

# Update Country Report Sweden

IEA Bioenergy Task 36 meeting  
Vienna - November 16, 2012



SP Technical Research Institute of Sweden

## Policy and legislation update

- 2010 Tax on MSW incineration abolished
- 2010 Tax exemption on biogas transported in pipe lines
- 2012 New National Waste Plan
  - Measures for waste prevention, definition of by-product and end-of-waste criteria
  - New environmental targets, e.g. food waste generation and treatment
  - Prevention and monitoring for dioxins and furans
- 2013 EfW plants included in 3<sup>rd</sup> ETS period



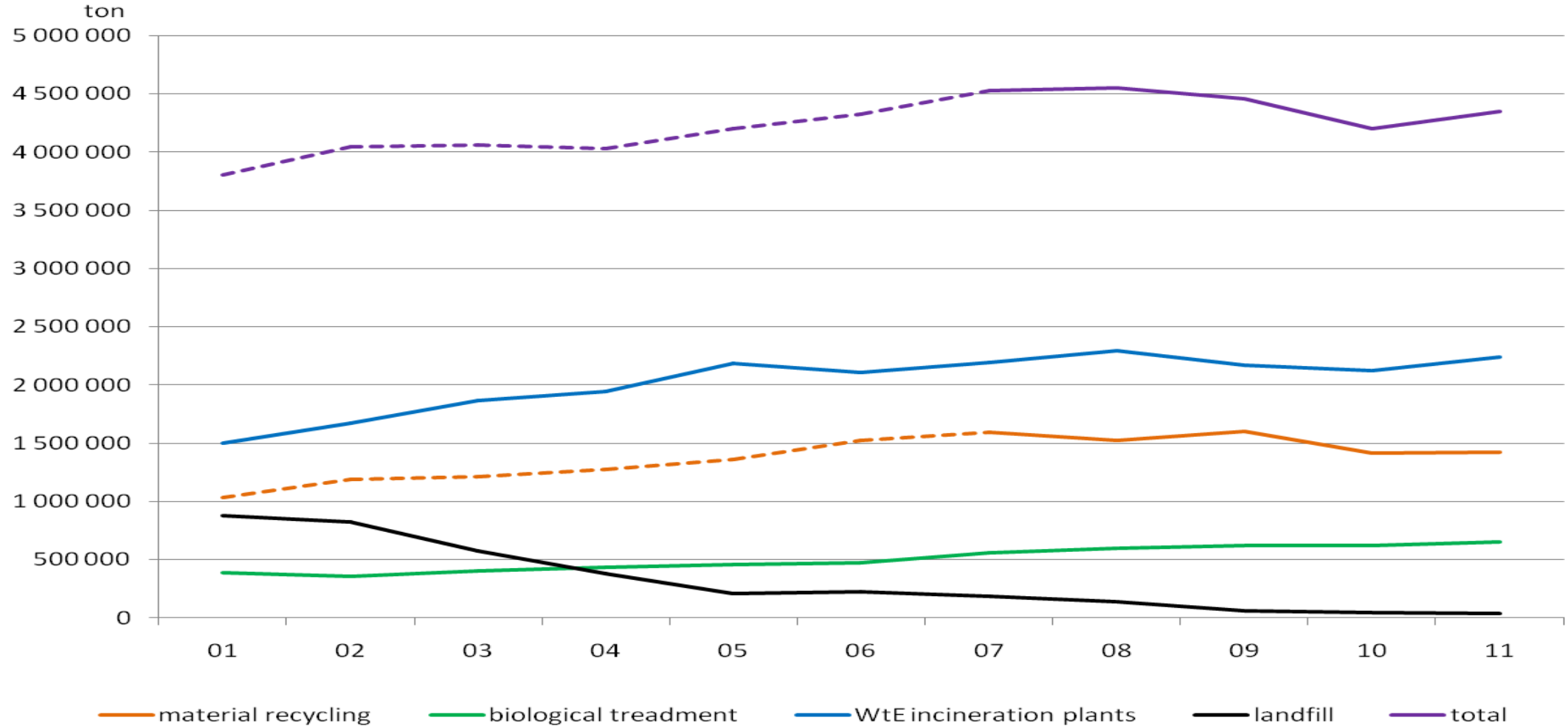
## Treated MSW volumes in Sweden for 2011 and 2007 (Source Avfall Sverige 2012)

Treatment method	2011		2007 <sup>1</sup>	
	Amount (tons)	Amount (kg/capita)	Amount (tons)	Amount (kg/capita)
Material Recycling	1 425 690	150,3	1 591 180	173,3
Biological Treatment	650 300	68,6	561 300	61,1
Incineration with Energy Recovery	2 235 720	235,8	2 190 980	238,6
Landfill	38 200	4,0	186 490	20,3
<b>Total</b>	<b>4 349 910</b>	<b>458,7</b>	<b>4 529 950</b>	<b>493,3</b>

1 Values for 2007 have been altered from last country report due to the fraction of office paper, which has been included in the material recycling amount before, is not considered anymore.

Furthermore the amount of hazardous waste that was reported as an own treatment method in the last report has now been distributed into to the actually used treatment methods..

# Treated MSW volumes in Sweden between 2001 and 2011 (Source Avfall Sverige)



Values for 2001-2006 adjusted by own calculations with known values for office papers and parts of hazardous waste

## Thermal treatment – Figures for 2011

- 30 WtE incineration plants that burn mixture of MSW and commercial waste
- Total burned waste: 4.9 Mt (46% Swedish MSW)
- Imported waste: 813 kt (152 kt MSW)
- Heat generation 12.2 TWh, electricity 1.8 TWh (including support fuels)
- Additional incineration plants that use only commercial waste
- Incineration capacity expansion ongoing – planned increase from about 5.4 Mt today until 5.8-7 Mt (MSW plus commercial waste) in 2018

Municipality	Plant	Swedish MSW [kt]	Total waste [kt]
Avesta	Källhagsverket	29	56
Boden	Bodens Värmeverk	35	99
Bollnäs	Säverstaverket	32	40
Borlänge	Fjärrvärmeverket, Bäckelund	33	89
Borås	Ryaverket	25	110
Eda	Åmotsfors Energi	14	71
Eksjö	Eksjö Energi AB	21	50
Finspång	FTV Värmeverket	24	28
Göteborg	Sävenäs avfallskraftvärmeverk	249	536
Halmstad	Kristineheds avfallsvärmeverk	100	190
Hässleholm	Beleverket i Hässleholm	26	45
Jönköping	Kraftvärmeverket Torsvik	41	165
Karlskoga	Karlskoga Kraftvärmeverk	35	86
Karlstad	Avfallsvärmeverket på Heden	45	51
Kiruna	Kiruna Värmeverk	11	70
Kumla	SAKAB Förbränning	40	163
Köping	Norsa avfallsförbränningsanläggning	23	28
Lidköping	PC Filen	45	98
Linköping	Gärstadverket	143	297
Ljungby	Ljungby Energi AB	48	59
Malmö	Sysav förbränningsanläggning	174	549
Mora	Avfallsförbränningen Mora	15	20
Norrköping	E.ON Händelöverket	205	336
Skövde	Värmekällan	28	56
Stockholm	Högdalenverket	436	702
Sundsvall	Korsta kraftvärmeverk	101	209
Uddevalla	Lillesjö Avfallskraftvärmeverk	49	100
Umeå	Dåva kraftvärmeverk	51	121
Uppsala	Vattenfall AB Värme Uppsala	157	324
Västervik	Stegholmsverket	13	47
<b>Total</b>		<b>2 236</b>	<b>4 893</b>

## Biological treatment – Figures for 2011

- Source separated collection at over 60% of municipalities (further 70 municipalities in planning)
- 650 kt treated biological
  - Composting 450 kt (320 kt park and garden waste)
  - AD 200 kt Food waste (about 65 kt to AD plants at waste water treatment facilities, 135 kt to co-digestion plants)
  - Food waste to composting is steadily decreasing
- 19 co-digestion plant
  - 0.42 TWh biogas, 0.38 TWh upgraded to SNG (mainly used as vehicle fuel)
  - Over 90% of digestate used as fertilizer (13 plants are certified)
- About 135 AD plants at Waste Water Treatment facilities
  - 0.64 TWh biogas, 0.35 TWh upgraded to SNG
- About 55 landfill site collecting landfill gas (around 0.27 TWh collected, decreasing)

## Additional information – Fossil Carbon Content in waste

Report: “Determination of the fossil carbon content in combustible municipal solid waste in Sweden” (Avfall Sverige RAPPORT U2012:05)

- C<sup>14</sup> analysis of solid waste and flue gas samples at 7 Swedish plants (September 2010- August 2011)
- Average value for fossil carbon share in percent of total carbon
  - 36% waste samples
  - 38% flue gas samples

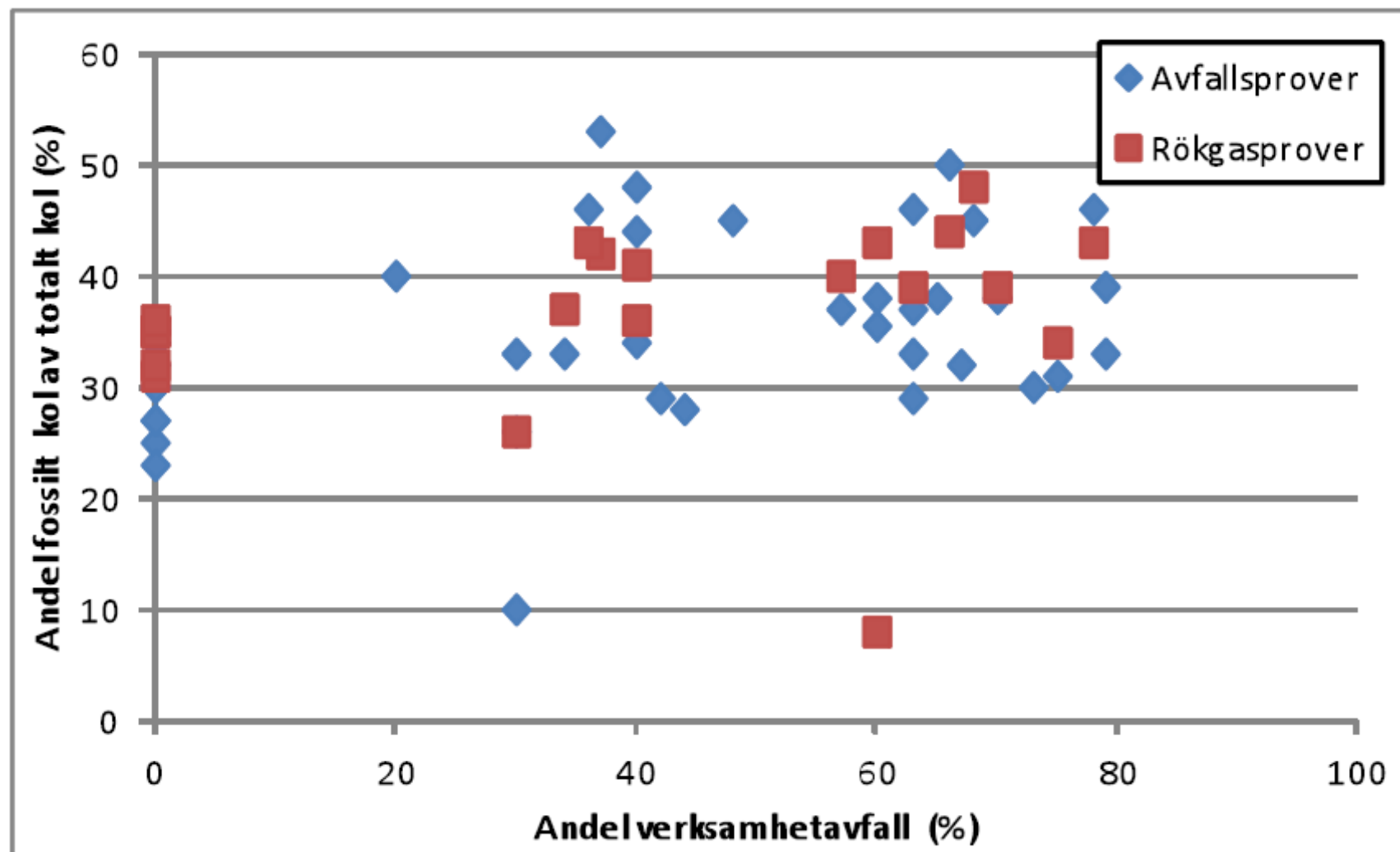


Chart from Avfall Sverige Rapport U2012:05 background value of 107 pMC.

## Additional information – Fossil CO<sub>2</sub> emissions from waste incineration

ETS period (2013-2020)

- SEPA published standard factors for fossil carbon discharge from waste incineration that can be used by plants category A (and B)
- MSW: 30.2 t<sub>CO<sub>2</sub></sub>/TJ (waste energy)
- Commercial waste: 36.8 t<sub>CO<sub>2</sub></sub>/TJ (waste energy)

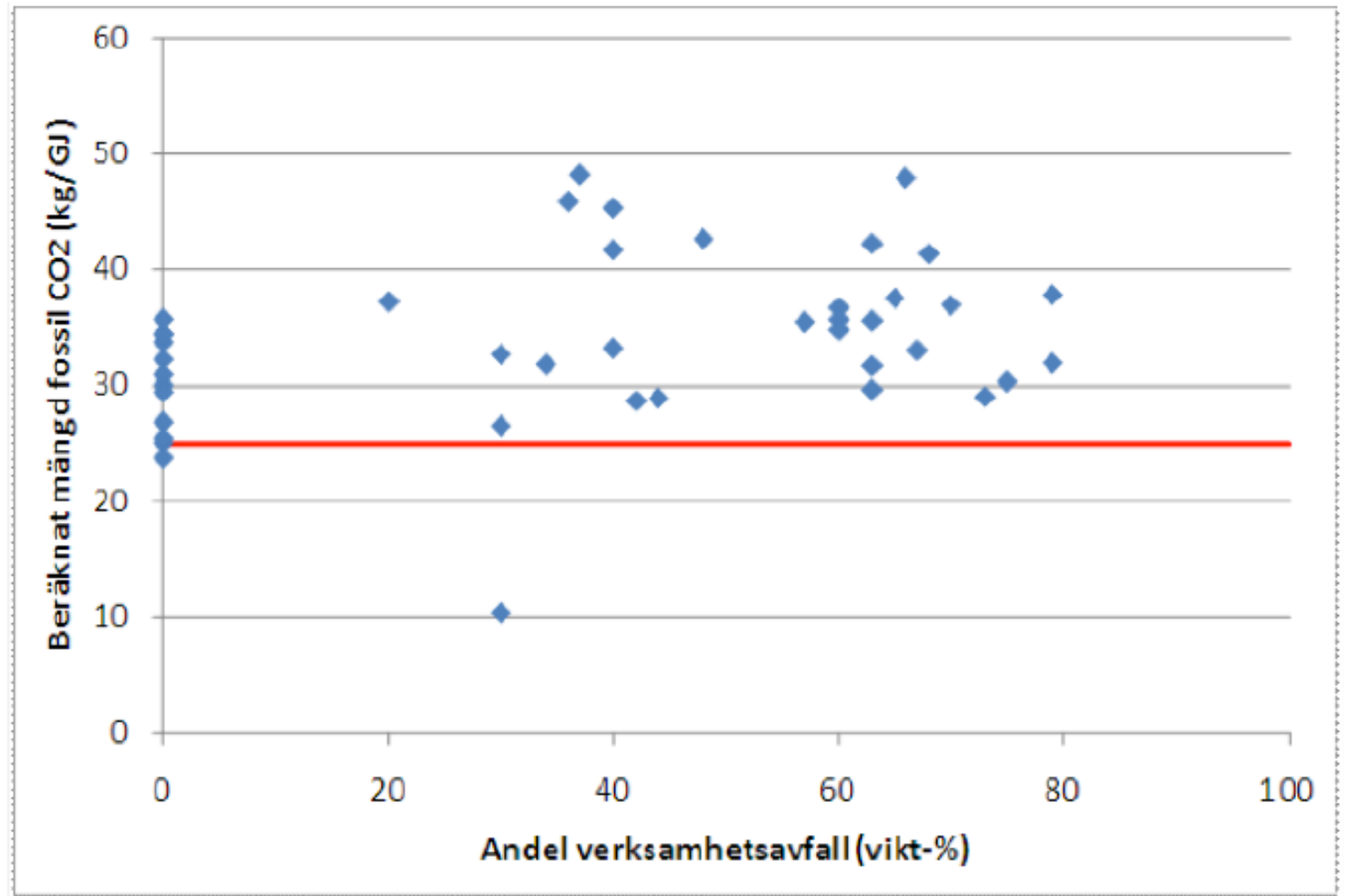


Chart from *Avfall Sverige Rapport U2012:05*