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1 Introduction on bio-waste management in Norway

Municipalities have the responsibility for the household waste in Norway, whereas all other waste (ranging from schools, restaurants, shops and industry) remains the responsibility of the waste owner. The source separation of biowaste started in Norwegian municipalities in the 1990s motivated by a landfill ban for unsorted waste (made effective in 2001) and a state tax on end disposal of waste. In 2009 a second and more comprehensive landfill ban was introduced, prohibiting the landfilling of degradable waste with TOC > 10 % or organic matter > 20 %.

Source separation and collection of biowaste from households has increased from 171 000 tonnes in 2011 to 333.000 tons in 2016 (source SSB).

Of this, 153.000 tons was garden waste and 189.000 tons was food and other organic waste.

70% of the population are living in municipalities offering source separation and door-to-door collection of food waste. Biowaste from household (including garden waste) was delivered to either composting (228.000 tons) or biogas production(105.000 tons) in 2016. This equals 64 kg/source separated organic waste collected per inhabitant in total.

Collection rate from the households (average source sorted organic waste out of total, where source sorting is implemented) is 69% (source Østfoldforskning, 2016)

Commercial food waste and other biowaste is collected either separately and for small quantities together with food waste from the households.

In addition garden waste is collected at civic amenity sites, in some municipalities garden waste is collected in a door-to-door collection.

2 National concept/strategy on bio-waste management

2.1 Legal framework

Compost, sewage sludge, digestate and manure is since 2003 regulated together in a Regulation for Organic Fertilizers. The regulation is basically product oriented and all products must be registered before they can be traded. Demands are set up for a quality assurance system to ensure the compliance with the regulations. Product quality demands are set up for heavy metals and other toxic substances, hygienic parameters, impurities etc.

This regulation is in 2016-2017 under a revision. The assignment takes into account the EU-strategy for the circular economy, and the goal is to increase the use of organic and waste-based fertilizer products at the same time as environmental considerations is safeguarded.



Table 1. Quality classes and user restrictions (under revision)

Quality classes	0	I	II	III
	mg/kg dry matter			
Cadmium (Cd)	0,4	0,8	2	5
Lead (Pb)	40	60	80	200
Mercury (Hg)	0,2	0,6	3	5
Nickel (Ni)	20	30	50	80
Zink (Zn)	150	400	800	1500
Copper (Cu)	50	150	650	1000
Chrome (Cr)	50	60	100	150
User restrictions	No specific restrictions	Maximum 4 t DM/da*10a, use on agricultural land and green areas permitted	Maximum 2 t DM/da*10a, use on agricultural land and green areas permitted	Use on green areas permitted. Maximum 5 cm/10a

2.2 Waste management programs and strategies

/describe your basic strategic documents, waste management plans and programs, related to the bio-waste management (implemented measures, targets, bans, etc.)/

- Mandatory source sorting and collection of ‘household-like’ food waste (on its way...?)
 - This has been evaluated and recommended from the EPA of Norway primo 2017, still not decided.
- National cross-sectoral Biogas Strategy (2014) - [link](#)
 - Recommends more push on biogas.
 - There is a significant potential for biogas production by 2020 and the potential will increase further after that. Government want to facilitate increased production and use of biogas in Norway.
 - Biogas Should be part of the ongoing, long-term work of restructuring Norway to a low-emission society.
- Bioeconomy Strategy (2016) - [link](#)
 - Increased value creation and employment
 - Reduction in greenhouse gas emissions
 - More efficient sustainable resource utilization
- Circular Economy and waste management note - from the Government to the Parliament (2017) - [link](#)
 - The report presents the role of waste policy in a circular economy. The message emphasizes waste prevention, increased recycling and material recovery. The message also contains an overall plastic strategy, which undergoes all planned and initiated measures against marine pollution and dispersion of microplast nationally and internationally.
 - The report states a clear direction and vision, but is vague in concrete measures, according to Avfall Norge - [link](#)
 - Norway do not meet the current obligations of 50 percent material recovery of household waste by 2020, says Nancy Strand, CEO of Avfall Norge.

2.3 National standards and technical guidelines (collection, treatment and use)

/list your national (or others) standards, related to the bio-waste management, implemented in your country/

There are a set of Best-practice / industry norms from Avfall Norge on biowaste. For animal byproducts, the EU-regulations fully apply.

- Validation of open windrow composting, 2015
- Best practices for composting of garden waste, 2016

2.4 Quality Assurance Scheme (QAS) and National Quality Assurance Organization (NQAO)

/describe main, structure, aims and the functions of your NQAO and the main elements and requirements of QAS certification scheme/

- The Regulation for Organic Fertilizers set forth quality levels in terms of heavy metals and maximum levels of unwanted substances (stones, plastics etc). The facility needs to have an internal control system in place. The Norwegian Food Safety Authority will have perform control projects.
- No QAS system in place today, but Avfall Norge has started a project that will recommend an industry norm / QAS-system that can be approved by an accredited 3. party body in order to comply with the new fertilizer regulations in EU and potential for CE-marked fertilizer.

3 Source separated collection of bio-waste

/describe current situation on source separate collection of bio-waste in your country (organizational aspects, implemented systems, current rates, successful stories)

Today 70% of the population (3,7 mio) lives in municipalities with source separation.

In January 2017 the Norwegian Environment Agency (EPA) announced their recommendation on mandatory source separation of food waste and plastics. It is expected that this will be decided as part of the Government's report on Circular Economy, as part of Norway's commitment to EU on material recovery (50% by 2020).

4 Bio-waste treatment (recycling, material/energy recovery)

/describe main technologies used for bio-waste treatment in your country (quantity of plants (composting, anaerobic digestion, mechanical biological treatment of Municipal solid waste, treated quantities, treatment prizes and other figures)/

Norway's strategies

- Biogas and composting, with high material recovery.
- Increased industrial utilisation of the resources from biogas plants (CO₂, new biofertilizer products.
- Interest in new treatment methods - new EU regulations opens up for treating green waste via fly larvae to produce fish fodder.
- Push for phasing out use of peat in soil products - opens up new opportunities for the industry. Government decided in 2016 that a Peat-phase-out plan to be made. This is now going through an impact assessment.

Number of plants

- There are approx 40 biogas plants in Norway, including smaller treatment plants for sludge and farmbased plants.
- 8 of these biogas plants are large industrial scale plants treating municipal food waste, alone or co-digested with either manure or sludge.
- 1 large commercial plant is constructed for forest sludge and fish waste (Biokraft)
- There are also approx 40 composting plants, treating food waste, sludge or garden waste.
- The biogas plants are mainly located in the south.



Map of biogas plants



Map of composting plants

5 Application and market

/describe briefly the development of market and applications areas for different organic derived products in your country (produced types and prizes for the different type of products)/

The market for compost is in positive development.

This summer (2017), we asked in a survey: How has the demand for compost-based products changed over the last two years? The results were positive:

- 46% experienced the demand had increased “some” or “substantial”.
- 49% experienced unchanged demand
- 5,4% experienced a decrease in demand

6 Expected trends and developments

- Peat phase out plan decided in Parliament - details are under development
- New regulation on source separation - expected, as Norwegian EPA concluded positively in 2017
- Increased focus on unused biowaste resources (from fish farming, agriculture and forestry)

7 Contacts and sources of information

Name: Jens Måge
Institution: Avfall Norge
Position: Adviser
Telephone: +47 922 922 62
E- mail: jens.maage@avfallnorge.no
Website: www.avfallnorge.no
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About Avfall Norge / Waste Management Norway



Avfall Norge is a Norwegian waste management and recycling association leveraging 30 years of industry-specific knowledge to promote and develop socially responsible waste management policies in Norway and Europe.

Our members are responsible for the treatment of more than 95 percent of all household waste in Norway, and represent both public services and private companies. We offer training and guidance, ensure sound policies and constructive political dialogue, and initiate research and development projects to build industry capacity.

Avfall Norge was founded in 1986 with the aim of coordinating and maintaining municipal interests and inter-municipal cooperation in the waste management sector. Since then, the association has remained a competitive actor in a rapidly changing industry, and remains a nationwide resource for public services and private companies alike.

Activities

Waste Management Norway's annual conference

Every year, we gather around 1,000 people for a three day conference focusing on inspiring, sharing important knowledge and maintaining and building networks. We take care of current topics and facilitate events for the benefit and benefit of participants and exhibitors. In 2017, we gathered designers, manufacturers, commerce, consumers and others from business together with industry and key suppliers, 84 exhibitors, focusing on creating a "Circular Future." See photos and movies on Facebook. Next year, we will deepen in the theme of "Industrial Sustainability" - an important factor in succeeding in a circular economy. Join us for Stavanger 5th - 7th of June 2018 you too!

Knowledge

We hold courses and events ranging from basic courses in waste and recycling, debates and breakfast meetings on current topics, to courses in hazardous waste reception for experienced operating operators. See all our courses and events.

Research and development

Our professional groups and networks initiate research and development that corresponds to the industry's specific issues. Members get access to Norway's most widespread network of experts in the waste and recycling industry. Our research to better treat an increasingly complex stream of waste brings us closer to a circular economy.



Competence and training

Avfall Norge is the initiator and driver of the industry's major competence raft [REdu](#). REdu is a collaboration between member companies and universities.

We organise many courses and seminars throughout the year to keep the industry up to date.

Framework and policy-work

We work actively with political framework to increase the overall goal of the circular economy and to the benefit of our members and the community.