
Evaluation of Energy Checks in Small- and Medium Sized Enterprises in Sweden

KanEnergi Sweden AB

ENGINE

Sweden has taken part in a European energy program, ENGINE, with the main goal of lowering the energy use in small and medium sized enterprises (SME). This has been done by completing 14 energy checks in Swedish SMEs as well as educating the key personal within these enterprises.

The enterprises that energy checks were preformed at belong to the metal fabrication, automotive supply industries, as well as similar types of production industries.

The total amount of energy used by the companies in Sweden that participated in the ENGINE program is **45 GWH/year**.

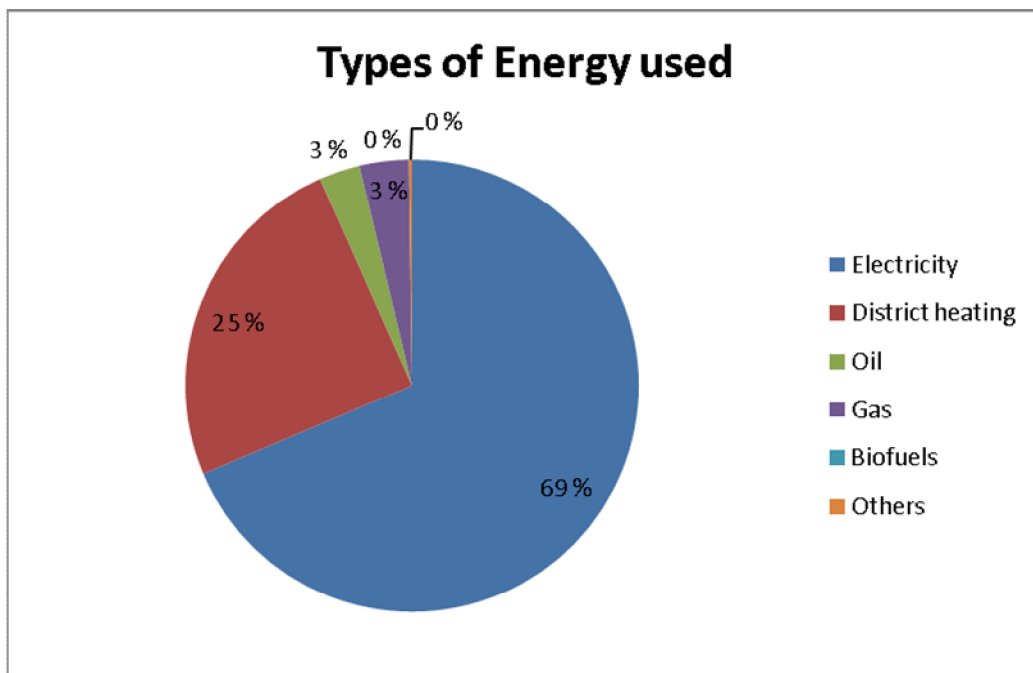


Figure 1

Annual Key Figures:

The average amount of energy used compared to the turnover is **221 MWh/MEuro**.

The average amount of energy used compared to the amount of employees is **55 MWh/employee**.

The average amount of energy used compared to the size of the enterprise is **459 kWh/m²**.

The average amount of proposed energy saving measures is **26 %** for all the companies in Sweden.

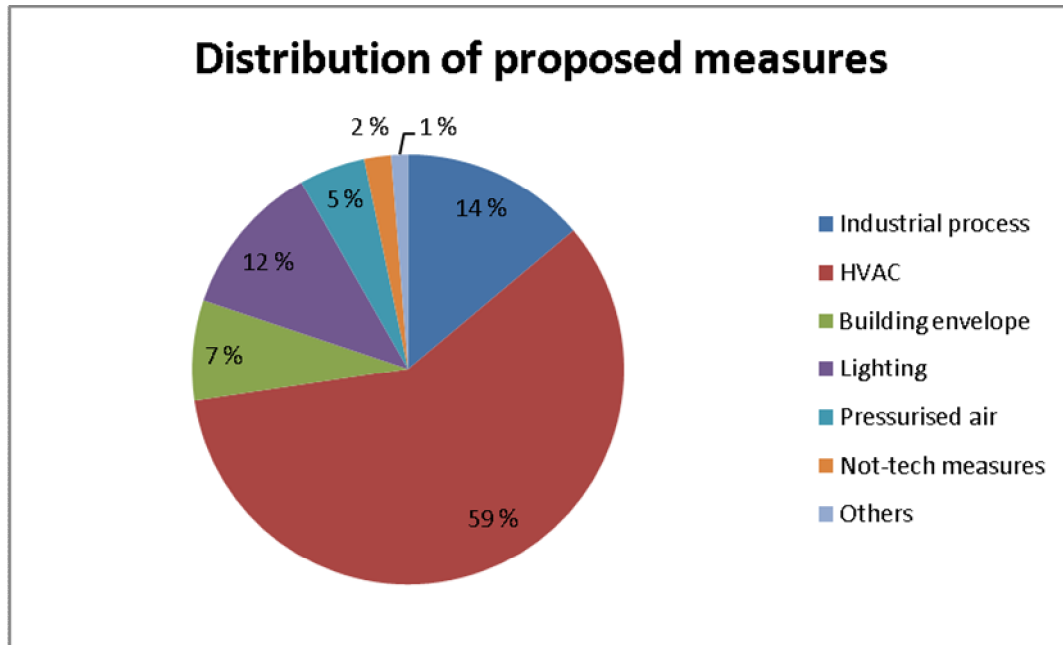


Figure 2

In Sweden the heating, ventilation and air-conditioning (HVAC) area of energy use stands for the majority of recommended energy efficiency measures (see figure 2). There are several reasons why the HVAC has the highest energy efficiency potential:

- Sweden is a Nordic country with long and cold winters. If a building is ventilated too much or the operating hours do not correspond with the actual production hours, a lot of energy can be lost to no value. If the ventilation is on when it is not needed not only do the fans use electricity but the ventilation transfers the heat from inside of the building to the outside. This results in large heat losses and the buildings heating system ultimately ends up heating the outside air. This heat and electricity loss can be minimized by making sure working heat exchangers are used and that the operating hours are adjusted to the actual needs.
- During the winter there is usually a lower demand for ventilation due to the large density difference between the outside and the inside air. This enables the use of half speed operation of the ventilation system (most systems have built in half speed possibility). This saves electricity as well as the demand for heat.
- Sweden has historically had low energy prices which have resulted in neglected HVAC systems. Thus the motors in the ventilation system might be old and inefficient and the buildings might be over ventilated. This can be changed by installing new motors and fans or installing frequency converters so that the fan motors can be adjusted in speed to an appropriate level.
- There are often control systems in place but they are not used properly or at all. The ventilation might be controlled by incorrect placed thermostats. The incoming air might be heated or cooled to inappropriate temperatures. As mentioned earlier, the operating hours do

not correspond to the actual need. Optimizing the HVAC with the help of the control systems can be very effective compared to the time and cost needed to do so.

- Excess heat from the production (e.g. heat from production machines, heat from air compressors, ovens, etc.) can be used to preheat the incoming air in the ventilation system or moved to a different part of the building where heat is needed.

The industrial processes are also an area where there is usually energy to be saved. However, this area is harder to define and generalise because each company has their own unique process. Compared to the building support systems (HVAC, lighting and compressed air) where the differences between the enterprises is usually minimal. The industrial processes are usually hard to energy improve because the machines in the processes are often expensive and advanced machines where one can not change aspects like the energy use. The common areas that there is potential for saving energy is reusing heat from the machines or making sure they are completely turned off when they are not used.

A third area where there is saving potential is the lighting system. In most cases the industries had T8 fluorescent lights or old ineffective mercury lighting. There are better lighting alternatives on the market and the enterprises usually save money by changing their old ineffective lights towards newer more efficient ones. In many cases their was no sectioning of the lighting, which means the lights would be turned on in the whole factory when there is only a need to illuminate a small portion of the production hall. This can be improved by drawing new wires and dividing the light system in to different sections. Dimmers and motion detectors are also a good way to save energy.

October 2007 – March 2010

ENGINE

Energy Efficiency in SME

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