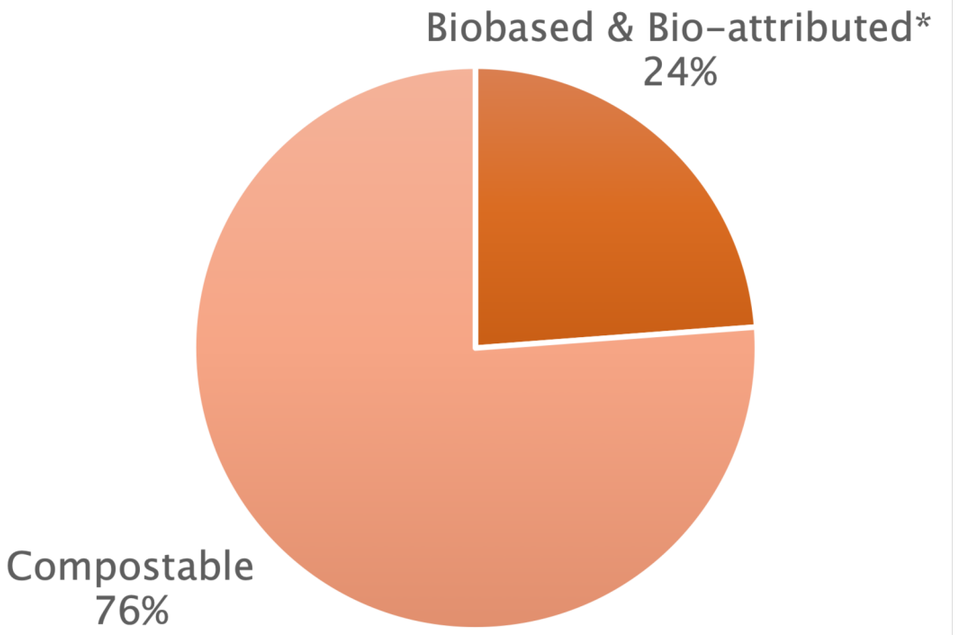
Compostable plastics are ideal to close the lifecycle into organic recycling (and/or to solve recycling issues e.g. in agriculture), thus are more tied to the following applications:

- Bags & sacks: carrier bags, organic waste bags, ultra-light bags;
- Other flexibles: flexible packaging (both food and non food contact), mulch film;
- Rigid: plates, glasses, cutlery, trays and dishes, coffee capsules, etc…

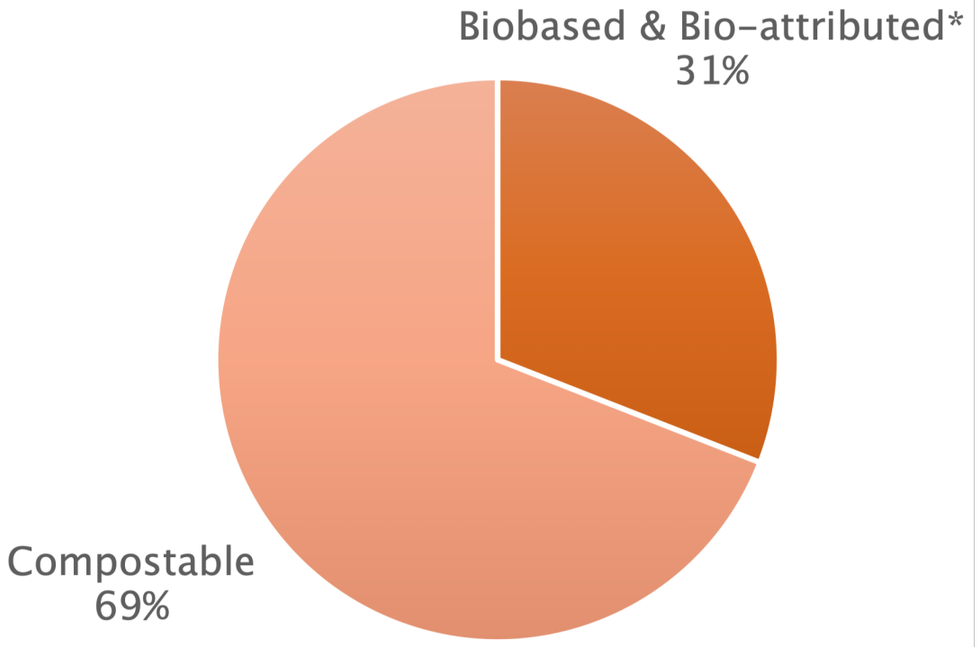
Market evolution – all bioplastics

European demand – 2019, 2021

2019 – ca. 210 Kton



2021 – ca. 320 Kton
C.a.g.r. >23%



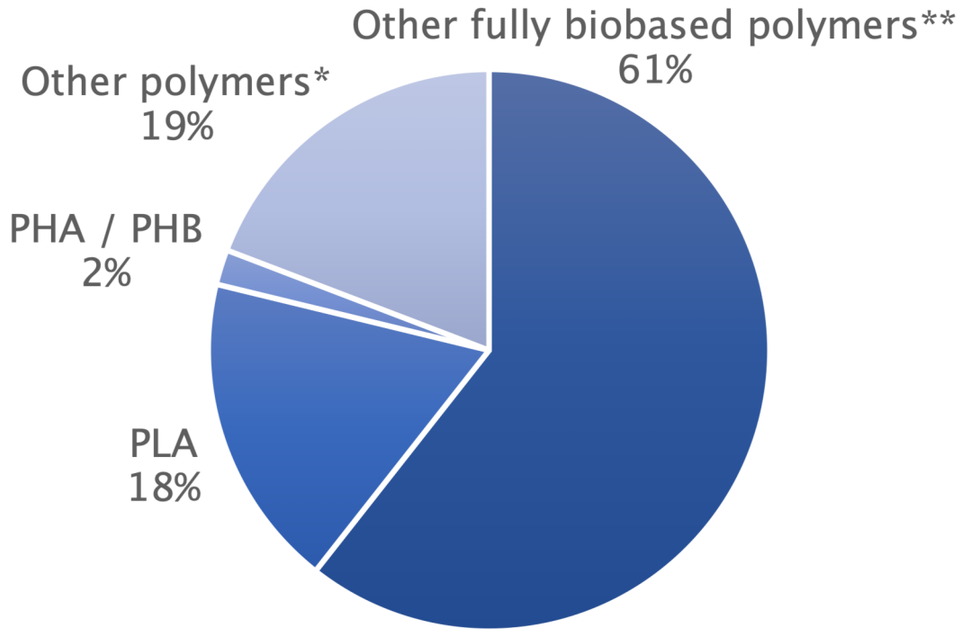
* = fully and/or partially renewable polymers
See introduction for perimeter and coverage

Source: Plastic Consult for Assobioplastiche

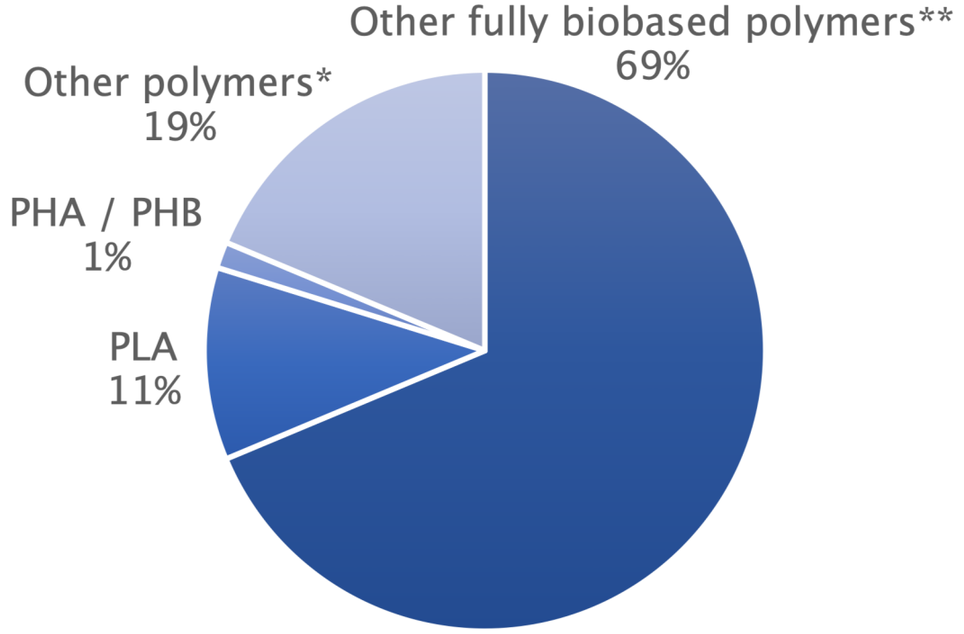
Market evolution – biobased plastics

European demand – 2019, 2021

2019 – ca. 50 Kton



2021 – ca. 100 Kton
C.a.g.r. >41%



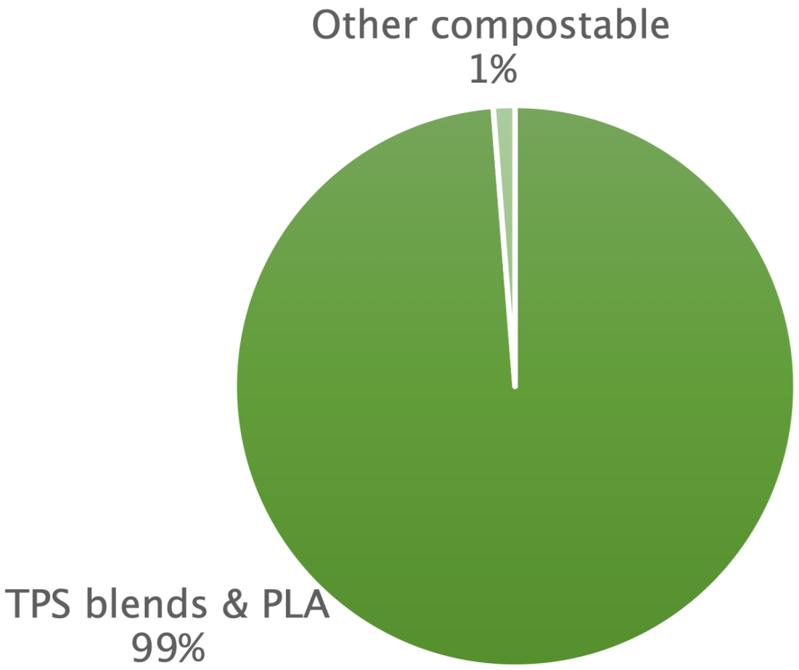
* = partially biobased / bio-attributed
** = fully biobased PE, PP, PA, PMMA, etc.
See introduction for perimeter and coverage

Source: Plastic Consult for Assobioplastiche

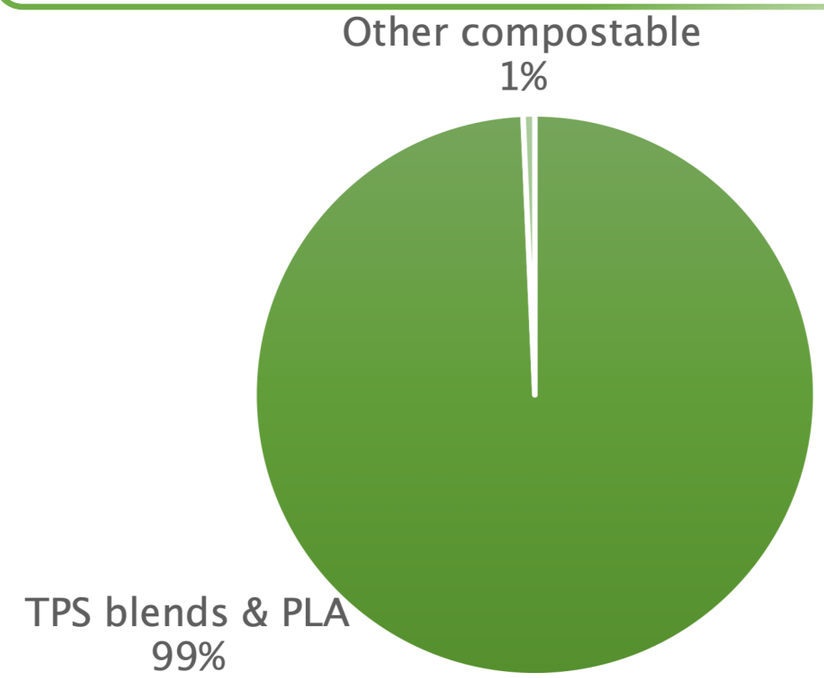
Market evolution – compostable plastics

European demand – 2019, 2021

2019 – ca. 160 Kton



2021 – ca. 220 Kton
C.a.g.r. Ca. 18%



Source: Plastic Consult for Assobioplastiche

See introduction for perimeter and coverage

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Bioplastics

Trend for biobased and compostable plastics

Biobased plastics

(incl. partially and bio-attributed)

- CO_2 reduction goals will stimulate both biobased and bio-attributed polymer demand;
- Massive investments planned for bio-attributed (biorefineries);
- Ambitious development targets by the stakeholders: >100 Kton of bio-attributed polymer demand, in weight of renewable content, expected for 2030 (aggregate European demand);
- New capacity for fully biobased should consent adequate polymer availability.

Compostable plastics

- Market development tied to evolution of legislation;
- Better outlook for waste bags due to development of organic recycling (mandatory for all EU countries by 2023);
- Some other food contact applications, e.g. coffee capsules and flexible packaging, are expecting a robust growth (ideal solution for their recycling);
- Further development expected in other niche markets, such as agricultural film and other packaging.

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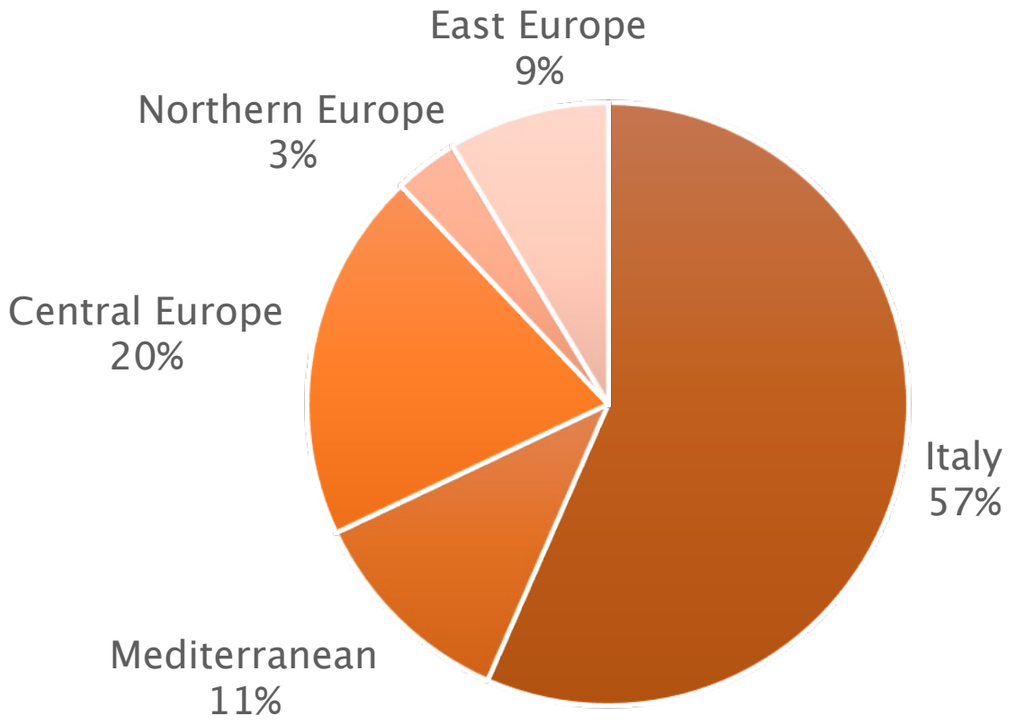
Focus on compostable plastics

European demand breakdown – by country

2021 – ca. 220 Kton



Legislation has driven demand across Europe over the years.

Italy started in 2011 (with the "*shopper law*", and last year adopted SUP Directive consenting Single-Use compostable (at least 50% renewable) plates and cutlery. By far the largest market.

Spain and Greece recently introduced laws requiring compostable polymers for carrier bags.

Several Eastern Countries (Poland, Hungary, Romania) have in place similar legislation packages.

Mediterranean = Spain + Portugal + Greece
Central Europe = France + Germany + Benelux + Austria and Switzerland
Northern Europe = Scandinavia + UK + Nordic

Source: Plastic Consult for Assobioplastiche

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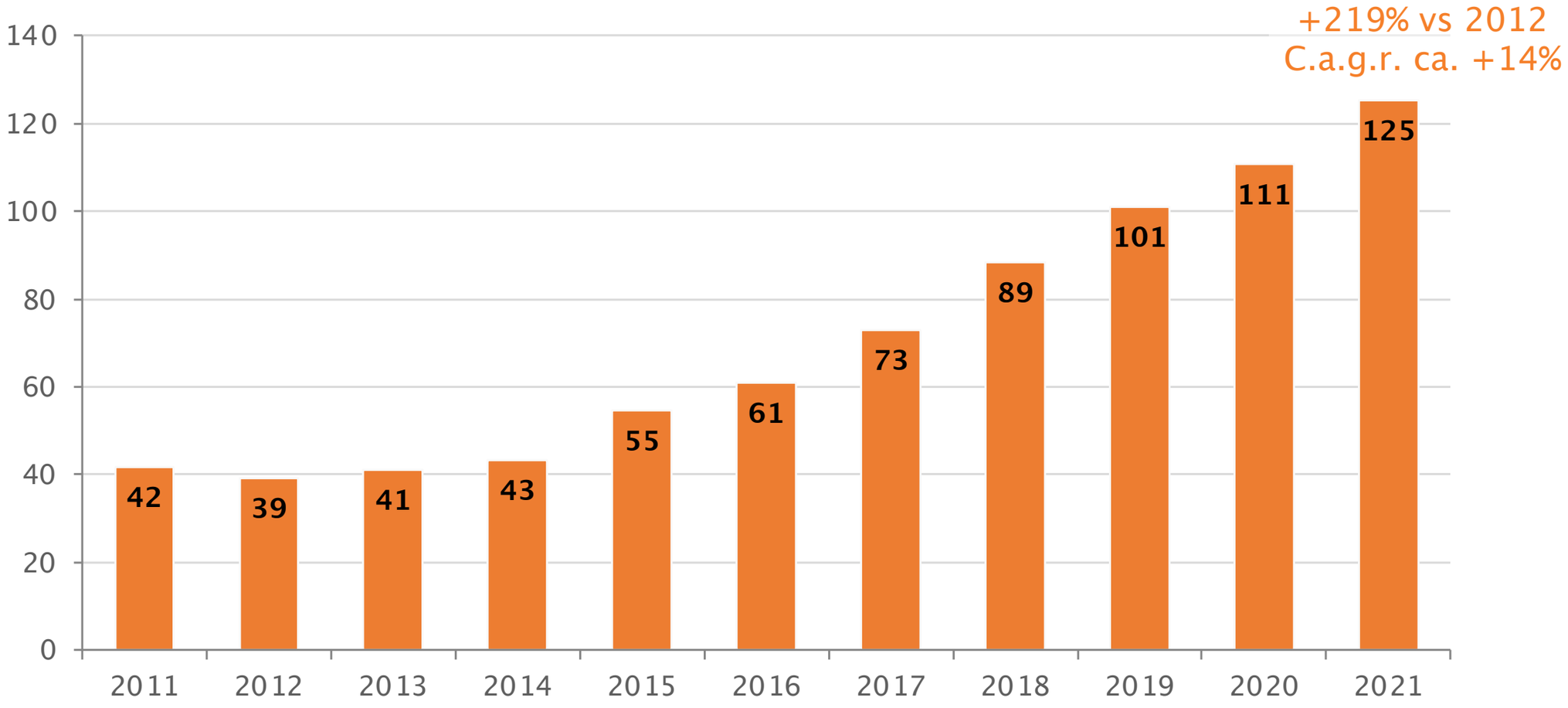
Focus on compostable plastics

The Italian case – demand evolution



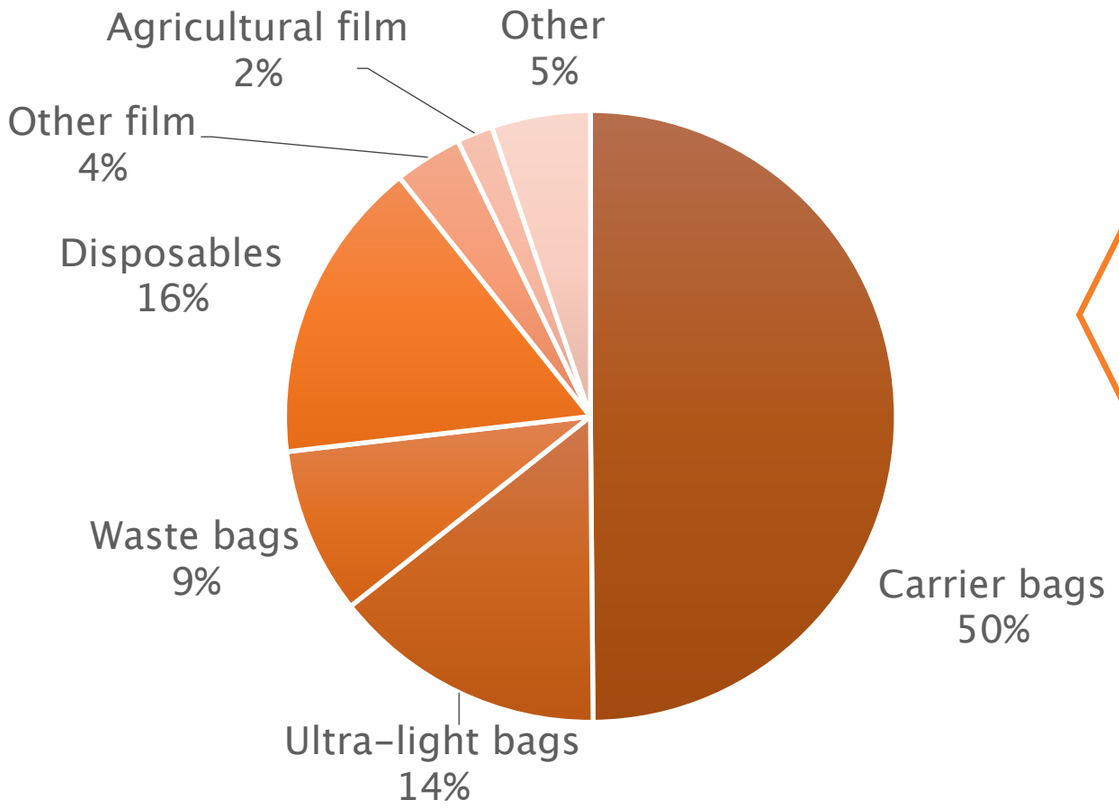
Source: Plastic Consult for Assobioplastiche

Data expressed in Kton, rounded figures

Focus on compostable plastics

The Italian case – Demand breakdown

2021 – ca. 125 Kton



Italy can be considered a somewhat mature market for compostable plastics, since large scale introduction of compostable carrier bags dates back to 2011 (when their share was over 90%).

During the years, several applications have been developed:

- ultra-light food contact bags since 2017;
- Plates, glasses and cutlery since 2019;
- Other: mulching films, films for food and non-food packaging, coffee capsules, which still have ample growth opportunities.

Source: Plastic Consult for Assobioplastiche

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Main challenges

For bioplastics in Europe

Core challenges

- Higher to extreme higher feedstock costs for biobased plastics;
- Mass-balance approach quite difficult to explain to the value chain;
- Compostable are still too often disregarded in Central / Northern Europe, while Mediterranean Cluster and EE adopted legislation / incentives to further boost demand, also due to a far more developed organic waste collection system;
- Difficulties for the public / consumers to understand if products are ***actually made*** of renewable polymers.

External challenges

- Unbearable level of energy costs, expected at least for end 2022 and S1 2023;
- Uncertainty on conflict evolution: ceasefire and end of hostilities in 2023?
- Absence of regulations on mandatory / optimal minimum renewable carbon content, which could further boost biobased / bio-attributed polymer demand in Europe.

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Main opportunities

For bioplastics in Europe

Core opportunities

- Growing demand for compostable in Southern and Eastern Europe in particular;
- Renewable polymers are on the opposite preferred choice in Central and Northern Europe, where most of the increases should take place in the next years;
- Ample room for investments in Europe for both biobased and biodegradable polymers, since consumption trends indicate higher demand than installed capacity.

External opportunities

- Evolution of legislation (both at EU and State level);
- European programs of decarbonization and circular economy;
- Voluntary commitments by value chain stakeholders (brand owners and retail chains in particular).

Thank you
for your attention

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