

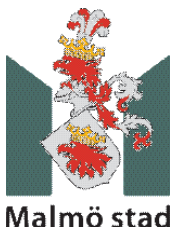


Potential for more efficient energy use in the City of Malmö

A summary

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ENERGIKONTORET SKÅNE



Potential for more efficient energy use in the City of Malmö

Energikontoret Skåne was commissioned by the City of Malmö to carry out an analysis of the potential for more efficient energy use in Malmö. A description of the current situation was drawn up first. Then the potential for energy efficiency enhancements was studied in the industrial, housing and service sectors. This is a summary of the analysis. The complete material is available in the form of a report as part of the support material for the City of Malmö's energy strategy.

Targets for more efficient energy use

The efficiency enhancement target laid down in the City of Malmö's environmental programme for 2003-2008 is to reduce energy use by 10% per capita by 2010 compared with the level in 2000. The proposed efficiency enhancement target for the City of Malmö's energy strategy is to reduce energy use by 20% per capita by 2020 compared with the level in 2000.

Current situation

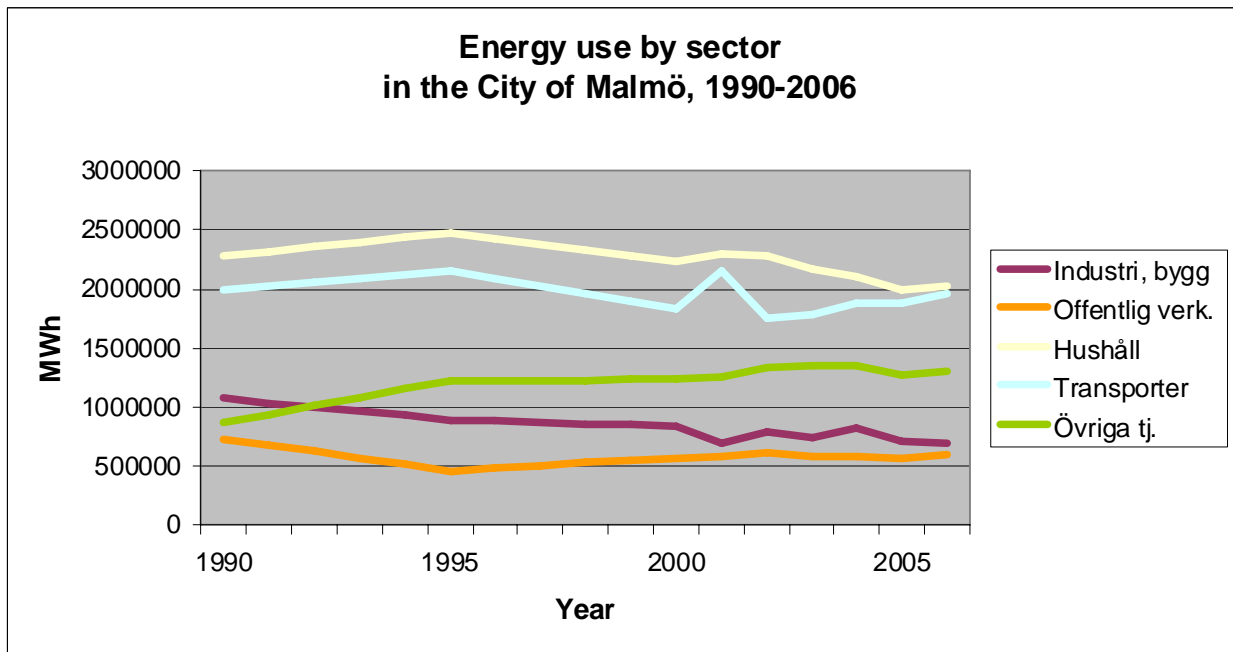


Figure 1. The chart shows the energy used by sector in the City of Malmö for the period 1990-2006. Interpolated values for 1991-1994 and 1996-1999. The sectors are Industry and construction, Public services, Households, Transports and Other services. Source: SCB, 2007 and E.ON 2007

Figure 1 shows energy use by sector. The household and transport sectors are responsible for the highest energy use in the municipality. Together they account for around 60% of total energy use, roughly 30% each. The third largest sector is other services, which includes energy use for private business premises, offices and shops. This sector increased by nearly 50% in the period 1990 - 2006 and accounts for around 20% of total energy use. The industrial sector and the public sector together account for roughly 20% of total energy use, 10% each. Energy use in the agricultural sector is minimal and is therefore not included in the analysis.

Figure 2 on the next page compares energy use per person in Malmö, Skåne and Sweden as a whole in 2004. Malmö stands out in the comparison primarily concerning energy use in the other services sector and the industrial sector. In the other services sector, the City of Malmö has considerably higher energy use per capita and in the industrial sector considerably lower energy use compared with Skåne and Sweden as a whole. In the other sectors the use per capita is relatively evenly distributed.

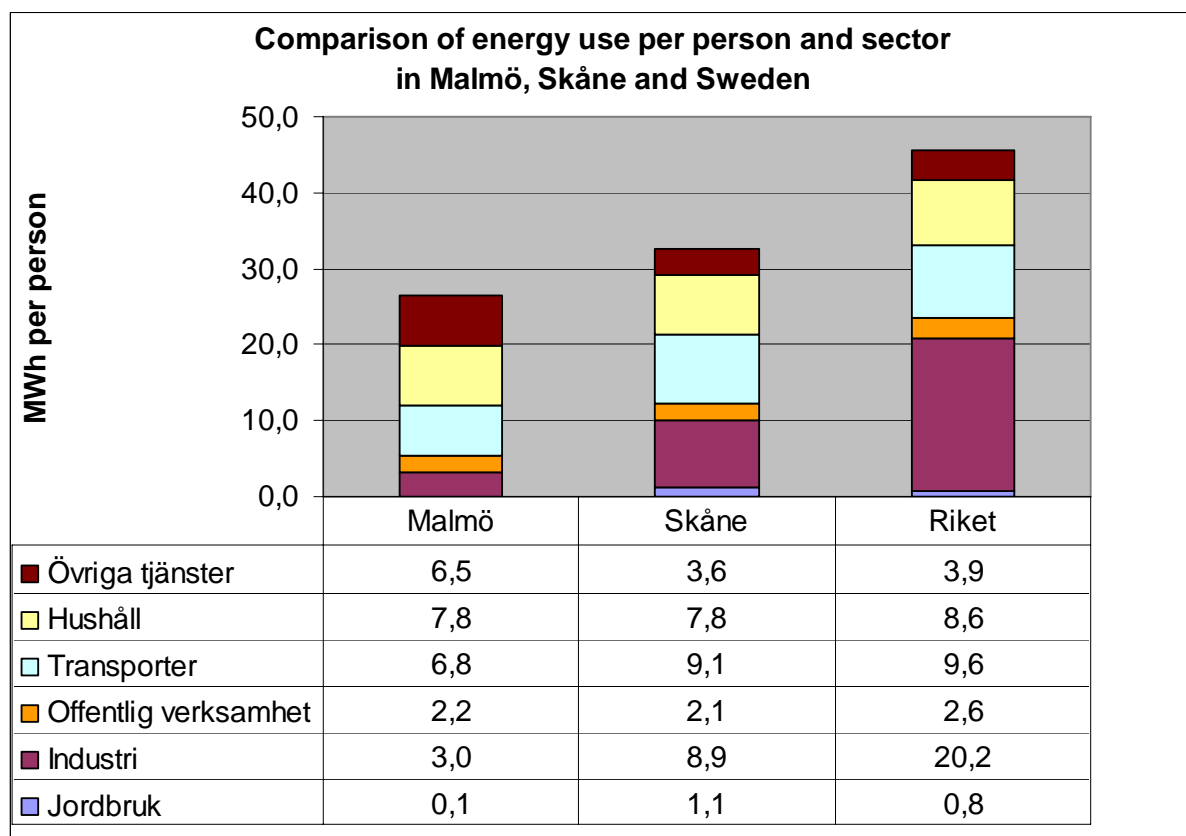


Figure 2. The chart shows energy use per person in MWh per person for the City of Malmö, Skåne and Sweden as a whole in 2004. The sectors are Other services, Households, Transports, Public services, Industry and Agriculture. Source: SCB, 2007

Potential in different sectors

Energy efficiency enhancement potential in the industrial sector in the City of Malmö

With the current data, it is impossible to talk about energy efficiency enhancement in the industrial sector in Malmö in anything other than general terms. Various studies talk about an energy efficiency enhancement potential in small and medium-sized non-energy-intensive industries of between 20% and 40%. For energy-intensive industries, they talk about energy efficiency enhancement potential of 1-2% per annum per unit produced.

Possible action in the City of Malmö:

- Map the industrial sector in respect of industries and energy use.
- Have an energy operator carry out case studies for a selected number of companies representing Malmö's industrial sector in order to make it possible to assess the total energy saving potential in the industrial sector.

- Develop supervisory work by providing information about energy efficiency enhancement on supervisory visits and raising the requirements in the field of energy and transport.
- Intensify energy advice to small and medium-sized enterprises.

Energy efficiency enhancement potential in single-family houses in the City of Malmö

A report from the National Board of Housing, Building and Planning¹ describes an efficiency enhancement range of 18-50% in single-family houses in Sweden. This range can also reasonably be used as an assessment of the savings potential in the City of Malmö. The reason for the breadth of the range is that the potential depends greatly on the level of measures taken. Statistics from the City of Malmö show that 57% of single-family houses were built before 1970. In these single-family houses it is reasonable to assume that there is good potential to work on measures such as additional insulation and replacing windows with better insulated ones. It is difficult to say to what extent this work has already been done and what the exact savings potential is.

Possible action in the City of Malmö:

- Continue to support and intensify municipal energy advice, which is the municipality's best way of reaching out to its residents with information on efficiency enhancement measures at home.
- Provide information, in connection with the processing of building permits, on the possibilities for energy efficiency enhancement when building new single-family houses and converting single-family houses.

Energy efficiency enhancement potential in municipal blocks of flats in the City of Malmö

The City of Malmö owns a municipal housing company, MKB. The total floor area managed is 1.6 million m², of which 157,000 m² is business premises that are let. Since 1993 MKB has reduced energy use, including hot water, by 20%. During 2006 energy use for heating was reduced by 2.5%.

It is estimated that, by optimising operations, MKB can save a further 10% of energy use for heating, excluding hot water, without taking very expensive action. To save further on hot tap water, incentive agreements are required with individual metering of hot water. This is an expensive measure but is estimated to be able to save up to 30% of energy use for hot water. If more expensive action is taken to improve buildings' climate shells, for example additional insulation, heat recovery from ventilation and the installation of energy-efficient windows, a 50% reduction in energy use for heating the buildings is a reasonable assumption.

Possible action in the City of Malmö:

- Continue the already purposeful work to enhance the energy efficiency of blocks of flats.

¹ Piska and Morot, the National Board of Housing, Building and Planning, 2005

Energy efficiency enhancement potential in private blocks of flats in the City of Malmö

43 TWh in total was used in blocks of flats (including certain business premises) in Sweden in 2003. Of this 43 TWh approximately 12 TWh was used for household power and building power, which means that around 31 TWh was used for heating the building and hot water. There are different calculations of the energy efficiency enhancement potential of blocks of flats. According to the National Board of Housing, Building and Planning¹ the energy efficiency enhancement potential is 5.6-14.8 TWh for the heating of the building and hot water. This means an efficiency enhancement potential of 18-48%.

The City of Malmö has approximately 53,000 private rented flats and approximately 48,000 cooperative flats in blocks of flats. No information is currently available on the heated area to which these properties correspond. If the private rented flats and the cooperative flats have a similar area distribution between the number of flats and area as MKB, this means approximately 4 million m² private rented flats and 3.5 million m² cooperative flats.

Possible action in the City of Malmö:

- Hold a dialogue with private property owners on the work to enhance energy efficiency in blocks of flats.

Energy efficiency enhancement potential in business premises in general in the City of Malmö

38 TWh in total was used in business premises in Sweden in 2003. Of this 38 TWh approximately 17.6 TWh were used for operating power, which means that around 20 TWh was used for heating the building and hot water. Using the same reasoning as for the energy potential for single-family houses and blocks of flats, there are different calculations of the energy efficiency enhancement potential of business premises. According to the National Board of Housing, Building and Planning¹ the energy efficiency enhancement potential is 4.5-11.1 TWh for the heating of the building and hot water. This means an efficiency enhancement potential of 22-56%.

Possible action in the City of Malmö:

- Map business premises per area of use (floor area and number).
- Map specific energy use in business premises per area of use.
- Continue the structured efficiency enhancement work in the municipality's properties.
- Continue the work on going through power contracts and energy use in the City of Malmö's districts and administrations according to the "Systematic energy efficiency enhancement in the City of Malmö's districts" model.
- Consider starting an energy group with representatives of trade organisations in the various areas of use of business premises to discuss energy issues and energy efficiency enhancements.

Household power, building power and operating power

Household power in homes is used primarily for lights, household appliances and home electronics. Building power in blocks of flats is used primarily for lights, ventilation and laundry equipment. In business premises energy is sometimes also used for purposes such as air conditioning and food refrigeration. According to the National Board of Housing, Building and Planning, the efficiency enhancement potential in Sweden is assessed as being

12-24% of the total use of power for these purposes. The majority of the savings can be achieved by switching to more efficient appliances and lighting in households.

Services

Efficiency enhancement potential for lighting in the City of Malmö

Street lighting

Work is continuing to replace the last few per cent of mercury lamps with new lamps containing high-pressure sodium. Work is also in progress to replace the first generation of sodium lamps with new, more energy-efficient sodium lamps. These two measures reduce energy use by a maximum of a few per cent, according to the streets department.

Regarding the dimming of street lights, there is information to suggest a reduction of energy use of 30% in lighting coils that are dimmed. The streets department does not have all the results from its pilot studies but is doubtful that the saving is as high as 30%.

The major efficiency enhancement potential lies in LED lamps for street lighting. The technology in this area is being developed and not yet widely commercially available. It is difficult at present to talk about savings in terms of per cent. However, if the technology becomes applicable and commercially available for street lighting, the savings potential is high.

Possible action for the City of Malmö:

- Continue the work commenced on dimming.
- Follow developments on LED lamps for street lighting and create test areas with LED lighting.

Traffic lights

In September 2007, 80 out of 106 traffic light systems had LED lights. In January 2009, all traffic light systems are expected to have LED lights and will then consume approximately 375 MWh. When all traffic lights have been changed, there will be no future efficiency enhancement potential for traffic lights as technology stands today.

Efficiency enhancement potential for sewage treatment plants in the City of Malmö

An examination thesis recently investigated how efficiency enhancement work in connection with sewage treatment plants in Malmö could be carried out. A better structure for energy measurements and following them up is desirable in order to work in an efficient manner, according to the authors of the report. In brief, the potential can be summarised as follows. The processes that use the most energy are also the processes which have the greatest potential for saving energy. At the sewage treatment plants at Sjölanda and Klagshamn this involves compressors that are used to aerate the sewage and pumps for elevating the sewage. No specific potential is mentioned for the plants at Sjölanda and Klagshamn. However, reference is made to reports in which the general savings potential is 10-30% of energy use if structured efficiency enhancement work is implemented at sewage treatment plants.

Possible action for the City of Malmö:

- Make use of the conclusions in the report on the potential for energy efficiency enhancements at sewage treatment plants and structure conscious energy efficiency enhancement work.

Efficiency enhancement potential for waterworks in the City of Malmö

The current operations manager is unaware of any organised energy efficiency enhancement work having been carried out in the past. Initially, an efficiency enhancement potential study would need to be carried out and action would then be taken accordingly. In general, it can be said that the majority of pumps are used to convey water and looking at their efficiency enhancement potential would be interesting. The operations manager stresses that efficiency enhancements must not jeopardise the safety or quality of the drinking water.

Possible action for the City of Malmö:

- Structure conscious work on energy enhancements in the waterworks.

Efficiency enhancement potential for the transport sector in the City of Malmö

Contact has been established with the streets department for help to estimate the efficiency enhancement potential in the transport sector. The potential is estimated at 15-30% by 2020.

Conclusions

On the basis of the current data, it is difficult to draw a specific conclusion for the exact total efficiency enhancement potential in the City of Malmö. In relation to the base year 2000, the energy saving per capita was 6.4% by 2006. By means of purposeful efficiency enhancement work, the potential for achieving the target of a reduction of energy use per capita of 20% by 2020 is regarded as realistic. In a calculation of the efficiency enhancement potential in the municipality using the general saving potential for Sweden as a whole, the potential was found to be 17-41% for the City of Malmö.

The operators with whom it is particularly important to develop a partnership to achieve the target set are private owners of business premises and blocks of flats and the industrial sector. Via municipal energy advice, the municipality has an excellent tool for reaching out to owners of single-family houses and encouraging them to make further energy efficiency enhancements. Regarding the transport sector, the municipality has a separate transport programme covering energy efficiency enhancements, among other things.

The City of Malmö carries out serious, purposeful efficiency enhancement work in several activities. It is important for this work to continue and for experience to be spread and shared with other operators in the municipality.