WASTE POLICIES IN FINLAND – TOWARDS A RECYCLING SOCIETY THE NATIONAL WASTE PLAN FOR 2016

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THE FINNISH ENVIRONMENT 14 | 2009

Towards a recycling society

The National Waste Plan for 2016

ENVIRONMENTAL PROTECTION

MINISTRY OF THE ENVIRONMENT

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- Finland’s waste policies are based on the following key principles in accordance with the EU waste strategy (1996) on the prevention and recycling of waste (2005):

- Prevention, the pollute pays, producer responsibility, the precautionary principle and self-sufficient principle

- Finland’s waste legislation defines waste management activities in the following order of precedence :
  - preventing wastes reducing their harmful impacts
  - recovering wasted – including primarily their material content and secondarily their energy content
  - the safe treatment of wastes and the rehabilitation of any related damages

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A number of reports were commissioned in connection with the preparation of the new plan

- National Waste Plan for 2016 - Background document, Finnish Environment 16/2007 (in Finnish)
- The role and critical limits of waste co-incineration in Finland's waste disposal strategy, Background document, Part I, Reports of the Finnish Environment Institute 15/2006 (in Finnish)
- Assessing the impacts of the promotion of material efficiency, Background document, Part II, Reports of the Finnish Environment Institute 9/2006 (in Finnish)
- Environmental aspects of energy and material recovery of wastes, Background document, Part III, Reports of the Finnish Environment Institute 12/2006 (in Finnish)

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- Identification and assessment of the environmental impacts of landfilled industrial waste, Background document, Part IV, Reports of the Finnish Environment Institute 2/2007 (in Finnish)
- Role of municipalities in future waste management, Background document, Part V, Reports of the Finnish Environment Institute 8/2007 (in Finnish)
- Assessing the impacts of the proposed steering methods, Background document, Part VI, Reports of the Finnish Environment Institute 9/2007 (in Finnish)
- Assessing the cost impacts of the National Waste Plan, Pöyry, Report 29 May 2007 (in Finnish)

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- The aim is to achieve a decline in the amount of municipal waste by the year 2016.

- Furthermore, the aim is to achieve a situation in which 80 % of municipal waste is recycled or used as energy and a maximum of 20 % ends up at landfills.

- These and other aims proposed in the Plan can only be achieved if all players in the waste management sector commit themselves to its aims and take action to reach them and if there are substantial changes to current waste-management and recovery practices.

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Towards a recycling society
The National Waste Plan for 2016

- Increasing the waste prevention by promoting material efficiency
- Increasing recycling
- Promoting the management of hazardous substances from the waste point of view
- Reducing the harmful climatic impacts of waste management
- Reducing negative health and environmental impacts of waste management
- Improving and clarifying the organisation of waste management
- Developing expertise in the waste sector

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Putting trans frontier waste shipments on a safe and well-managed basis

- International action will be taken to combat illegal waste shipments and further measures will be taken to expand cooperation between authorities in the border control of waste shipments.

- The work on the international harmonisation of waste classification and the interpretation of waste shipment legislation will be continued.

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The required capacity for treating municipal waste in 2016

- If the above-mentioned recovery objectives are to be achieved, the targeted waste amounts (less than 2.3-2.5 million tonnes/year) will require a composting or digestion capacity of between 320,000 and 350,000 tonnes by 2016.

- Other materials would require a recovery capacity of between 700,000 and 750,000 tonnes.

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- At the same time, incineration capacity required for energy use would be between 700,000 and 750,000 tonnes.
- This total includes waste incineration in incineration and co-incineration plants.

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- The aim of the National Waste Plan is that by 2016 a maximum of between 460,000 and 500,000 tonnes of municipal waste would end up at landfills and that in 2016, landfills would number between 30 and 40.

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Plants recovering or treating municipal waste	Treated amounts in 2006 (1,000 tonnes)	Percentage of the municipal waste generated in 2006	Required capacity in 2016 for targeted amounts of waste (1,000 tonnes)	Percentage of the municipal waste generated in 2016 (= Targets for recovery and treatment)
Composting or biogas plant (digestion)	137	5	320–350	14
Composting at source	54	2	140–150	6
Material recycling (excl. composting and digestion)	648	25	700–750	30
Waste incineration plant or co-incineration plant	222	9	700–750	30
Landfill	1,504	59	460–500	20
Total	**2,565**	**100**	**<2,300–2,500**	**100**

Treated and recovered amounts of solid municipal waste in 2006 and the capacity required in 2016 for the targeted amounts and recovery rates.

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Generation, recovery and treatment of waste in 2005

- Almost 66 million tonnes of waste was generated in Finland in 2005.
- The figure does not include the manure used in agriculture and the cutting waste left in the forests.
- Of the waste generated, some 29 % was recovered as material and 14 % used as energy.
- The remaining 57 % ended up at landfills or was treated using other methods.

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- The largest amounts of waste were generated in connection with mineral extraction (21 million tonnes) and construction (22 million tonnes).
- Of the mining waste, some 47 % was wallrock, 47 % tailings and 6 % waste soil.
- The largest changes in the amount of waste in the sector have resulted from the changeover from opencast mining to underground mining.

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- Waste soil accounts for almost 95 % of the construction waste. In 2005, about 38 % of all construction waste was recovered.

- Of the waste generated during housing construction (about 1.7 million tonnes; excluding waste soil) about 33 % was used as materials.

- At the same time, about 27 % was used as energy, while the remaining 40 % ended up at landfills.

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- Industrial waste totalled almost 17 million tonnes.
- The largest industrial waste categories were wood and bark, slag generated in connection with metal processing and manufacturing of metal products, and chemical-industry waste, particularly gypsum.
- The recovery rate of industrial waste varies greatly between sectors. Pulp and paper industry, food industry and the manufacturing of wood products exceeded the 70 % recovery target laid down in the National Waste Plan for 2005.
- However, oil and chemical industry and the manufacturing of basic metals fell substantially short of the target.

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- Almost 2.4 million tonnes of hazardous waste was generated in 2005.

- Most of that amount originated from the extraction of minerals, metal processing, manufacturing of metal products and construction.

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- Municipal waste is waste that is generated by households and similar waste generated in connection with industrial, service and other operations.

- Households and the service sector are the largest source of municipal waste. In the period 2000-2006, the amounts of municipal waste have varied between 2.4 and 2.6 million tonnes.

- In 2005, the total was 2.48 million tonnes.

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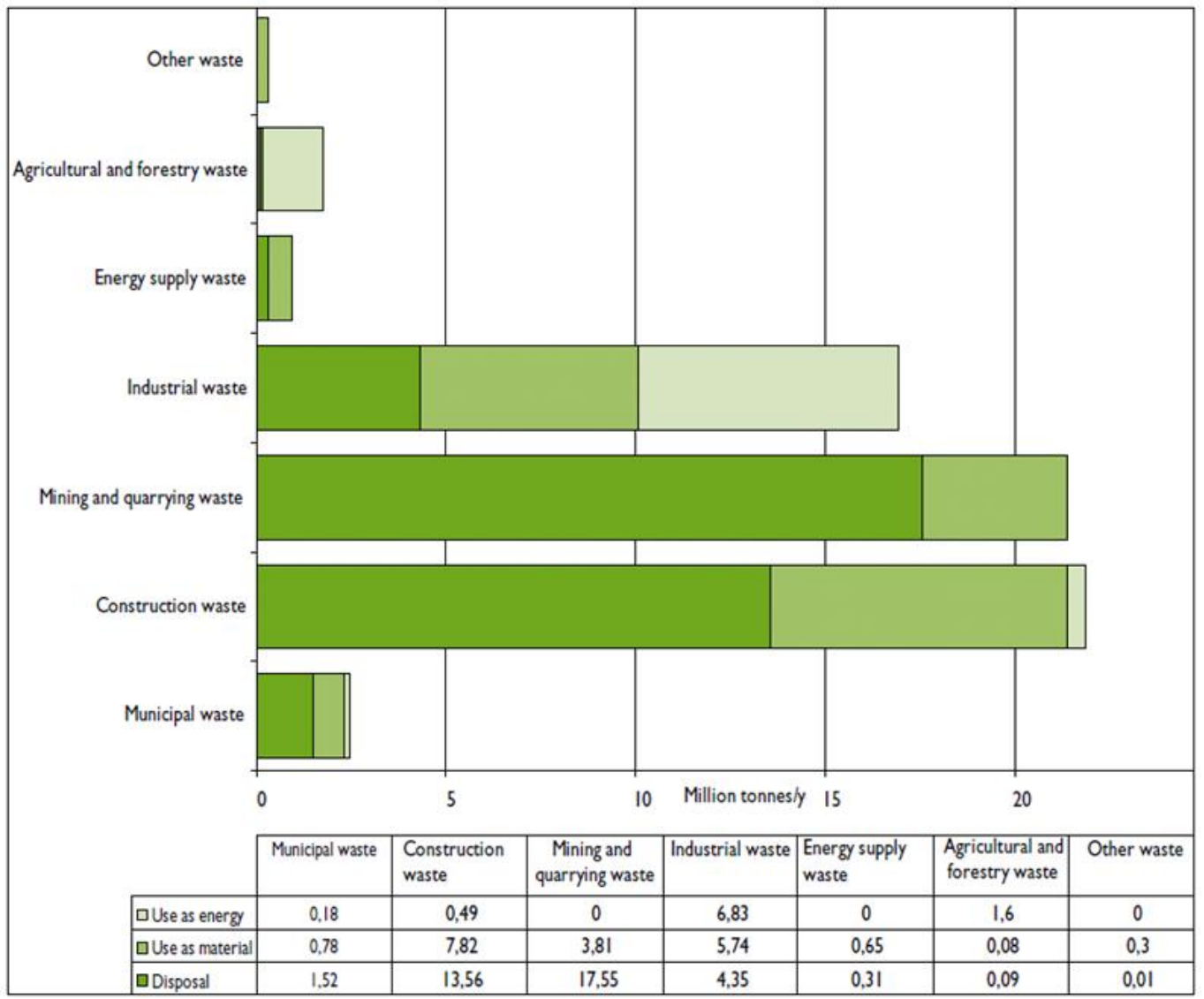

	Municipal waste	Construction waste	Mining and quarrying waste	Industrial waste	Energy supply waste	Agricultural and forestry waste	Other waste
Use as energy	0,18	0,49	0	6,83	0	1,6	0
Use as material	0,78	7,82	3,81	5,74	0,65	0,08	0,3
Disposal	1,52	13,56	17,55	4,35	0,31	0,09	0,01

Accumulation of waste and its recovery and treatment in Finland in 2005 (Source: Statistics Finland)

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Conclusion

- The Government has approved the new national waste plan until 2016. This nationwide strategic plan includes the principles and objectives of waste management and waste prevention.
- For each goal and objective of the plan, the required policy instruments have been proposed and the responsible body for implementation has been identified.
- Finland's waste policy is aimed specifically at waste prevention and decreasing the negative effects of waste on human health and the environment.

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The waste management goals, and the policy instruments that are required for reaching these goals, are described by eight main themes:

- Improving the materials efficiency of production and consumption
- Promoting recycling
- Decreasing hazardous chemicals in waste
- Reducing harmful effects on the climate from waste management
- Reducing risks to health and the environment from waste management
- Developing and clarifying the organization of waste management
- Improving waste management know-how
- Managing waste shipments safely

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- A main target is to stabilise the volume of municipal solid waste at the level it was at the beginning of 2000 and after that the volume of waste should start to decrease by 2016.

- Another target is that 50 % of the municipal waste should be recycled, energy will be recovered from 30% and not more than 20 % will be landfilled.

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- Additional targets are:
  - all manure from farming activity should be recovered
  - 90 % of sludge originating in sparsely populated areas should be treated in sewage treatment plants and 10 % in biogas plants of farms
  - 70 % of construction and demolition waste should be recovered by material or energy recovery
  - 5 % of the natural gravel and crushed rocks used in construction or other activities should be replaced with in-dustrial and mining waste
  - 100% of the municipal sewage sludge should be recovered

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Waste statistics 2011

Municipal waste

Even less municipal waste deposited at landfills

- The amount of municipal waste deposited at landfills has decreased already for five years.
- In year 2011, a total of 1.1 million tonnes waste was deposited at landfills, which includes a fall of nearly 30 per cent from five years ago and a drop of 4.2 per cent from last year.
- At the same time, the share of landfills in waste treatment decreased by five percentage points.

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- Approximately 206 kilograms of waste per capita was transported to landfills.
- The corresponding average in the EU Member States is 230 kilograms, but the differences between countries are considerable.
- For instance, in Germany and Sweden, only a few kilograms of landfill waste is produced per capita.

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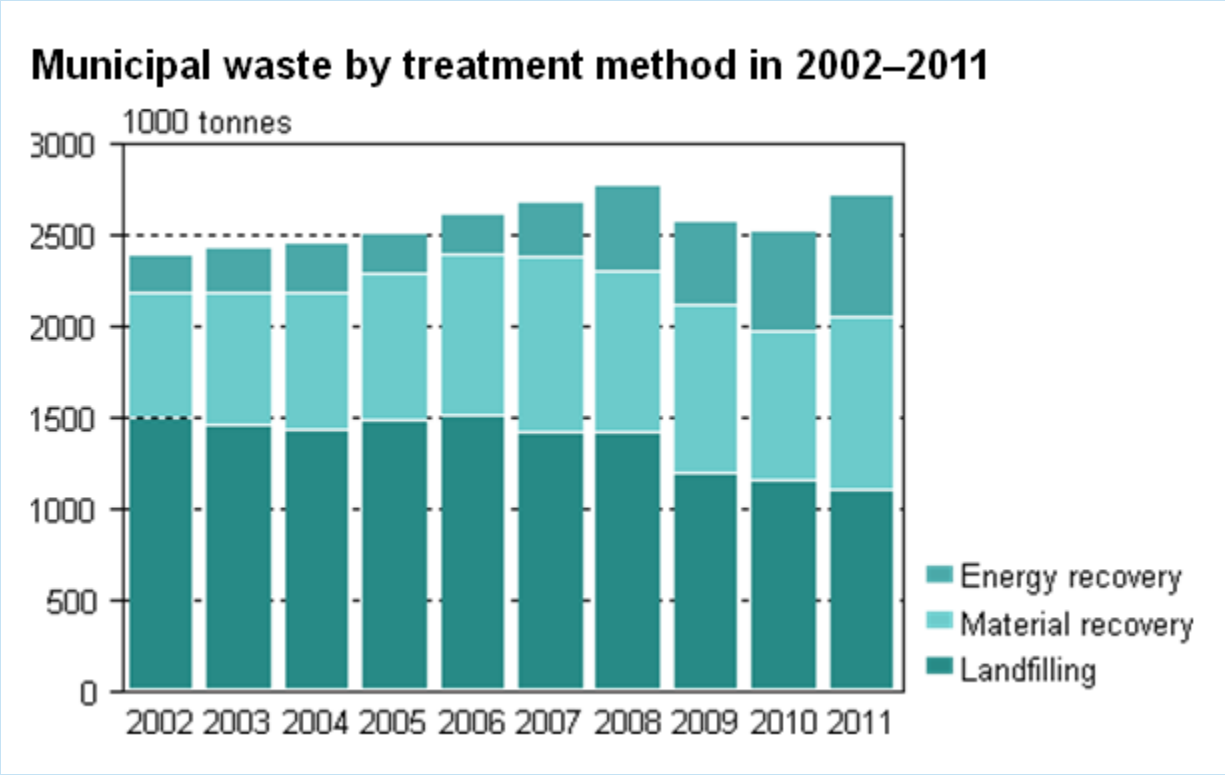
Municipal waste by treatment method in 2002–2011
1000 tonnes
3000
2500
2000
1500
1000
500
0
2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Energy recovery
Material recovery
Landfilling

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- Households' willingness to sort their waste is high.
- For instance, according to a recently published Household Budget Survey, over 80 per cent of households sort cartons regularly, while five years ago the share was only 35 per cent.
- The share of recycling or utilization of waste material and, in particular, burning in treatment of municipal waste has clearly increased over recent years.

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- However, recycling has not been on a clear growth path, at least not to the extent one could predict based on household behavior.

- The share of recycling in waste treatment increased by two percentage points from the previous year.

- The amount of burnt (energy recovery) municipal waste has tripled in five years but last year the share of burning in treatment only increased by good two percentage points.

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- Last year, the total volume of municipal waste rose to the level seen three years ago and was 2.7 million tonnes.

- The volume of municipal waste decreased during 2009-2010, which may have been due to the dip in the national economy at the time.

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Municipal solid waste treatment in Finland 1997 - 2011
1000 t per year
3000
2500
2000
1500
1000
500
0
1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Recycling
Energy
Landfilling

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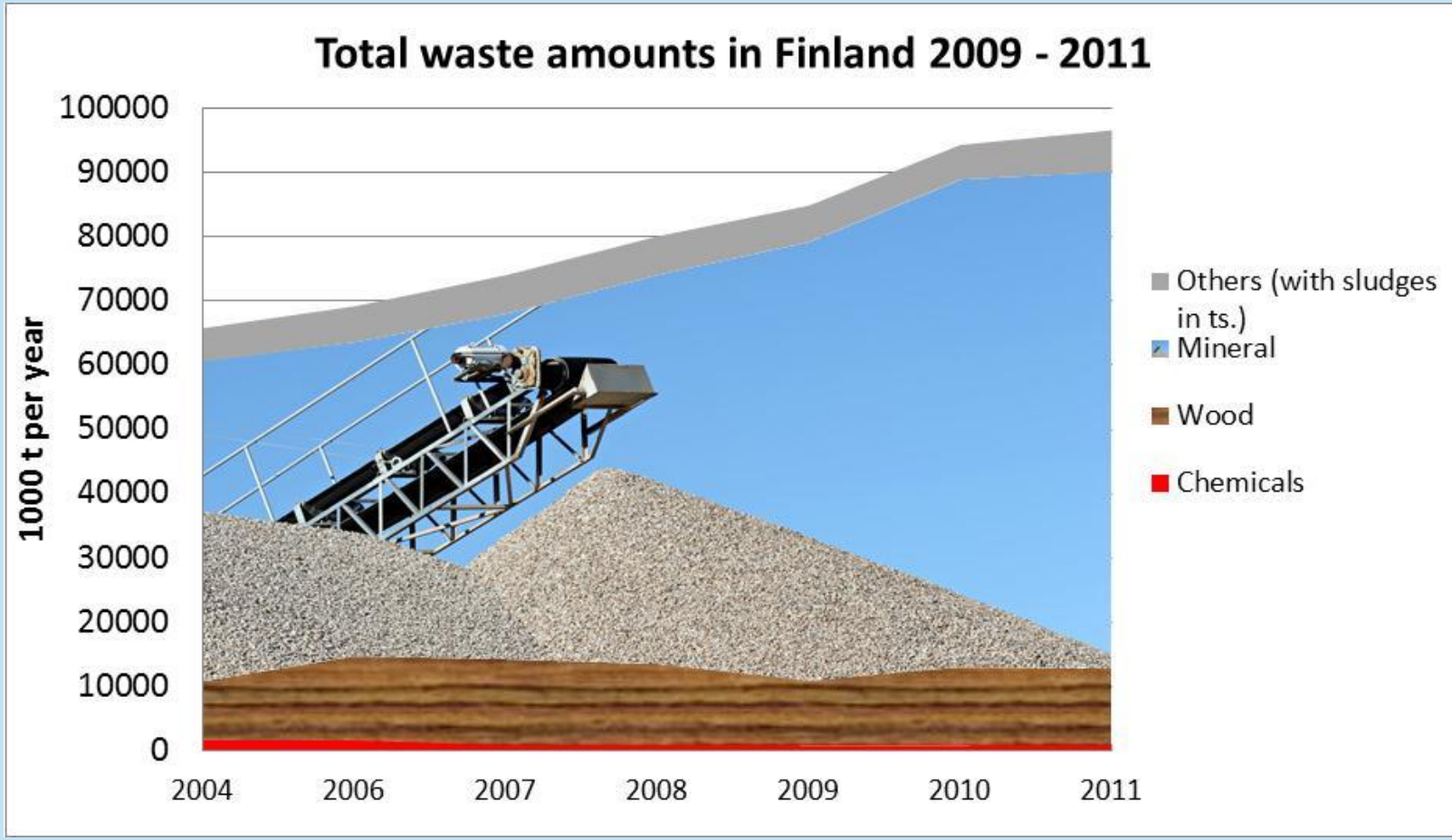
Total waste amounts in Finland 2009 - 2011
1000 t per year
100000
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
2004
2006
2007
2008
2009
2010
2011
Others (with sludges in ts.)
Mineral
Wood
Chemicals

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The increasing use of wastes in energy production / future trends

- Many new waste power plants are under construction in Finland
- There are seven waste power plants in Finland now
- New incineration technology has promoted this trend
- Capacities
  - Lahti Energy Kymijärvi / 250 000 tons. It produces using new gas technology warmth 90 MW and electricity 50 MW.
  - Ekokem Ltd second waste power plant uses 120 000 tons waste. It costs 60 million euros.

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- Oulu Energy Ltd. It uses municipal waste 120 000 tons. It produces warmth and electricity 50 MW in a year.
- Vaasa Waste Energy Ltd uses 150 000 tons waste in a year.
- Tampere Tammerpower has got environmental permits for 150 000 tons of waste
- Leppävirta municipality has in permit process 145 000 tons waste power plant. Plant to start 2015.
- In Turku region new waste power plant is plant to use 150 000 tons of waste. It should be ready before 2017.

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- In all to the year 2017 all waste power plants need waste 1.5-1.6 million tons.

- In Lapland there are no plans for waste power plants, because there is not enough waste available.

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- Finlands biggest waste power plant is almost ready in Helsinki region. It should be ready under 2014.
- It produces warmth and electricity. It is one of the biggest in Nordoc countries.
- Costs are little under 300 million euros. It needs municipal waste 320 000 tons in a year.
- This quantity of waste needs cooperation with all municipalities in Helsinki metropolitan area.

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Uutiset

Jätevoimaloita syntyy Suomeen vauhdilla

Vantaan jättilaitos valmistunee etuajassa.

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PEKKA KARHUNEN

VALMISTUU VAUHDILLA. Suomen suurin jätevoimala Vantaalle voi valmistua jopa etuajassa ensi vuonna ja alittaa budjettinsa. Vuonna 2016 voimaan tuleva uusi jätelaki on vauhdittanut jätevoimaloiden rakentamista, koska orgaanisten jätteiden vieminen kaatopaikoille kielletään.

Suomeen puuhataan nyt vauhdilla uusia jätevoimaloita. Suomeen on syntymässä puolenkymmentä uutta jätevoimalaa lähivuosina. Kyse on satojen miljoonien eurojen investoinneista.

Toimivia jätevoimaloita Suomessa on seitsemän. Aiemmin hyljeksityistä jätevoimaloista jopa kilpaillaan kuntien kesken. Uusi puhtaampi polttotekniikka ja savukaasujen poiston tehostaminen putsaa voimaloiden mainetta.

Jätelaitosyhdistyksen toimitusjohtajan **Esa Nummelan** mukaan vuonna 2016 voimaan tuleva biohajoavien jätteiden, kumin ja muovin kaatopaikkakielto nopeuttaa uusien jätevoimaloiden rakentamista.

Omassa sarjassaan jätteiden hyödyntämisessä on jo käynnissä oleva Lahti Energian Kymijärven II-voimala. Se ei käytä vain yhdyskuntajätettä vaan ostaa kierrätyspolttoainetta teollisuudelta ja kaupoilta vuosittain 250 000 tonnia. Voimalaitoksen teknologiakin on muita pidemmällä. Lahdessa jätteet kaasutetaan ja vasta kaasusta tehdään lämpöä 90 MW ja sähköä 50 MW.

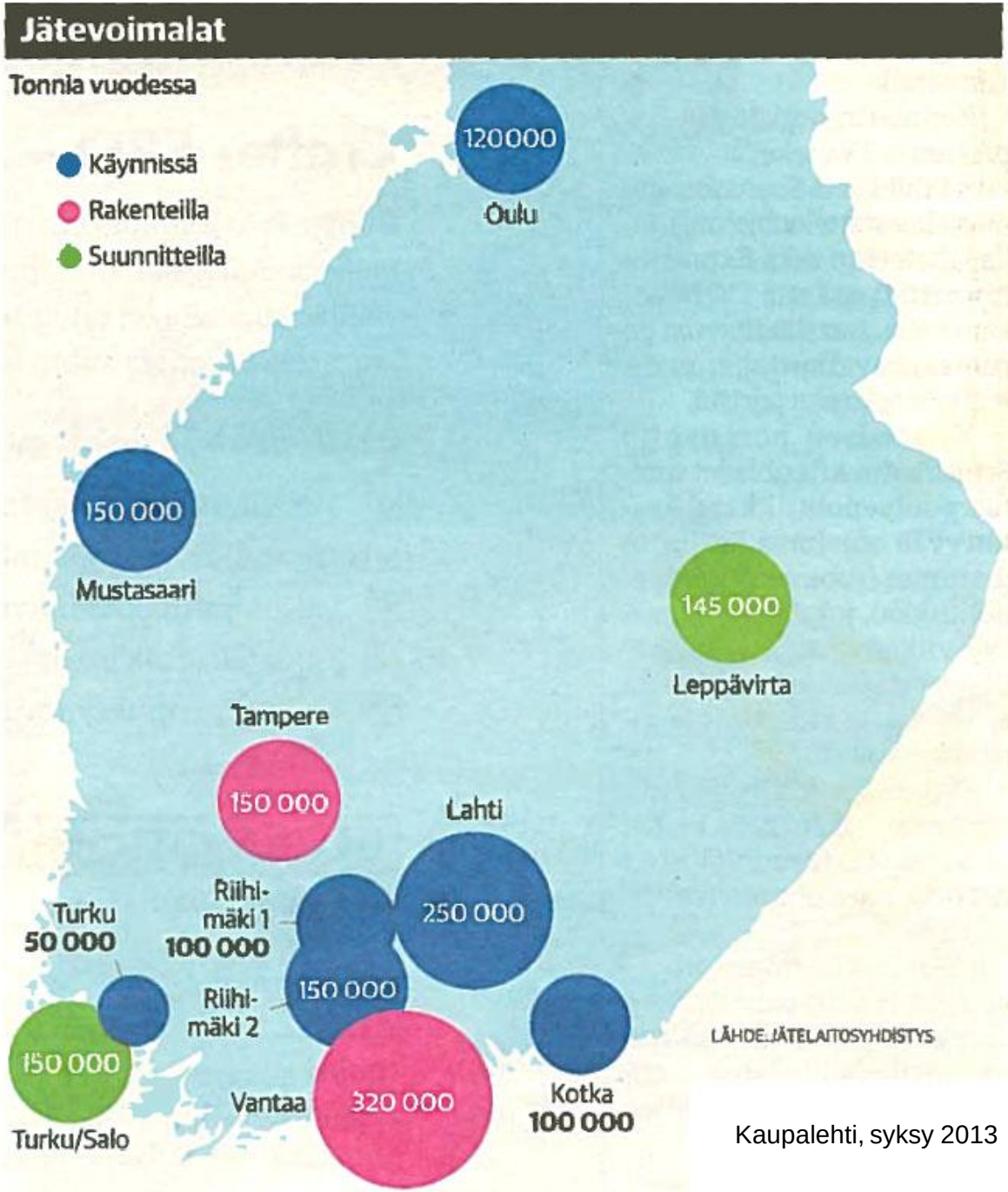
EKOKEMIN toinen jätevoimala käynnistyi vuoden alussa Riihimäelle. Uusi voimala käyttää jätettä 120 000 tonnia. Laitos maksoi 60 miljoonaa euroa.

Oulussa ja Vaasassa uudet jätevoimalat aloittivat viime vuonna. Oulun Energian Laanilan voimalaitos käyttää yhdyskuntajätettä 120 000 tonnia. Laitoksen lämpö- ja sähköteho on 50 MW vuodessa. Vaasan Westenergy Oy:n laitos polttaa jätteitä 150 000 tonnia vuodessa.

Tampereen Tammervoima on saanut lainvoimaisen ympäristöluvan 150 000 jätetonnin voimalalleen. Leppävirran 145 000 tonnin voimalan ympäristövaikutusten arviointi on kesken. Molempien voimaloiden pitäisi käynnistyä vuona 2015.

Lounais-Suomen jätevoimalan sijoituspaikasta kilpailevat Turku, Raisio ja Salo. Voimala käyttäisi jätteitä 150 000 tonnia vuodessa. Laineena käyttävä voimala, Vantaa Energian jätevoimala, on jo puol valmis ja valmistunee etuajass Vantaan Energian projektijohtaja **Kalle Patomeren** mukaan laitos v olla luovutuskunnossa vuoden 201 jälkipuoliskolla. Se tuottaa kauk lämpöä 120 MW ja sähköä 80 MW, on yksi suurimmista Pohjoismaiss

"On mahdollista, että alitamm hieman 300 miljoonan euron ku



Kaupalehti, syksy 2013

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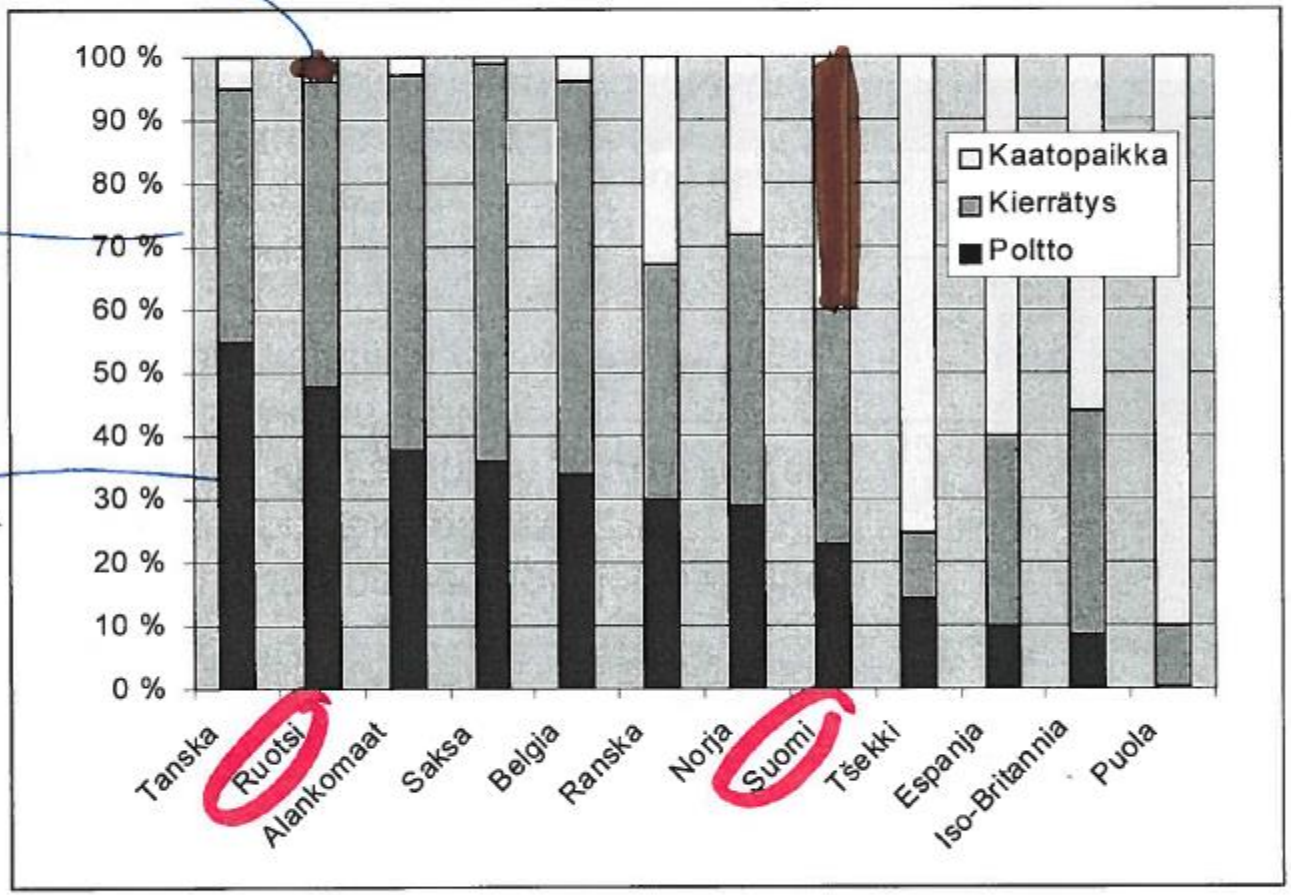
Yhdyskuntajätteen käsittely – esimerkkejä Euroopan maista



Eurostat 2009, SYKE 2009

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VTT

WASTE POWER PLANT SITUATION IN FINLAND

- WASTE POWER PLANT SITUATION IN FINLAND
- At this moment 7 waste power plants are in use
- In near years will be 5 new waste power plants
- to the year 2017 all Finnish waste power plants need 1,6 -1,7 millions tons waste

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- For example, Helsinki metropolitan area waste power plant will be ready 2014
- Capacity : 120 MW heating energy and electricity energy 80 MW
- Needs waste 320 000 tons / year
- costs about 300 million euros

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