

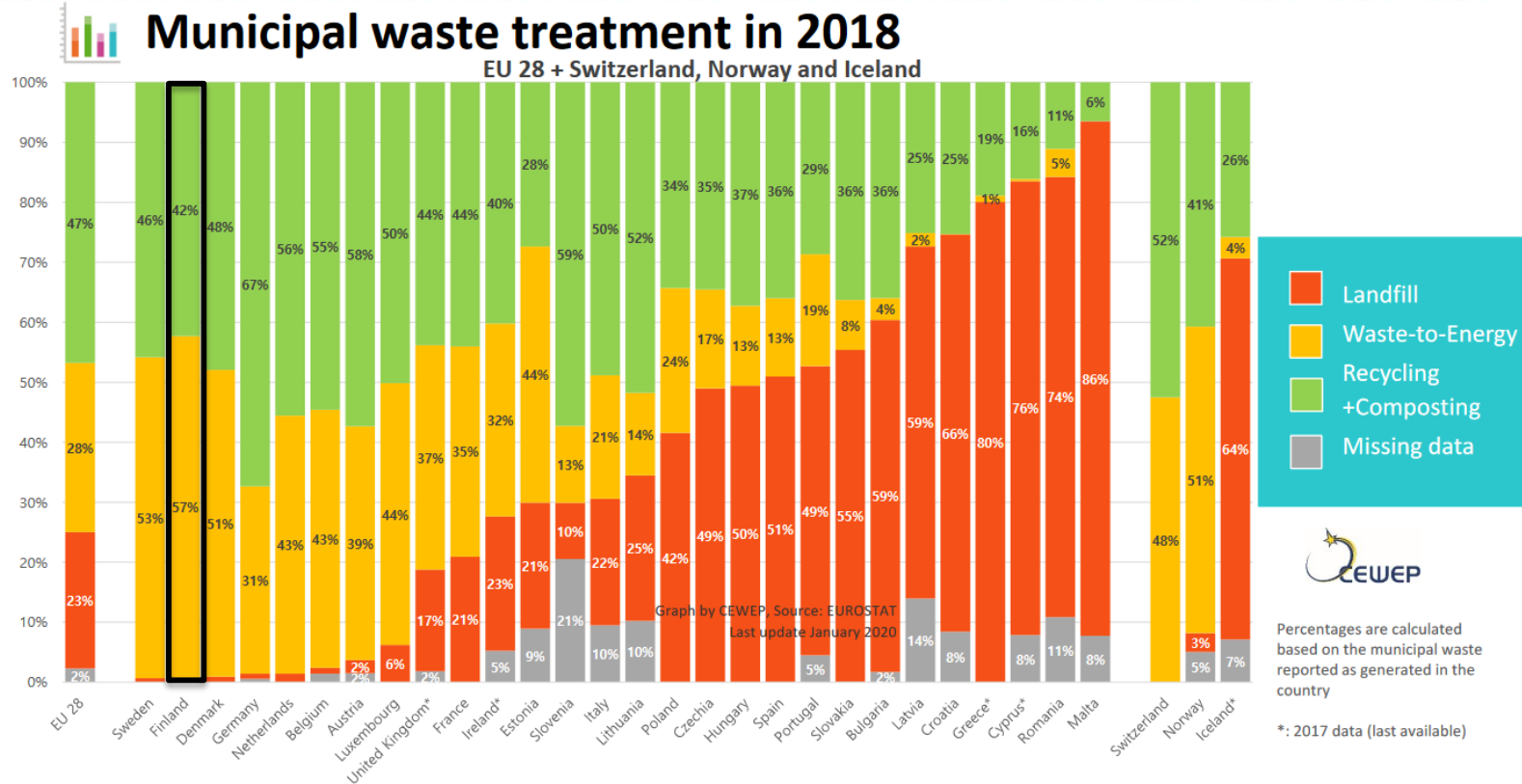
Waste incineration in Finland

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30/06/2020 VTT – beyond the obvious

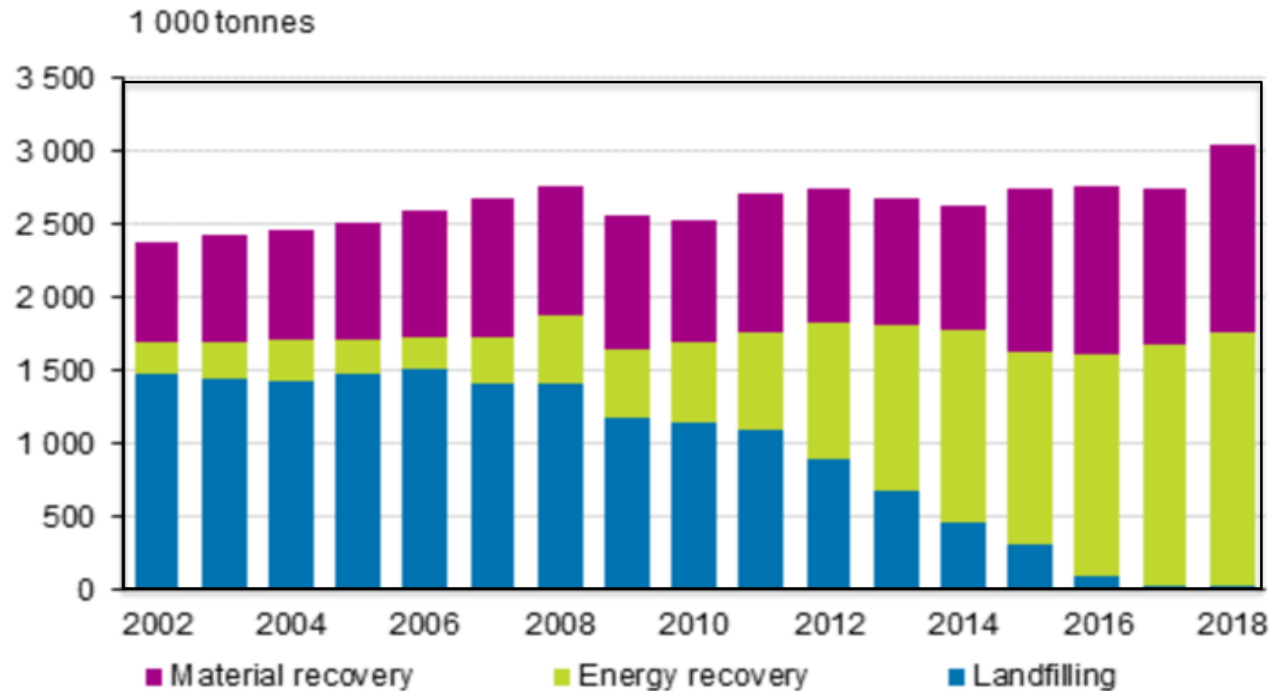
Municipal waste treatment in EU countries in 2018



Development of municipal waste treatment in Finland 2002 - 2018

- Municipal waste = Community responsible on the waste
- In 2018 the total amount of municipal waste was 3 041 082 tons (approximately 550 kg per capita).
- The share of material recovery was 42 % and the share of energy recovery 57 % and only 0.7 % was landfilled in 2018.
- Approximately 1.4 million tons waste was collected separately (material recovery).
- Large share of biowaste (total 370 000 tonnes) was composted or digested (biogas).
- The digestion residue is used in soil improvement or landscaping.

Municipal waste in Finland by treatment method in 2002 - 2018



Source: Waste statistics 2018, Statistics Finland

High priority before waste incineration: Material recovery by separate waste collection

- Based on source separation and separate collection of several waste fractions:
 - Paper and board
 - Biowaste
 - Beverage packages (cans and bottles; deposit-refund system)
 - Glass
 - Wood
 - Metals
 - Plastic
 - Electric and electronic waste
 - Batteries

- Hazardous waste collected separately



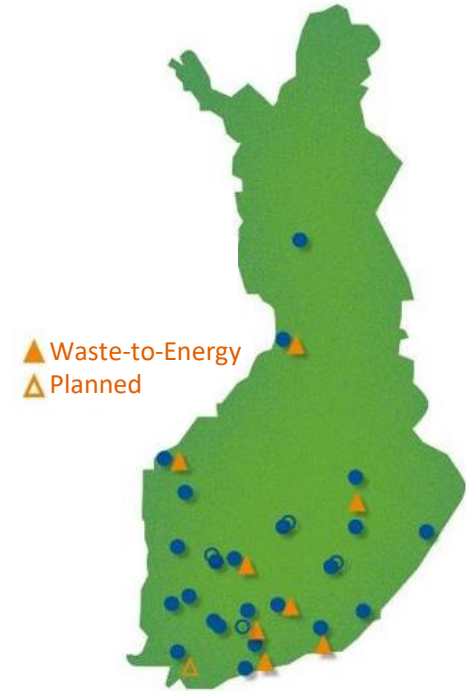
Waste incineration regulations in Finland

- Waste incineration regulations are based on EU directives
 - Finnish regulations adopted from directives
- Incineration conditions
 - Waste incineration
 - 850°C minimum 2 seconds
 - Hazardous waste containing at least 1 % of halogenated compounds
 - 1100°C minimum 2 seconds
- Emissions strictly regulated and controlled
- Energy content of waste utilised at high efficiency (approximately 90 % efficiency to power and heat)



Energy recovery from waste

- 9 Waste-to-Energy plants in operation
 - Total capacity 1,5 milj. ton
- 1 under construction (commissioning 2021)
- Approximately 20 conventional power plants have a license to co-fire waste derived fuels (SRF/RDF)
 - Strict emission regulations based on the share of co-fired waste
 - Today less than 10 plants are co-firing waste derived fuels



Waste incineration techniques used in Finland

- Total number of waste incinerators 9
 - 7 based on grate firing (most waste incineration technology)
 - 1 fluidised bed incinerator
 - 1 fluidised bed gasification and combustion of cleaned gas
- 1 hazardous waste incinerator (high temperature rotary kiln + afterburning furnace; 2 lines)
- Co-firing of waste derived fuels (SRF/RDF) in conventional power plants having special license to co-fire (approximately 20 plants)
- Co-firing of waste derived fuels (SRF/RDF) in cement kilns



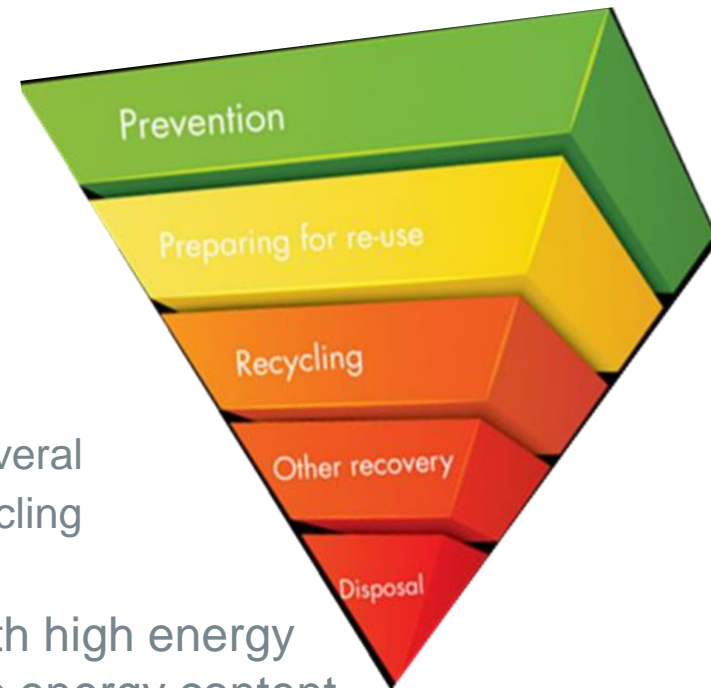
Solid residues (ash) of waste incineration

- Waste contains approximately 30 % non-combustible ash
- Bottom ash is processed
 - Metal recovery (4...6 % non-ferrous metals, approximately 10 % ferrous metals)
 - Mineral matter processed in order to replace virgin sand/gravel for example in road construction and in concrete industry
- Air Pollution Control (APC) waste is stabilised and landfilled
 - Water soluble salt removal plant in Pori



Role of waste incineration in waste treatment

- Waste incineration has very significant role in minimisation/avoiding of landfilling of waste
- However, re-use and recycling of materials has higher priority than energy recovery from waste (target 2020: 50 % re-use and recycling)
 - Efficient source separation and separate collection of several waste fractions enables high degree of re-use and recycling
- Modern and strictly controlled waste incineration with high energy recovery efficiency is a clean and safe way to utilise energy content of waste and avoid landfilling



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