

Status of Ash Use and Legislation in Finland

Workshop: Energy ashes and the Waste Frame Directive
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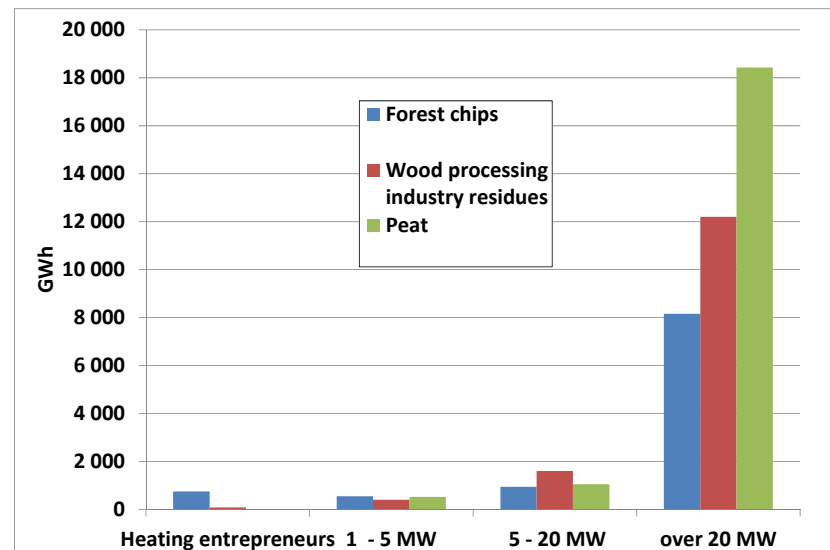
Where do ashes come from?

Boiler plants and fuel consumption in Finland 2010

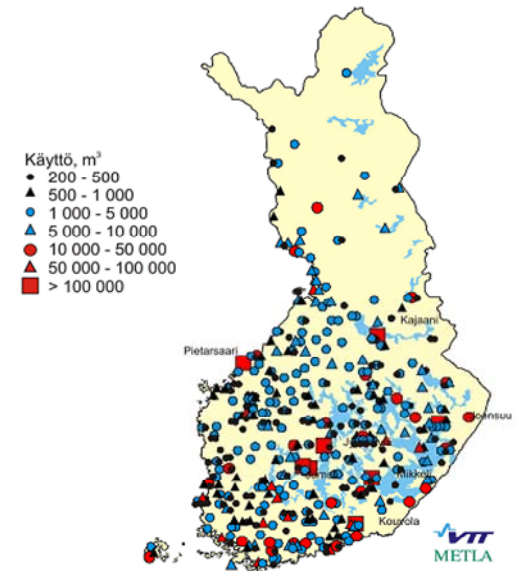
Type and number of different boilers:

- Pulverized fuel boilers ~ 25 units
- Fluidized bed boilers ~ 120 units
 - CFB 20 units
 - BFB 100 units
- Grate boilers ~ 650 units

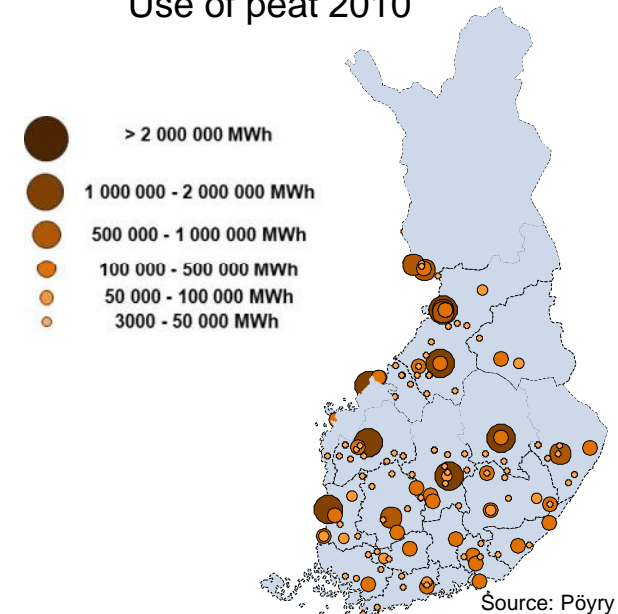
Fuel	TWh
Coal	40,5
Peat	26,0
Industrial wood residues and by-products	17,0
Forest chips	12,5
Recovered and waste fuels	3,3



Use of forest chips 2009



Use of peat 2010



Ash production in Finland

Waste No.	Name	Volume, t/a	Utilisation, t/a	Landfilling, t/a	Utilisation rate, %
10 01 01	Bottom ash, slag and boiler ash	182 157	97 142	85 015	53
10 01 02	Coal fly ash	475 937	141 506	334 432	30
10 01 03	Fly ash from combustion of peat and untreated wood	407 366	184 576	222 789	45
	Total	1 068 460	423 224	642 236	40

Source: Eeva Punta/Linnunmaa Oy (VAHTI data system of environmental administration 2009)

	Volume of bottom + fly ash 2010 (appr.) t/a	Utilisation rate, %
Coal ash	550 000	5...100
Peat and biomass ashes ~ 12 largest producers (mainly co-combustion)	350 000	25...100
WtoE ashes	270 000	0...100

Data collected from different sources (e.g. environmental reports of enterprises)

Utilisation of ashes in Finland

- Appr. 50 000 – 80 000 t/a in cement production (coal fly ash)
- Appr. 50 000 t/a as binder material in concrete production (coal fly ash)
- Appr. 20 000 t/a as filler in asphalt (coal fly ash)
- Appr. 40 000 t/a as fertilizers in forests and 30 000 in agriculture (wood, peat and biomass ashes)
- Earth construction applications ~ 250 000 (?) t/a
 - Lot of ashes are used in construction of landfill sites, storage fields etc.



Finnish national legislation: Fertilizer use of ashes

- Regulated by Fertilizer Product Act 539/2006 & Ministry of Agriculture and Forestry Decree on Fertilizer Products 24/11 & Ministry of Agriculture and Forestry Decree on the operations concerning fertilizer products and their supervision 13/07
 - Fly and bottom ashes from combustion of biomass and peat
 - Maximum values for minor elements
 - Maximum loads for Cd and As
 - Minimum values for nutrients
 - Forestry: K+P 2 % & Ca 6 %
 - Other use: Neutralising value 10 % (Ca)
 - Addition of nutrients in the form of inorganic fertilizers products is allowed to granulated ash fertilizers

Element	Maximum concentration for ash fertilizers mg/kg db.	
	Agriculture, landscaping	Forestry
Arsenic, As	25	40
Mercury, Hg	1,0	1,0
Cadmium, Cd	2,5	25
Chromium, Cr	300	300
Copper, Cu	600	700
Lead, Pb	100	150
Nickel, Ni	100	150
Zinc, Zn	1500	4500

Finnish national legislation

Utilisation of ashes in earth construction applications

- Notification procedure if requirements of Government Decree on recovery of certain wastes in earth construction (VNa 591/2006) are fulfilled
 - Fly and bottom ashes from combustion of coal, peat and wood
 - In certain applications (public roads, streets, bicycle lanes, pavements, parking areas, sport areas, storage fields and roads in industrial areas)
 - Limit values for total content of harmful substances and maximum values for their leaching
- For other ashes and applications:
Environmental permission is required



Government Decree on recovery of certain wastes in earth construction 591/2006 – limit values

	Maximum value for total content, mg/kg db.	Maximum value for leaching	
		Covered structure	Coated structure
Arsenic, As	50	0.5	1.5
Barium, Ba	3000	20	60
Cadmium, Cd	15	0.04	0.04
Chromium, Cr	400	0.5	3
Copper, Cu	400	2	6
Mercury, Hg		0.01	0.01
Molybdenum, Mo	50	0.5	6
Nickel, Ni		0.4	1.2
Lead, Pb	300	0.5	1.5
Antimony, Sb		0.06	0.18
Selenium, Se		0.1	0.5
Vanadium, V	400	2	3
Zinc, Zn	2000	4	12
Chlorine, Cl ⁻		800	2400
Fluoride, F ⁻		10	50
Sulphate, SO ₄ ²⁻		1000	10000
Dissolved organic compounds		500	500

Finnish national legislation: Waste Tax Act

- Amendment of Waste Tax Act 1126/2010
 - Waste tax:
 - 1.1.2011 → 40 €/t
 - 1.1.2013 → 50 €/t
 - Fly ashes are taxable wastes
 - Covers also private landfill sites
 - Utilisation of ashes in construction of landfill sites is tax free





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