Organic Recycling within the Circular Economy

The role of compostable plastics

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- Managing Director of the Italian Compost and Biogas Association (CIC) 2003 – 2014
- General Secretary of the Italian Association for Bioplastics 2011-2015
- President of the International Solid Waste Association 2012-2016,
- Advisor to the Italian Minister of Environment 2013
- President of the World Biogas Association since 2016
- Managing Director of the BBIA since 2015
- Founder of the European Circular Bioeconomy Policy Initiative 2021.

EUROPEAN CIRCULAR BIOECONOMY POLICY INITIATIVE

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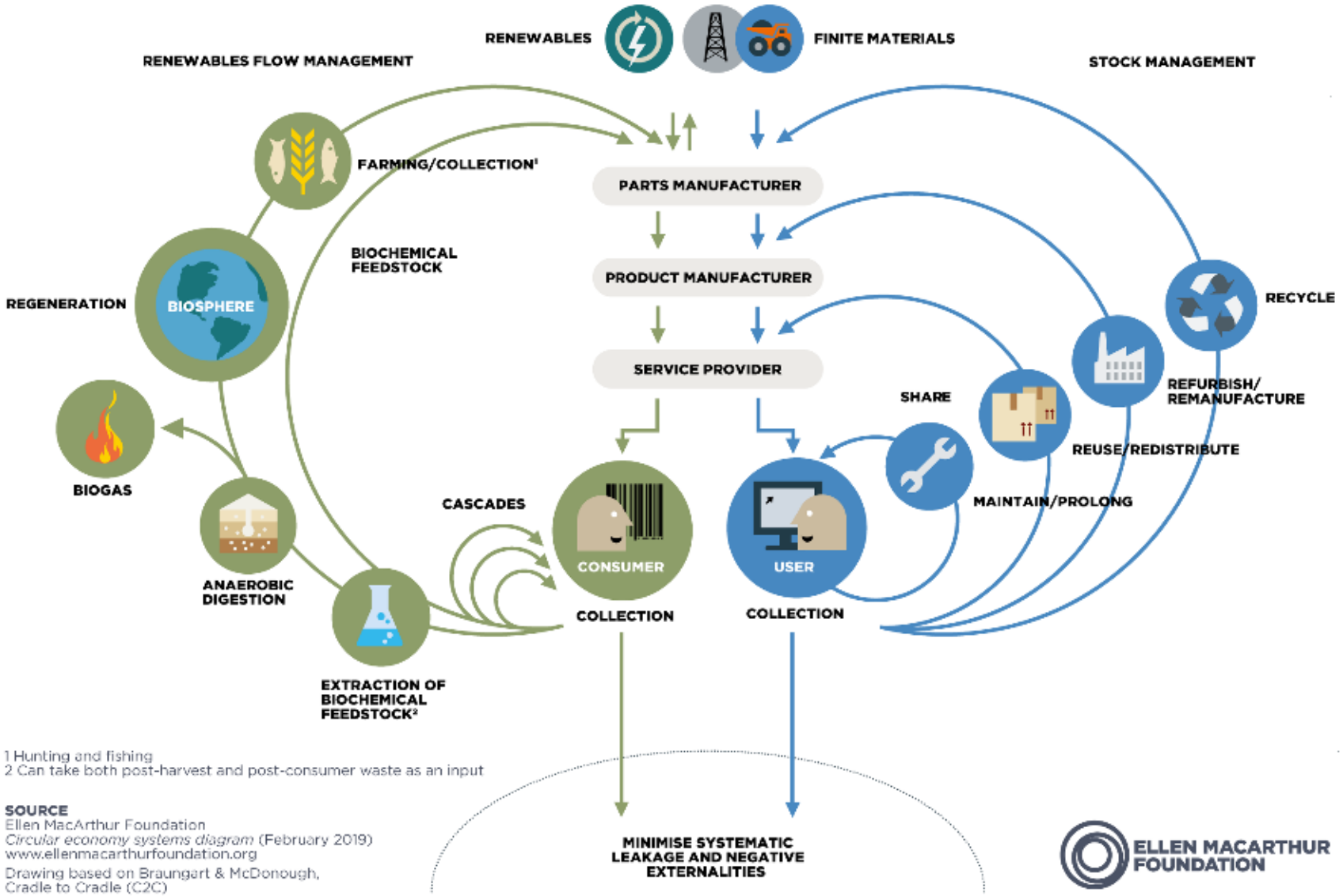
May 20, 2021 IOM3



1 Hunting and fishing
2 Can take both post-harvest and post-consumer waste as an input

SOURCE
Ellen MacArthur Foundation
Circular economy systems diagram (February 2019)
www.ellenmacarthurfoundation.org
Drawing based on Braungart & McDonough, Cradle to Cradle (C2C)

ELLEN MACARTHUR FOUNDATION

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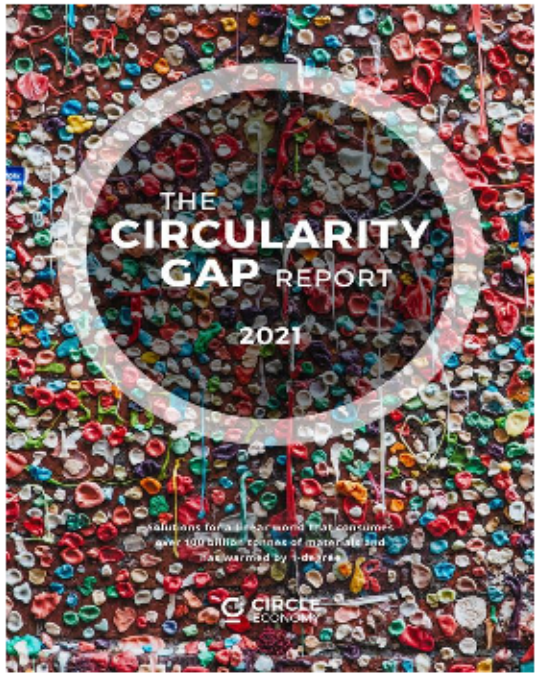
We all say we want to go circular but..



"our world is only 8.6% circular, leaving a massive Circularity Gap. The outlook is grim. Just two years ago that number was 9.1%."

Which part of the butterfly do compostables fit into ?

Not much help on littering, substitution of plastic FMCG products, mechanical recycling, maybe in the future chemical recycling ? Material substitution is not the answer to littering.

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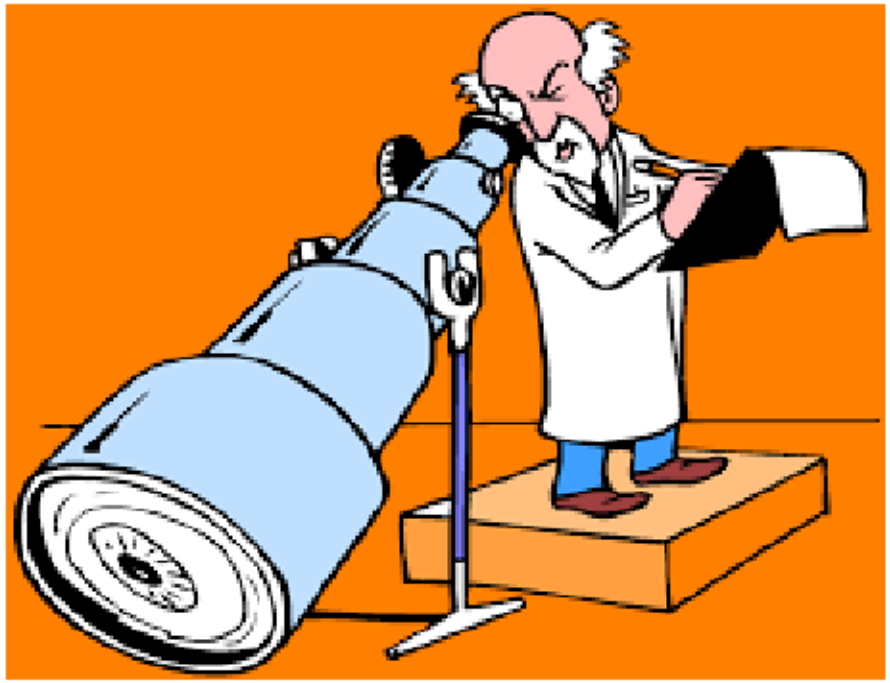
Look the right way down the telescope

Focussing on compostables which have a potential UK market for 140,000 tons as a substitute for plastic packaging is the wrong perspective.



Failing to see the bigger picture, the 5,000,000 tons of food waste that need to be collected for treatment is the danger. The big picture is biowaste and regeneration of the biosphere.

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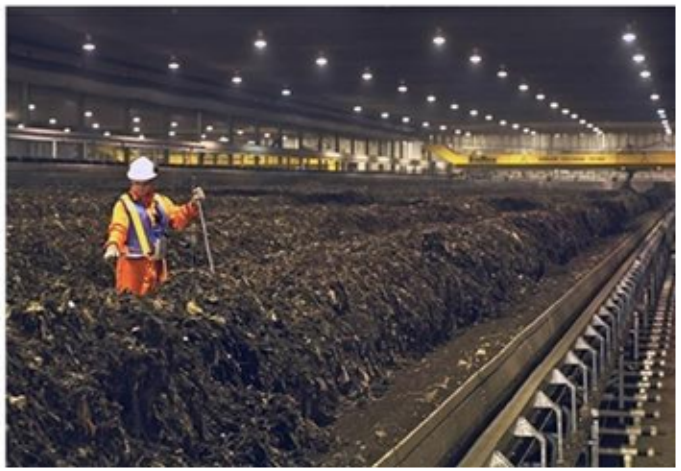
Lots of help and a big role to play in the biosphere: get organic carbon and nutrients back to soil

Industrial Composting Facilities



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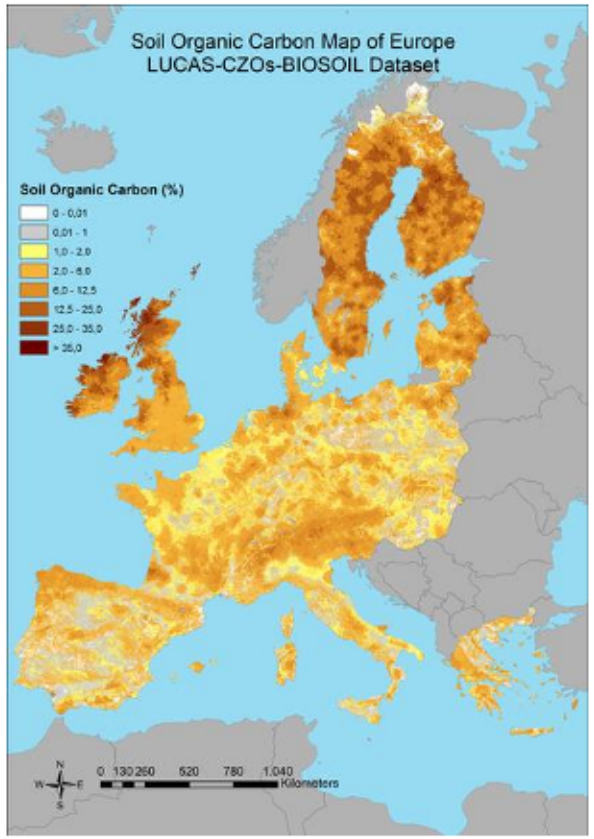
From 2023 we are obliged to collect, treat and manage food waste separately across all UK and EU



The challenges

- We are losing circa 15m tonnes/year topsoil from crop harvesting across the EU, 3m tons UK
- EU sends 50m tonnes of food waste to incineration and landfill instead of into treatment, UK 5m tons. This contributes to climate change emissions.

The opportunities

- By treating biowaste, we can generate biogas, biomethane, compost, digestate and extracted CO_2
- We can meet targets to reduce GHG emissions, produce renewable energy, return nutrients to soil, restore the soil to soil loop that urbanisation has broken.

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0.4% of organic carbon returned annually to soil globally equals all global GHG emission annually.

COMPOST MITIGATES CLIMATE CHANGE (from Jane Gilbert Carbon Clarity)

CARBON STORED IN SOIL

CURRENT	5 million
POTENTIAL	55 million

SMARTPHONE CHARGES

CURRENT	608 billion
POTENTIAL	12 trillion

AVOIDED EMISSIONS AS FERTILIZER

CURRENT	4 million
POTENTIAL	43 million

KM DRIVEN IN A CAR

CURRENT	36 billion
POTENTIAL	396 billion

tonnes of carbon dioxide equivalents every year

www.epa.gov/energy/greenhouse-gas-equivalencies-calculator

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Recycle Your Organics - Feed Your Soil - Compost!

Biowaste : from the fork back to the farm. What do we want from biowaste ?

Lots of energy to decarbonise eg HGV transport or heating to meet GHG reductions and net zero

Lots of compost to get organic carbon back to soil to meet GHG reductions and safeguard farming long term

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Yet we are transmitting huge volumes of plastic with our biowastes, inevitably leaking to soil

Image from the Environment Agency

See BBC report Follow the Food series on plastic Pollution of our food systems

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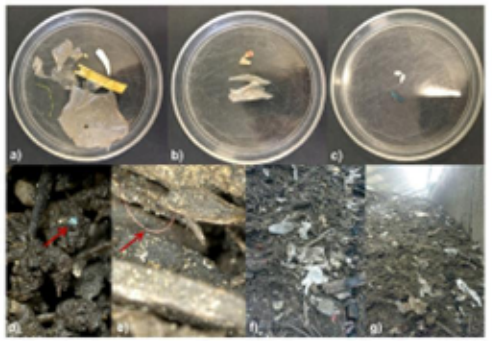
Negative sales value of compost and digestate, polluting food systems

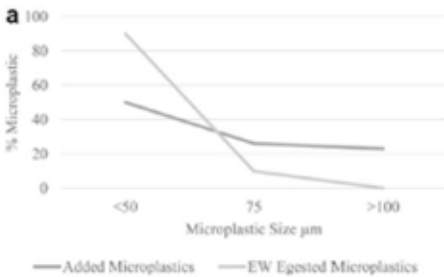
The issue of food waste collections and contamination

Micro-plastics in sludge and soil

- 10Mt/yr of organic wastes (incl. biosolids and composts) applied to farmland
- Estimated to include >100 kt of microplastics



Plastics in compost (from Bläsing and Amelung 2018)



Earthworms concentrate finer microplastic particles in their casts (from Lwanga et al. 2016)

If the above is the quality of food waste collection (as currently in the UK and many other countries)….

…..then the inevitable consequence across the whole EU is massive plastic contamination to soils

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Photos from the England Environment Agency

From collections, contaminants inevitably filter through to soil

AD and compost plants already extract **99.5%** of plastics from contaminated food waste. They do a fantastic job but they should not have to. They are biowaste plants, not plastic waste plants.

But as more plastics enter the system, the more difficult it will be to extract them.

Plastics are going to soil.

Studies from the UK Environment Agency, EEA, Bayreuth University Germany, already show worrying levels of plastic contaminating farmlands, more than to the oceans.

Some of this derives from compost and digestate.

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Yet fortunately we still are in time to act

- HH food waste collections in England just 400,000 tons in 2019 just 2% of arisings (DEFRA)
- HH food waste collections across whole UK just 800,000 tons in 2019
- Biodegradable waste sent to landfill, circa 5,000,000 tons plus incineration.
- Food waste potentially entering treatment by 2030 will increase totally across UK from 0.8mn tons to circa 4 million tons.
- We can act now to reduce plastic pollution to food waste collections and treatment.
- The Italians have been separately collecting food waste for 20 years. Let's see how they did it.

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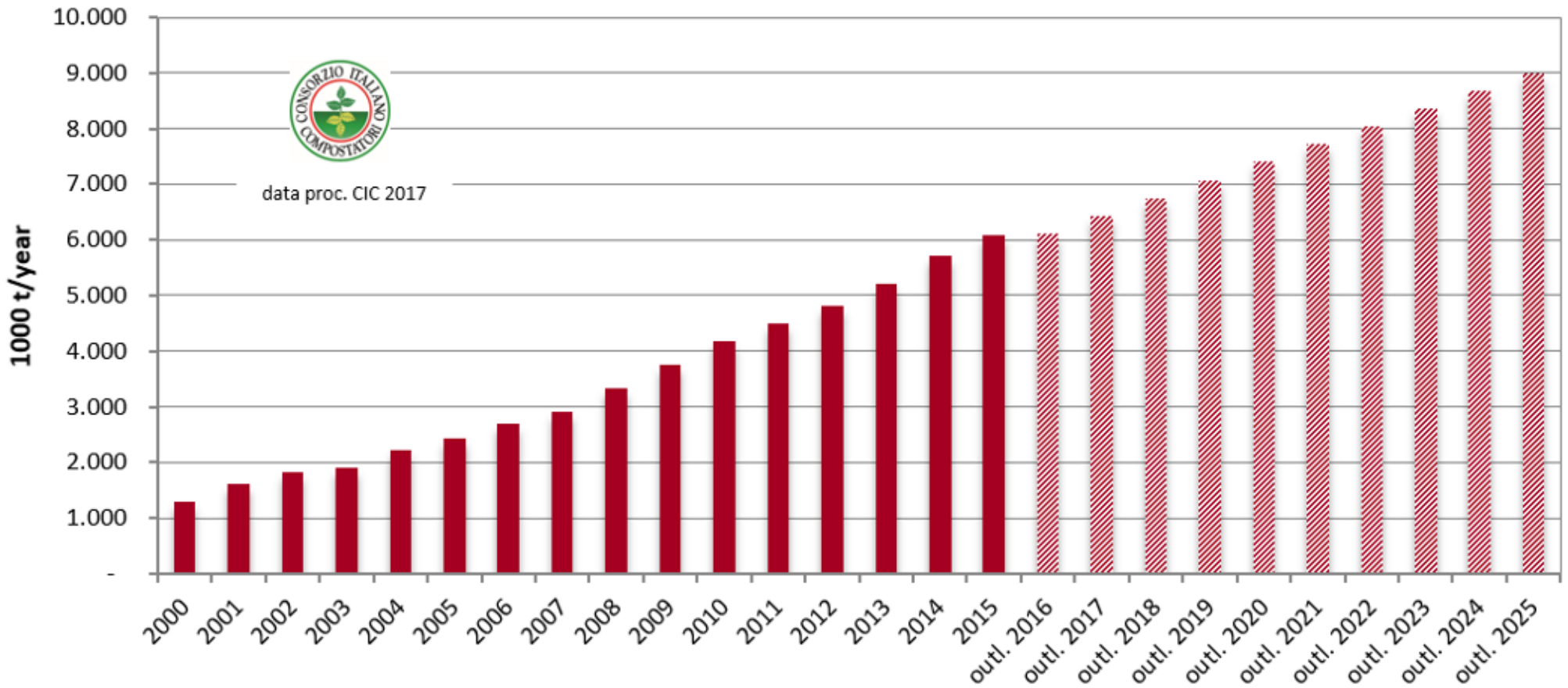
Growth of biowaste treatment in Italy 2000-2025



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This is a similar trajectory all EU countries will face as separate food waste collections begin in 2024
Circa 50% of all food waste in the EU 27+UK, NOR, SWZ is collected and treated in Italy.

How Italy handled the challenge of plastic

The level of contamination and the cost became a major issue in the 2000s

Italy introduced **a law** in 2010 for food waste to be collected either with reusable containers or with food waste collection bags certified to the EN13432 standard on compostability.

Then in order to reduce pollution further

- Italy banned single use plastic carrier bags in 2011, allowing only compostable
- Italy banned single use fruit and vegetable bags in 2019, allowing only compostable
- These bags can be reused as food waste binliners encouraging citizens to recycle food waste.

So Italy has very pure collections and low contamination levels…

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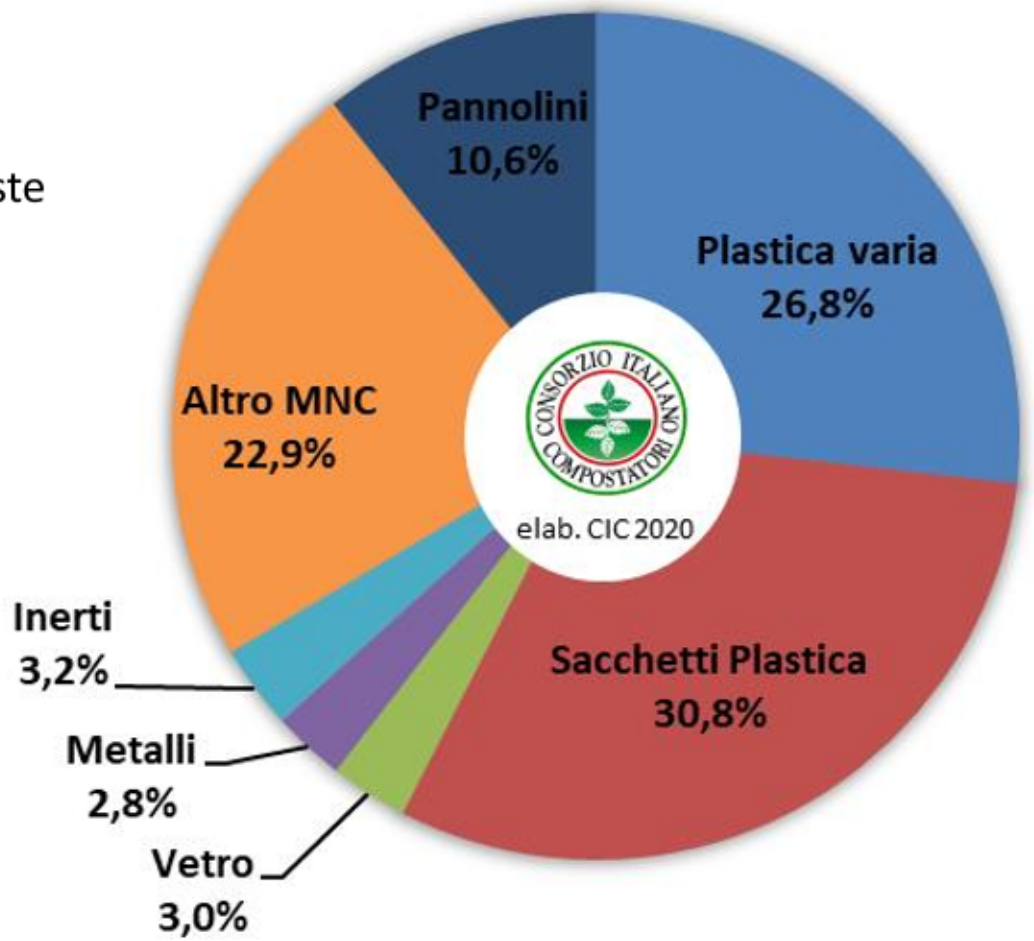
But this is still a big problem and they are working on further reduction

Analysis of Italian food waste contamination 2018
Composition of non compostable materials

Overall contamination of all non compostable materials in biowaste is 5%, plastics represents 3%



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Elab. CIC

What does this mean for the UK?

Let's do the maths…

- 100,000 tonnes of plastic contamination cost for Italian plants = circa €100m annually on 4.6m tonnes of food waste equals a cost of c.€20/ton of food waste.
- And the Italians are working hard on reducing the contamination. Their levels are the lowest in the EU. Romania 10-15%; Spain 15%+, Germany, NL 10%, UK 5-10%.
- UK biowaste plants are facing the same inevitable cost of transferring financial resources from biowaste treatment to incineration.
- Whilst we obsess about straws and cups, we ignore the largest single, unnoticed disposal of plastic waste in the UK - into biowaste treatment.

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What can we do to avert this?

We must intervene **before** 2023 food waste collections are mandated to stop plastics going to soil and destroying food waste treatment plants.

- Mandate a **similar law to Italy's** across the UK to ensure purity of food waste collections is maximised. Ban plastics from biowaste collections, mandate use of compostable bags for collections, period.
- **Ban lightweight plastic bags from shops**, allowing compostable bags so citizens can re-use them for food waste collections (the CO-OP model)
- **Ban non compostable plastics in products carrying food waste to treatment**, eg tea bags, coffee pods- it is not enough to suggest, there must be market limitations.

Biowaste plants are not terminals for packaging but for biowaste. So the materials that enters them must mimic biowaste ie be compostable.

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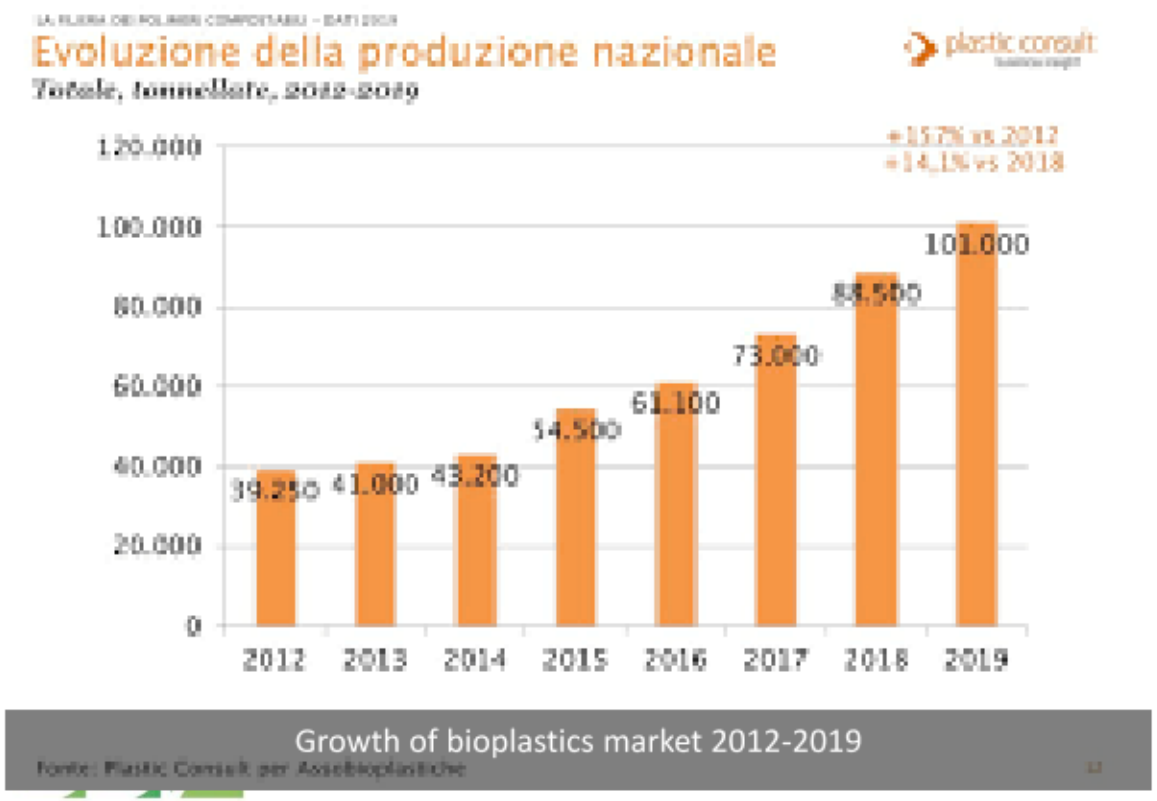
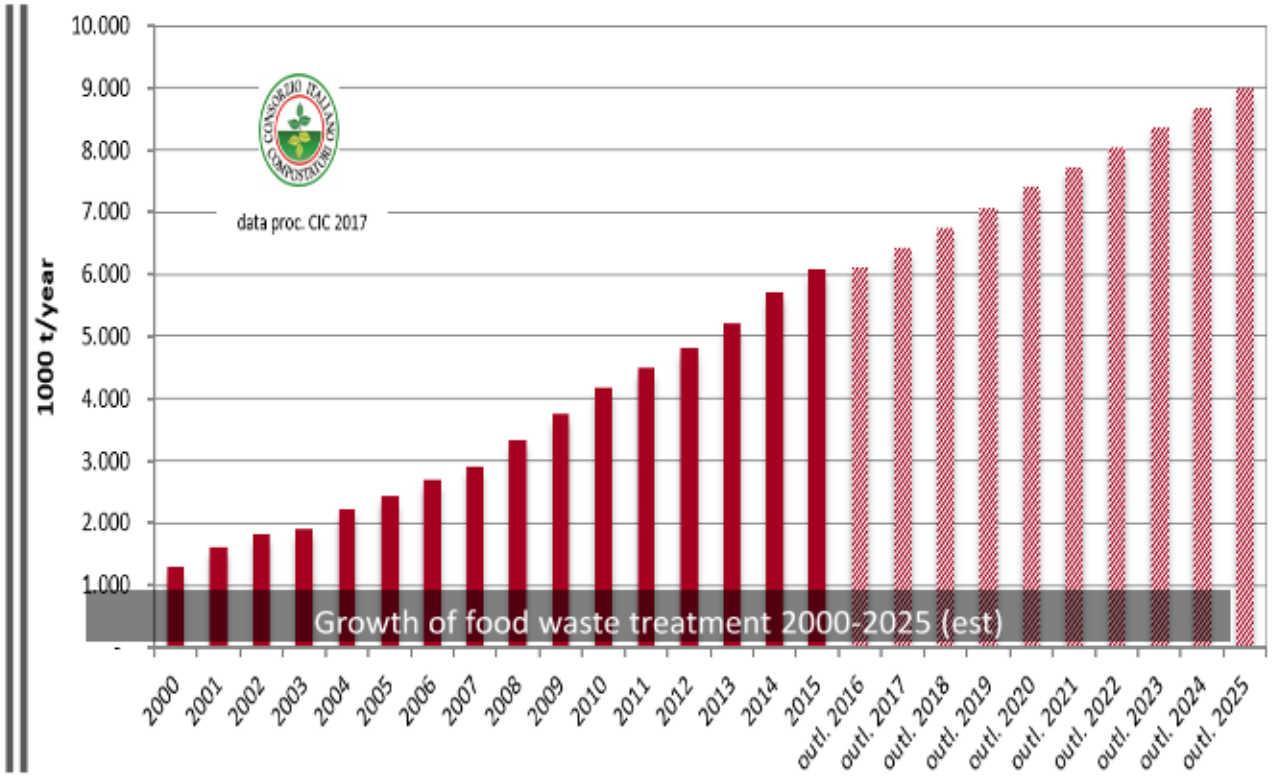
The use of compostable plastics needs to be seen as an instrument for the collection of organic wastes. In Italy the two are completely correlated.

CIC estimate that c.70% of compostable plastic on the Italian market is recycled in composting and AD



Growth of bioplastics market 2012-2019

Fonte: Plastic Consult per Assobioplastiche



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The ratio is 2 kilos per 100 kilos of biowaste-2%

By comparison, data for the UK

Food waste collections UK 800,000 tons (10% of potential)

Compostable market UK 25,000 tons 30% recycled

Food waste collections Italy 6,000,000 (75% of potential) 7 X UK

Compostable market Italy 120,000 tons 5 X UK 70% recycled

We need to focus our attention on getting the food waste collections & treatment right where compostables have a use and a natural marketplace because we cannot treat plastic with biowaste.

As a packaging buyer, a retailer, a designer, a caterer you should be asking

“how can I reduce plastic contamination in food waste though my packaging choices ?”

You should not be asking “can compostables stop littering?” or “can compostables substitute plastic ?”

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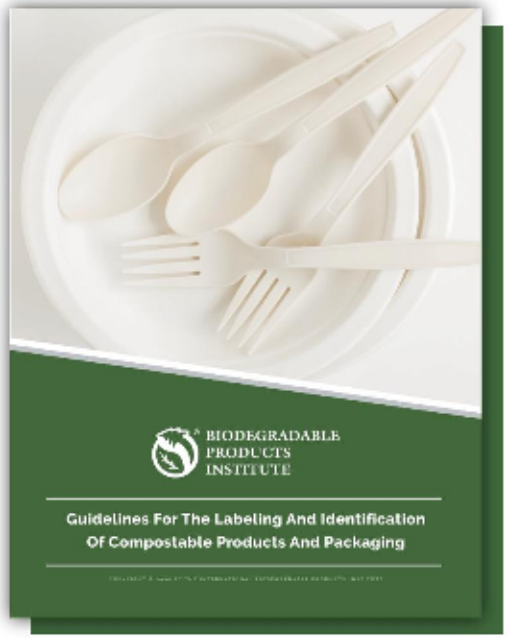
Do we have guidelines ? Yes.

UK, issued February 2020 will be updated late 2021

EU will be publishing guidelines in late 2021

The six key applications for compostable plastic packaging are:

1.Food caddy liners
2.Fruit and veg stickers
3.Tea bags
4.Coffee pods
5.Ready meal trays
6.Closed loop situations like at festivals or within buildings like coffee shops



USA published September 2020

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Brands adopting compostable packaging and other uses

A bin liner disguised as a carrier bag

Quality Street sweet wraps

Planet Organic

Put your food waste here

Sticky labels

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Thank you

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