

A large, light green circular arrow graphic that curves around the central text, pointing towards the top right.

Maximum Recycling of Material and Energy, Minimum Landfilling

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Sweden



Maximum Recycling – Minimum Landfilling

Driving forces

- Legislation – Laws, Directives, etc.
- Environmental Awareness/Environmental Engagement
- Education and Information

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Legislation Sweden (1)

- 
- 1969 The Environmental Protection Act.
 - 1972 The Public Cleansing Act. Responsibility by the law for Local Authorities/Municipalities to collect, treat and landfill Municipal Waste.
 - 1970s More stringent regulations for the handling of Hazardous Wastes and Industrial Wastes.
 - 1994 Producers' Responsibility for Packaging (Cardboard, Metals, Glass, Plastics and Paper).

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Legislation Sweden (2)

- 
- 1999 The Environmental Code with attendant ordinances and regulations.
 - 2000 Tax on landfilled waste.
 - 2001 Ordinance on producers responsibility for electronic waste.
 - 2002 Ban on landfilling of combustible waste.
Ordinance on Incineration.

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Legislation Sweden (3)

- 2005 Ban on landfilling of organic waste.
Swedish environmental target: The amount of landfilled waste to be reduced by at least 50 percent compared with 1994.
- 2006 Tax on incinerated household waste.
- 2009 New EU framework directive on waste.
- 2010 National Swedish targets:
 - 35% of food waste from households, restaurants, etc. to biological treatment
 - at least 50 percent of household wastes to be recycled (including biological treatment)



At the heart of the eco-cycle

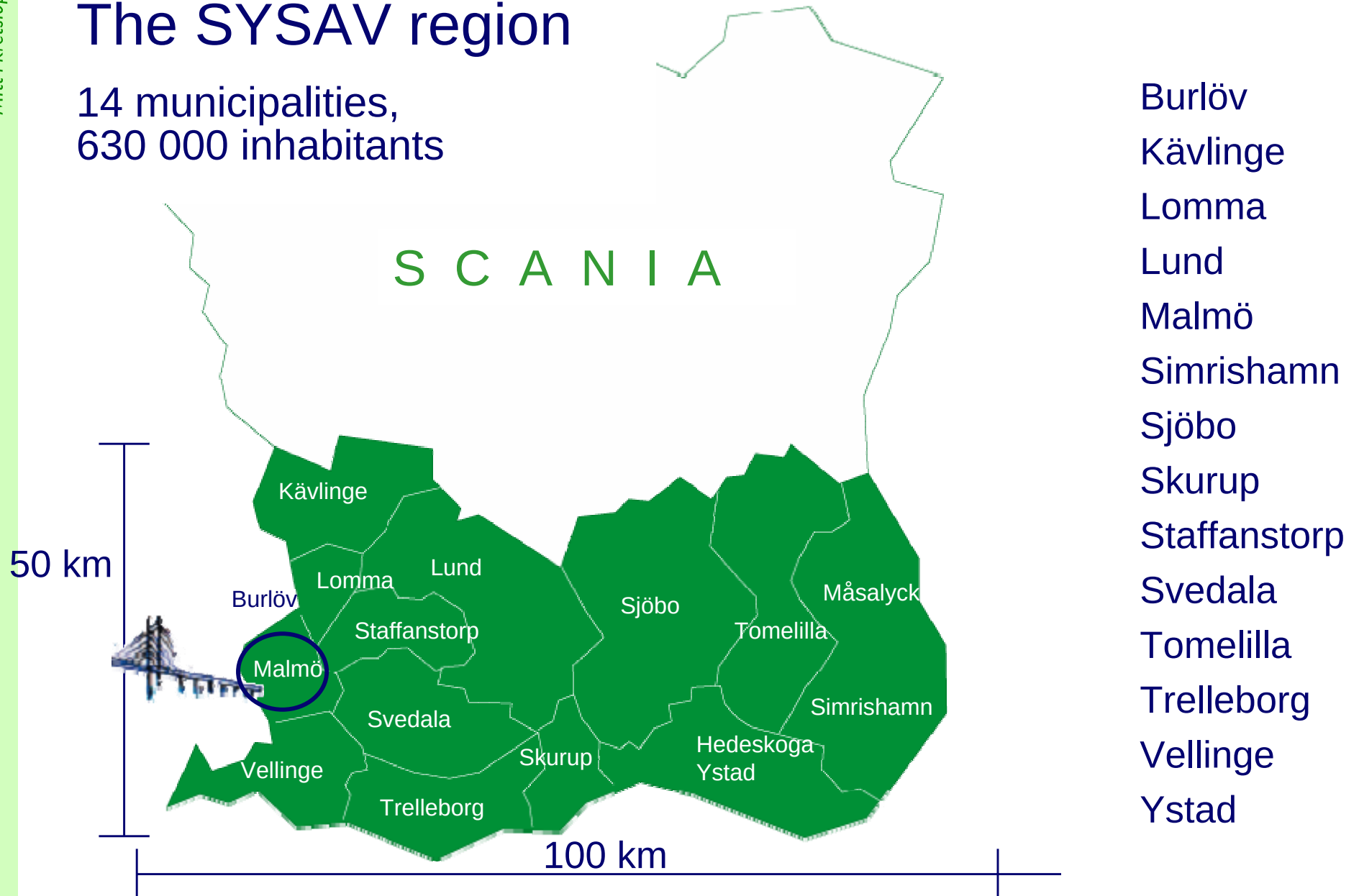
Goals:

- Maximum recycling of materials and energy
- Minimum landfilling.

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The SYSAV region

14 municipalities,
630 000 inhabitants



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South Scania Waste Company

Turnover 660 M SEK (2005)

Number of employees 250 (2006)

Sysav is responsible for treatment, recovery and disposal of household, industrial and hazardous waste in Southern Scania.

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The Sysav group handled 871,000 tons of waste in 2005



- Household waste
- Bulky waste
- Industrial waste
- Construction and demolition waste
- Health care waste
- Hazardous waste

with

a Combination of Methods

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The eco-cycle model



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The resources of SYSAV



Research & development, training and external consulting.



Biological treatment of organic waste.



Recycling of gravel, asphalt and concrete.



Handling and recycling of waste paper, cardboard boxes, glass, wood and plastic etc.



Slurry exhausting, dry suction, high pressure flushing, pipe flushing, transport, cleaning etc.



Separation and recycling of construction waste and industrial waste.



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Special solutions for companies



Dismantling, separation and recycling of electronic waste.



A comprehensive system for handling of construction and demolition waste.



A system for secure collection and handling of healthcare waste

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LOTS®

Container for hazardous waste from Industries



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Maximum Recycling – Minimum Landfilling

Waste provides electricity and heat



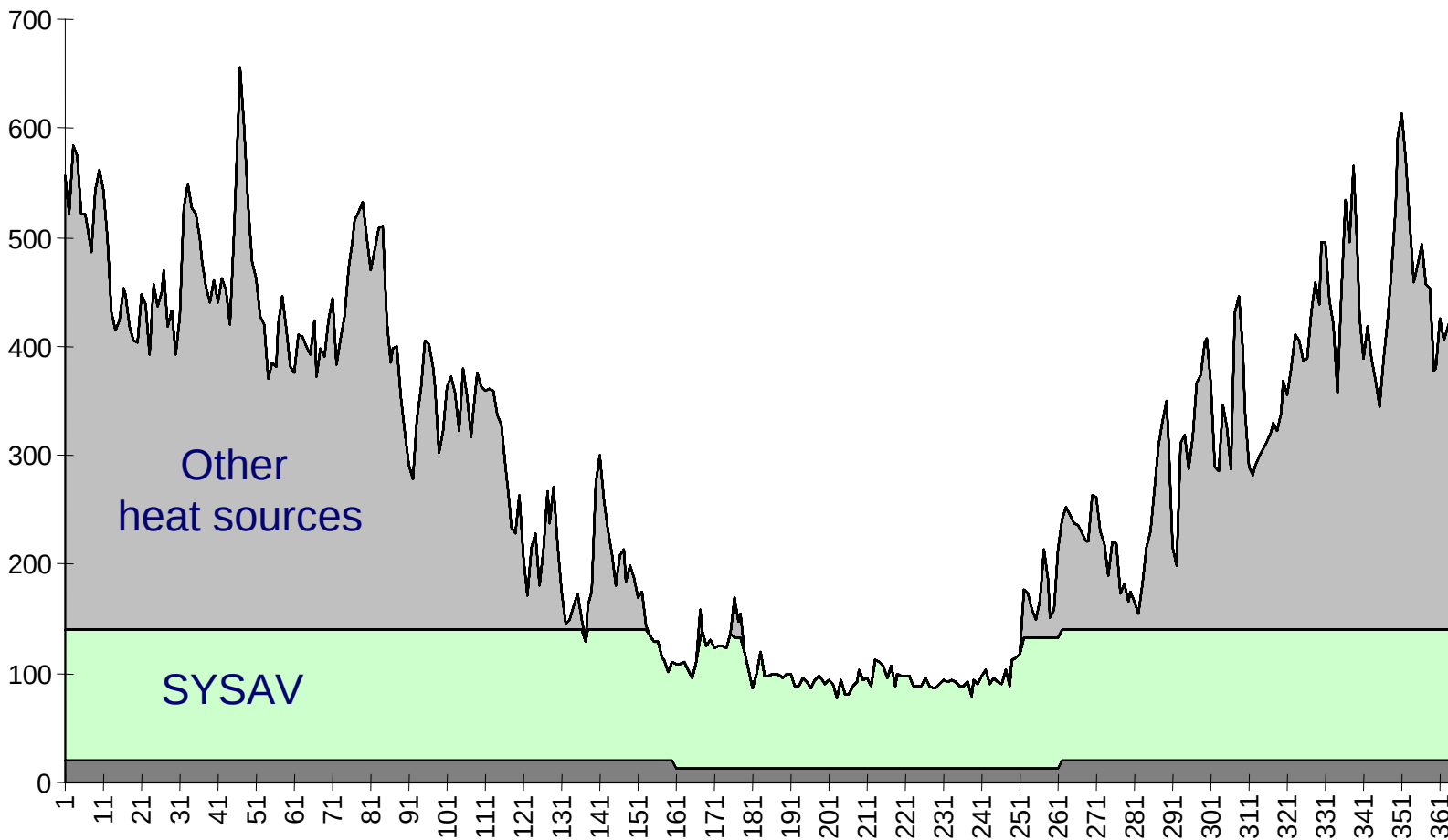
Total annual processing of 400,000 tons of waste, with an energy production of:

- **1,000,000 MWh of heat**
- **135,000 MWh of electricity**

Corresponds to 40 percent of the district heating demand of the municipalities of Malmö and Burlöv.

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MW Use of SYSAV heat during the year



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Expansion of the Sysav Waste-to-Energy Plant

2006



2008



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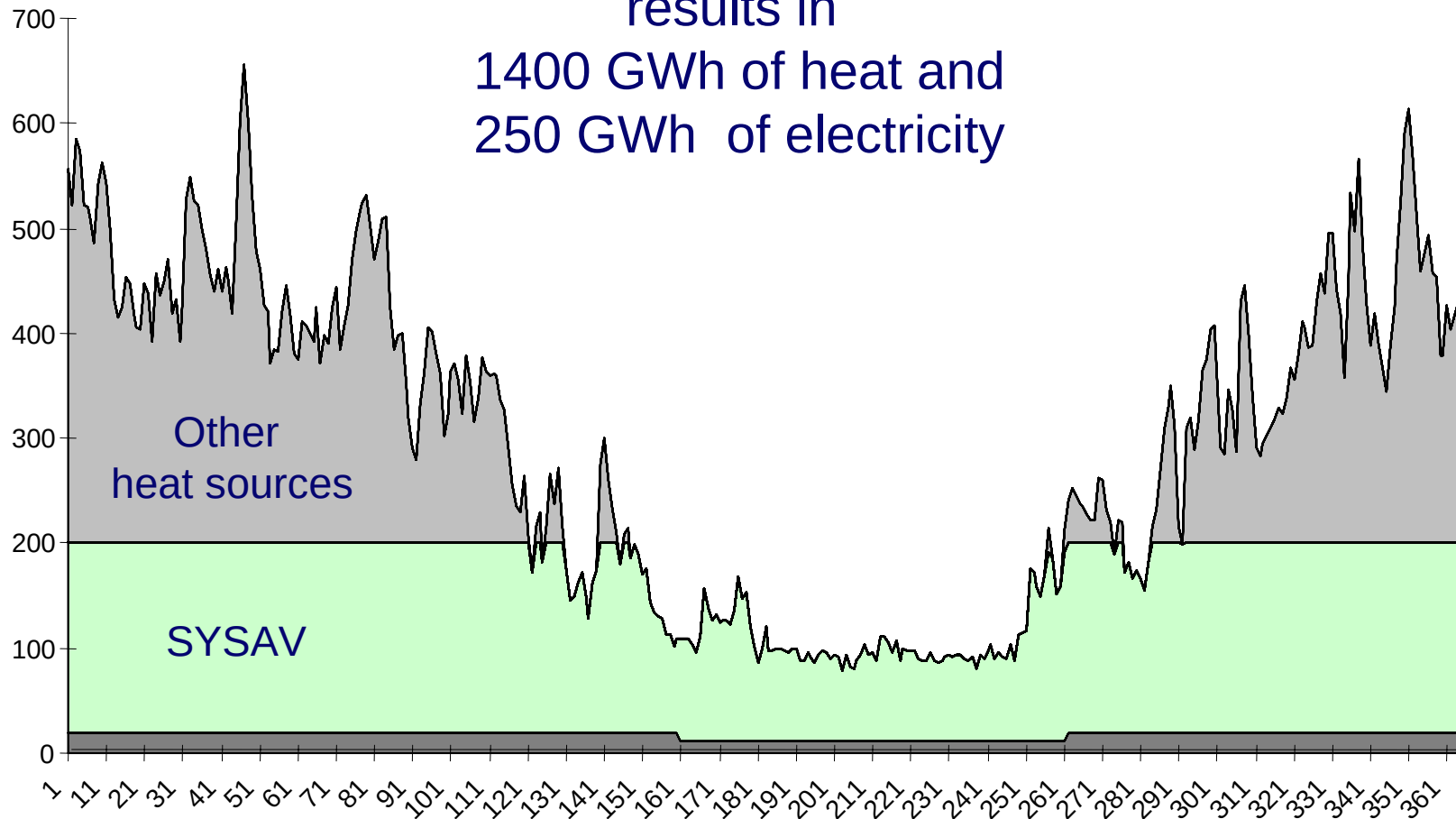
SYSAV

Processing of 550 000 tonnes of waste/year

results in

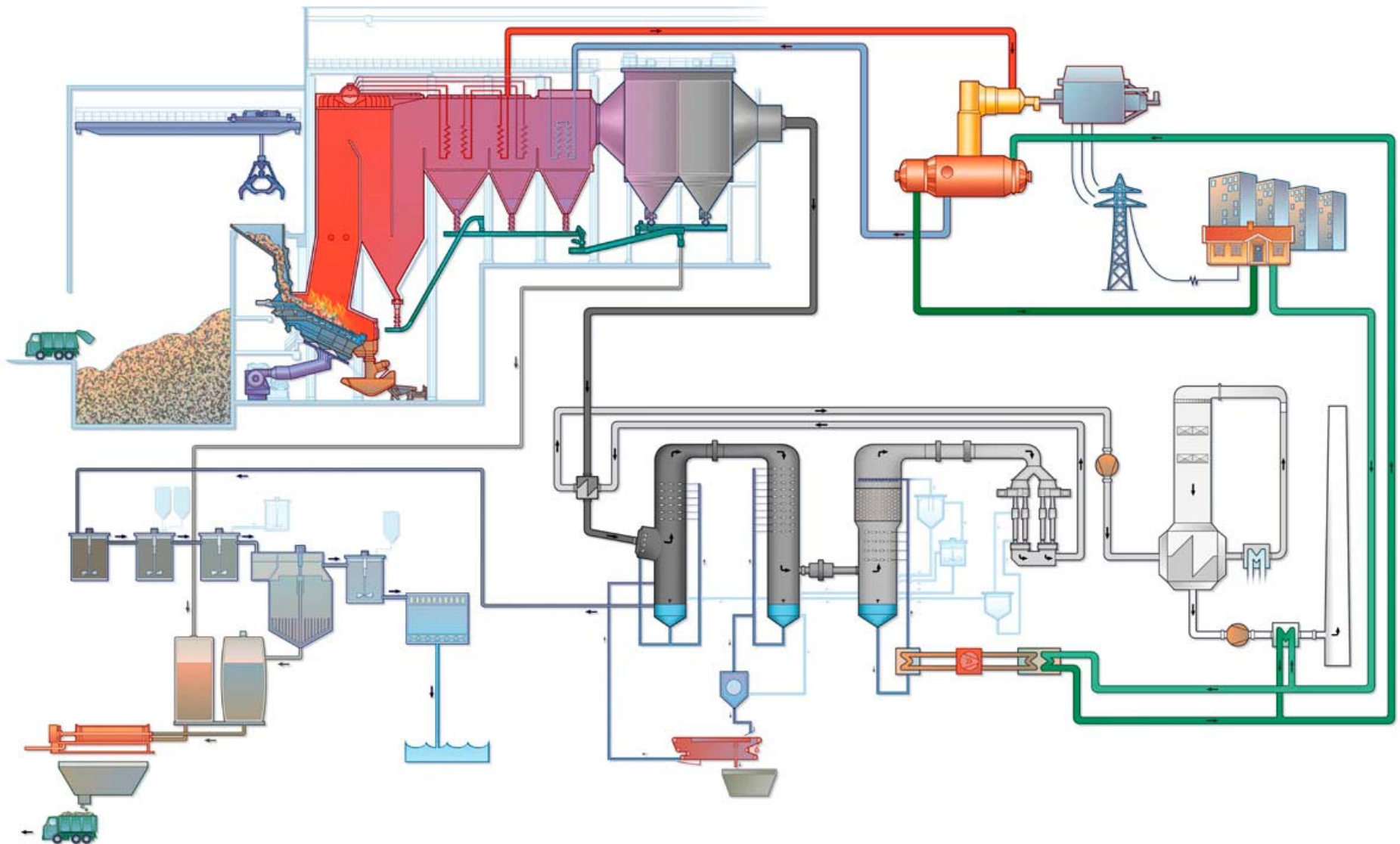
1400 GWh of heat and
250 GWh of electricity

MW



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Waste to heat and power



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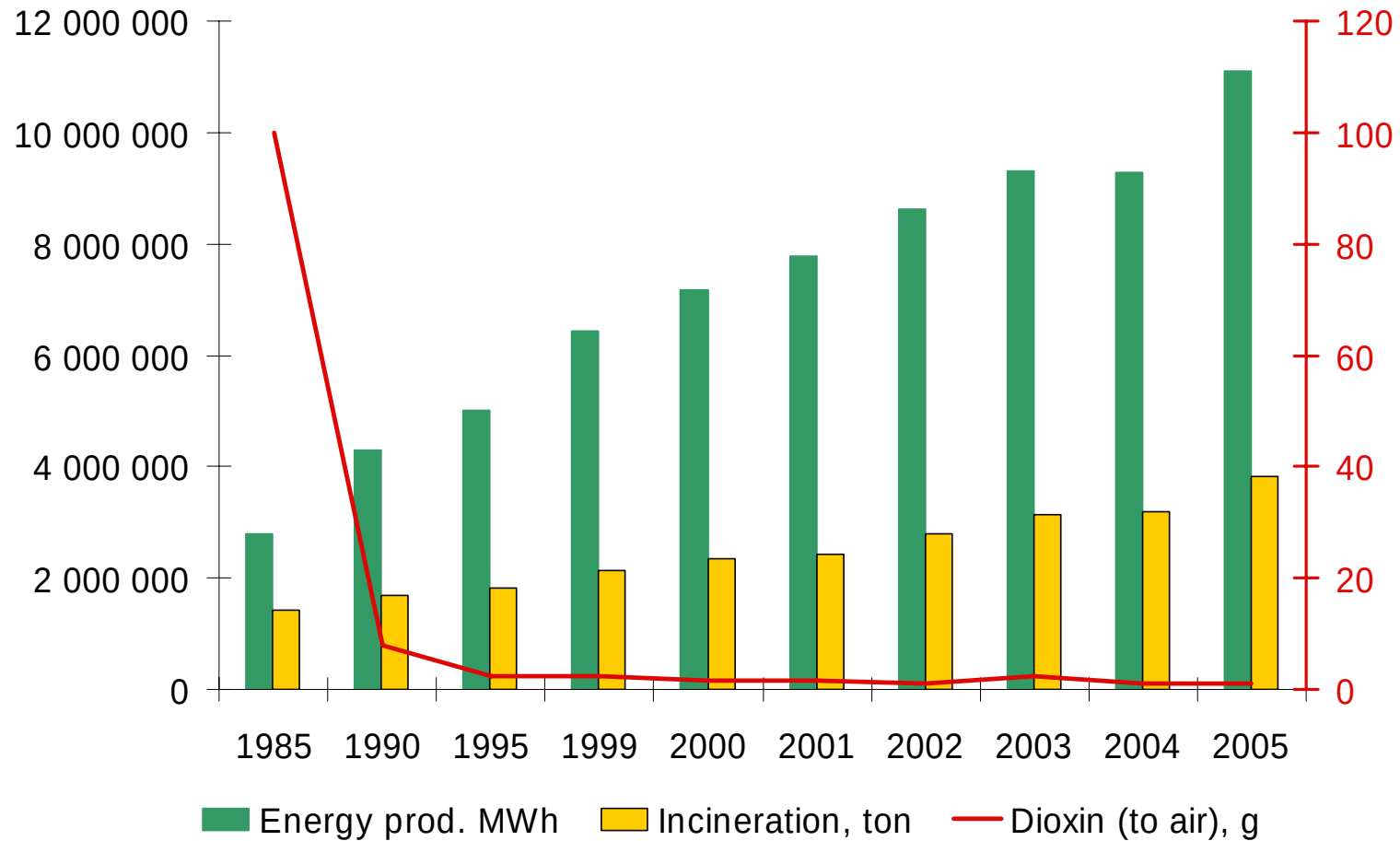


Advanced Flue gas cleaning

- Electrostatic precipitator
- 3 scrubbers incl. a condensing scrubber
- Electroventuri filter
- Catalyst

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Dioxin emissions to air 1985 - 2005



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The Swedish Example



The amount of waste to WTE facilities has more than **doubled** from 1985-2005,

while the energy production has **quadrupled**, and

most of the emissions have **decreased** with 99%.

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Bottom ash recycling - of metals and gravel



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Soil Remediation

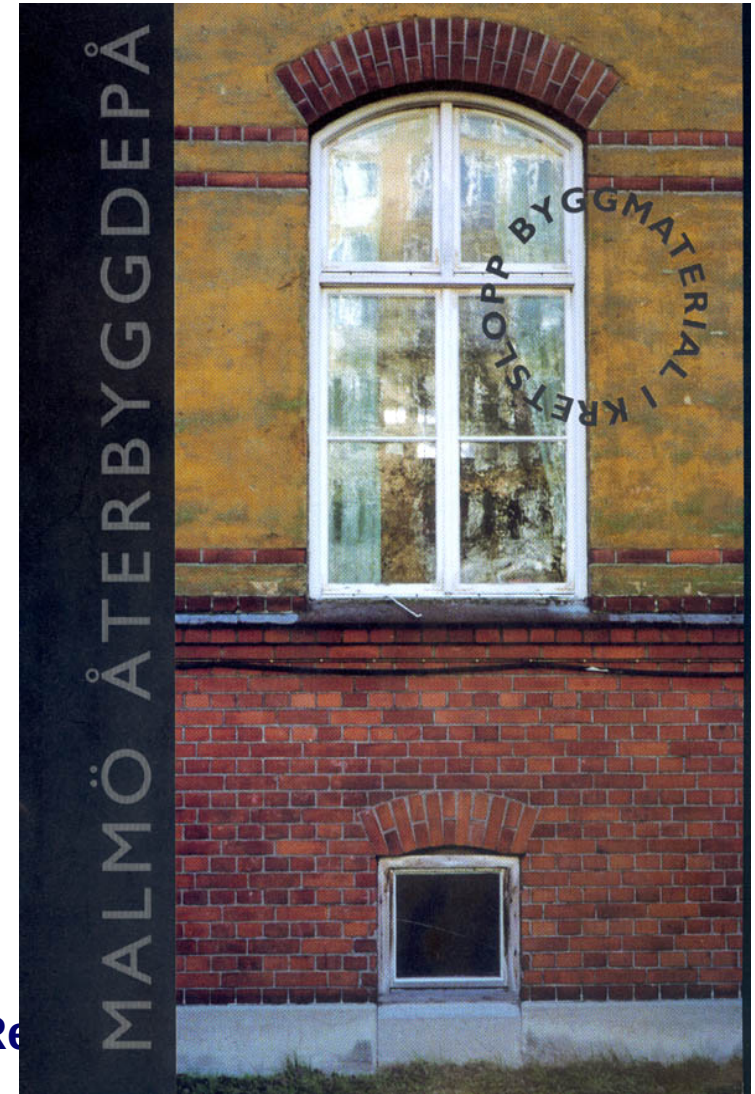
– Remediation of polluted soil by the use of biological methods.



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Building Material Recycling Shop

- reuse and selling of construction and demolition material, in co-operation with Malmö Local Authority Service Administration



Sysav Biotec AB

Biological Treatment

Treatment of food waste from:

- Households
- Industries
- Others
 - Restaurants, Food stores, kitchens, and so on



Solid and liquid Biowaste

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Sysav Biotec today

Handling 3,000 tons of food waste annually

Food waste is transported to the regional waste company Merab and pretreated in a screw-press to a slurry

The slurry is then transported to a fermentation plant in the municipality of Kristianstad

Sysav Biotec in 2007

- Treatment of 4,000 tons of food waste
- Plant for pre-treatment and sanitization in operation in Malmö, capacity 10,000 ton
- Cooperation with the wastewater treatment plant in Malmö: fermentation of pre-treated food waste at the wastewater plant together with sewage sludge
- Biogas gives heat and electricity

Fermentation Plant

- Bunker
- Pre-treatment
 - Shredding
 - Mixing with fluid
 - Separation (sieve, screw-press)
- Sanitization (by heating the substrate to 70 C for one hour)
- Fermentation (15-30 days)
- Treatment and storage of liquid fertilizer
- Energy extraction



Sysav Biotec in 2010

- Treatment of 25,000 tons of food waste
- Plant for pre-treatment and sanitization, capacity 25,000 tons
- Fermentation of the slurry from food waste in a separate reactor
- Plant for cleaning Biogas and to produce Biogas with fuel quality (equal to 2 million litres of petrol)
- Production of fertilizer to farming land (quality certification)

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Energy extraction from Biogas

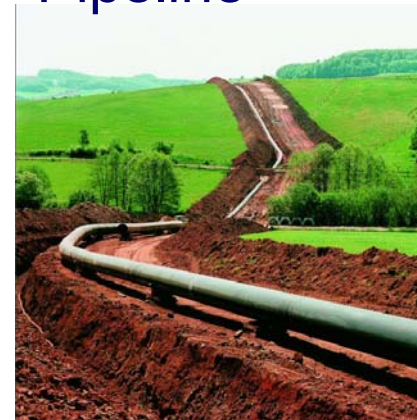
Heat

Electricity



Automobile fuel

Pipeline



Gas cleaning



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Liquid Fertilizer

Comparison with industrial fertilizer

- + Contains stabilized organic substances
- + Positive environmental impact
- Larger cost to apply on farmland



Comparison with pig manure

- + High amount of nitrogen
- + Easy to apply (and less odor)
- Unknown product

Composting of Green Waste

Composting at four Landfill sites

Compost



The Spillepeng Landfill – a recycling site

Sorting, recycling, composting and final landfilling of waste with recovery of landfill gas



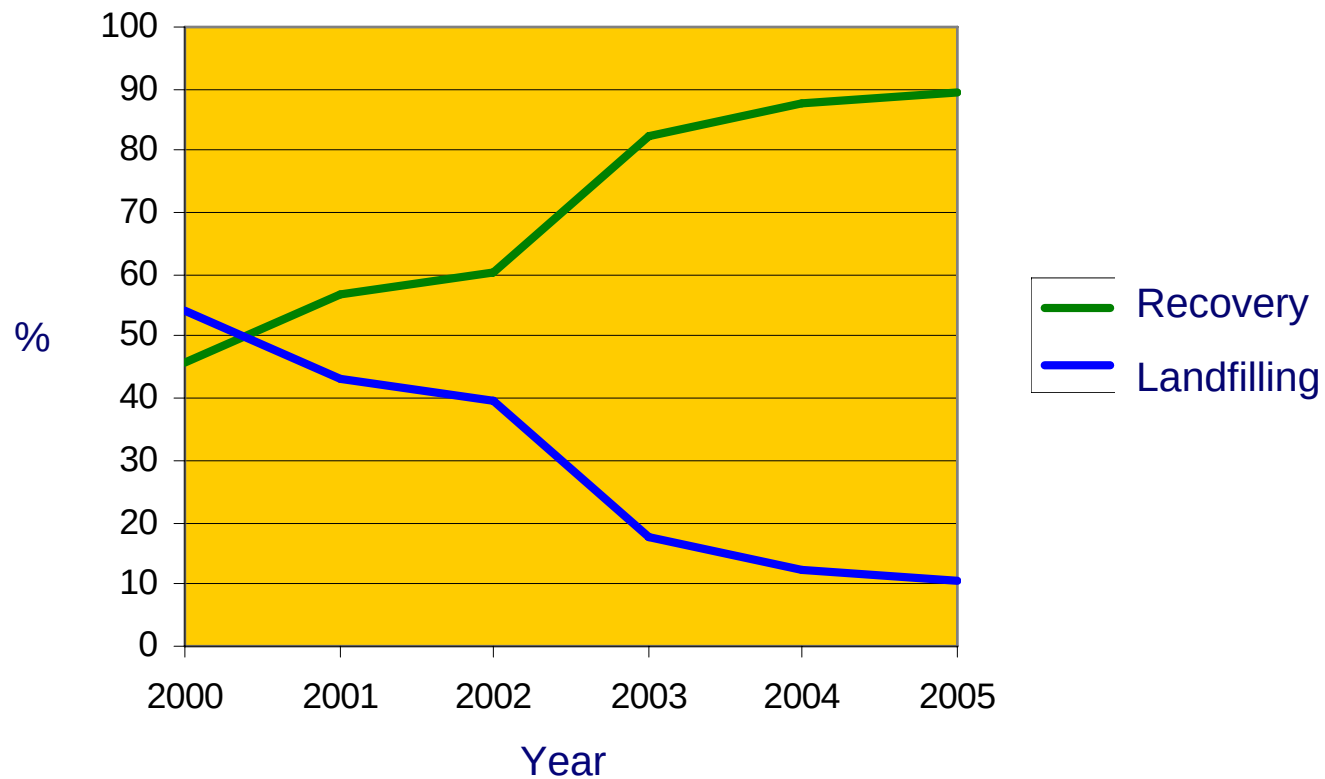
Sysav 2005

	(tons)
Industrial waste	369 000
Household waste	316 000
Newspapers, boxes etc	65 100
Heavy masses	80 000
Hazardous waste incl electronics	41 300
Total:	871 400
Recovery	91.3 %
Material recycling	
Biological treatment	
Waste to energy	
Final landfilling	8,7 %

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Recovery versus Landfilling

Sysav 2000-2005



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Maximum recycling, Minimum Landfilling



The Waste Problem is solved with
an Integrated Waste Management
- with a **Combination of Methods**

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Thank you
for your attention!