

European Compost Network

Bio-waste Management in Europe

Presented at BAPE's workshop on waste management, Quebec – Canada

Date: 14 April 2021

Session: International Experts



www.saveorganicsinsoil.org



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www.compostnetwork.info

- **European Compost Network**
- **European Bio-Waste Management – Facts and Figures**
- **EU Circular Economy**
 - **New Waste Legislative Developments**
 - **EU Fertilising Product Regulation**
- **ECN-QAS Quality Assurance of Compost and Digestate**
- **Further initiatives**
 - **EU Green Deal**
 - **New EU Soil Strategy**
 - **ECN/CIC Initiative ‘Save Organics in Soil’**

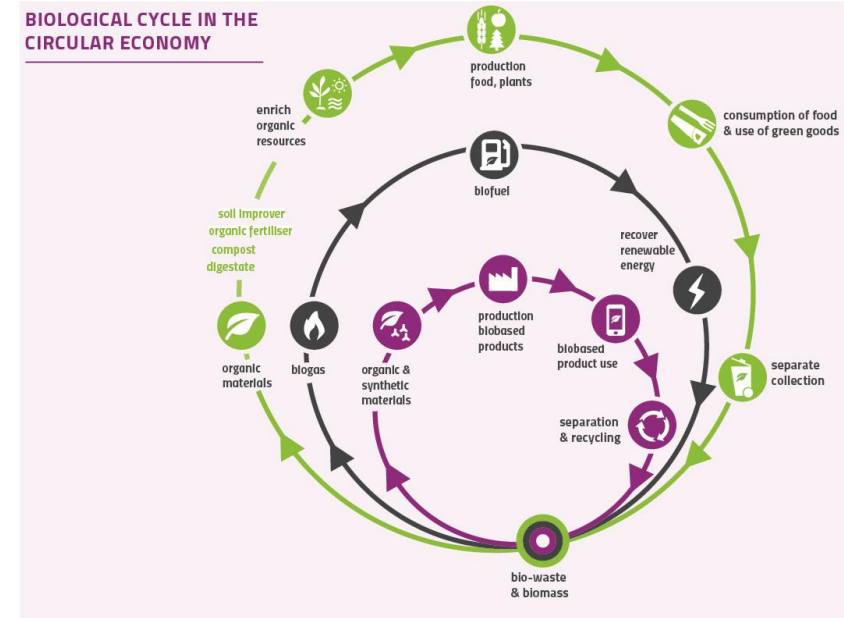
European Compost Network



ECN's Vision

“Living well within the limited resources of the planet respecting the organic cycle”

- ECN is the leading European membership organization
- Promoting sustainable recycling practices of organic resources: composting, anaerobic digestion...

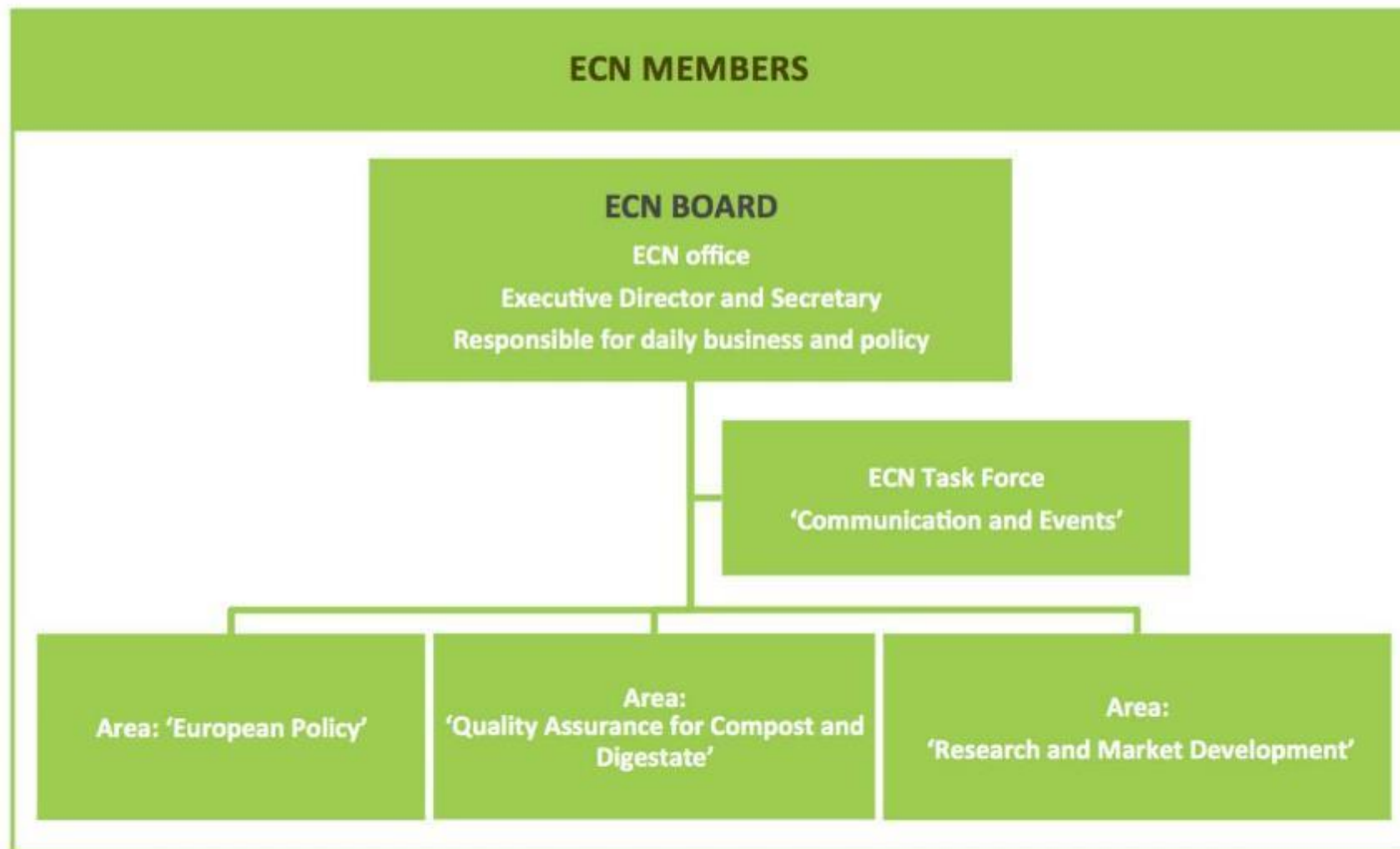


65 members from 30 European countries

48 M tpa treatment capacities

4.500 treatment plants (composting & AD)

ECN's Work Strategy



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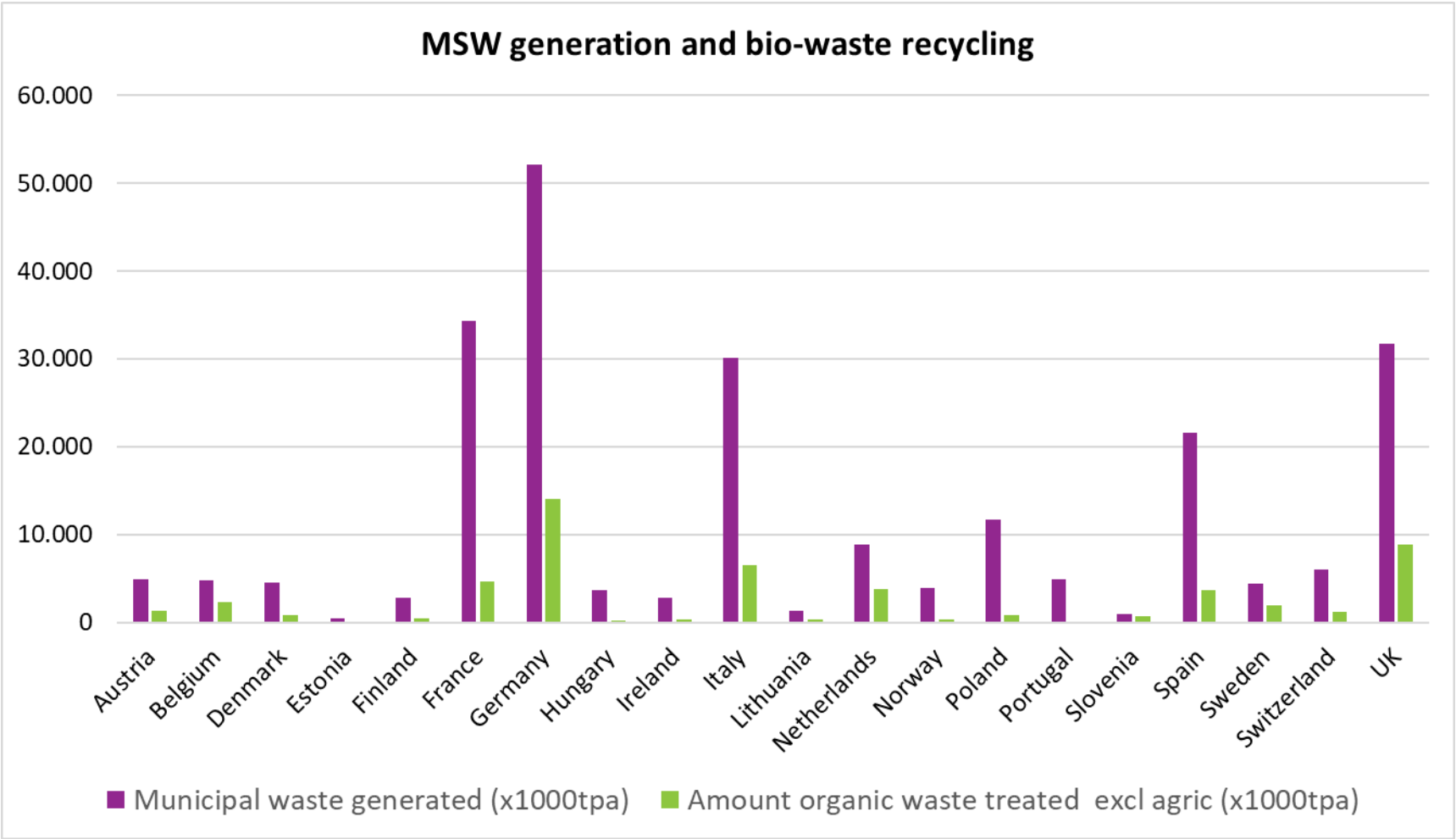
European Bio-Waste Management – Facts & Figures



- Published by ECN, supported by ISWA WG BTW
- Data reporting results from 18 European countries



Bio-Waste Recycling of Municipal Solid Waste in Europe



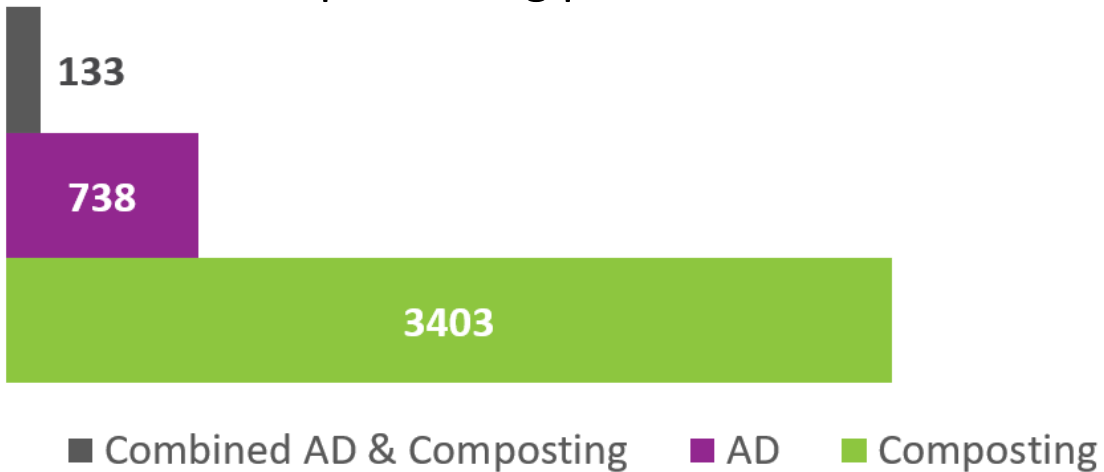
Source: ECN Status Report 2019, based on data from 18 European countries
 * AT, BE, CH, DE, EE, FI, FR, HU, IE, IT, LT, NL, NO, PL, PT, SE, SI, UK

State on Bio-Waste Management in Europe



4274

Composting & AD bio-waste
processing plants



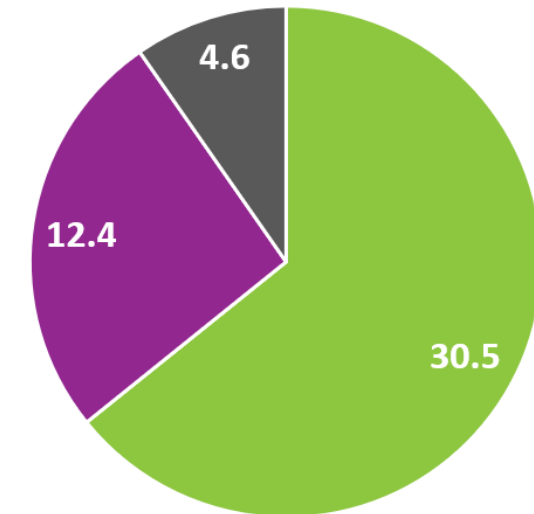
Source: ECN Status Report 2019

based on data from 18 European countries

(AT, BE, CH, DE, EE, FI, FR, HU, IE, IT, LT, NL, NO, PL, PT, SE, SI, UK)

47,5 million tonnes

bio-waste composted / digested

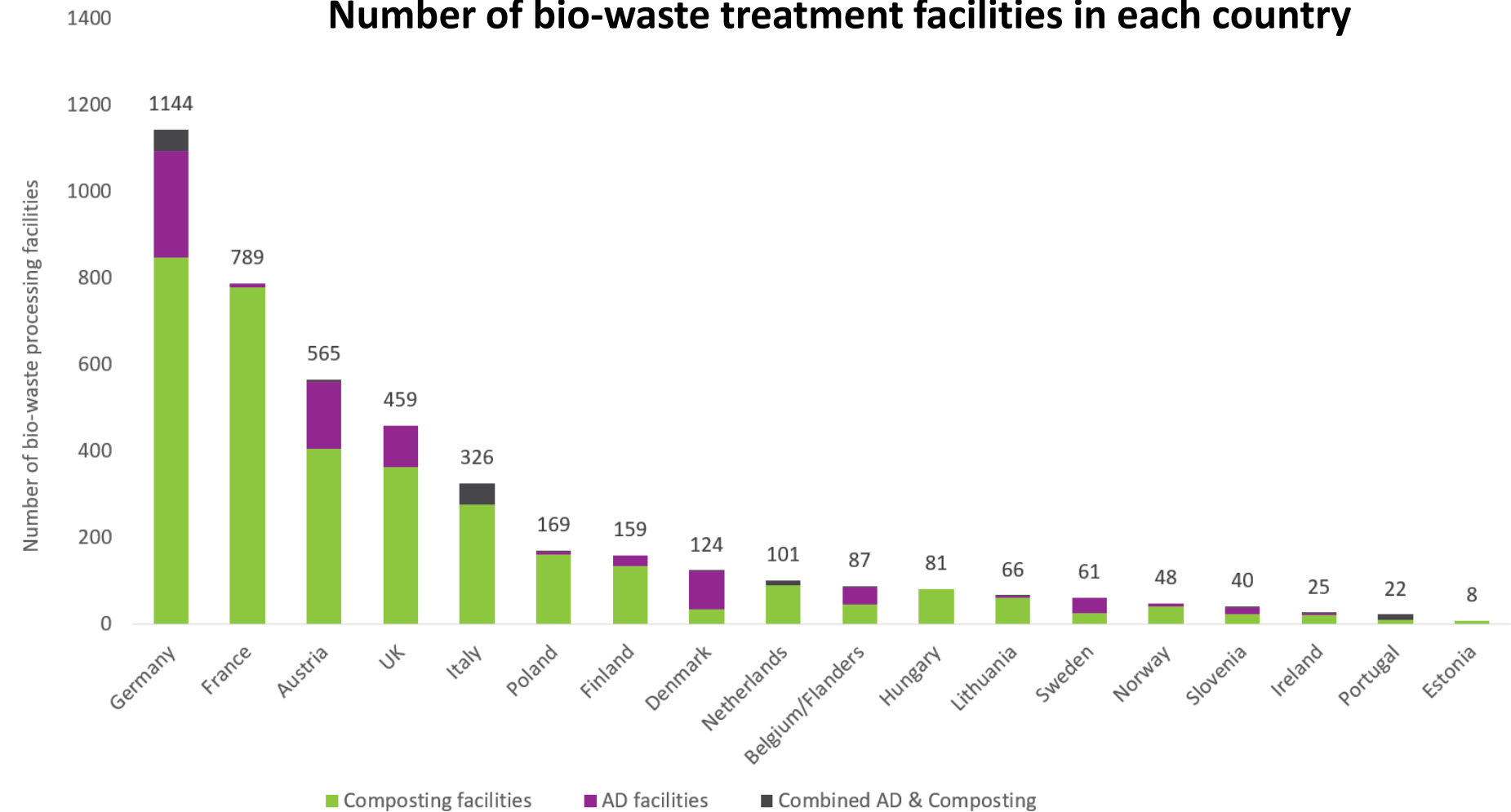


■ Composting
■ AD
■ Combined AD & Composting

State on Bio-Waste Management in Europe

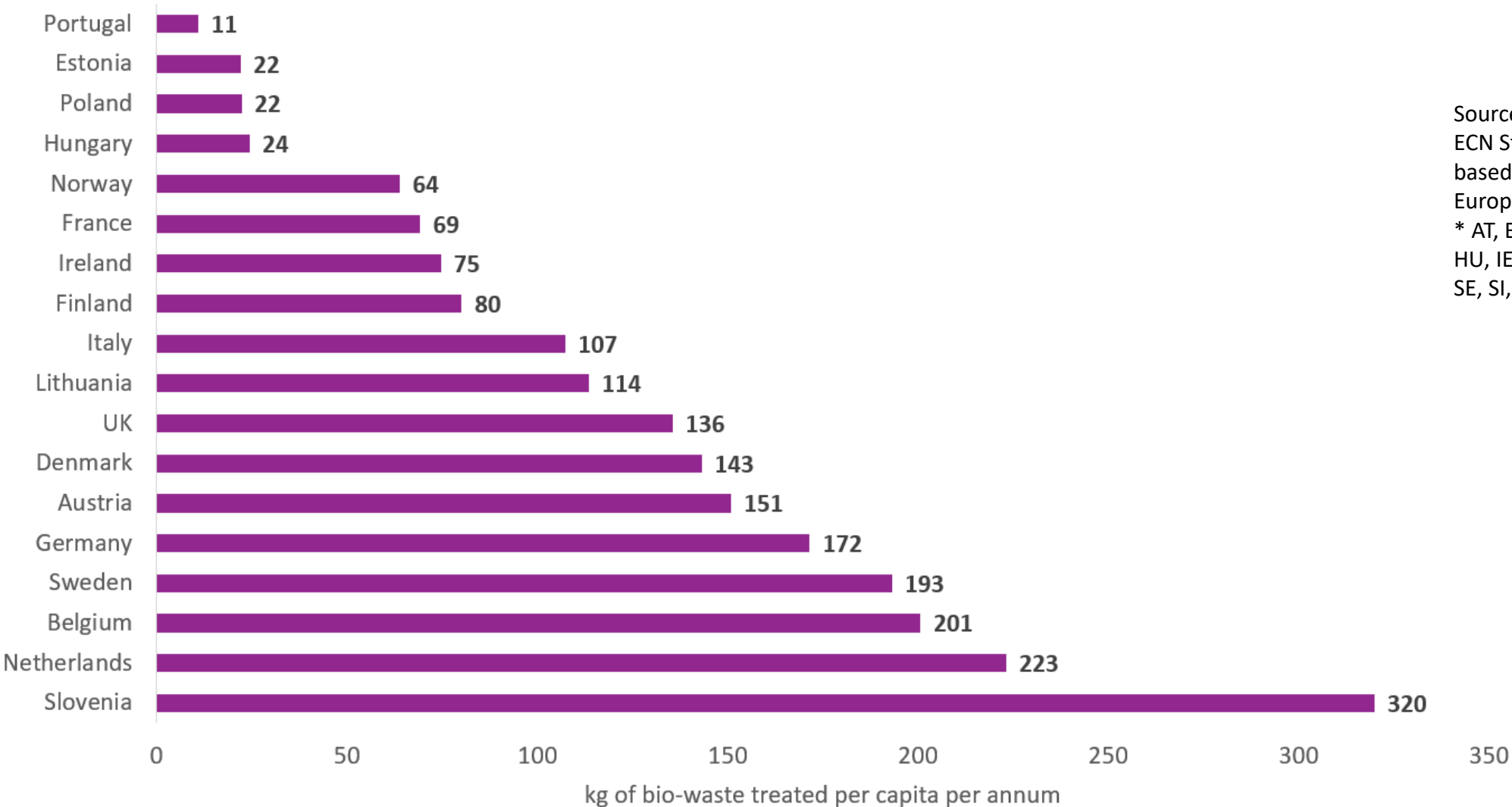


Number of bio-waste treatment facilities in each country



Source: ECN Status Report 2019, based on data from 18 European countries
* AT, BE, CH, DE, EE, FI, FR, HU, IE, IT, LT, NL, NO, PL, PT, SE, SI, UK

Countries ranked according to bio-waste treated per capita



Source:
ECN Status Report 2019
based on data from 18
European countries
* AT, BE, CH, DE, EE, FI, FR,
HU, IE, IT, LT, NL, NO, PL, PT,
SE, SI, UK

Municipal waste & Recycling rates

Austria

4,928
Thousand tonnes
of municipal
waste per year

564 kg
Municipal waste
per capita per year

58%
Recycling rate



Belgium

4,746
Thousand tonnes
of municipal
waste per year

419 kg
Municipal waste
per capita per year

54%
Recycling rate



Germany

52,133
Thousand tonnes
of municipal
waste per year

633 kg
Municipal waste
per capita per year

67%
Recycling rate



Italy

30,112
Thousand tonnes
of municipal
waste per year

497 kg
Municipal waste
per capita per year

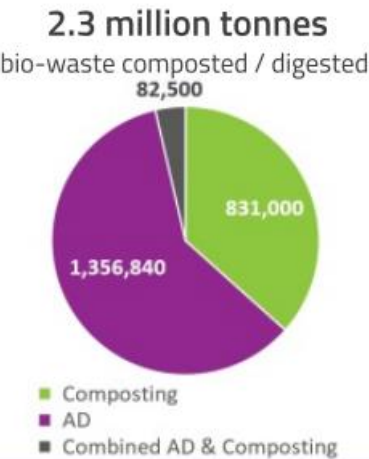
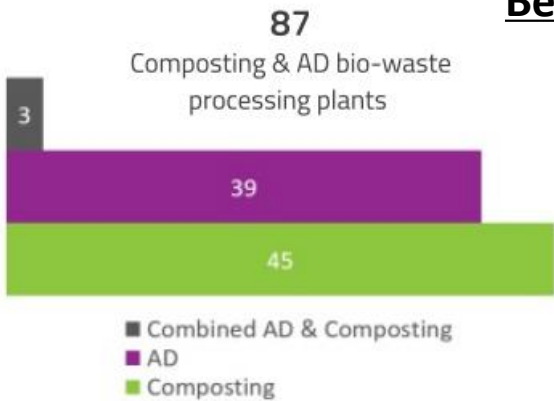
46%
Recycling rate



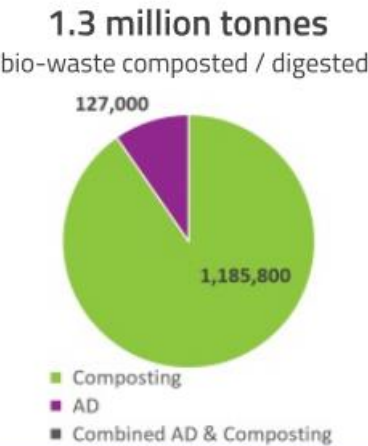
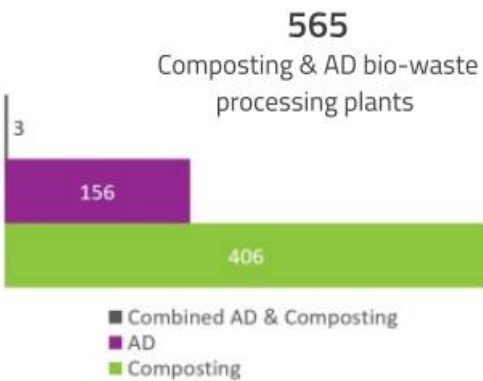
Source: ECN Status report 2019

Bio-waste Management

Belgium



Austria

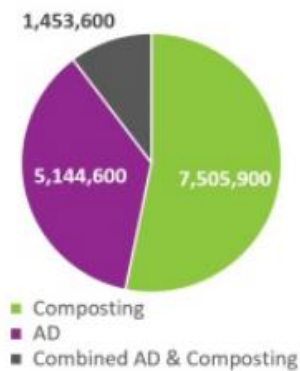


Bio-waste Management

Germany



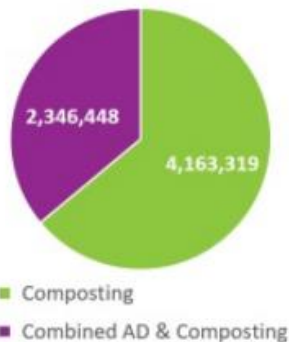
14.1 million tonnes
bio-waste composted / digested



Italy



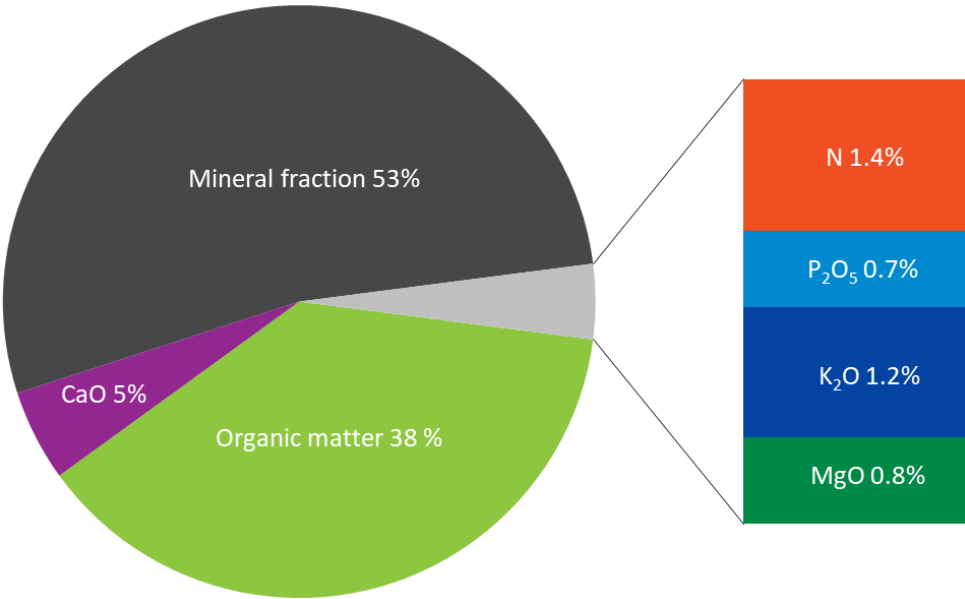
6.5 million tonnes
bio-waste composted / digested



Compost & Digestate – Nutrients and Organic Matter

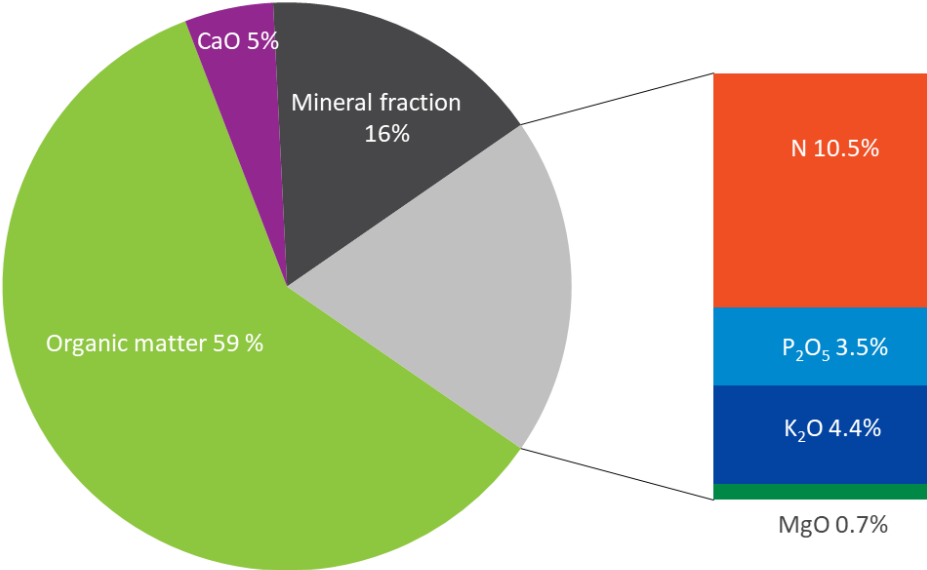


**Compost Typical Composition
(% dry matter)**



Organic Soil Improver

**Digestate typical composition
(% dry matter)**



Organic Fertiliser

and /or

Nutrient and Organic Matter Value



11.7
Million tonnes of
compost



4.1
Million tonnes of
digestate

Nutrients



129
Thousand tonnes of
NITROGEN RECYCLED



42
Thousand tonnes of
PHOSPHATE RECYCLED

(Theoretical estimates)

Carbon

3.5
Million tonnes
(dry mass) organic
carbon recycled

1.8
Million tonnes
(dry mass) humic
substances recycled

15,7 Mio. Tonnes of Compost and Digestate can replace

- **1.5 % of Total Inorganic Nitrogen***
- **4.3 % of Total Inorganic Phosphorus***

Application of 30 tonnes of fresh compost per hectare

- **9 tonnes of organic matter is added to the soil**

Compost Stores Carbon in the Soil

Soils can be improved by regular applications of quality compost.

- A fraction of the organic matter in compost is converted into a stable form called '**humus**' - this remains in soil for many years.

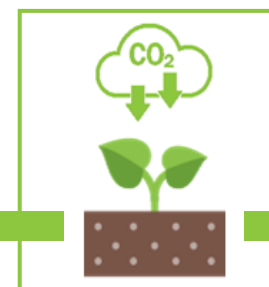
**1 tonne of compost (fresh mass)
sequesters**

30 kg soil organic carbon

110 kg CO₂ equivalents

(equivalent to 11% of its mass)

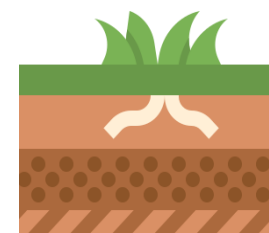
Source: ECN Factsheet 1: Soil Structure & Carbon Storage. www.compostnetwork.info



BIO-WASTE



COMPOST



SOIL



Soil Carbon Sequestration

Calculation basis

In 2017 appr. 48 million tonnes of bio-waste was treated, resulting in an estimated 12 million tonnes of compost (74% of the total) and 4 million tonnes of anaerobic digestate (26% of the total).

Scaling up, the median value of 118-138 million tonnes of bio-waste was taken, and it was assumed that there would be a pro-rata increase in compost and digestate production (i.e. 74% of the total would be compost and 26% digestate).

Europe Current

48 MILLION
TONNES A YEAR OF
BIO-WASTE

12 MILLION
TONNES A YEAR OF
COMPOST

1.3 MILLION
TONNES
A YEAR OF CO₂
EQUIVALENTS

EQUIVALENT TO **281**
WIND TURBINES RUNNING
FOR A YEAR⁵



Europe Potential

128 MILLION
TONNES A YEAR OF
BIO-WASTE

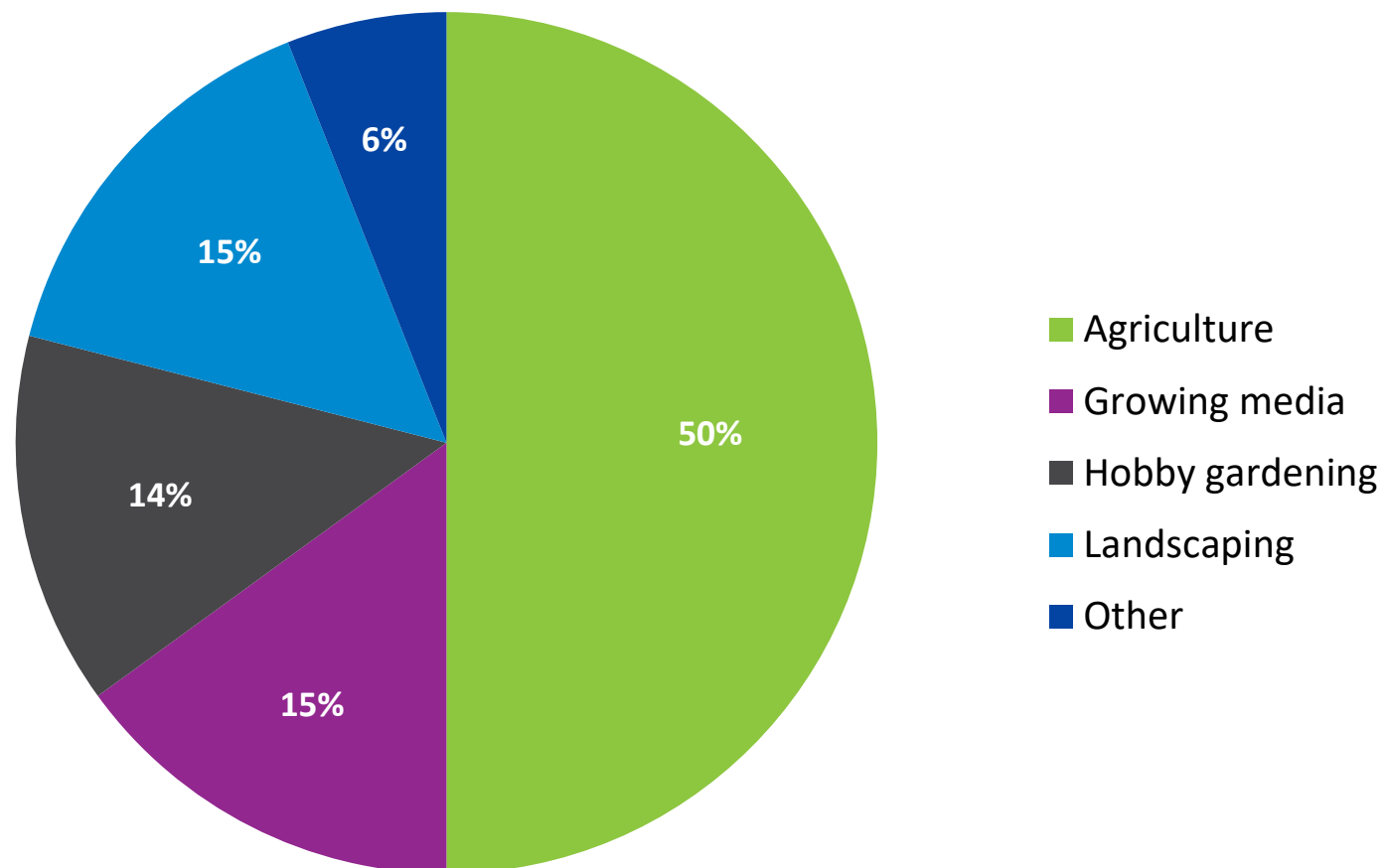
32 MILLION
TONNES A YEAR OF
COMPOST

3.5 MILLION
TONNES
A YEAR OF CO₂
EQUIVALENTS

EQUIVALENT TO **756**
WIND TURBINES RUNNING
FOR A YEAR⁵



Source: ECN Factsheet 1: Soil Structure & Carbon Storage. www.compostnetwork.info

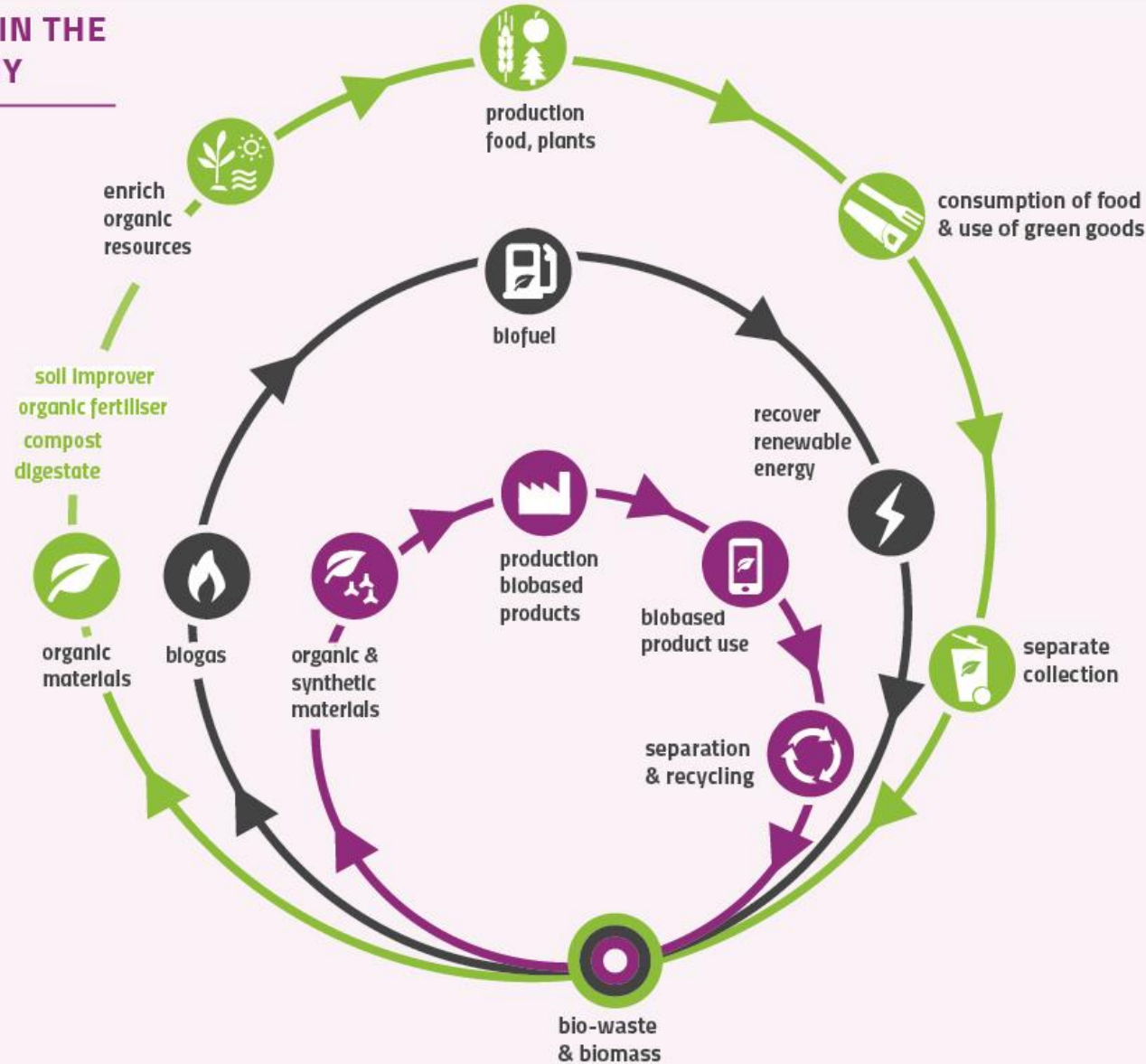


Source: ECN Status Report 2019

BIOLOGICAL CYCLE IN THE CIRCULAR ECONOMY

Bio-waste

- 20-60 % of municipal solid waste
- average 37 %



Bio-waste in the EU Circular Economy

CE Objectives

- Reduction of waste production in Europe
- Promoting recycling
- Saving primary resources
- Establishing of markets for secondary products

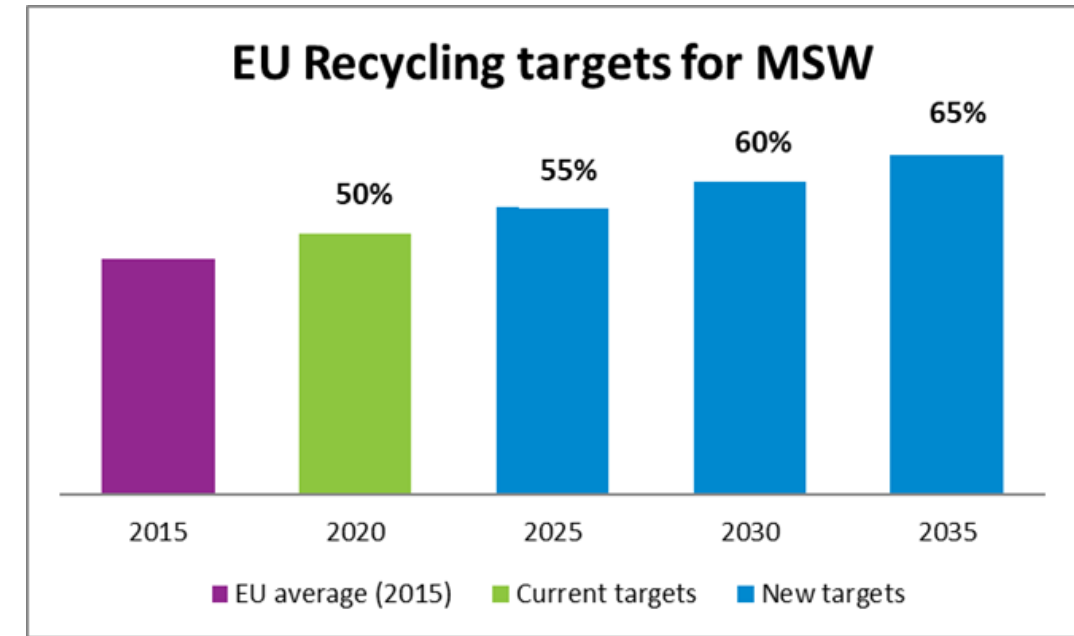
Status on MSW management & bio-waste recycling in Europe

EU Early Warning Report

- Early Warning Report for Member States at risk missing the 2020 target of 50% preparation for re-use / recycling for municipal waste published 2018

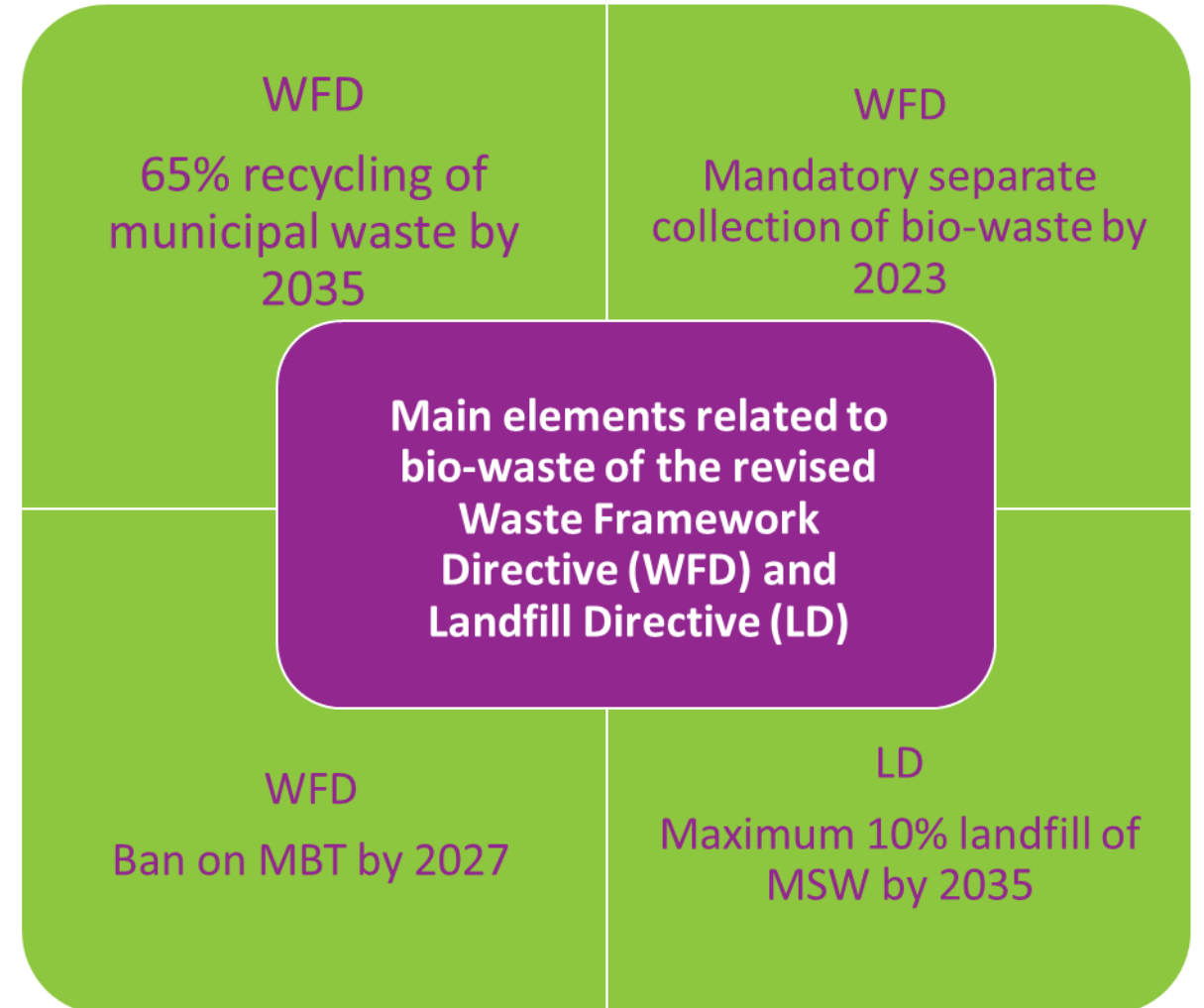
Proposed actions

- More effective separate collection to ensure high quality recycling,
- Mandatory requirements to sort bio-waste,
- Measures to encourage households to sort bio-waste,
- Measures (incl. taxes) to phase out landfilling and other forms of residual waste treatment.



04/07/2018 revised waste legislations entered into force

- Waste Framework Directive
- Landfill Directive
- Packaging and Packaging Waste Directive
- End-of-life vehicles, waste batteries and accumulators and WEEE directives.



WFD – Separate collection of bio-waste

- **Bio-waste** means biodegradable garden and park waste, food and kitchen waste from households, offices, restaurants, wholesale, canteens, caterers and retail premises and comparable waste from food processing plants.
- **‘Municipal bio-waste separated and recycled at source’** means bio-waste that is recycled at the place where it is produced by the person who produce it.



Separate collection



Separated and recycled at source

Calculation point for bio-waste treatment (Composting & Anaerobic Digestion (§ 2(6)))

Biodegradable material entering composting or anaerobic digestion operation with the exception of material removed during or after the recycling operation



Input material



Removed fraction



Recycled material

CE - Fertilising Products Regulation

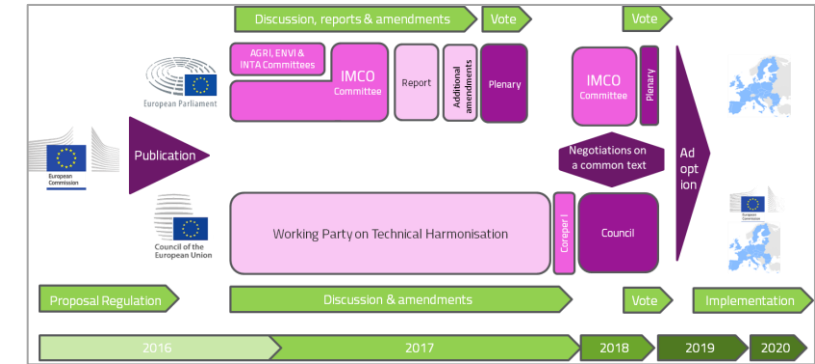


Regulation (EU) 2019/1009

entered into force on 15 July 2019

Objectives

- **Boosting organic matter (biowaste) recycling** from biowaste
- **Integration of organic fertilising products** into the scope of the new Regulation
- Introducing **harmonised EU rules for products** diverting from organic waste materials
- Creating access to CE marking and **free trade for organic fertilising products across EU**
- **Optional Harmonisation**, free choice to opt for compliance with national rules for fertilising products restricted to national markets or CE marked fertilisers with unrestricted access to EU market



Fertilising Products Regulation - Quality Assurance

Quality Assurance is a pre-condition for placing compost- or digestate-based fertilising products on the European Market



- External control of the quality assurance system by an accredited notified body

ECN-QAS for Compost and Digestate

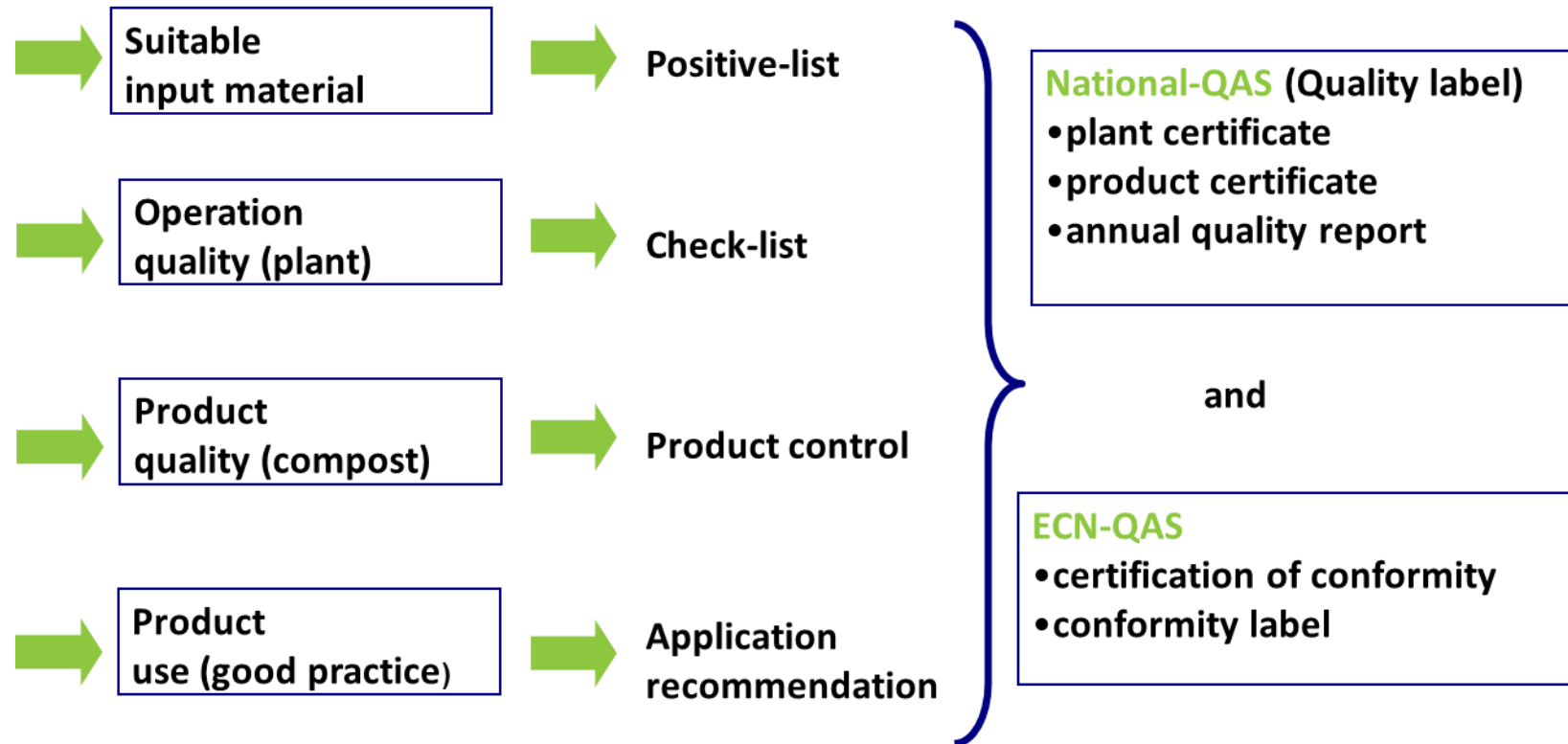


Targets of the European Quality Assurance Scheme for Compost and Digestate ECN-QAS

- Harmonisation of the compost quality and requirements across Europe
 - Harmonisation of quality assurance schemes across Europe
 - Assistance to build up national quality assurance schemes
 - Assurance and monitoring of high quality compost products in Europe
- **Promotion of recycling of organic waste materials «from waste to product»**



ECN-QAS for Compost and Digestate



Process requirements for compost and digestate



	ECN-QAS	Fertilising Products Regulation
Input material	Bio-waste, source separated, ABP Cat. 2 & 3 materials, Excluding sewage sludge and mixed municipal waste	Bio-waste, source separated, ABP materials, Excluding sewage sludge and mixed municipal waste and ABP materials for which no end point in the manufacturing chain has been determined.
Process criteria for digestate	According to the Animal By-Products Regulation (EC) No. 1069/2009 and (EU) No. 142/2011	a) Thermophilic at 55 °C/24 h/hydraulic retention time of 20 days b) Thermophilic at 55 °C incl. pasteurisation step 70 °C-1h c) Thermophilic at 55 °C followed by composting d) Mesophilic at 37-40 °C incl. pasteurisation step 70 °C-1 h e) Mesophilic at 37-40 °C followed by composting
Process criteria for compost	<u>Open windrow system</u> >55 °C for 10 days >65 °C for 3 days <u>Closed system</u> >60 °C for 3 days	<u>For all systems</u> 70 °C ≥ 3 days 65 °C ≥ 5 days 60 °C ≥ 7 days 55 °C ≥ 14 days

Quality criteria for compost and digestate



	Parameter	Assessment
Soil improvement	Organic matter	≥ 15 %, declaration
	Alcaline effective materials (CaO)	Declaration
Fertilisation	Nutrients (N; P, K) (S, NH ₄ -N, NO ₃ -N only for digestate)	Declaration
Material properties	Plant compatibility	Benchmark accord. to the test on germinable plants, declaration
	Water content /dry matter content	Declaration
	Bulk density/volume weight	Declaration
	Grain size	Declaration
	pH-value	Declaration
	Electric conductivity	Declaration
Stability (EU Fert. Reg.)	Oxygen uptake rate (OUR)	25 mmol O ₂ / organic matter*h
	Rotting degree (only for compost)	≥ III
	Residual Biogas potential (only for digestate)	0,25 Liter biogas / g volatile solids

Comparison of limit values in Europe



Values [mg /kg]	Cd	Cr _{total}	Cu	Pb	Hg	Ni	Zn	As
EU Fert. Reg. 2019/1009	1,5/2	Cr (VI) 2	300	120	1	50	800	40
ECN	1,5	60	300	130	0,45		600	
Compost (Green waste)	0,7	14	31,4	42	0,1	8,3	157	4,9
Compost (Bio-waste)	0,7	23,1	58,2	62,7	0,1	11,8	248	6,7
Digestate	0,6	23,5	119,8	12,0	0,1	13,1	375,9	7,7
AT	1/0,7	70	150/70	120/45	0,7/0,4	60/25	500/200	
DE	1,5	100		150	1,0	50		
BE	1,5	70	90	120	1,0	20	300	15
EU Organic Farming	0,7	70	70	45	0,4	25	200	
EU Ecolabel	1,0	100	100	100	1	50	300	
EoW Criteria	1,2	100	100	120	1	50	400	

Further initiatives



- EU Green Deal
- New EU Soil Strategy
- ECN/CIC Initiative 'Save Organics in Soil'

Carbon Neutral Economy 2050

Climate law Proposal (10/03/2020)

- GHG emissions reduction from source
- GHG emissions removal from the atmosphere in natural sinks – e.g. in soil

Farm to Fork Strategy 2020

- Reducing mineral fertilisers and pesticides; increasing organic farming

Biodiversity Strategy 2030

- 30 % restoring land and increasing organic farming

2020

- New **chemicals strategy** for sustainability

2021

- **Green Public Procurement (GPP) criteria and targets** in sectoral legislation with **mandatory reporting**
- **Industrial Emission Directive: Revision**
- **Unintentional release of microplastics: labelling, standardisation, certification and regulatory measures**
- **Waste Shipment Regulation: Revision**

2022

- Harmonised model for **separate collection and labelling** of waste

2023

- Regulatory framework for **certification of carbon removals**

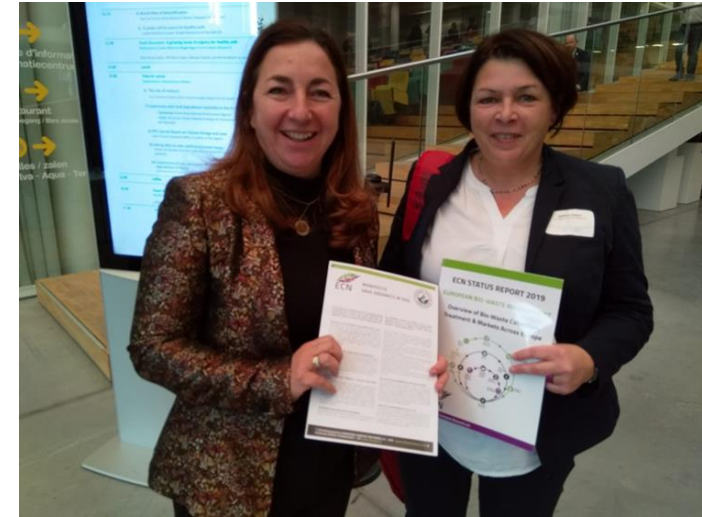
New EU Soil Strategy



- A new policy framework is needed because the 2006 EU Soil Thematic Strategy is no longer adapted to the policy context of today and the improved scientific knowledge base
- Led by DG ENV D1 Land use and management, this initiative will update the current 2006 Soil Thematic Strategy



- Healthy soils are essential to meet climate and biodiversity goals under the European Green Deal



Claudia Olazabel, Head of Soil Unit DG ENV of EU Commission and Stefanie Siebert, Executive Director of ECN, Brussels, November 2019

Scope of the New Soil Strategy

The strategy will address soil and land degradation in a comprehensive way and to help achieve land degradation neutrality by 2030.

The goals are to:

- protect soil fertility
- reduce erosion and sealing
- increase organic matter
- identify contaminated sites
- restore degraded soils
- define what constitutes 'good ecological status' for soils.



Save Organics in Soil – Main Priority Goals



Please sign the
Manifesto here:

<https://www.saveorganicsinsoil.org/>

Encourage policy makers to develop instruments to move Europe towards implementing sustainable, climate-proof land management practices:

- INCREASING **Soil Organic Matter** in arable soils
- ENCOURAGING The use of **recycled nutrients** and a **more efficient management of nutrients on agricultural land**.
- ENSURING That the European Commission adopts a **Soil Framework Directive**
- PROTECTING The existing **stock of carbon in soils**
- MAINTAINING A high level of **organic fertility in soil** by applying **stable organic matter** (e.g. compost) **from biomass** (e.g. bio-waste)
- MINIMIZING **Further losses of carbon from cultivated carbon rich soils**

Announcement - ICAW 2-8 May, 2021



Please celebrate the International Compost Awareness Week 2-8 May 2021 with us!



The soil connects us all. Not just we humans, but all life on earth.

Through plants and their roots, air that is breathed and exhaled, water that seeps into the soil from rain and snow, and the organic matter that is returned to the soil, living connections are made and sustained.

Twenty-five percent of the world's species live in the soil. They clean our water, feed the plants that feed us and calm our climate. Like us, they need food, water, air and shelter.

When we add compost to the soil, we give them what they need to keep their world and ours going.

Canada



Europe



United States of America

Further information



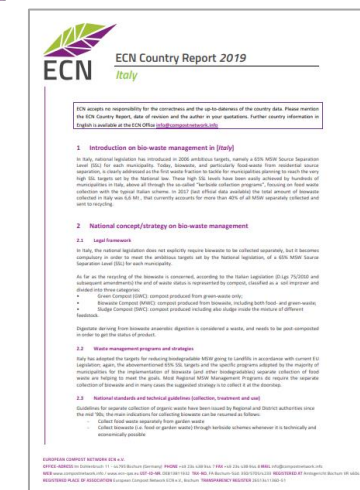
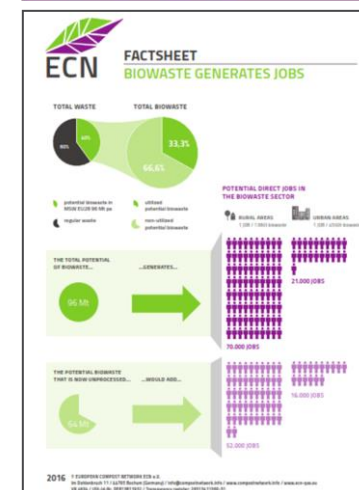
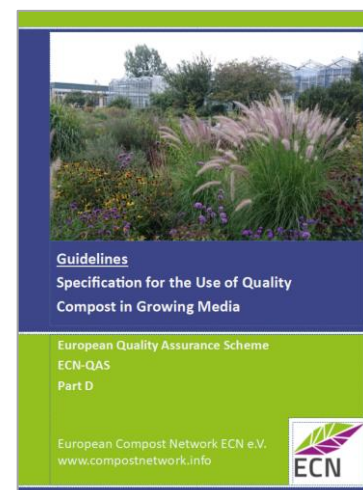
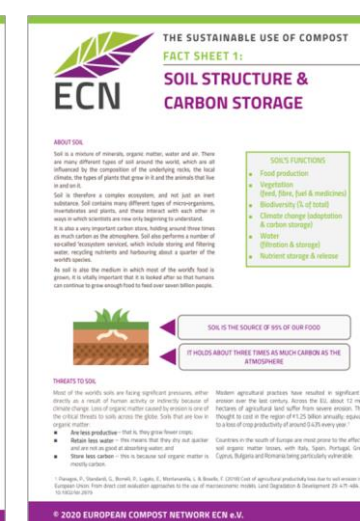
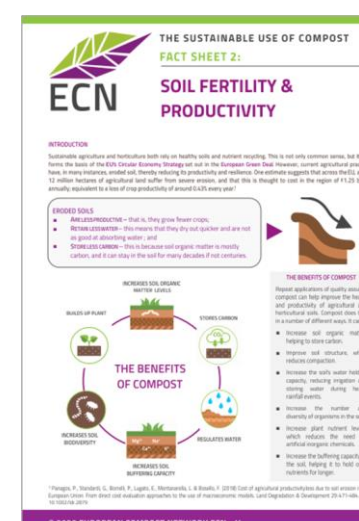
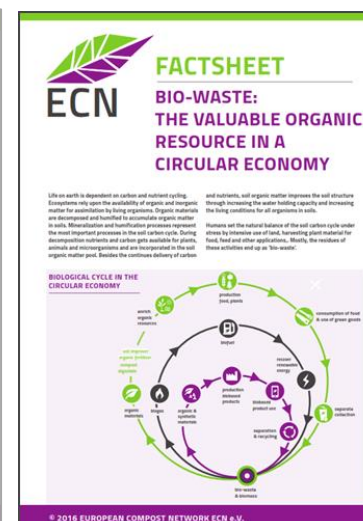
ECN Homepage:

www.compostnetwork.info

- ECN Status Report
- Factsheets
- ECN E_Bulletin
- Country reports
- ECN-QAS Manual

S.O.S Initiative:

www.saveorganicsinsoil.org



Further information



Sign the manifesto

‘Save Organics in Soil’:

www.saveorganicsinsoil.org



Join the international conference

Growing Media2021:

www.growingmedia2021.com



GrowingMedia2021—International Symposium on Growing Media, Soilless Cultivation, and Compost Utilization in Horticulture

22-27 August 2021, Ghent, Belgium

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