

The energy statistics of the Norwegian building network

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Abstract

The Norwegian building networks was established in 1996. The goal of the program has been to promote rational use of energy within the tertiary building sector in Norway. From 1996 until 2003 owners of the buildings which participated in the network have yearly reported primary energy use and other relevant data for monitoring, benchmarking and evaluation of energy use in the buildings which participates in the network. The statistics contains data about the buildings, like the size of heated area, technical installations, activity data and structural data.

The energy statistics of the Norwegian building network for 2003 contains data from 1 535 approved buildings. These buildings have in total a heated area equal to 8.4 million square meters and a total energy use of 2.3 TWh. The buildings consist then of about 6.3 percent of the total energy use in the tertiary building sector in Norway.

In this paper we present the main findings in the energy statistics from 2003. The paper presents stationary energy use in the buildings as the total delivered energy to the buildings per year. The energy use will include these types of end uses: Heating, ventilation, hot water, lighting, energy used in machinery and other equipment. The total delivered energy is not corrected for the efficiency of the various installations in the buildings. The changes in energy use from year to year in the period is described and explained by climate variations, changes in use, changes in heating system, activity data and the age of the buildings. The Norwe-

gian building network database contains unique information about energy use in the tertiary building sector in Norway.

Introduction

Since 1996, the Norwegian Building Network has been built up by building owners who have agreed to reduce their energy consumption by performing a range of activities in a network process. The network process lasts for between two and two-and-a-half years, and the building owners must commit themselves to reduce their energy consumption by at least 10 percent. Financial support is not primarily directed towards investments, but for activities that raise awareness of energy consumption at all levels of the company. Typical activities include energy management, energy auditing, training and consumer information.

The Building Network for 2003 consisted of information about 1 532 buildings to the central database maintained by Enova SF. About 64 percent of the buildings are in the public sector, while the remainder are privately owned. Figure 1 shows the distribution of public and private buildings in the Building Network statistics for 2003.

Since 2000, all buildings that join the Building Network have had their energy use measured before and after the network process. Starting in 2002, incentive agreements have been set up in order to relate the payment of support funds to the achievement of specific targets.

In 2004 the Norwegian Building Network was evaluated (ECON, 2004). The database and the statistics from Building Network was a basis for the evaluation. The results from the evaluation showed that the network process has been a successful measure, even though the hypothesis of a 10 per-

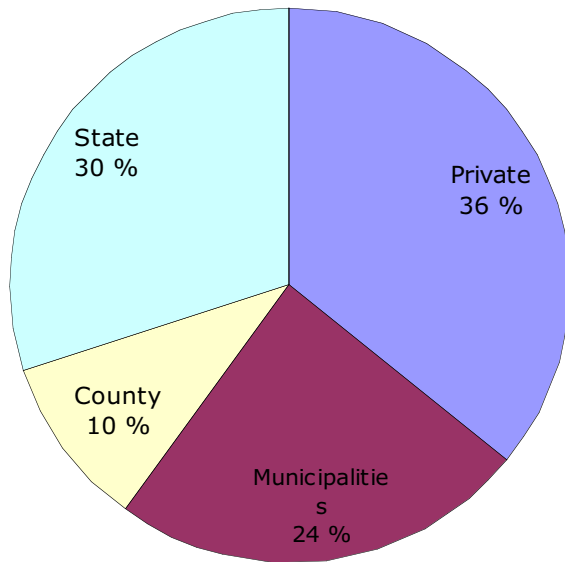


Figure 1. Shares of public (municipalities, counties and state) and private buildings (the shares are related to the total number of buildings) in the Building Network statistics for 2003.

cent reduction of energy use in the buildings could not be completely verified from the evaluation. Figure 2 shows the verified average percentage energy savings for buildings in the network, which accumulated to about 7 percent energy saving about five years after project initiation, with basis in the energy use the first year of the project initiation. The measures that have been made are among others: energy audits, energy surveys systems, training, consumer information. According to the statistics of 2003 (Enova, 2004:1) there has been done larger investments in energy efficiency in 22 percent of the buildings participating in the statistics.

Energy statistics for individual building categories

The establishment of the Building Network made it possible to collect energy statistics from the various buildings participating in the network. Building owners who become members of the Building Network agree to report the energy consumption of a range of buildings for five years through a contractual agreement. The sample of buildings participation in the network is not random; thus the figures that emerge from the statistics cannot simply be extrapolated to the total Norwegian building mass. For the building categories that include the largest number of individual buildings the average figures are more representative than for the other categories.

Figure 3 shows the climate corrected energy use per heated floor area for a selection of building categories by. We can see that commercial buildings have by far the highest energy consumption, while schools have the lowest consumption of the non-domestic buildings.

The statistics are based on the following criteria:

- Energy use is measured as total delivered energy to a building in a year. The energy use is thus not corrected for efficiency losses in installations etc.
- Area is measured as heated area according to Norwegian Standard NS 3940
- Building categories are defined according to NS 3457
- Climatic corrections are applied with respect to a normal year according to the methodology of Statistics Norway

The statistics have become an essential tool for many actors in the building industry and authorities:

- Building owners use them in benchmarking their buildings
- Technical consultants use them in planning new buildings
- Energy companies use the statistics when making estimates of the power requirements of new installations, etc.

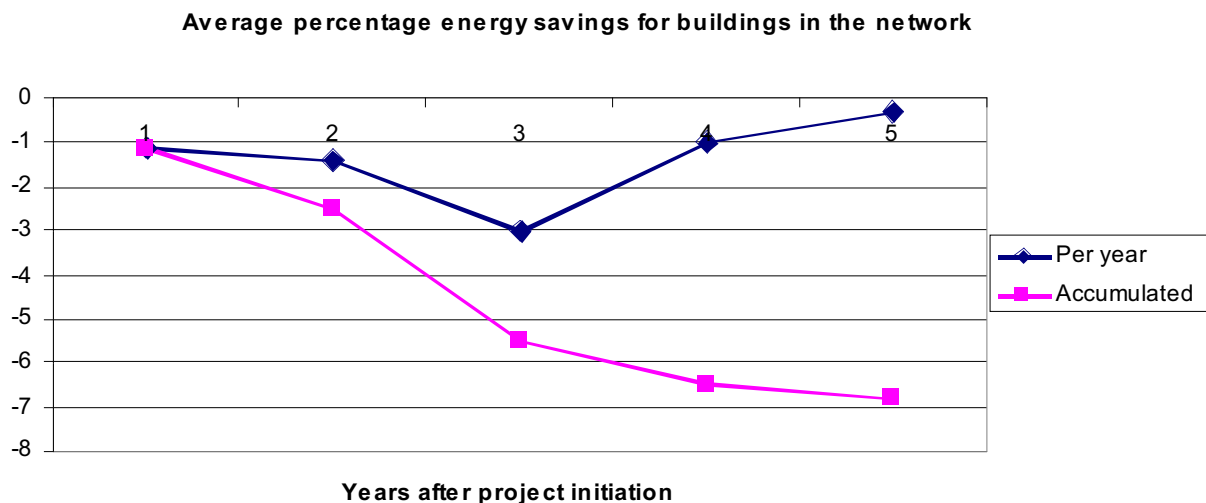


Figure 2. Results from an evaluation of the energy networks program (Econ, 2004).

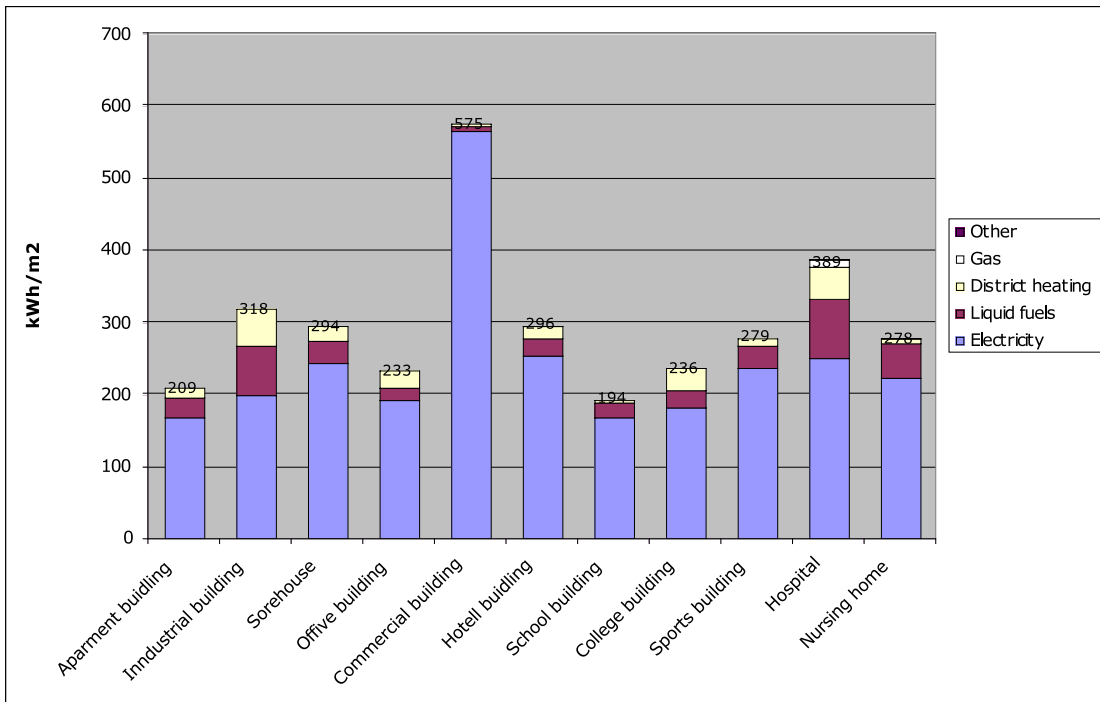


Figure 3. Climate corrected energy use per heated floor area for a selection of building types in 2003.

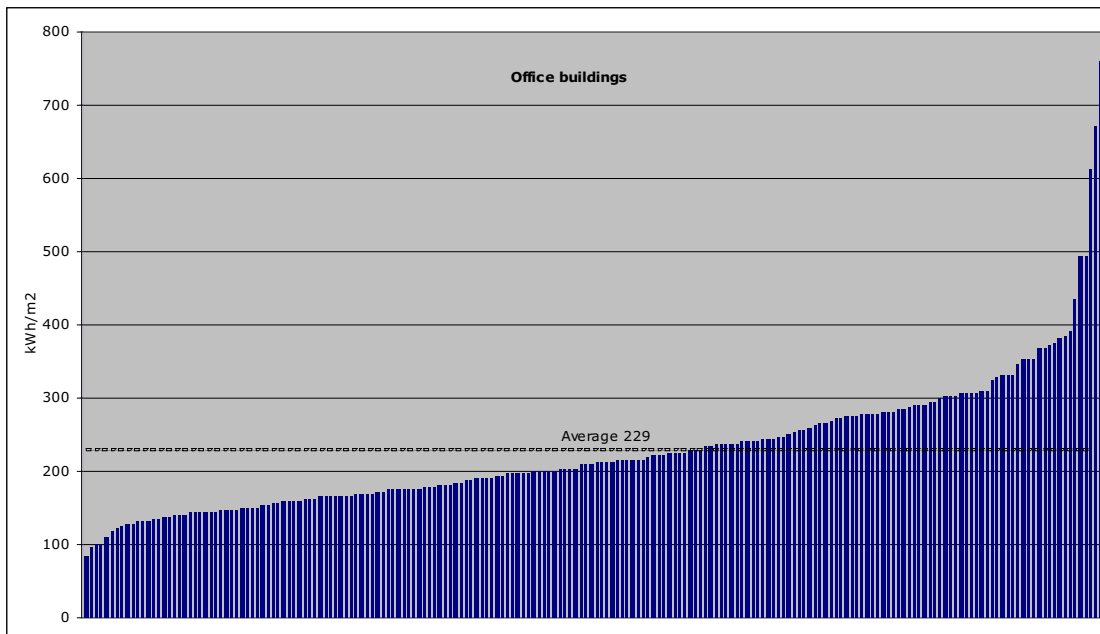


Figure 4. Distribution of climate corrected energy use per heated floor area in office buildings in 2003.

Figure 4 shows the distribution of climate corrected energy use per heated floor area in office buildings in 2003. Even though the data are not corrected for the activities in the various buildings it is likely that there is still a potential for energy efficiency in a number of the office buildings participation in the Building Networks.

The energy statistics can also give a detailed picture of changes in energy use from year to year. Figure 5 shows the changes in electricity share and share of liquid fuels from 2002 to 2003. The total sum is not 100 percent since some

buildings also use other types of fuels like bio fuels or even coal.

Conclusions

The Building network statistics is an important tool for both dissemination of the results from the program as well as in evaluation of the energy results from the program. The Building Network has shown results; the verified average percentage energy savings for buildings in the network has

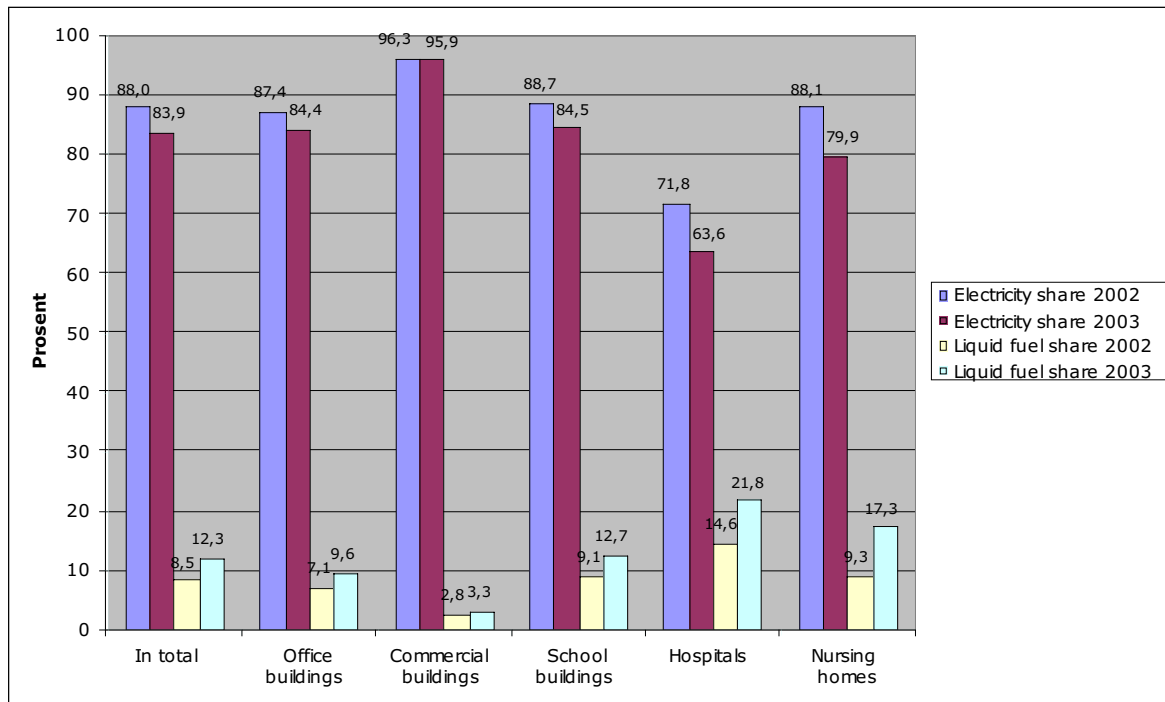


Figure 5: Changes in electricity share and share of liquid fuels from 2002 to 2003.

been evaluated. The evaluation showed about 7 percent energy saving about five years after project initiation, with basis in the energy use the first year of the project initiation.

The content of this executive summary has shown a sample of figures from the 2003 version of the Building Networks statistics. The figures are shown in this summary gives a brief introduction to some of the content of a poster presentation of the Building Network statistics.

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