



Circular Economy and Bio-waste in Europe

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ISWA Study Tour on Biowaste Collection and Recycling 2019

Milan-Veroan-Venice-Milan, Italy

29 September – 3 October, 2019

Overview

- The European Compost Network
- Status on Municipal Solid Waste Management (MSW) and Bio-waste Recycling in Europe
- The EU Waste Legislation on Biowaste Recycling
 - EU Waste Framework Directive
 - Implementation acts
 - EU Fertilising Product Regulation
- Perspectives



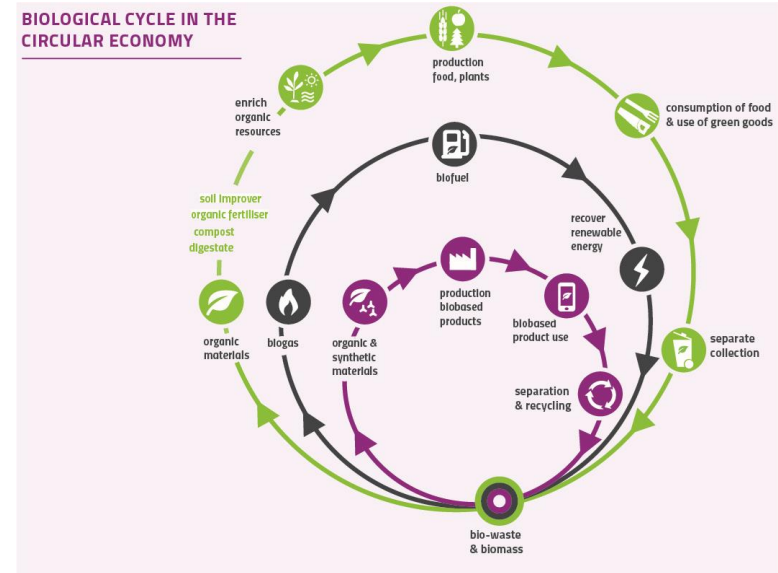
ECN

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...



63 members from 28 European countries

48 M tpa treatment capacities

4.500 treatment plants (composting & AD)

European Compost Network

ECN's objectives for the separate collection, biological treatment, production & use of quality compost and digestate :

1. FAVOURABLE LEGAL FRAMEWORK – EUROPEAN POLICY

Achieve an EU legal framework

2. MARKET DEVELOPMENT

Achieve favorable market conditions across Europe

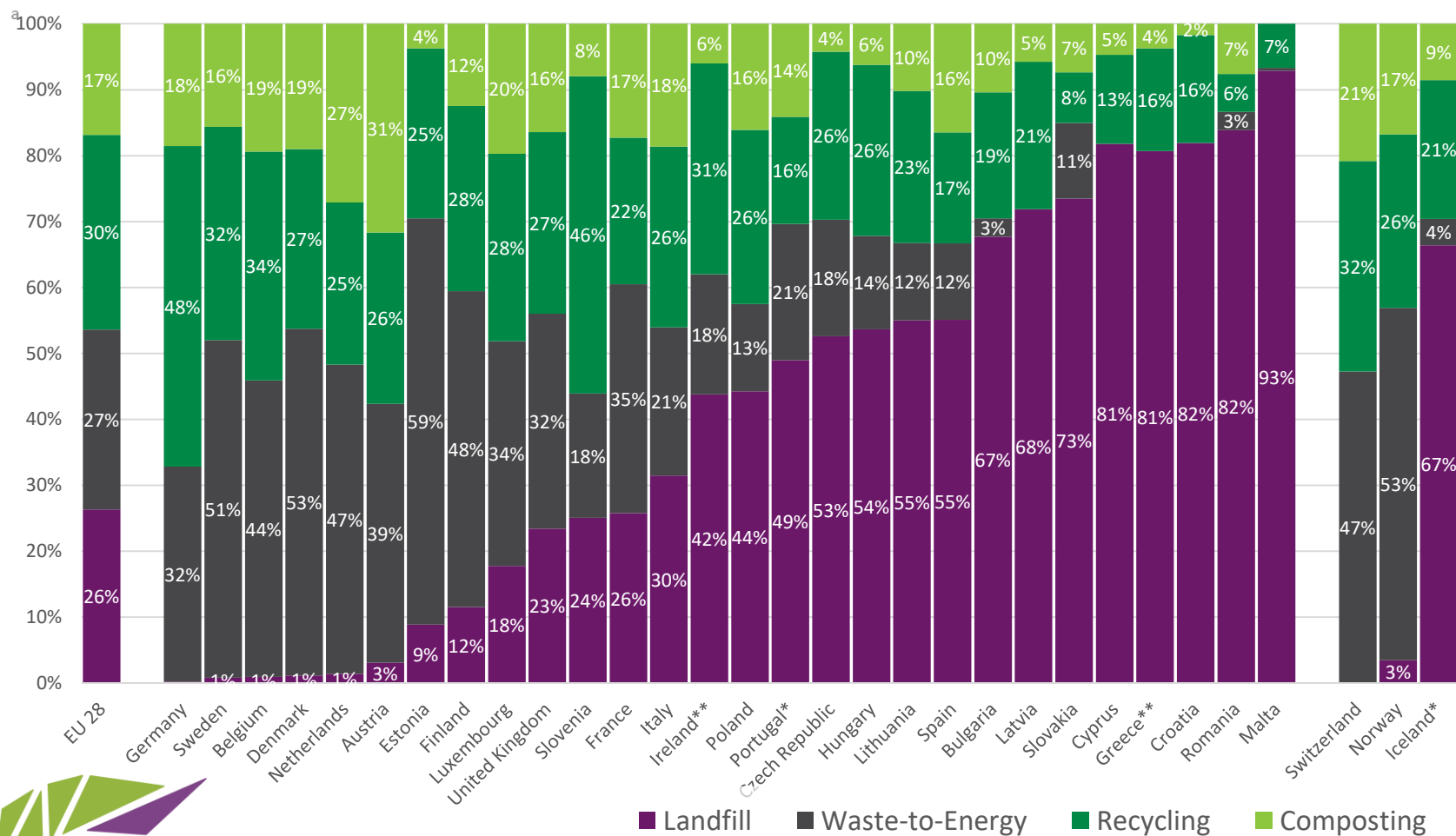
3. IMPLEMENTING QUALITY ASSURANCE SCHEMES

Achieve Europe wide implementation quality assurance schemes with ECN-QAS as a benchmark



Status on MSW management & bio-waste recycling in Europe

2016



* : 2014 data (most recent data available)

** : 2012 data (most recent data available)

Source: EUROSTAT 2017

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.



State on Bio-Waste Management in Europe

ECN Status Report 2019

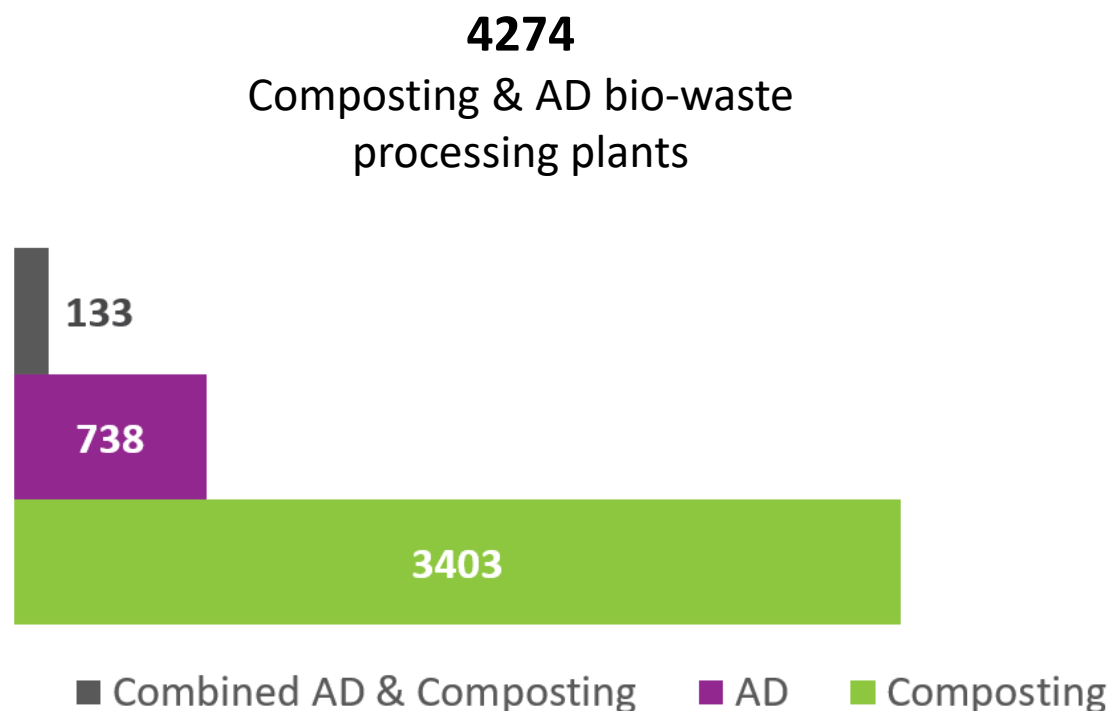
European Bio-Waste Management

Overview of bio-waste collection, treatment & markets across Europe

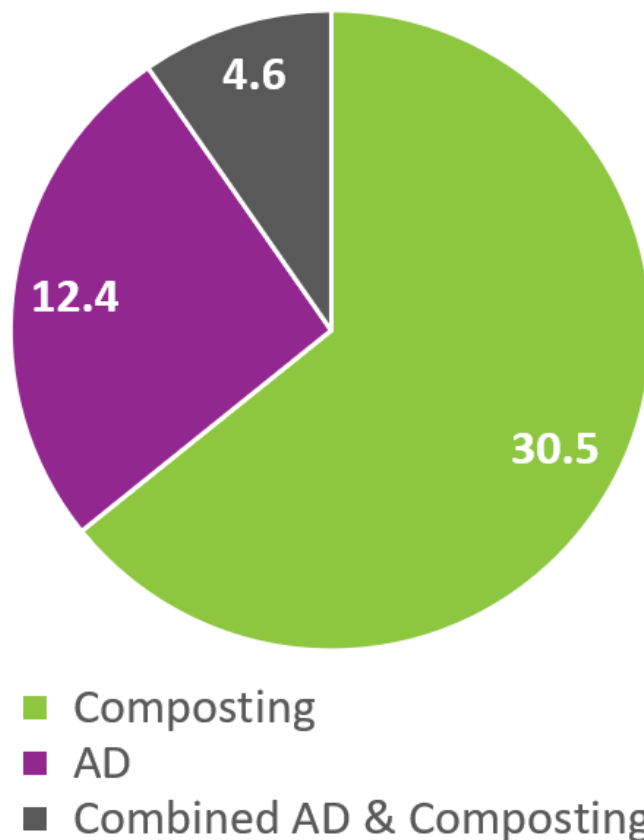
- Published by ECN, supported by ISWA WG BTW
- Data reporting results from 18 European countries



State on Bio-Waste Management in Europe

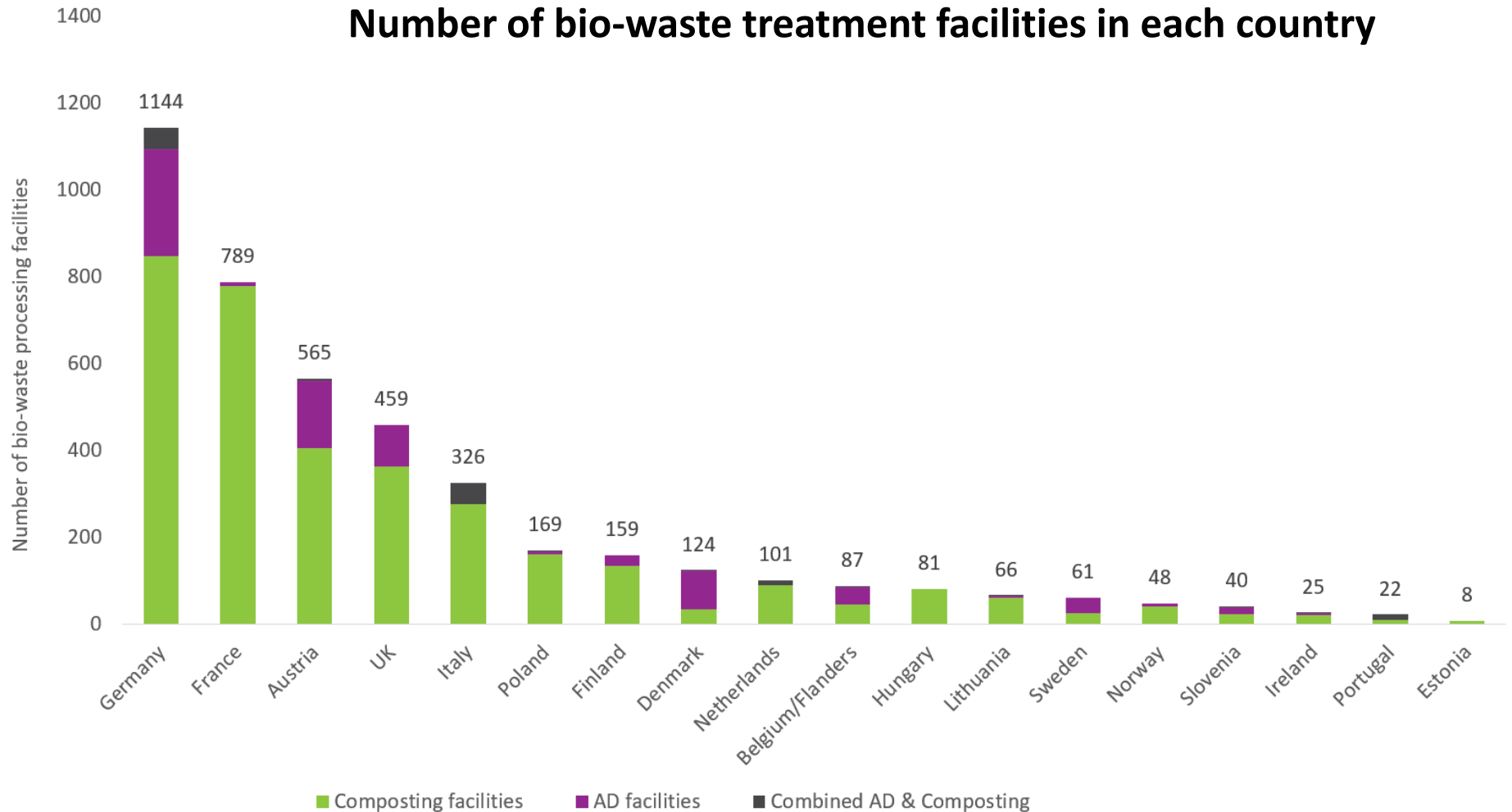


47,5 million tonnes
bio-waste composted / digested



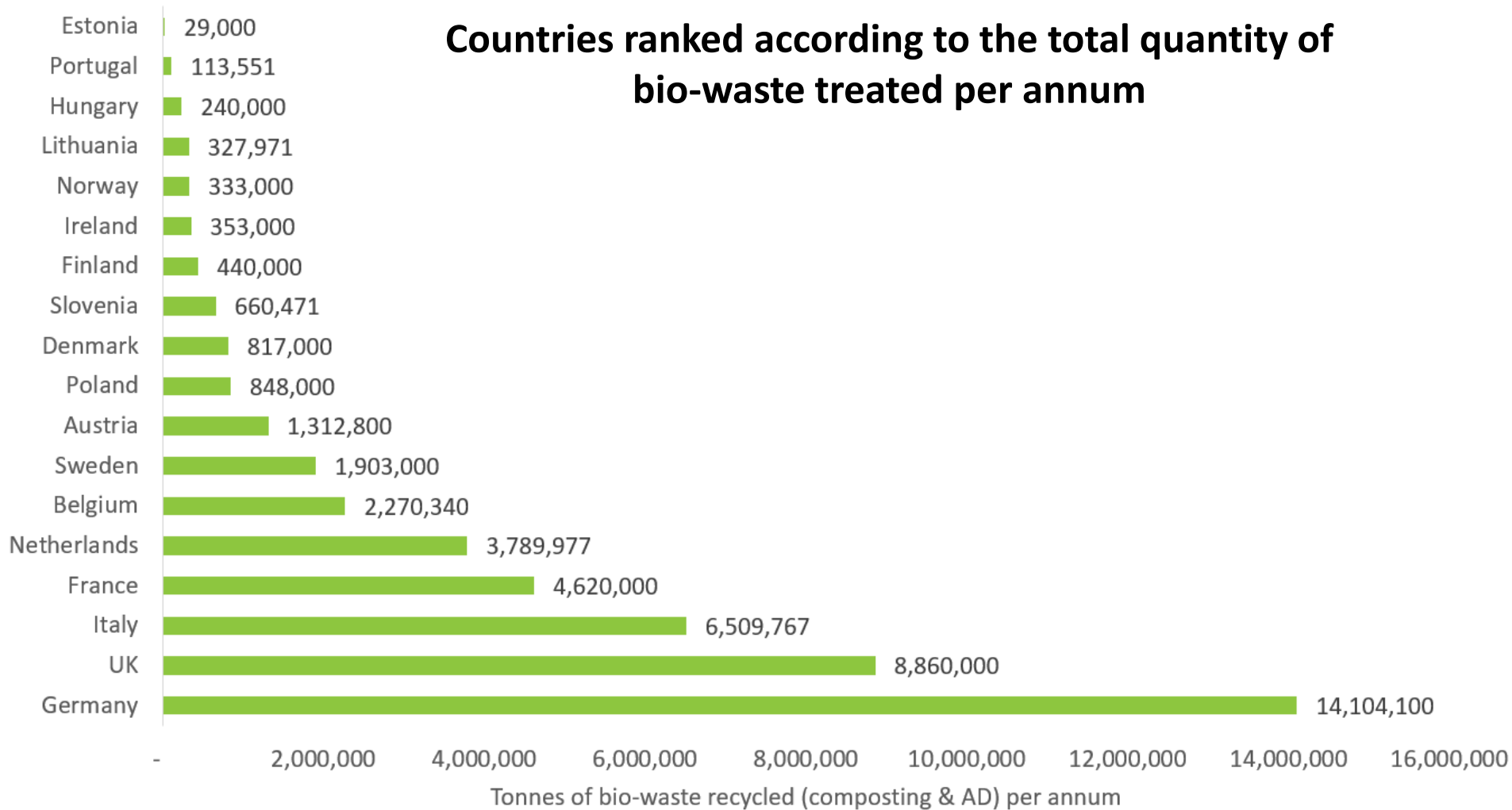
State on Bio-Waste Management in Europe

Number of bio-waste treatment facilities in each country



State on Bio-Waste Management in Europe

Countries ranked according to the total quantity of bio-waste treated per annum



Status on MSW management & bio-waste recycling in Europe

Potential und Treatment

- Total biowaste potential in Europa: **118-138 Mt pa**
- 20-60 % Biowaste in Municipal Solid Waste (MSW)
- Biowaste potential of MSW in Europa: **96 Mt pa**
- Biowaste management in Europa: **40 Mt pa**



❖ **60 Mt pa Biowaste are wasted every year!!**

Food waste in EU 28 (2012)

- 87.6 Mt total food waste per year
- 46.5 Mt food waste from households

❖ **41.1 Mt pa of commercial and industrial biowaste**

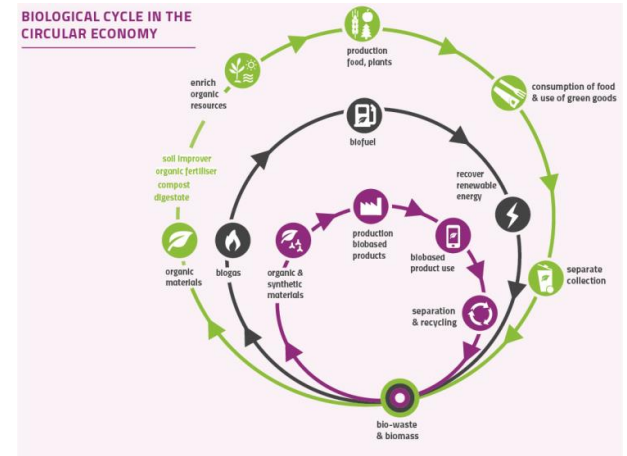
Source: Stenmarck et. al. 2016 FUSIONS report

The Waste Legislation on Bio-Waste Recycling

The EU Circular Economy

Objectives

- Reduction of waste production in Europe
 - Promoting recycling
 - Saving primary resources
- Revision of the Waste Framework Directive and Landfill Directive
- **Status: Adopted in 2018 and implementation in Member States**
- Establishing of markets for secondary products
- Revision of the EU Fertilising Regulation
- **Provisional agreement by the European Parliament on 27 March 2019 reached**



The Waste Legislation on Bio-Waste Recycling

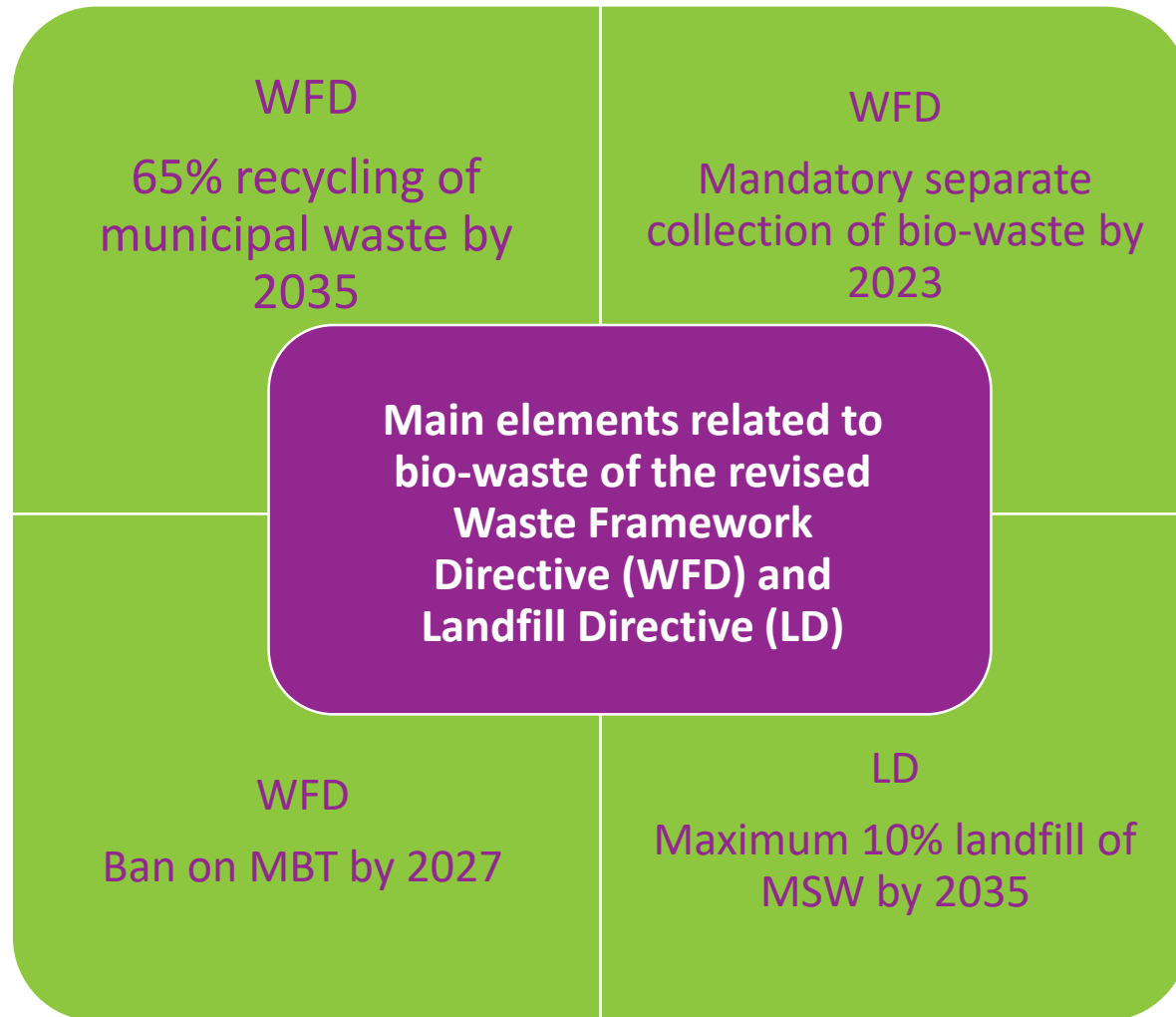
New CE Waste legislation

- **4 July 2018** new waste legislations entered into force
 - Waste Framework Directive
 - Packaging and Packaging Waste Directive
 - Landfill Directive
 - End-of-life vehicles, waste batteries and accumulators and WEEE directives.
- Member States have to transpose the new legislations **until 4 July 2020**

| Outcome of the legislative process | |
|--|---|
| ECN priority topic | Revised Waste Framework Directive |
| <u>Separate collection and recycling of bio-waste</u> | Member States shall collect bio-waste separately by 31 December 2023 (§22 (1)). Separately collected bio-waste cannot be incinerated (§10 (3a)). Derogations for environmental, technical, and economic reasons are included in the text (§10 (3)). By 31 December 2021, Member States shall submit a report to the Commission on the implementation of §10 as regards bio-waste, including on the material and territorial coverage of separate collection and any derogations under §10 paragraph 3 (§10 (4)). As of 1 January 2027, municipal bio-waste entering aerobic or anaerobic treatment may only be counted as recycled if it has been separately collected or separated at source (§11a (4a)) - MBT will no longer count towards recycling targets. |
| <u>Calculation of recycling targets</u> | The amount of municipal biodegradable waste that enters aerobic or anaerobic treatment may be counted as recycled where that treatment generates compost, digestate, or other output <u>with similar quantity of recycled content</u> in relation to input, which is to be used as a recycled product, material or substance. Where the output is used on land, it may only be considered as recycled if resulting in agriculture or ecological improvement (§11a (4a)). End-of-waste materials to be used as fuels or other means to generate energy, be incinerated, backfilled or landfilled, cannot be counted towards the recycling targets (§11a (4b)). Implementing acts establishing rules for the calculation, verification and reporting of data, in particular as regards bio-waste separated and recycled at source shall be adopted by 31 March 2019 (§11a (8)). |
| <u>Inputs into final recycling process</u> | The Commission will monitor national criteria and will, when necessary, adopt implementing acts that specify the permissible waste inputs (§6). |
| <u>Specific recycling target for bio-waste</u> | By 31 December 2024 the Commission shall consider the setting of recycling targets for municipal bio-waste (§11 (5)). |
| <u>Collection target for industrial bio-waste</u> | By 31 December 2024, the Commission shall consider the setting of recycling targets for commercial waste and non-hazardous industrial waste (including bio-waste) (§11 (6)). |
| <u>Incentive schemes dedicated to bio-waste</u> | Member States shall make use of economic instruments and other measures to provide incentives for the application of the waste hierarchy such as those indicated in <u>Annex IV</u> or other appropriate instruments and measures (§4 (3)). Member states will promote the use of materials produced from bio-waste (§22 (2c)). |
| <u>Bio-waste definition allowing for biodegradable plastics in collection of bio-waste</u> | Member States <u>may allow</u> waste with similar biodegradability and compostability properties to be collected together with bio-waste if it complies with European or equivalent national standards (§22 (1)). |
| <u>Standard for organic recycling</u> | Mandate for the development of a European standard for bio-waste entering organic recycling processes by 31 December 2018 (§22 (3)). |
| <u>Home composting</u> | Member States shall encourage home composting (§22 (2b)). |
| <u>Food waste reduction</u> | An indicative Union-wide food waste reduction target of 30% by 2025 and 50% by 2030 is included in the final text (Recital 12). |
| <u>Separate waste codes for municipal bio-waste</u> | The amendments that included separate waste codes, as proposed by the European Parliament, are not reflected in the final text. |

[ECN Fact sheet](#) on new WFD

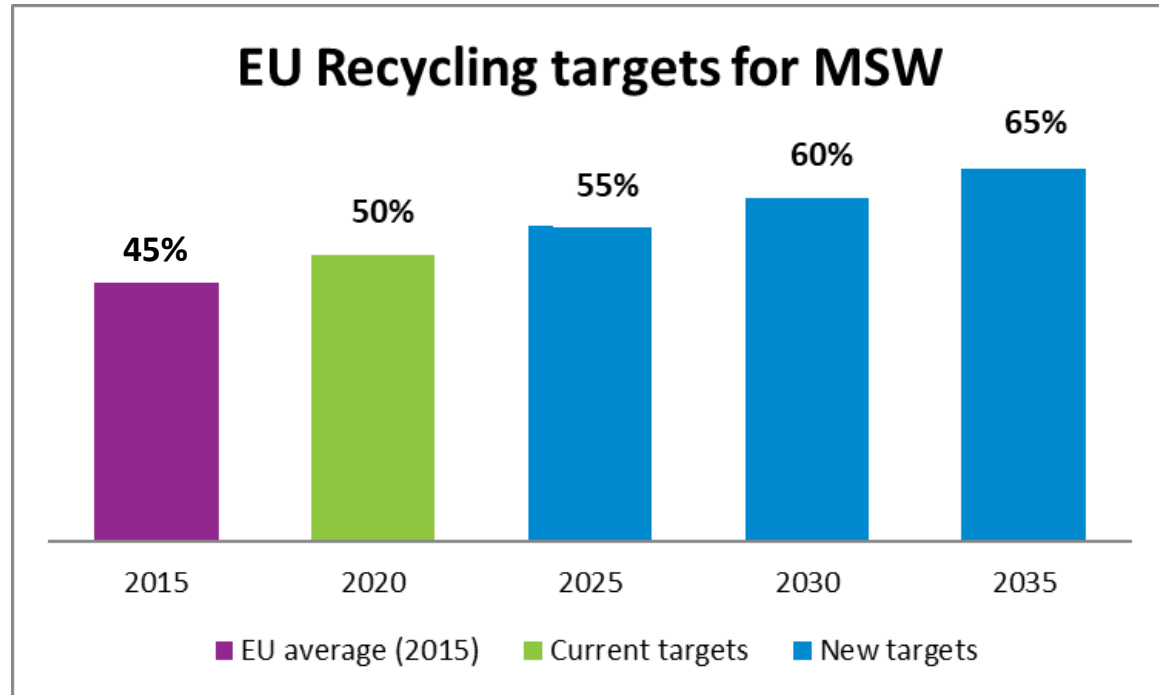
The Waste Legislation on Bio-Waste Recycling



The Waste Legislation on Bio-Waste Recycling

EU Recycling targets for MSW

- 5-year extension for countries with a low starting point
 - 11 MS: EE, EL, HR, CY, LV, LT, HU, MT, RO, SK, BG
 - Implementation + interim targets
- Single calculation method
 - Harmonised definition of municipal waste
 - Reporting input to recycling
- High Quality recycling of biowaste
 - Counting only separately collected and recycled bio-waste as of 2027



Source: EU COM/DG ENV 2018:

http://ec.europa.eu/environment/waste/target_review.htm

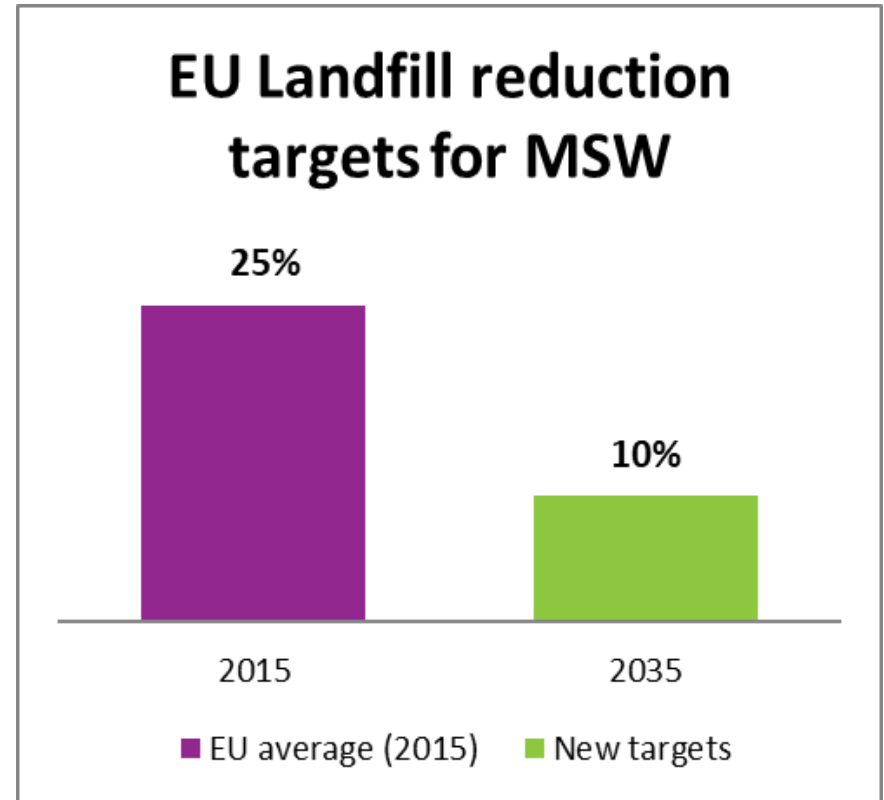
The Waste Legislation on Bio-Waste Recycling

EU Landfill reduction targets for MSW

- 5-year extension for countries with high landfill rates
 - 10 Ms: EL, HR, CY, LV, LT, HU, MT, RO, SK, BG
 - Implementation + interim targets
- Calculation rules for landfilling
- Landfill restrictions for separately collected waste

Source: EU COM/DG ENV 2018:

http://ec.europa.eu/environment/waste/target_review.htm



The EU Waste Framework Directive - WFD

Requirements for separate collection in the WFD

- Mandatory separate collection of bio-waste or separated at source by **31 Dec. 2023** (§22)
- As of 1 Jan. 2027 only municipal bio-waste separately collected/separated at source and treated by composting or AD will be counted as recycled (§11a (4a)) - **MBT will no longer count towards recycling targets**
- Incineration of separately collected bio-waste not allowed (§10 (3a))
- **Derogations from separate collection** based on environmental, technical, and economic reasons (§10 (3))
- **Reporting obligations by Member States on the implementation** including the material and territorial coverage **of separate collection** and any derogations (§10 (4))



The EU Waste Framework Directive - WFD

Calculation of recycling targets

- Input material that enters aerobic or anaerobic treatment may be counted as recycled,
 - Where that treatment generates compost, digestate, or other output with similar quantity of recycled content in relation to input, which is to be used as a recycled product, material or substance.
 - Where the output is used on land, it may only be considered as recycled if resulting in agriculture or ecological improvement (§11a (4a)).
 - End-of-waste materials to be used as fuels or other means to generate energy, be incinerated, backfilled or landfilled, cannot be counted towards the recycling targets (§11a (4b)).



Implementation decision on WFD

Implementation decision on calculating recycling targets (COM 2019/1004)

- Commission Implementation Decision on establishing rules for the calculation, verification and reporting of data on the recycling of municipal waste (article 1- article 9)
- Annexes (I- VI)
 - Annex I 'Non-exhaustive list of calculation points'
 - **Annex II 'Methodology for calculating municipal bio-waste separated and recycled at source'**
- Published in EU Official Journal on 20 June 2019

Implementation decision on WFD

Definitions (§1)

- **‘calculation point’** means the point where municipal waste materials enter the recycling operation whereby waste is reprocessed into products, materials or substances that are not waste or the point where waste materials cease to be waste as a result of a preparatory operation before being reprocessed;
- **‘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

Implementation decision on WFD

Calculation rules for municipal bio-waste separated and recycled at source

1. The amount of recycled municipal bio-waste entering aerobic or anaerobic treatment shall only include materials that actually undergo aerobic or anaerobic treatment and shall exclude all materials, including biodegradable material, which are mechanically removed during or after the recycling operation.



Input



Removed fraction



Recycled material

EU Fertilising Product Regulation

Commission proposal COM(2016)157 final, published 17 March 2016

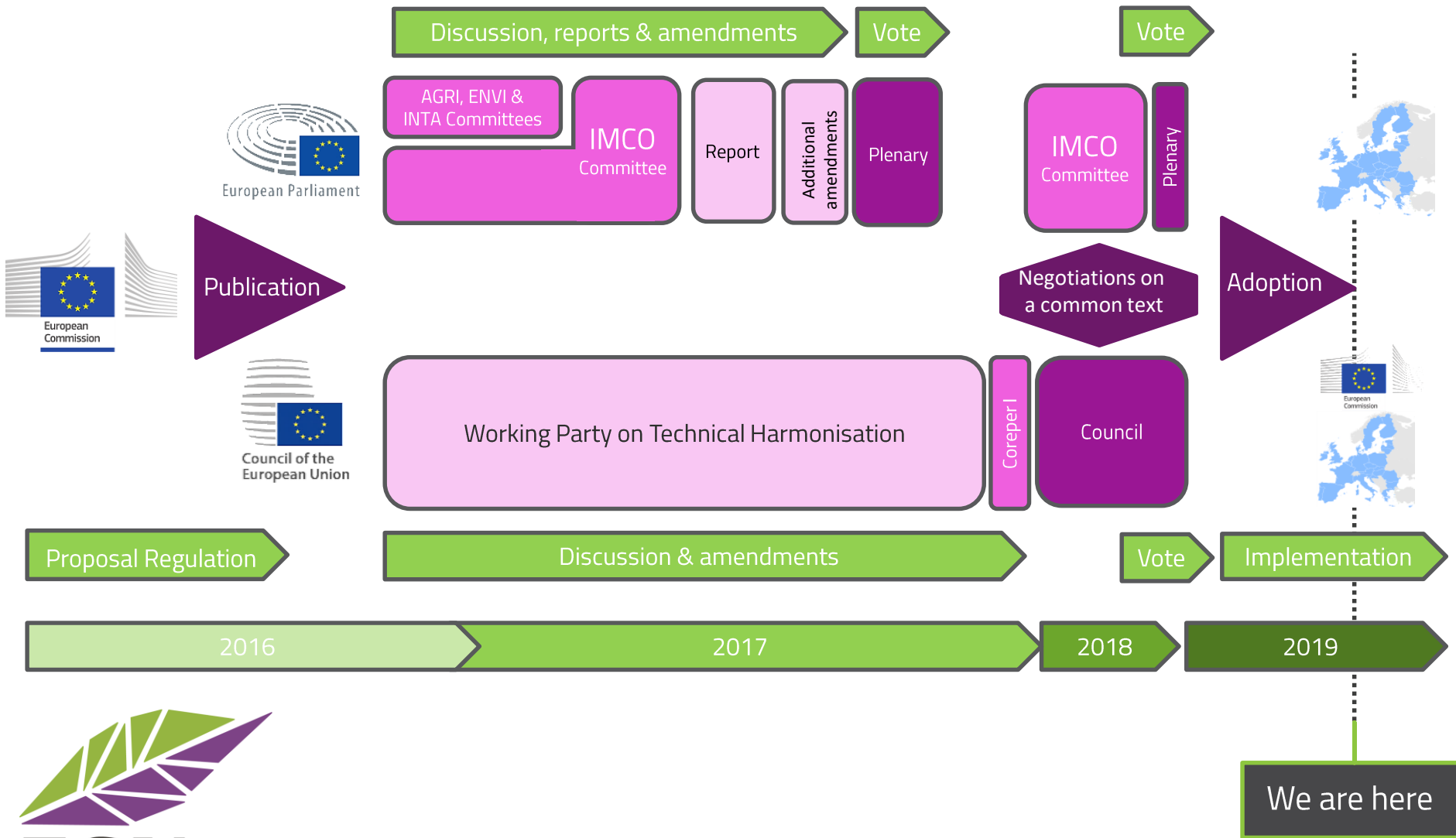
Objectives

- **Boosting organic matter (biowaste) recycling** from biowaste within CEP
- **Integration of organic fertilising products** into the scope of the NFR
- 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



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Status of the EU Fertilising Product Regulation

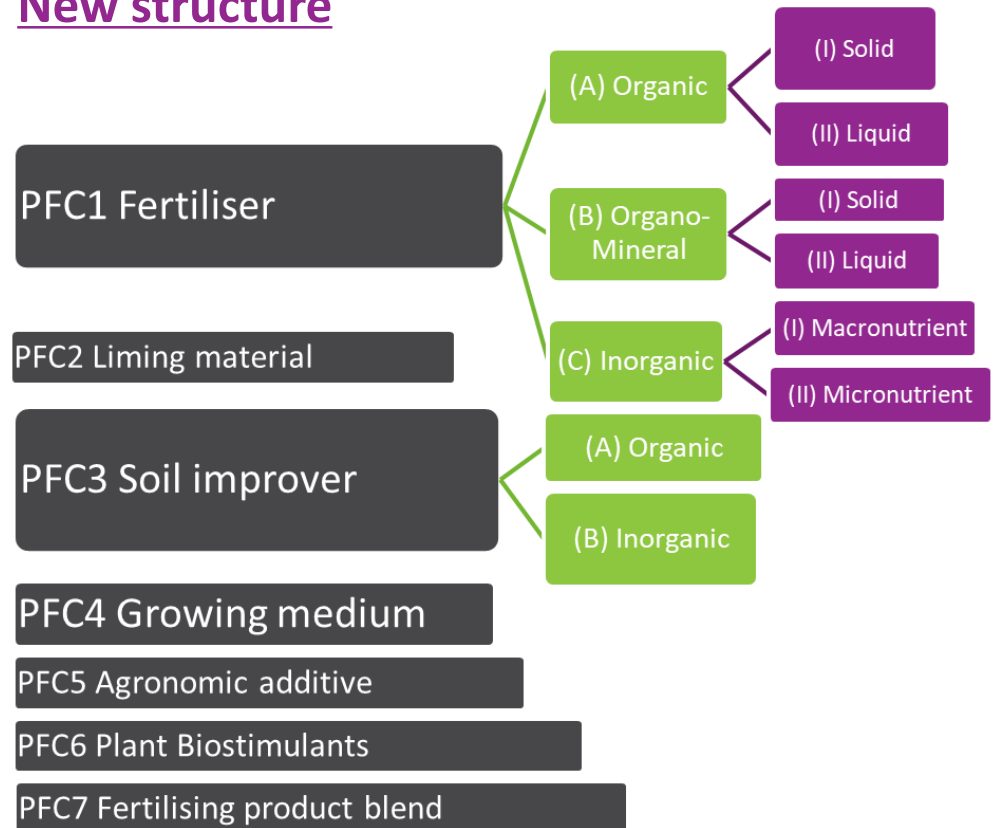


EU Fertilising Product Regulation

Scope

- Besides mineral fertilisers and liming materials - organic fertilisers, soil improvers, growing media and bio-stimulants will be included.
- Recycled waste materials will be recognized as products (end-of-waste criteria for compost and digestate from bio-waste)
 - Based on defined input materials (separate collected bio-waste, no MBT material, no sewage sludge)

New structure



EU Fertilising Product Regulation

Exhaustive list of
Component
Materials
Categories CMC
(11)

- Quality
- Safety
- ...

CMC 3 Compost
CMC 5 Digestates other
than from energy crops

Exhaustive list of
Product Function
Categories
PFC (7)

- Quality
- Safety
- Declaration
- ...

PFC 1 A. Organic fertiliser
PFC 3 A. Organic Soil Improver
PFC 4 Growing Media
PFC 7 Fertilising Products Blends

Conformity
assessment
procedure related
to 'CMC/PFC'
combination

- Modul A - D1
- Declaration of conformity

Modul D.1
Quality Assurance of
Process and Products



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Process Requirements for Compost and Digestate

| | Fertiliser Regulation | |
|--------------------------------|--|---|
| Input material | Bio-waste, source separated, ABP cat 2 & 3, excluding sewage sludge and mixed municipal waste Plus a liquid or non-liquid microbial or non-microbial extract made out of compost; and Unprocessed and mechanically processed residues from food production industries, except ABPR materials | |
| Process criteria for digestate | 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 | 70 °C ≥ 3 days 65 °C ≥ 5 days 60 °C ≥ 7 days 55 °C ≥ 14 days | Remark: For ABP input materials to composting/AD the requirements of REG (EC) No 1069/2009 have to be fulfilled! |

Specific criteria for Compost and Digestate

| Criteria | Fertilisers Reg. Digestate | Fertiliser Reg. |
|--|-------------------------------|---------------------|
| | Digestate (CMC 5) | Compost (CMC 3) |
| PAH ₁₆ (mg/kg dm) | 6 | 6 |
| Impurities (% dm) | ≤ 0,5 ^{x1} | ≤ 0,5 ^{x1} |
| Stability | | |
| Oxygen Update rate [OUR] (mmol O ₂ / OM *h) | 25 | 25 |
| -OUR/Rotting degree /- Residual Gas potential (liter biogas/g volatile solids) / organic acides (mg/l) | -/≤0,25/- | III/-/- |



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^{x1}no more than 3 g/kg dry matter of macroscopic impurities above 2 mm in any of the following forms: glass, metal or plastics; and from 16/07/2026 no more than 2.5 g/kg dry matter of plastics above 2 mm

Requirements for Organic Fertiliser - PFC1(A)(I)/(II)

| | PFC 1 (A)(I) | PFC 1 (A)(II) |
|--|------------------|---------------------|
| Criteria | Solid | Liquid |
| Corg | $\geq 15 \%$ | $\geq 5 \%$ |
| Nitrogen (N) | $\geq 2,5 \%^*$ | $\geq 2 \%$ |
| Phosphorus (P_2O_5) | $\geq 2 \%^*$ | $\geq 1\%$ |
| Potassium* (K_2O) | $\geq 2 \%^*$ | $\geq 2 \%$ |
| SUM (NPK) | $(1/1/1) \geq 4$ | $(1/1/1) \geq 3 \%$ |
| All values based on fresh matter | | |
| * As a minimum one of the three nutrient contents have to been reached | | |

Remark: The minimum nutrient values will be difficult to be reached with compost and digestate.

Requirements for Organic Soil Improver – PFC3(A)

| | Organic soil improver |
|----------------------------------|--|
| Dry matter | $\geq 20 \%$ |
| Corg | $\geq 7,5 \%$ |
| Composition | <p>An organic soil improver shall consist of material 95% of which is of solely biological origin</p> <p>An organic soil improver may contain peat, leonardite, lignite, no other material which is fossilized or embedded in geological formations.</p> |
| All values based on fresh matter | |

Requirements for Organic Fertiliser and Organic Soil Improver

| Criteria | PFC 1 (A)(I)/(II) | PFC 3 (A) |
|---|--------------------|-----------------------|
| | Organic fertiliser | Organic soil improver |
| Cd (mg/kg dm) | 1,5 | 2 |
| Cr VI / Cr (mg/kg dm) | 2 / - | 2 / - |
| Hg (mg/kg dm) | 1 | 1 |
| Ni (mg/kg dm) | 50 | 50 |
| Pb (mg/kg dm) | 120 | 120 |
| Cu (mg/kg dm) | 300 | 300 |
| Zn (mg/kg dm) | 800 | 800 |
| As /mg/kg dm) | 40 | 40 |
| C ₂ H ₅ N ₃ O ₂ (g/kg dm) | absent | - |
| <i>Salmonella</i> spp. | absent | absent |
| <i>E. Coli</i> / <i>Enterococcaceae</i> (CFU/g) | ≤ 1000 | ≤ 1000 |

EU Fertilising Product Regulation

From Waste to Product

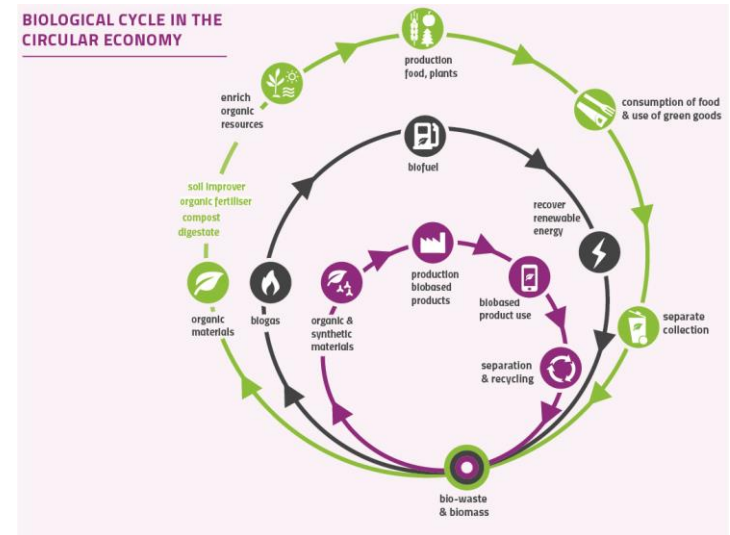
Quality Assurance is a pre-condition for placing compost- or digestate-based fertilising products on the European Market

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



Perspectives

- With the adoption of the revised waste legislations and the EU Fertilising Product regulation **the way is paved towards a circular bioeconomy in Europe.**
- Sustainable bio-waste management will play a key role in **Europe's nascent circular economy.**
- **Member states** have to start with **implementation of separate collection and treatment of bio-waste.**
- High quality recycling is a pre-condition for **placing compost- and digestate-products on the European Markets**



Information

ECN Status Report 2019 – European Biowaste Management

Download:

www.compostnetwork.info

Thank you for your
attention!

