

## SmartGrid – An energy efficient way of living

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If we want to replace the use of fossil fuels with sustainable energy, we have to continue to meet the energy demands of the consumers. One way of doing this is to optimize and control the energy consumption in each household, so that the total consumption is as even as possible during the whole day. The question is, whether it is probable that an average household will be able to redistribute their energy consumption enough for it to have a notable effect on the total energy consumption.

SmartGrid is the energy companies' solution to power shortage. It's an easy way for the supplier to control the energy consumption for a private household. It enables the companies to raise the price of energy when the demand is great and lower the prices during the night when the total consumption is less. Because the consumption is much greater during the morning and evening, it forces the suppliers to make sure there's no energy shortage by increasing the amount of energy made from fossil fuels.

Our project focuses on the advantages of SmartGrid for a normal household with a heat pump. Using MatLab we will model the heat flow in an average house equipped with a heat pump. We will look at the water flow in connection to underfloor heating and strive to control the heat pump, so that it will take advantage of the low energy prices during the night. Our goal is to be able to control the heat pump in a way that allows the household to maintain a comfortable room temperature.

We are hoping to lower the consumption peaks by shutting of the heat pump during these periods of time. This will smooth the peaks out and thereby decrease the total energy demand during these hours. Hopefully this will allow the energy companies to produce less energy from coal power plants and thereby reduce the amount of energy from fossil fuels.