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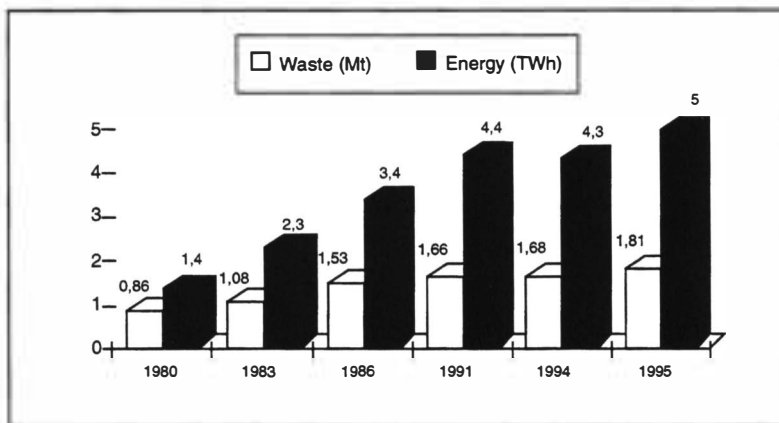
## WASTE INCINERATION IN SWEDEN - PAST AND FUTURE

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### SUMMARY

Today there are 21 energy-from-waste plants with a total of 39 incinerators in operation in Sweden. Statistics for 1995 show that a total of more than 1.8 million tonnes of waste were combusted, and the energy produced amounted to 5 TWh (see diagram below).



*Diagram 1. Quantities of waste incinerated and energy produced at Swedish waste incineration plants in the period 1980–1995.*

The quantity of combusted waste has more than doubled since 1980, and energy production during the same period has almost quadrupled. This is because the

waste has become more energy-rich, but above all it is because energy recovery is more efficient and the proportion of energy lost by cooling has been reduced. Initially the plants were equipped only with a cyclone or electrofilter for cleaning of dust-bound pollutants in the flue gases. Because of stricter environmental requirements, all the plants have been supplemented with advanced cleaning systems which also remove gaseous pollutants from the flue gases. For plant-specific flue-gas cleaning equipment see table 3.2, chapter 3.

A total of 12 plants have also taken measures to reduce NO<sub>x</sub> emissions. Three plants have installed flue-gas recycling, five plants have installed SNCR, and four plants have combined SNCR and flue-gas recycling.

The investments in advanced flue-gas purification systems and equipment for reduction of NO<sub>x</sub> have resulted in heavily reduced emissions from the waste incineration plants (see table 1).

*Table 1. Annual emissions from waste incineration in Sweden 1985, 1991, 1995.*

Substance	Unit	1985	1991	1995	Change 1985-95
Dust	t/year	420	45	27	-94%
Hydrogen chloride	t/year	8400	410	360	-96%
Sulphur oxides	t/year	3400	700	1160	-66%
Nitrogen oxides	t/year	3400	3200	1550	-54%
Mercury	kg/year	3300	170	90	-97%
Cadmium	kg/year	400	35	8	-98%
Lead	kg/year	25000	720	133	-99%
Dioxins	g/year	90	8	2.2	-98%

In 1986, 1.53 million tonnes of waste were incinerated, and energy production amounted to 3.4 TWh. In 1995, 1.81 million tonnes of waste were incinerated and energy production was 5.0 TWh. The last ten-year period of Swedish waste incineration can thus be summed up as follows: Increased quantity of incinerated waste per year (+18%), significantly higher energy production (+47%), and greatly reduced emissions (-54 to -99%).

In environmental terms, energy production from waste is fully comparable to (and in some cases better than) conventional energy production with e.g. oil, coal, and gas. The waste can mostly be classified as bio-fuel, and the energy from the waste can be used efficiently in the Swedish district heating networks.

The view of energy production from waste differs from country to country, however. The EU Commission is working today to draw up new guidelines for the incineration of waste. The working material that has been presented shows that the emission criteria will be much stricter and that they are not at all in pro-

portion to the much higher emission levels permitted for other types of energy plants. This is due to a difference in the basic view of waste incineration. In northern Europe we have a well-developed district heating network and hence greater opportunities and interest as regards the use of waste energy. In the rest of Europe, above all in the southern countries, there is very slight interest in waste energy, so waste incineration plants are mostly viewed as destruction plants; this means that they are not seen as a substitute for other types of energy stations but just as a source of emissions.

If tougher EU criteria are introduced, as per appendix 1, the investment cost for the Swedish waste incineration plants will amount to a total of about SEK 840 million for rebuilding and additions to flue-gas cleaning.