

Wastewater Treatment Update

FINLAND

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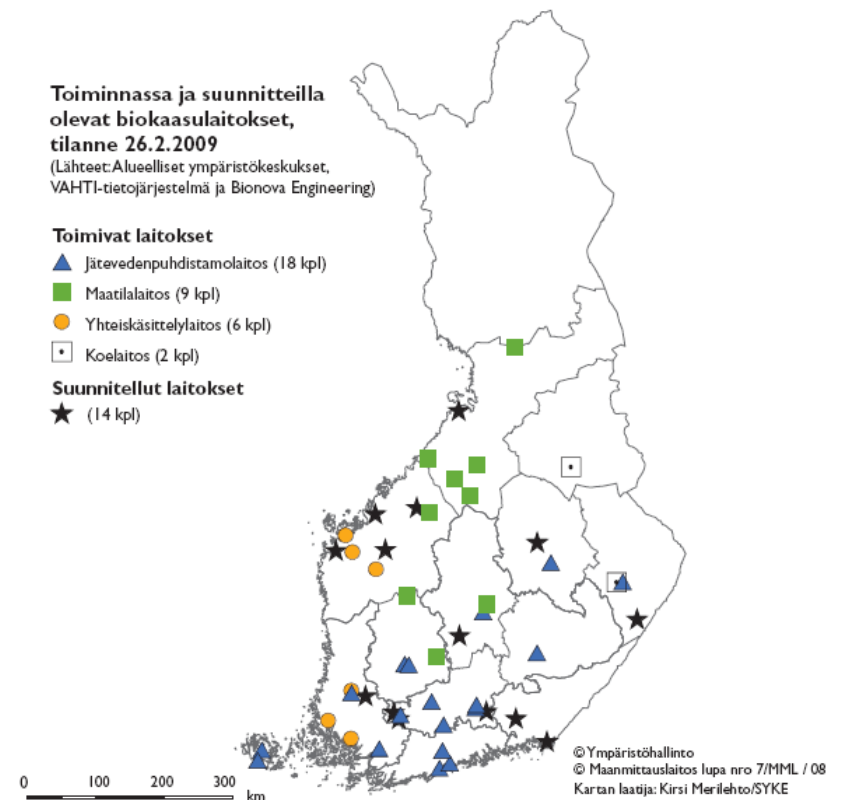
Wastewater Treatment in Finland

- 80 % population is connected to municipal wastewater treatment plants
 - Treatment process is typically combined biological organic material and N removal + chemical precipitation of P
- 540 wastewater treatment plants (PE >50)
- Number of large WWTP is 10 (PE >100 000)
- Reduction level
 - BOD 97 %
 - P 96 %
 - N 56 % (Helsinki 90 %)



Methane Reduction, Recovery, and Use Initiatives in Finnish WWTP

- Municipal WWTP + digesters 18 pcs.
- Municipal sludge + biowaste combined digesters 8 pcs.
- Industrial WWTP 4 pcs.



Biogas production

- Biogas production at 60 % of WWTP (PE > 10 000)
- Annual biogas production 24 Mm³/a
- 20,5 Mm³/a was utilised
- EI production 27 GWh
- Heat production 80 GWh



Biogas production



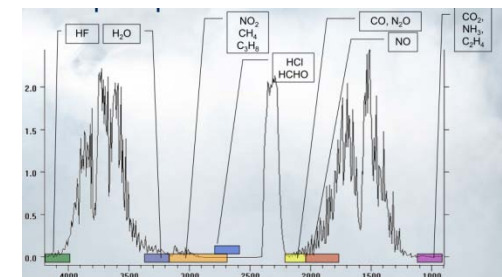
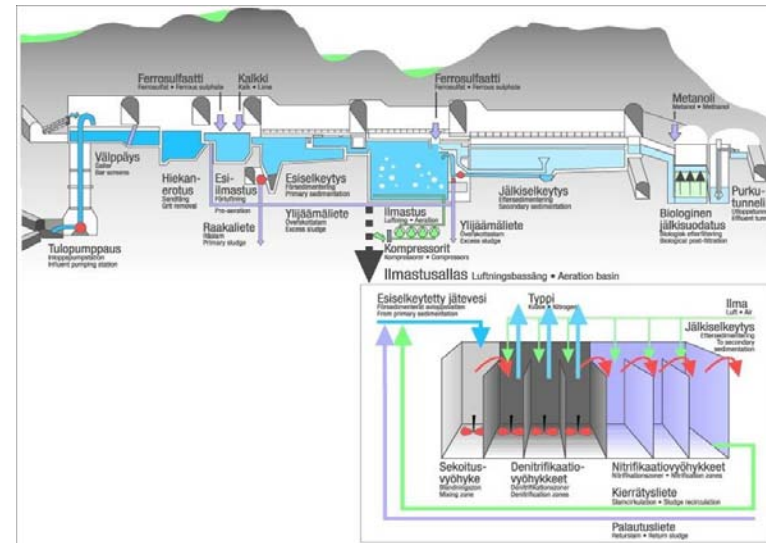
WWTP	Year	Material	Reactor capacity m ³	Biogas production (Mm ³ /a)	Utilization
Espoo / HSY	1981	Sewage sludge	2*6 000	2,9	CHP
Helsinki / HSY	1994	Sewage sludge	4*10 000	10,0	CHP
Forssa	1999	Sewage sludge	1 475	0,3	CHP
Hämeenlinnan seutu HS	1988	Sewage sludge	3 000	0,75	CHP
Joensuu	1987	Sewage sludge	2*2 000	0,8	CHP
Jyväskylän seutu JS	1987	Sewage sludge	2*2 750	1,6	CHP
Kuopio	1987	Sewage sludge	2* 3 000	1,1	CHP
Lahti Aqua1	1976	Sewage sludge	2*2 000	0,6	Heat
Lahti Aqua 2	1981	Sewage sludge	2*4 000	1,2	Heat
Maarianhamina	1979	Sewage sludge	2 000	0,3	CHP
Mikkeli	1962	Sewage sludge	2 000	0,4	Heat
Riihimäki	1974, 2005	Sewage sludge	1500 +800	0,7	CHP
Salo	1982	Sewage sludge	2 000	0,3	Heat
Tampere 1	1962	Sewage sludge	2*1 500	0,8	Heat
Tampere 2	1985	Sewage sludge	2*3 500	1,8	CHP
Klaukkala	2005	Sewage sludge		0,1	Heat

Barriers/Challenges to Methane Reduction, Recovery, and Use

- Size of the units is rather small
 - Large number of WWTP units which PE < 10 000
- Strong pressure to combined digesters (bio waste)
 - Increase the digestion unit dimensions and make it economically attractive
 - Negative influence to water process of WWTP (concentrated reject water)
- Production subsidiary mechanism for new biogas production units started in 2010
- Support mechanism for investments which are increasing energy efficiency (20-30 %)

New step for process emission control

- On line measurement of process gases was implemented in June 2012 at Viikinmäki WWTP
- Online measurement of methane, CO₂, N₂O etc.
- New and continuous information of process gases and correlations by Gasmeter CEMII FTIR



Thank You!

Kiitos!

