27%
Reduced energy

38%
Renewable energy

Kløver-/Hvedemarken

Old housing area demonstrates how to meet new EU standards

PROJECT ZERO
SONDERBORG

Engaged residents and energy renovation have reduced both CO_2 emissions and energy bills

Heating and cooling in industry and buildings account for nearly 50% of EU's energy consumption. 75% of the European building stock is energy-inefficient, presenting significant potential for energy renovations.

Built in the late 1960s, the neighborhood Kløver-/Hvedemarken in Sønderborg could have been just one of these potentials.

But since 2003, the blocks have undergone an ongoing energy renovation to reduce heat consumption, lower energy costs, and improve indoor climate comfort – contributing to greater efficiency, lower emissions, and more affordable living.

One of the remarkable results is a reduction in heat consumption by 27%, with a potential to reach 31% once fully implemented across all buildings.

Kløver-/Hvedemarken showcases how modern technologies can upgrade older buildings to meet today's challenges – positioning it as a frontrunner in achieving new EU targets to reduce energy consumption in existing buildings by 20% by 2035.

About Kløver-/Hvedemarken

Kløver-/Hvedemarken is a social housing area that has served as a testbed for energy-saving initiatives as part of Sønderborg's ambition for a CO_2-neutral energy system by 2029.

The neighborhood was built in the late 1960s and has 432 apartments in 19 blocks.

Kløver-/Hvedemarken is run by Sønderborg Andelsboligforening.

Watch the case video

Smarter district heating for a greener future

The area was equipped with district heating from the very beginning. In 2003 the district heating was mainly produced on waste and natural gas, but today it is one of the most climate-friendly heat supplies in Sønderborg – aiming to become CO_2-neutral by 2029.

Over the years, several projects in Kløver-/Hvedemarken have been successfully implemented to lower the energy use and the heating expenses.

In 2003, the heating system was upgraded from a single-pipe to a more efficient two-pipe system, lowering return temperatures, improving overall efficiency, and reducing heat loss across the network.

18 years later, an intelligent heating system was introduced to further optimize the use of district heating. By utilizing data from sources such as building models, weather forecasts, and real-time system measurements, the system enhances solar radiation use and prevents excessive temperatures, ultimately improving energy efficiency and the indoor climate for the residents.

27% reduced energy

Reduction in heat consumption

- Intelligent district heating system
- Lower return temperature
- Energy-efficient windows and doors
- 300 mm attic insulation
- Insulation of facades
- Residents trained in optimal use of thermostats

38% renewable energy

Solar energy provides 38% of the residents' electricity needs

- Solar panels on roof
- Batteries
- Intelligent battery management

Efficient buildings make comfortable homes

Energy renovation is key to improving energy efficiency in old buildings, and Kløver-/Hvedemarken is no exception.

In Kløver-/Hvedemarken, improved insulation accounts for more than half of the total reduction in heat consumption. The housing area has undergone two major insulation upgrades. Back in 2003, attic insulation was increased using stone wool, and during 2010, the building facades were renovated with extra stone wool insulation before rebuilding with yellow soft-molded bricks.

Additionally, windows and exterior doors have been replaced with energy-efficient models, further enhancing insulation and reducing heat loss. This not only saves energy but also improves comfort for residents.

The new windows and doors prevent cold drafts indoors and offer better soundproofing. As one resident with an apartment facing the street exclaimed after the installation, "Where did all the noise go?"

The sun covers 38% of the residents' electricity needs

On the rooftops of each building in Kløver-/Hvedemarken, you will find solar panels. These panels were installed in 2017, and a few years later, batteries were added, making it possible to store excess solar energy during peak production. Combined, they provide 38% of the residents' electricity needs.

In 2024, intelligent battery management was introduced in two blocks, featuring a system that gathers data on variable electricity prices, tariffs, weather conditions, and consumption patterns. Using this data, an optimal production profile is generated every hour to determine whether the battery should be charged or discharged, whether solar energy should be used directly in the building, or if it should be sold to the grid.

Resident engagement is key

Active resident involvement and democratic participation are key to successfully implementing changes in a housing area. To support this, Sønderborg Andelsboligforening has introduced Green Ambassadors – residents who inspire and motivate their neighbors to adopt more sustainable habits.

By engaging and educating residents, the initiative not only strengthens community cohesion and openness to renovations but also leads to notable energy savings. In Kløver-/Hvedemarken, residents have been trained to monitor their electricity and heating consumption using apps, maintain consistent radiator settings, and optimize appliance use - such as running washing machines and dishwashers during off-peak hours.

Since 2003, annual electricity consumption in Kløver-/Hvedemarken has decreased by 5%.

Resident engagement creates real impact:

- Green Ambassadors inspire sustainable habits
- Residents trained in energy monitoring and smart use
- 5% drop in electricity use since 2003
- Strengthened community and international interest

About ProjectZero

ProjectZero is a public-private partnership between Sønderborg Municipality and the Bitten & Mads Clausen's Foundation dedicated to making Sønderborg's energy system carbon-neutral by 2029. We also aim to inspire other cities to take on their green transition for a stronger positive impact on our climate.

In Sønderborg, citizens, organizations, businesses, utility companies and the municipality work strategically together in a public-private partnership to find local solutions to the global climate challenge.

Since 2007, energy-related carbon emissions have been reduced by 79% and the municipality is on track to deliver on their 2029 target of a carbon neutral energy system.

ProjectZero is anchored in the ProjectZero office, where a small team of employees coordinates and monitors the journey towards zero and brings together the right people, ideas and projects.

Our recipe for a green transition not only has the potential to solve the climate challenge in Sønderborg. It can be used all over the world. We want to show other cities the way and inspire them to create their own transformation. Every year, we welcome decision makers and journalists from all over the world, who want to know more about our road to carbon neutrality.

Do you want to know more or plan for a visit?
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