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WASTE SLUDGE MANAGEMENT Republic of Croatia



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Croatian Environment Agency

Waste Act (OG No. 178/04, 111/06, 60/08, 87/09)

Sewage Sludge Directive - Directive 86/278/ EEC



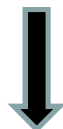
Ordinance on management of wastewater treatment sludge when used in agriculture (OG No. 38/08)



- Only treated sludge may be used in agriculture,
- Limit values for heavy metals and organic substances concentrations,
- Limit values for concentrations of heavy metals in soil where treated sludge is used in agriculture
- Areas where usage of treated sludge is prohibited are defined (**soil of karst fields, shallow or skeletal karst soil, soil in coastal and water protected areas**, soil saturated by water, covered by snow and on a frozen agricultural land....)
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According to 2010 data 1 959 163 of inhabitants (approx. 44% of population) is directly connected to drainage system.

Plan for implementation of water utilities directives foresees that by 2023



3 547 000 inhabitants (**83%**) will be directly connected to drainage system.

Quantities of waste sludge will increase significantly.

Approximately 100 municipal waste water treatment plants

- half of them have mechanical treatment
- half of them have biological treatment

Plan for implementation of water utilities directives

- necessity for 225 new WWT plants and reconstruction of 52 existing ones (by 2023)





1/3 of WWTP (those that have biological treatment) reported data in CEAs Environmental Pollution Registry (ROO).

According to data reported by WWT plants (industrial and municipal waste water) in 2011:

- **63 856 t** of waste sludge is produced.
- 78% is from Zagreb City central WWT plant (all quantities are stored at the location – on 31.12.2011 - 249 775 t)

Split, Rijeka, Osijek WWT plants (along with City of Zagreb) are considered to be plants with The highest workload (250 000 P.E.) and have only mechanical treatment (grids) .

– assumption: **no generation of waste sludge at Split, Rijeka, Osijek WWT plants**

Data reported according to Ordinance on management of wastewater treatment sludge when used in agriculture (year 2011):

681,5 t dry mater is used in agriculture:

- Largest quantities of waste sludge used in agriculture were not applied directly but they were mixed with waste from public areas (leafs, grass, branches...) and used as compost (**653 t** dry mater)
- 28,4 t of dry mater was directly applied
- 1,5 t dry mater was used for conditioning of green areas around factory

Current state

79% - stored at location

10% - composting (4 composting plants reported)

11% - landfill

Management of waste sludge in Croatia - unresolved problem



In Croatia Disposal of waste sludge to landfills is restricted by *Ordinance on the methods and conditions for the landfill of waste, categories and operational requirements for waste landfills* (OG No. 117/07, 111/11, 17/13)



Council Directive 99/31/EC of 26 April 1999 on the landfill of waste

- Limit values for organic substances concentrations in waste sent to landfills.
- Strict technical conditions for landfills

Provisions of the Ordinance:

1. **Reduction of biodegradable municipal waste disposal** compared to quantities of biodegradable municipal waste produced in 1997 to:

- 567 131 tones by the end of 2013
- 378 088 tones by the end of 2016
- 264 661 tones by the end of 2020

2. There is also **restriction regarding the waste disposal on landfills that are not in compliance with landfill Directive** (their closure is foreseen for the end of 2017)

Disposal of waste sludge is not an option!

Lack of infrastructure for waste sludge management

7 facility for composting with a capacity of 123 000 tons

Possible solution is seen in Waste Management Centers that are planned
(mechanical and biological treatment is foreseen – anaerobic digestion,
composting...)

+

waste incineration plant in City of Zagreb
(planned by draft Waste
Management Plan of Zagreb City)

Small capacity waste incineration
plant only for waste sludge ????



Rough estimation of waste sludge quantities in Croatia

Taking in account that:

- By the 2023 according to the Plan for implementation of water utilities directives 3 547 000 inhabitants will be directly connected to drainage system
- Study for EU27 countries which transposed directives related to municipal waste water treatment shows that 25 kg of dry mater/inhabitant/per year is produced
- Average percentage of dry mater in waste sludge is 29%

Maximum yearly quantity of waste sludge in Croatia would be:

$$= \frac{3\,547\,000 \text{ inhabitants} \times 0,025 \text{ t dry mater of sludge/inhabitant/year}}{0,29}$$

$$= 305\,776 \text{ tons} = 89\,000 \text{ dry mater}$$

Necessary actions:

- Make an accurate estimation of the annual amounts of waste sludges produced in relation to the Plan for implementation of water utilities directives and collect data on stored quantities of sludge
- Make an analysis of availability of agricultural and green areas on which waste sludge could be used (take into account the cost-benefit analysis of this type of recovery)
- Incorporate waste sludge as organic fertilizer or soil conditioner into the existing regulations in the field of agriculture
- prescribe standards for compost
- Due to the planned closure of non-compliant landfills by the end in 2017, consider the possibility of using sludge as organic material for the final cover for the landfill remediation
- Consider the use of sludge for remediation of sites of high risk (hot spots)
- Determine the possibility of using sludge as a substitute fuel in cement production (in Croatia there are currently in operation 6 cement factories)
- Intensify the implementation of measures and activities aimed at informing and educating the public



THANK YOU!

Data and information available:

- Annual reports
- On-line databases, www.azo.hr
- On request (Catalog of information)

info@azo.hr

www.azo.hr

Information on legislation, projects, waste management issues, data, on-line databases, reports, guidelines

