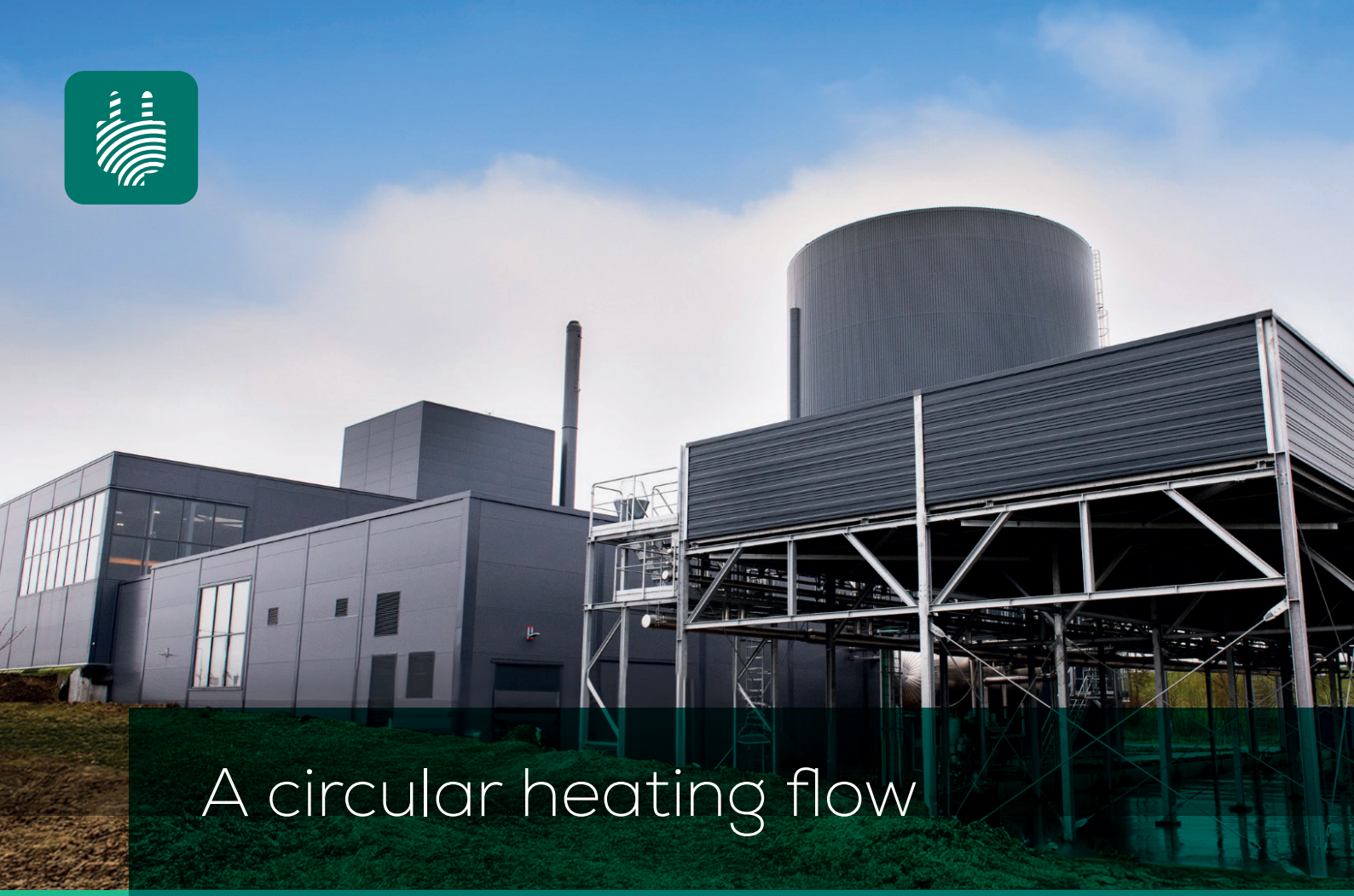
68%
CO_2-reduction

75%
Renewable energy

Sønderborg district heating

District heating – the heart of an integrated energy system

PROJECT ZERO
SONDERBORG



A circular heating flow

Across the Sønderborg area, district heating pipes form an underground web, weaving the community together through a variety of green energy sources.

Large-scale heat pumps, biomass plants, and excess heat from supermarkets, waste incineration, and even the hospital all contribute to this shared system.

By circulating and sharing energy in this way, Sønderborg reduces waste, lowers fossil fuel dependence, and provides citizens with a reliable and low-carbon heating supply.

Due to the local utility companies' efforts to replace fossil fuels with greener sources, CO_2 emissions from district heating in Sønderborg are 68% lower today than in 2007.

What is district heating?

District heating systems work by producing hot water from various plants and excess heat sources, which is then distributed through insulated pipes to connected buildings. The heat is then used for indoor heating and tap water before the cooled water is returned to the plant to be reheated.

This system utilizes multiple renewable energy sources and excess heat from data centers, supermarkets, local businesses and so on, making district heating more reliable and economically secure.

Watch the case video

On the path to CO_2-neutral heating

Since 2007, the total CO_2 emissions from district heating in Sønderborg have dropped 68%, driven primarily by a dramatic decline in natural gas use.

Today, district heating is supplied by using a diverse mix of energy sources like solar heat power, heat pumps, and excess heat from industry. On top of that, heat is generated from waste incineration and biomass, namely straw from Danish farmers, and wood chips and pellets from the surrounding region. Natural gas now accounts for less than 10% and is used only during peak demand to secure supply and keep costs down.

As a result, a resident in Sønderborg heating a 125 m^2 home with district heating now produces just 361 kg of CO_2 each year – 87% less than the 2,900 kg emitted by a gas boiler.

Looking ahead, plans are in place to phase out gas completely. Over the coming years, new large-scale heat pumps and an electric boiler will be added to the system, and before long, Sønderborg's citizens will enjoy 100% green heating.

68% CO_2-reduction

CO_2 emissions from Sønderborg's district heating have been reduced by 68% since 2007, primarily by replacing natural gas with renewable energy sources.

75% renewable energy

Renewable sources now account for 75% of Sønderborg's district heating energy mix. New heat pumps and electric boilers will bring the system to 100% within the next few years.

Excess heat is good business

Imagine making a cup of tea. As the water boils, steam rises and escapes into the air. Now picture capturing that steam, using it to heat another batch of water, storing it, and then piping it into your radiator on a cold day. Just like that, you've warmed your home without digging up any fossil fuels adding no additional CO_2 to the atmosphere.

That's exactly how excess heat works in a district heating system – you capture something that would otherwise be lost and turn it into a valuable resource.

A supermarket keeping its food cool, a hospital running an MR scanner, or a brick factory firing bricks at high temperatures – all these processes generate excess heat. Ideally, this heat is first utilized within the company, and any surplus is then sent into the district heating network to provide warmth for homes, offices, and public buildings.

For businesses located within the district heating area, this offers a valuable opportunity to cut CO_2 emissions, strengthen their green profile, and create a strong business case through energy savings.

Collaboration drives expansion

Five villages in the Sønderborg area have never had district heating. A project called Ledning Vest is changing that. Citizens, businesses and the local utility company have joined forces to expand the network to potentially 1,600 households, as well as the large slaughterhouse Danish Crown.

A central element of the project is a new electric heat pump which, in combination with a large water tank, demonstrates how modern district heating not only supplies heat but also helps stabilize the electricity system.

The water tank functions as a giant heat battery: when there is plenty of green electricity in the grid from solar and wind, the heat pump heats the water and stores it in the tank. When weather conditions change, the stored heat can be fed directly into the district heating network.

Ledning Vest is built on close collaboration and mutual trust among all parties involved.

The project demonstrates how district heating can be rolled out locally to strengthen energy security, support power grid stability and provide reliable heat for residents.

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?
Visit our website or contact us at
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