

MälarEnergi

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Water & Sewage

- 580 km water distribution network
- Consumption: about 200 litres/person and day
- Production: 14 million cubic metres/year
- Hässlö, Fågelbacken, etc.
- 500 km sewage disposal network
- Treatment plants in Västerås, Tortuna, Skultuna, etc.
- Chemical, mechanical, biological treatment
- Biohumus spinoff for soil improvement



Electrical Distribution

- 99 000 customers
- Energy turnover:
1 973 GWh (2002)
- 30 primary substations
(130-70-40-30-20 kV)
- 2060 km highvoltage net
- 2115 secondary substations
- 3490 km lowvoltage net



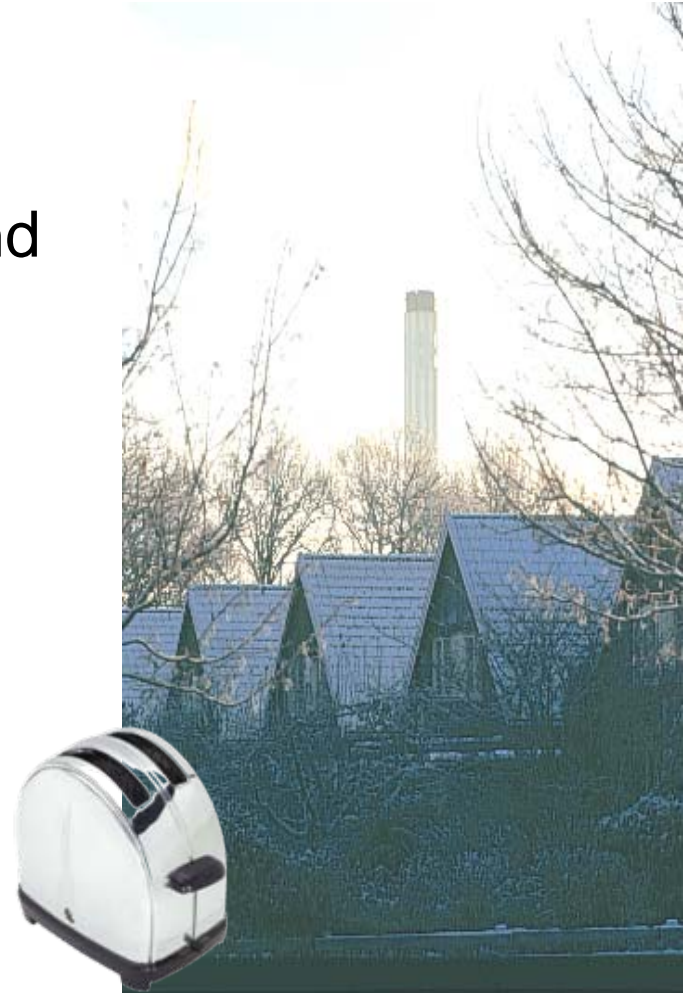
Electrical Trading

- 145 000 customers
- Sales: aprox
2 900 GWh
- Customers from Malmö
in the south to Luleå
in the north



District Heating

- About 12 500 customers
- More than 90% of properties in Västerås, Hallstahammar and Kungsör
- About 97% of the heating in Västerås is district heating
- 600 km district heating distribution network
- Sales: about 1 600 GWh

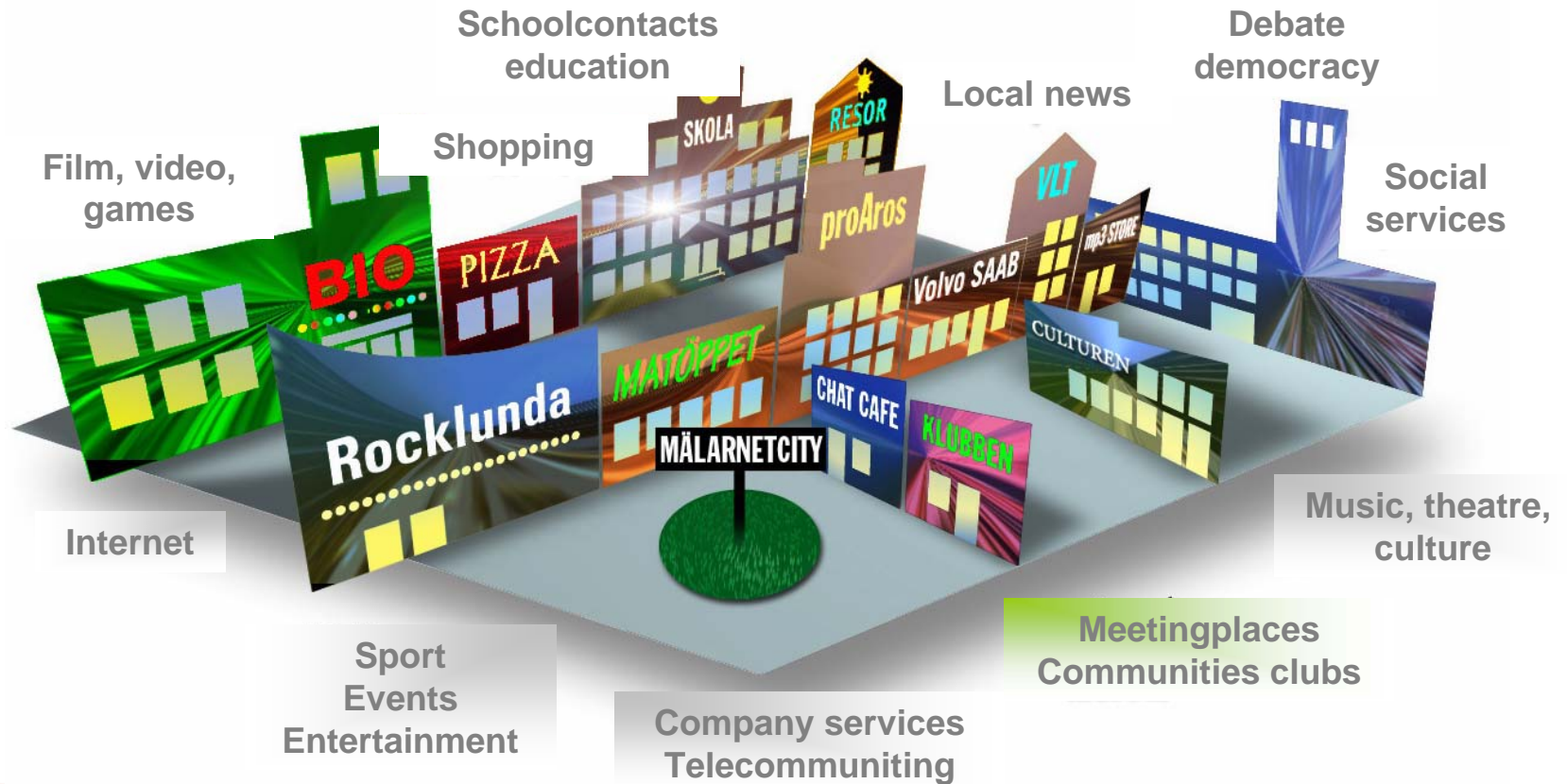


District Cooling

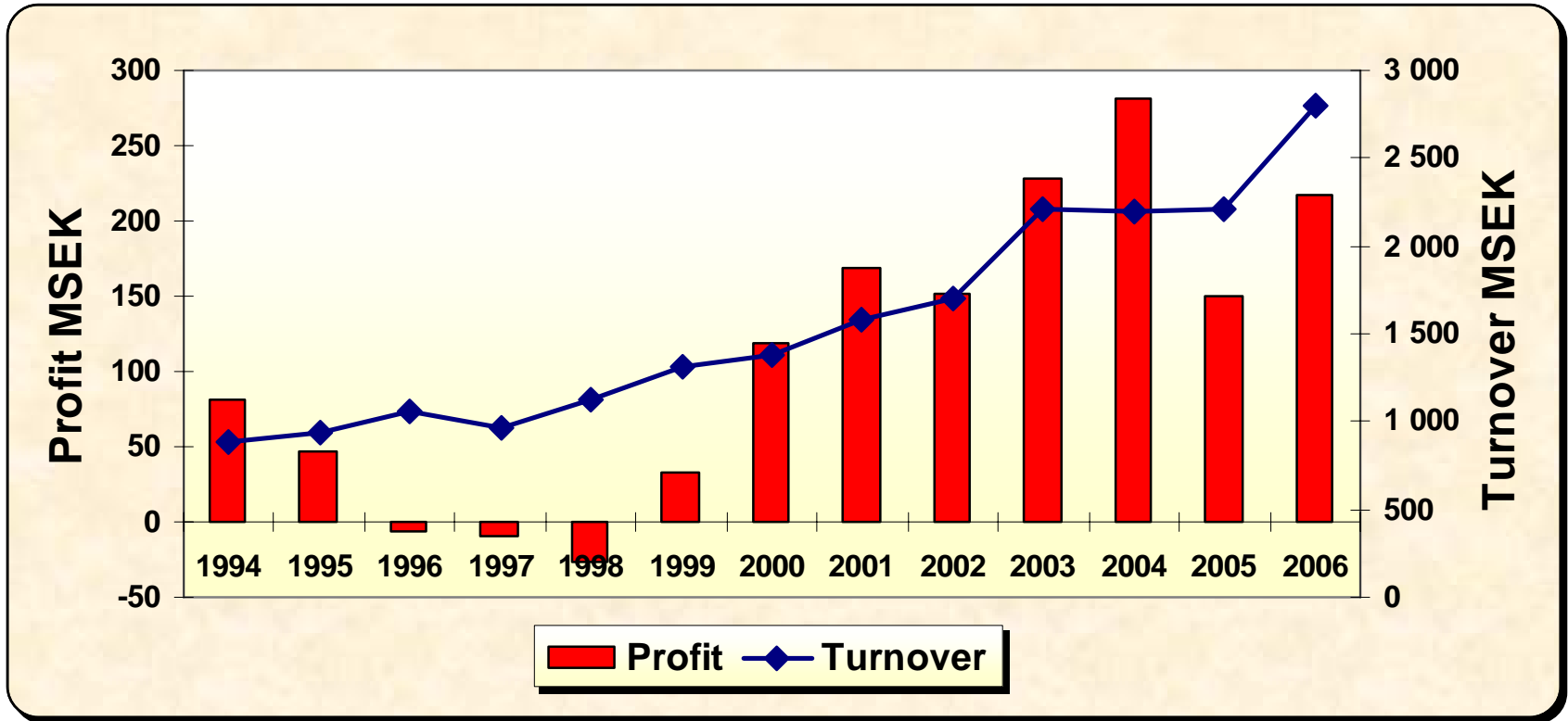
- Absorptionchiller + Lake-water + thermalpump-based
- 7 km transmission network
- Sales: 28 GWh
- 45 customers



Mälarenergi High Speed Networks



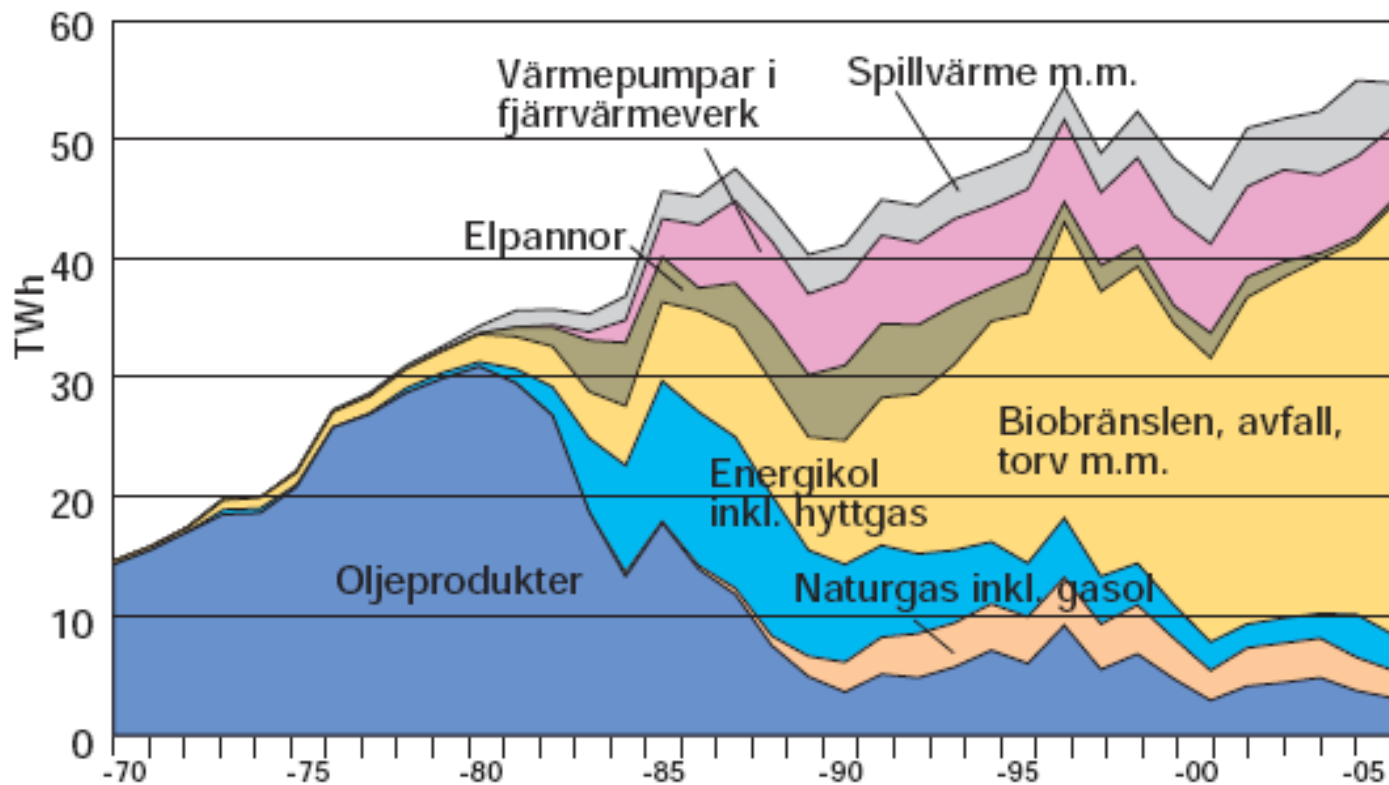
Turnover 1994 - 2006



Energy policies in Sweden

- Energy policies have changed over the years
- Before 1945, biofuel, coal
- 1945-1975, large dependency on oil and hydro
- 1975-1985, decreased use of oil, introduction of Nuclear, revival of coal
- 1985-, focus on environment and later on also renewable resources

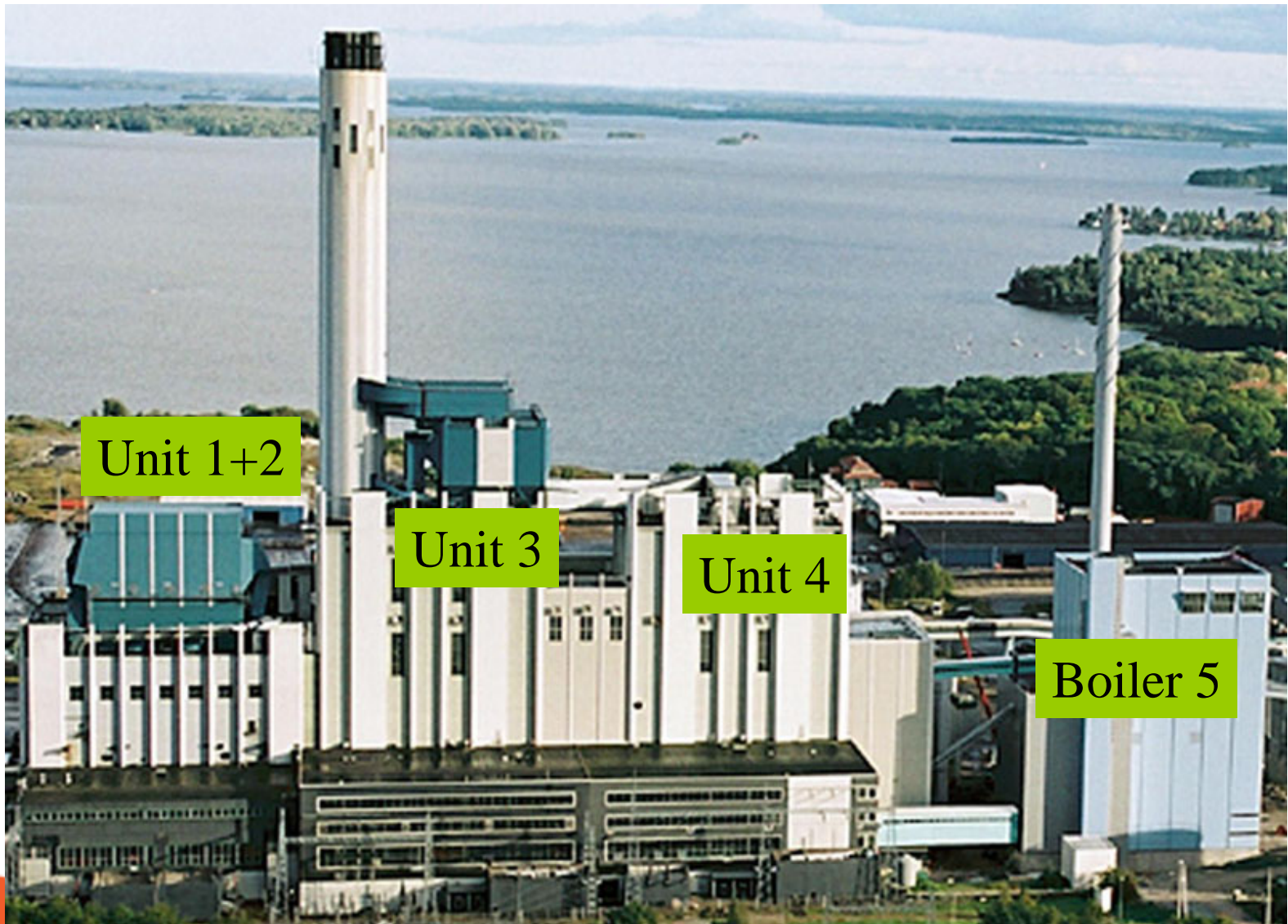
Fuelmix in Swedish District Heating 1970 - 2006



KALLA: SCB, ENERGIMYNDIGHETENS BEARBETNING

Energy policies in Västerås

- District Heating started in 1954, based on Coal in a combined heat and power plant (CHP)
- Conversion to oil took place between 1960 and 1970
- Conversion to coal place between 1980 and 1990
- Focus on environmental cleaning of coal between 1985-1995
- Since 1995 focus on conversion to bio mass



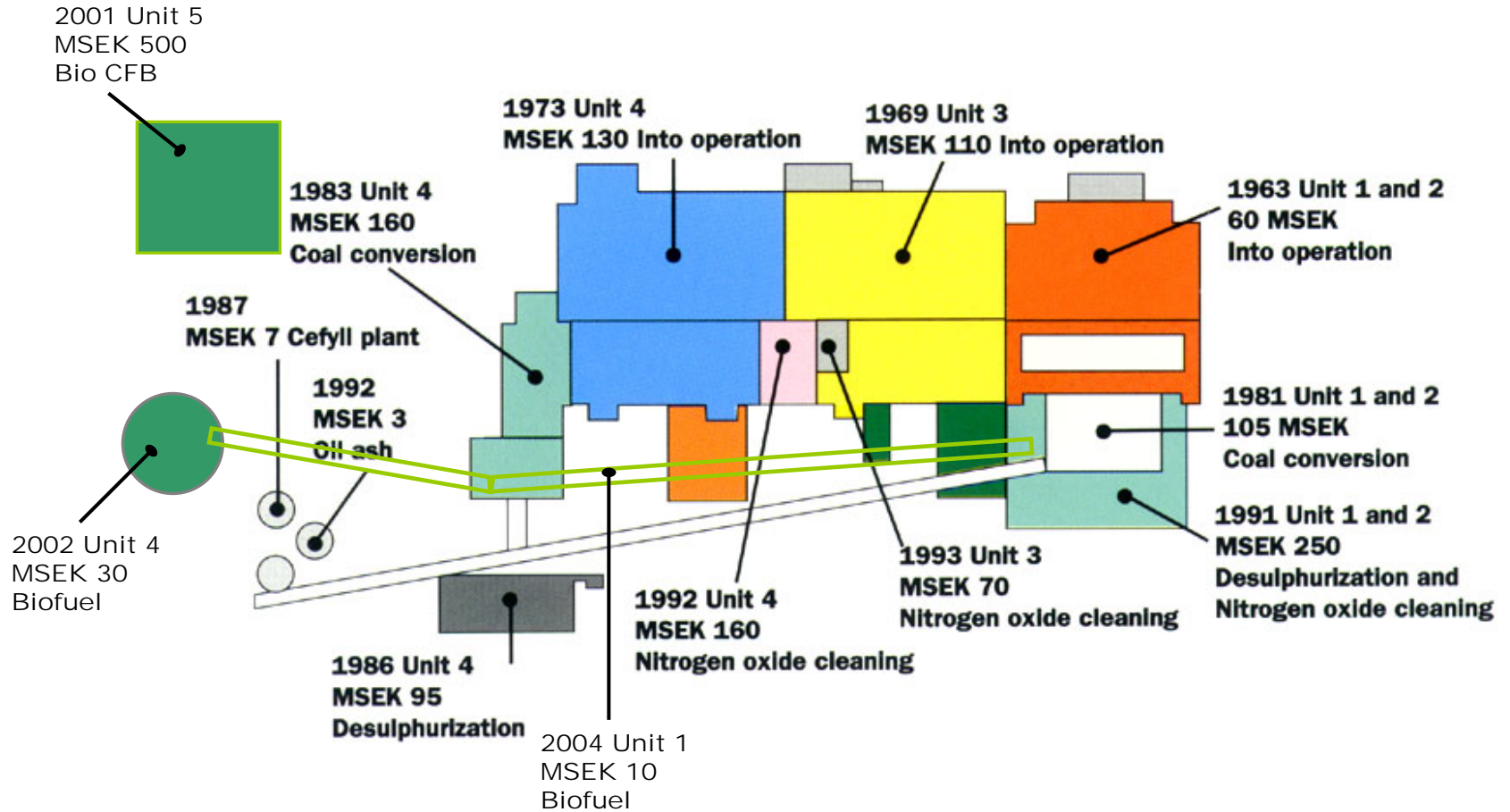
Unit 1+2

Unit 3

Unit 4

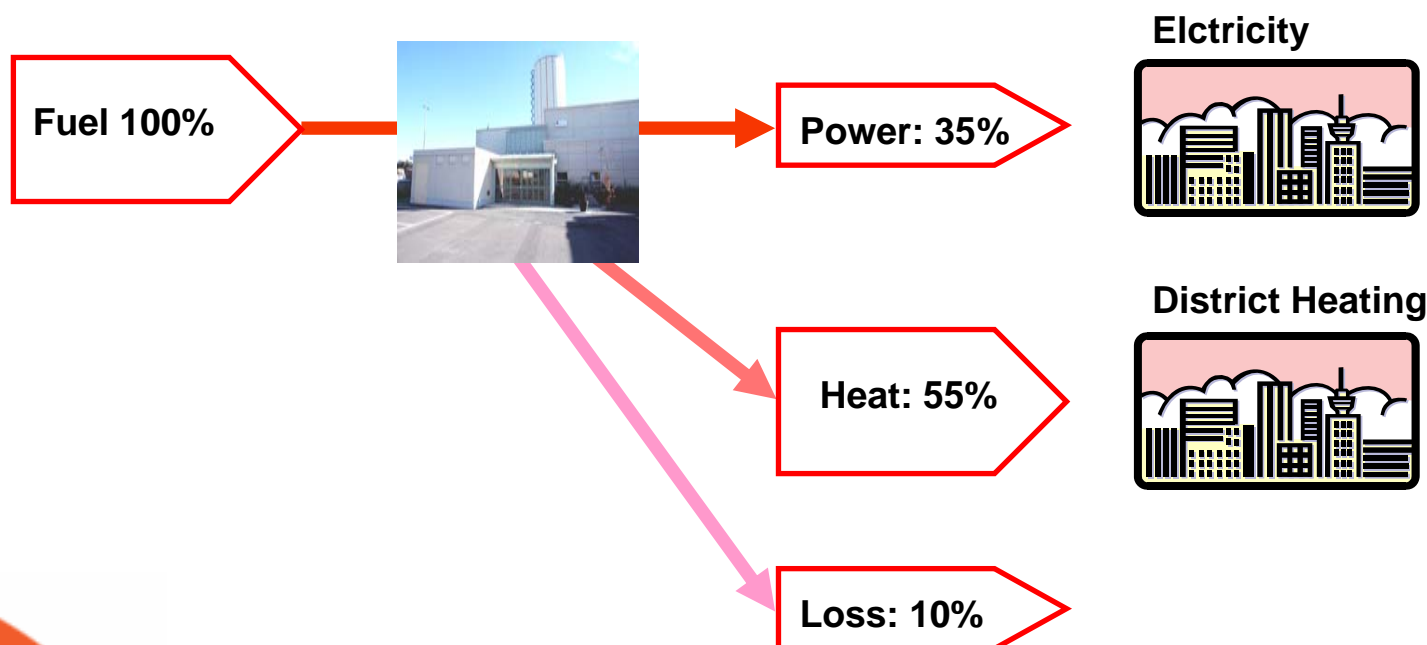
Boiler 5

Power Plant Investments



Combined Heat and Power (CHP)

- In CHP production, heat and power is produced in the same combustion process
- Total fuel efficiency app 90%

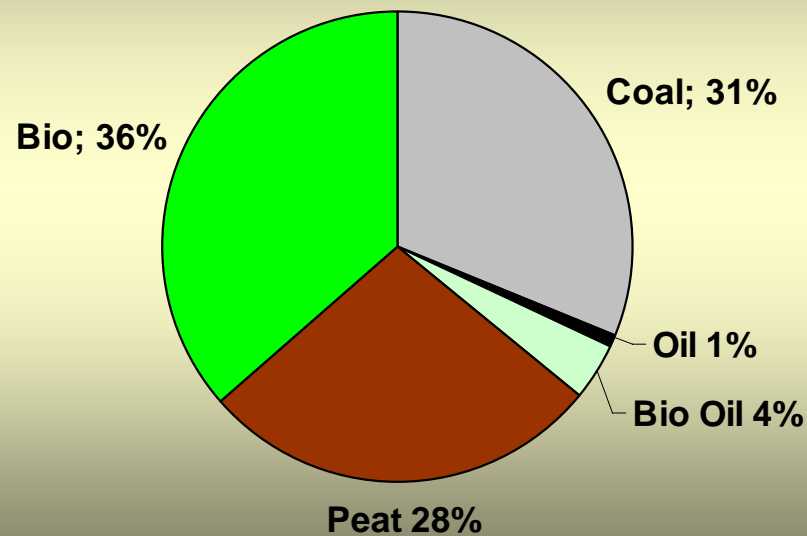


Conversion to Bio mass

- Production in Västerås - (Budget 2006)
 - Heat 1800 GWh
 - Power 700 GWh
- Yesterday: Consumption of app 400 000 tons of coal per year
 - All logistics by boat
- Since five years a major change to bio fuel has taken place

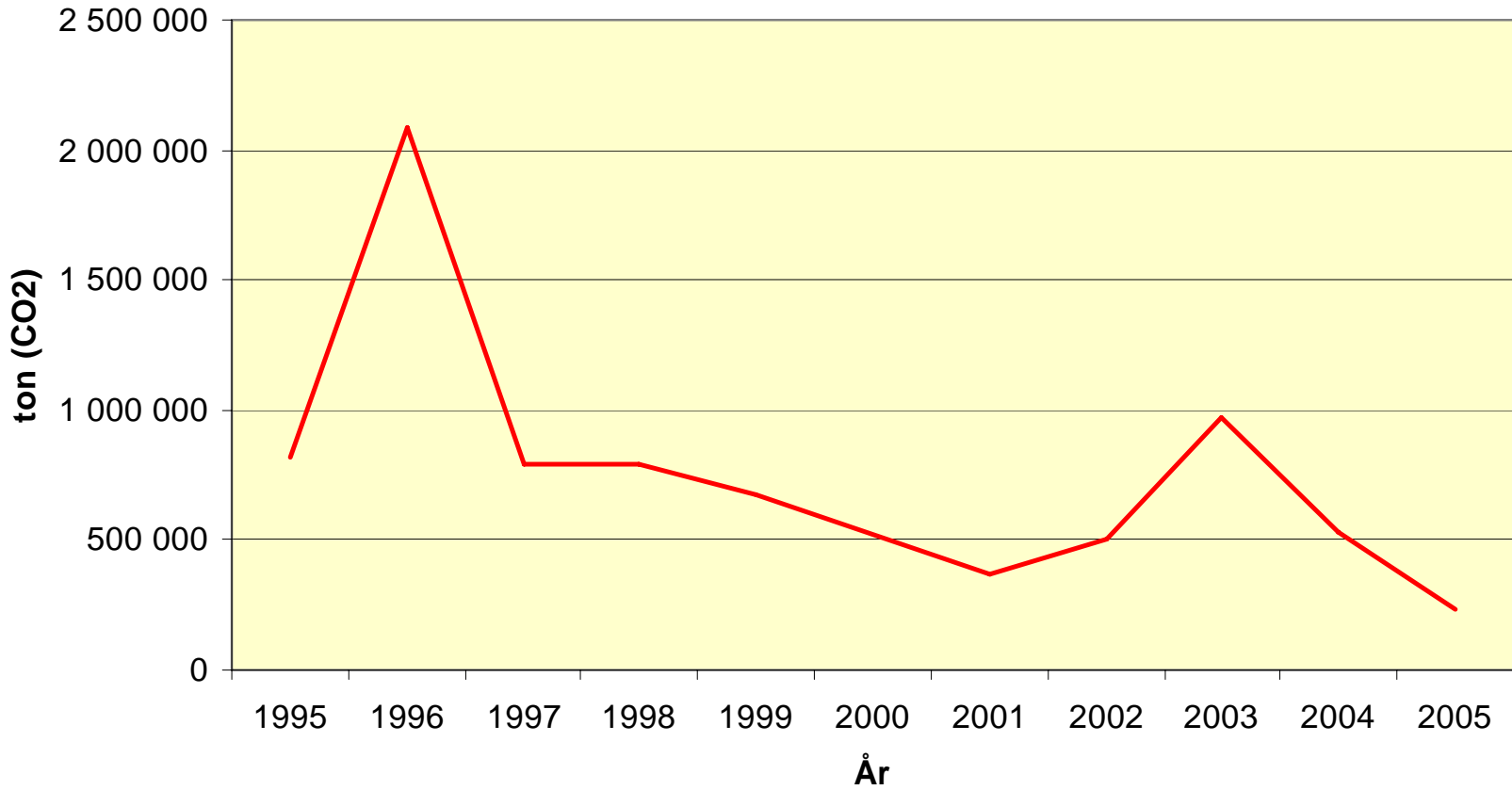
Fuelmix Today (2005)

Fuelmix 2005 - Total Energy 2500 GWh



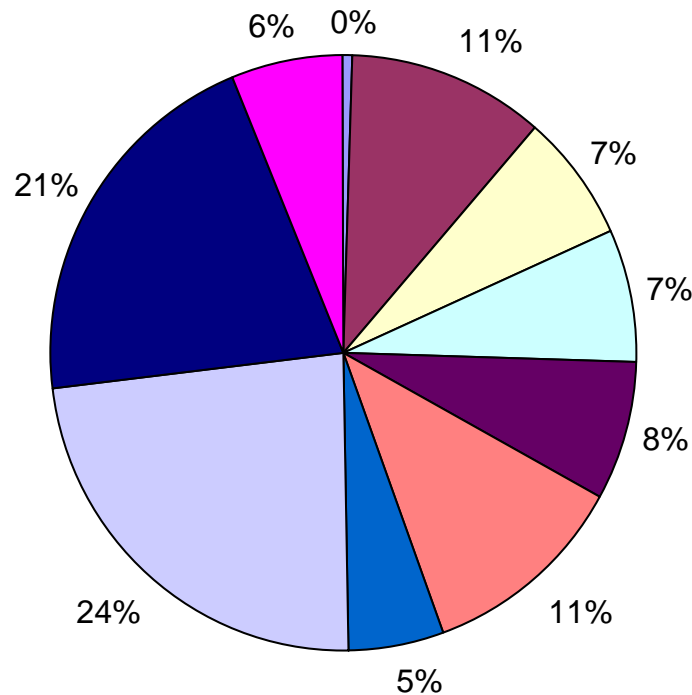
CO2 emission

CO2 (Fosile Fuels)



Fuel mix today (2005) - Biofuel

Totalt 1600 GWh



From oil to Bio mass

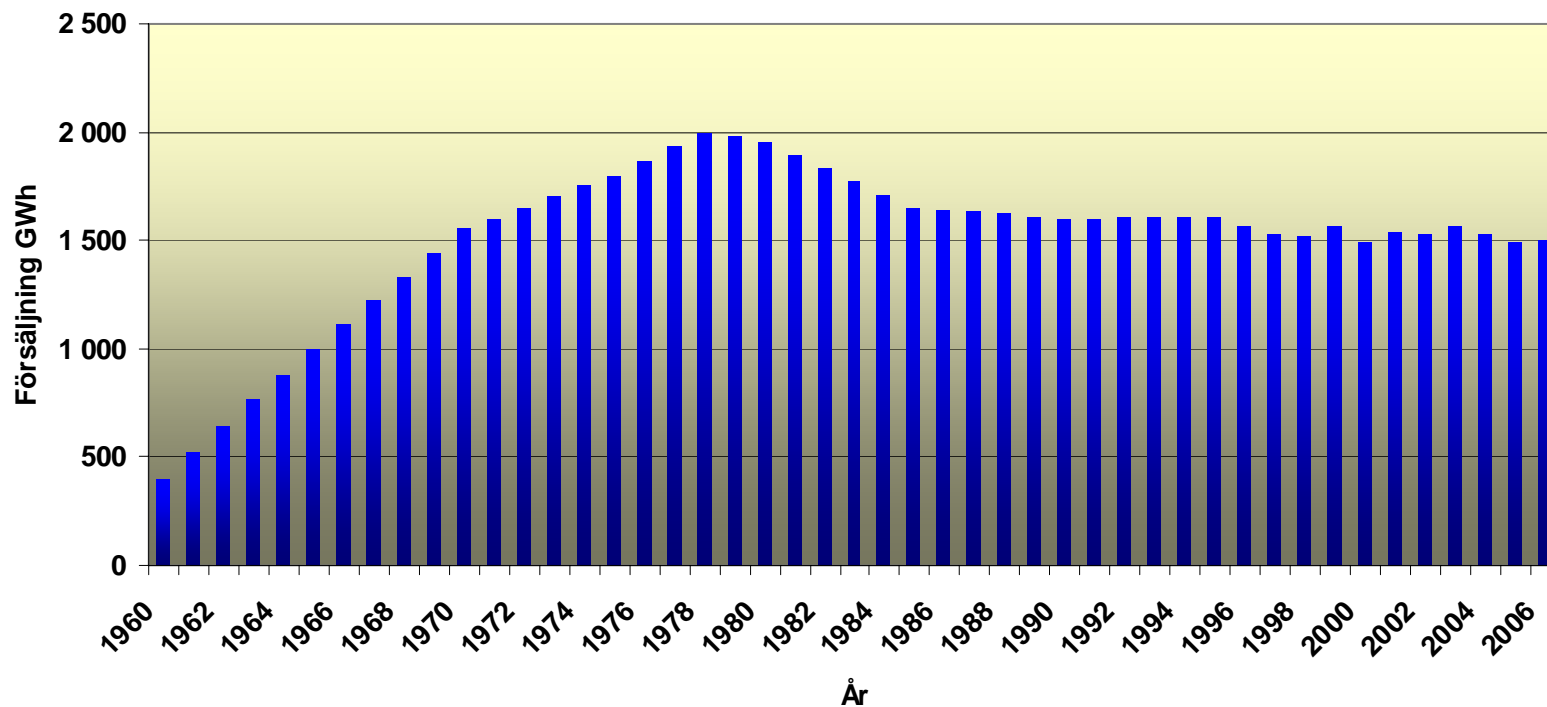
- 2,5 TWh produced by oil
 - 250 000 ton of oil
 - Approx. 60 oil tankers
 - Large storage capacity (in the rock)
- 2,5 TWh produced by bio mass
 - 625 000 ton of bio mass
 - 2 500 000 m³ of bio mass (10 times volume of oil)
 - 125 tankers or
 - 25 000 trucks or
 - a combination

From oil to Bio mass

- A cold winter week
 - Approx 140 GWh
 - 1400 trucks
 - Delivered weekdays, 14 hours
 - 20 trucks / hour
- That is compared to one tanker a week!
- The switch to bio mass is primarily a logistic challenge

Heat consumption in Västerås

Försäljning fjärrvärme Västerås 1960 - 2006



District Heating in Västerås

- Västerås has been very successful in developing district heating
- The district heating has been used to produce electricity with high efficiency
- The power plant has been successful in converting to bio mass
- Heating in Västerås today has a minimum of environmental impact
- The last step will be taken in a few years