PROCESS INDUSTRY & DISTRICT HEATING

INTREPIDH

A new type of collaboration across sectors can make the green transition in Europe more affordable

- Understanding its huge potential for Europe
- Challenges and recommendations
- Learning from best practices: 12 case studies across Europe lead the way

FOREWORD

Answering Challenges with Collaboration across Sectors – Foreword by INTREPIDH Project Partners

October 2025, Version 1

The **process industry sector** in Europe is under pressure and needs to make an affordable, sustainable transition. Solutions based on electrification, biomass, or biogas can solve some of the demands, but the industrial sector is looking for more attractive solutions.

The **heating sector** is likewise facing a significant transformation. European countries are looking to establish, expand, or modernise district heating and make it the primary infrastructure for supplying affordable and sustainable heating for buildings in urban areas.

Process heat based on district heating has the potential to supply a significant amount of carbon-neutral heat to the process industry, replacing heat produced from fossil fuels. **The co-transition of the process industry and the heating sector holds significant win-win potentials.**

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WHAT IS PROCESS HEAT BASED ON DISTRICT HEATING?

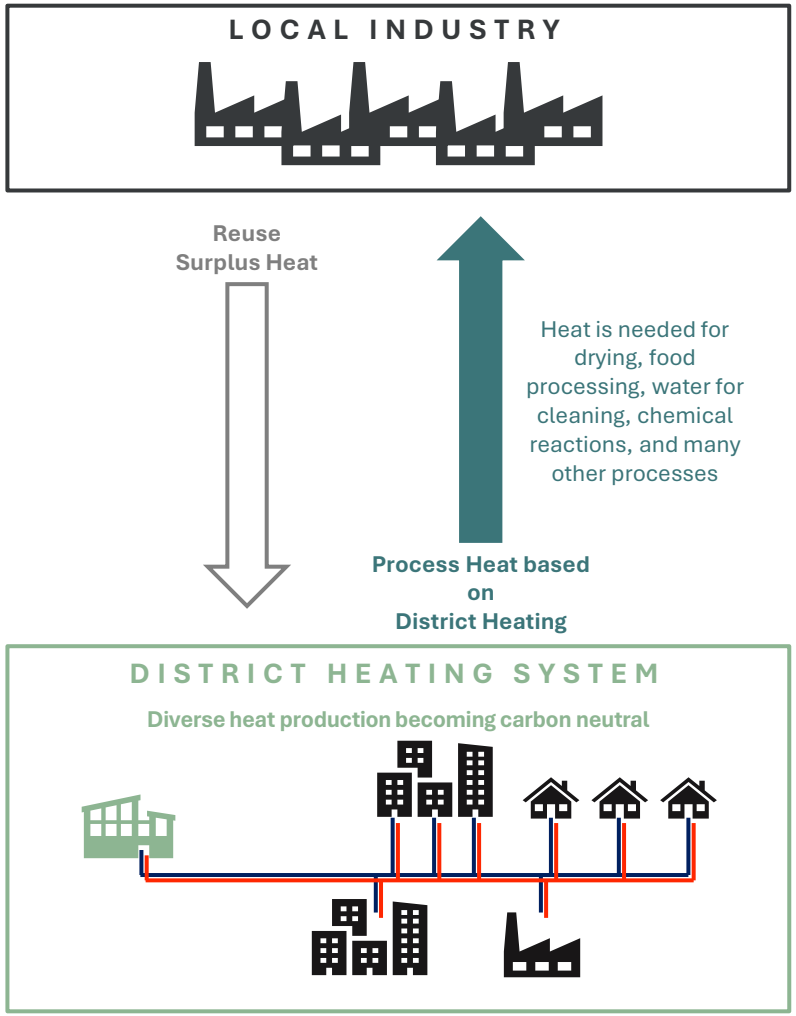
Process heat is energy needed to drive the industrial processes. See the figure to understand how process heat based on district heating differs from surplus heat.

What is Process Heat?

Process heat is often confused with surplus heat, also called excess or waste heat.

Surplus heat is residual heat from industrial processes that can be reused in, for example, a district heating (DH) system. **Process heat is energy needed to drive industrial processes.**

Today, it is often based on natural gas, and perhaps in the future, based on a mix of power, local DH, biogas, and certified biomass.



PROCESS INDUSTRY & DISTRICT HEATING ARE MADE FOR EACH OTHER

Using district heating as a heat source for the energy demand in industrial processes might be more suitable than you think.

Approximately half of the energy demand in the European industry is used for process heating and most of it is supplied by fossil fuels, mainly natural gas.

A wide range of temperatures are required in the industrial processes. Some sectors are well-suited for supplying surplus heat and other sectors are well-suited for receiving process heat.

District heating is the infrastructure that can connect different types of industry and supply residential areas and other buildings with space heating.

"Depending on estimations, district heating and cooling could supply between 32% and 48% of Europe's heat demand by 2050."

(Source: Euroheat & Power[1])

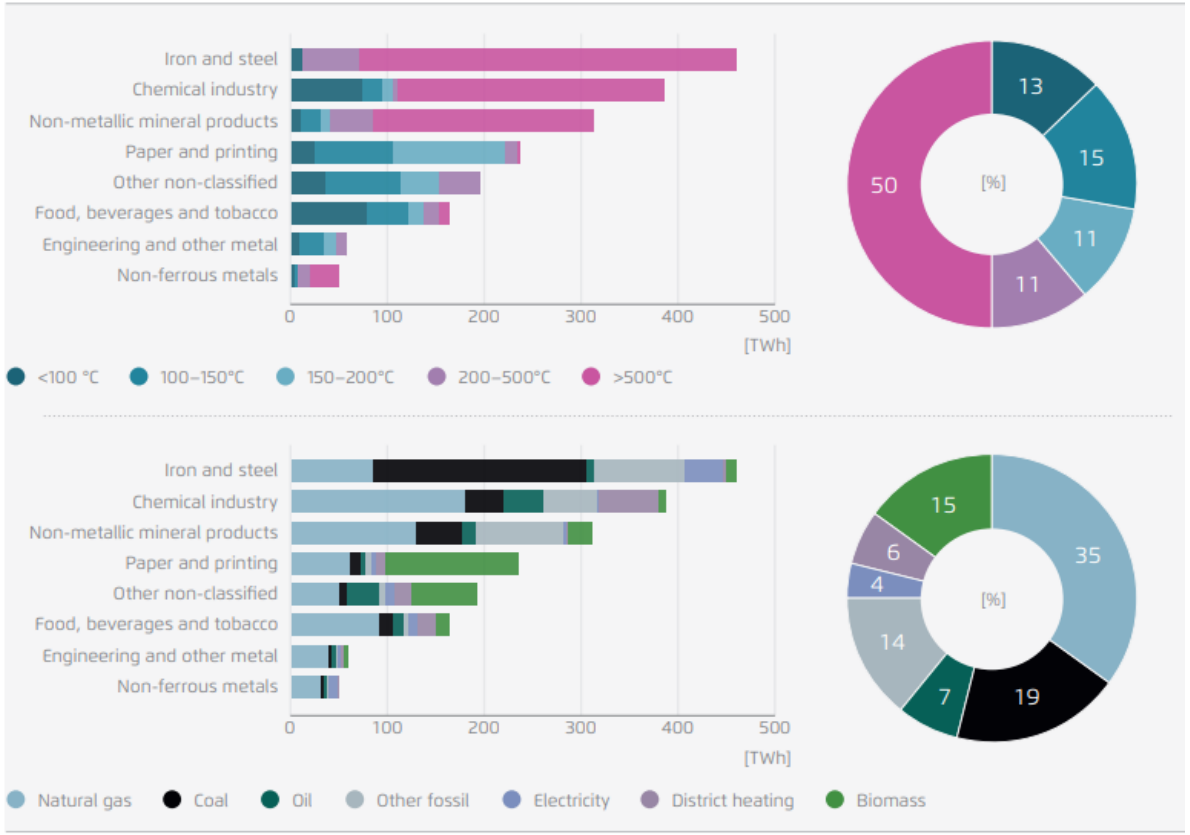
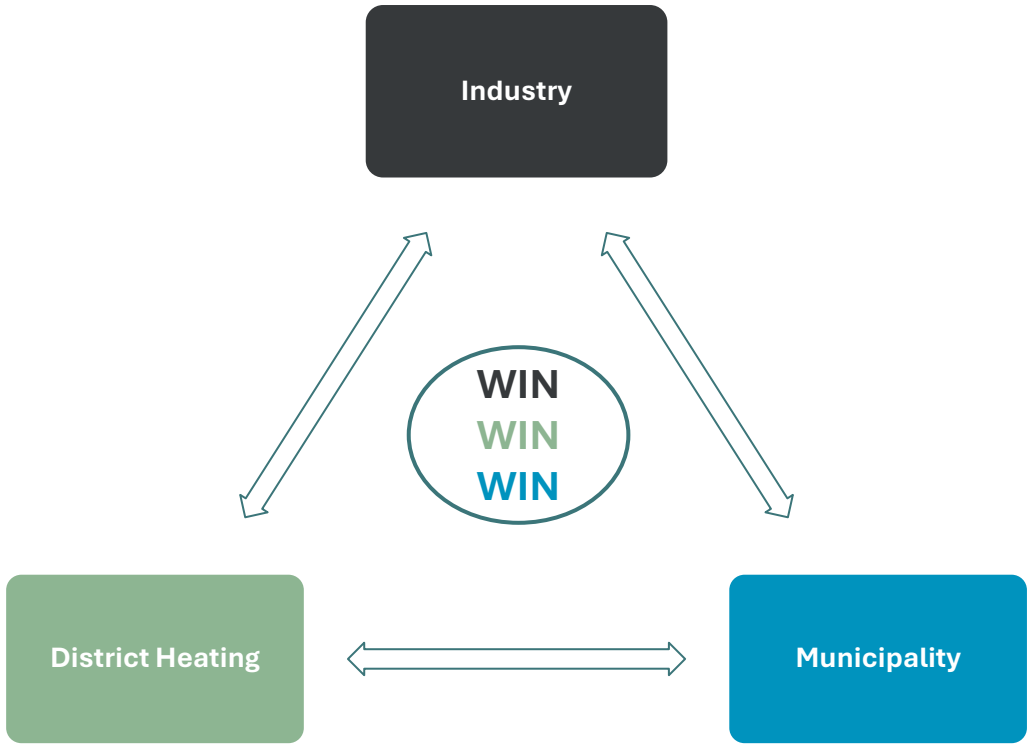


Figure 1. Source: Agora Industry[2]

1 | Source: Euroheat & Power: Link
2 | Source: Agora Industry: Link

WIN – WIN – WIN: BENEFITS

Using district heat for process heat has benefits to all involved actors. Next to the individual benefits there is also a lot of synergies that can be leveraged upon (see next page).



INDUSTRY PARTNER

Financial Benefits:	Operational Benefits:	Green Transition Benefits:
• Lower and more stable heat prices • External funding opportunities for transition projects • Potential lower investment costs	• Securing long-term heat supply and reducing risks • Less space needed on-site • Little initial knowledge needed as utility companies will bring energy competence and operational support	• Phasing out fossil fuels to lower CO_2 emissions and achieve climate goals • Improved corporate image • Future competitiveness

DISTRICT HEATING

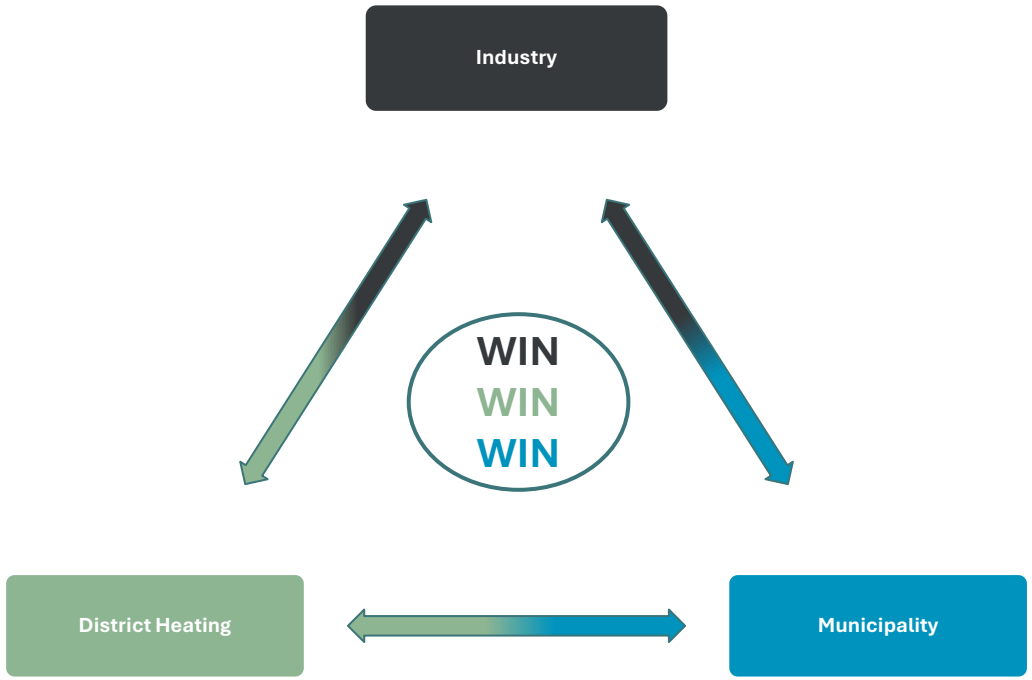
Financial Benefits:	Operational Benefits:	Green Transition Benefits:
• Economies of scale and sector integration reduce prices for heat customers • Lower investment costs per amount of heat delivered • Future competitiveness	• Leveraging existing infrastructure and production capacity (especially during summer months) • Improving energy efficiency and flexibility	• New industrial customers accelerate green investments • Improving social acceptance of district heating

MUNICIPALITY

Financial Benefits:	Operational Benefits:	Green Transition Benefits:
• Collaboration of DH and Industry in urban areas boosts the local economy and can attract local employment • If citizens and local industry save money on heat it is like giving them a tax cut	• Holistic heat planning creates synergies • Co-transition of industry and heating accelerates acceptance for the heat plan	• Lower CO_2 emissions to achieve climate goals • More efficient use of resources and lower need for energy infrastructure with sector integration

WIN – WIN – WIN: SYNERGIES

Using district heat for process heat has benefits to all involved actors in the project. Next to the individual benefits there is also a lot of synergies that can be leveraged upon.



SYNERGIES DISTRICT HEATING & INDUSTRY

- **Green transition:** Bidirectional energy exchange of surplus and process heat increase efficient use of resources. The use of city-wide infrastructure provides all industrial companies with new options for implementing CO_2 reductions.
- **Employer Branding:** Public image of both actors improves as they work towards decarbonization. Showcasing smart energy solutions attracts smart brains.
- **Commitment to local community:** Showcase that local solutions work: Using the local grid instead of global gas supplies ensures energy security and local autonomy.
- **Knowledge transfer:** Developing energy solutions in collaboration across sectors enhances the skill levels of employees.

SYNERGIES MUNICIPALITY & INDUSTRY

- **Branding**: Common interest to create an environment that attracts local employment.
- **Green transition**: Joint efforts to decarbonizes makes it easier to fulfil the climate goals on both sides.
- **Secure national funding**: Funding from higher levels can accelerate local transition and development.
- **Urban Planning**: Efficient planning and permit processing is a mutual interest.

SYNERGIES MUNICIPALITY & DISTRICT HEATING

- **Long-term thinking:** Holistic heat planning increases the use of sustainable solutions.
- **Expanding grid:** Anchoring new customers drives economies of scale.
- **Energy security:** Local supply and grid robustness help to create energy safety and public approval.
- **Commitment to local community:** Creating a liveable city by integrating local energy infrastructure and local heat sources in dialogue with the citizens.

MAIN CONCERNS AND HOW TO MITIGATE THEM

While a relatively new topic like process heat may raise many concerns – the good news is – they are manageable. See down below how to mitigate financial, technical, early, and project concerns.

FINANCIAL CONCERNS

Will DH-prices be too high compared to fossil solutions?

→ Early feasibility studies can confirm viability of project and design win-win situation for the utilities and industry partners.

How do we find a well-defined business model for collaboration?
(e.g. managing short payback times vs. long-term infrastructure time horizon)

→ Take inspiration and develop agreements tailored to the specific case (for inspiration read this catalogue!)

How do we deal with the lack of external financial support?
(e.g. subsidies, guaranties, loans, tax benefits etc.)

→ Increase awareness about the challenge of implementing process heat based on district heating to ensure that it is addressed in future legislation or financial support systems.

EARLY CONCERNS

How can potential cases be found?

→ Screening for potential cases can be done by using available data of heat consumptions or by conducting national screenings.

But what if there is no existing district heating system?

→ Including process heat in the municipal heat planning might improve the business case for establishing a new district heating system.

How to establish first contact?

→ Be proactive and curious: DH companies or industrial companies can reach out, and municipalities can create awareness by facilitating meet-ups.

TECHNICAL CONCERNS

The temperature of district heating is lower than the temperatures needed in many industrial processes, so how can district heating replace fossil sources?

→ In some cases, district heating can replace fossil-based process heat completely, but for most industrial companies, a greener solution will be a combination of elements such as district heating, electric boilers or heat pumps, biogas and/or certified biomass.

Can district heating be integrated without redesigning the industrial production line?

→ If it is just a replacement of the existing heat production, it will be a matter of placing and connecting new heat production or district heating, which has no impact on the production line.

→ If the production line has potential for energy optimisation, it is recommended to first look at energy optimisation and then design the energy supply to match.

PROJECT CONCERNS

How can trust be built?

→ Collaboration through continuous dialogue between the district heating and industry side on management and technical levels.

→ Be creative and stay flexible in designing the contract to find the win-win potential.

How can a project about process heat succeed if no one has a clue?

→ First step is to increase awareness with all actors and to distribute the existing knowledge (e.g. this catalogue) and reach out for help.

→ The topic is new to everyone, focus on sharing knowledge and learn together along the way. The technical elements are well-known, and technical consultants can help with the designs.

WHAT CAN YOU DO? - RECOMMENDATIONS

Everyone can play their part to make the sector integration a successful story. Here are some key recommendations for our partners in the industrial and district heating sector and the authorities on how to support the common goal.

FOR INDUSTRY

- **Explore the opportunities:** A combined green solution including district heating is more diversified and robust than a solution based on pure electrification. It is worthwhile investigating when designing your green transition plan.
- **Be proactive**: Reach out to the local district heating company or the heat planner in the municipality to explore the potential.
- **Play your part:** You can play an active role in the green transition of your community either as a surplus heat supplier or by using district heating to replace your fossil-based heat production. Share data to conduct feasibility studies.

FOR DISTRICT HEATING

- **Explore the opportunities:** The process industry is an attractive new type of customer, so make it a part of your strategic plan.
- **Be proactive**: Identify large heat consumers near your supply area - go knock on doors.
- **Go for win-win:** Co-create tailored contracts to match the customers' risk profile, size, and temperature needs. This will also help adjust the solution to match your needs.
- **Think long-term**: Demonstrate reliability and long-term value of the emission-free energy supply. Not all industrial companies are immediately ready to join.

FOR LOCAL, REGIONAL, OR NATIONAL AUTHORITIES

- **Heat planning**: Include the industrial sector in the municipal heat plan
- **Provide administrative support:** Accelerate permits, assist with regulatory issues, initiate screenings, and inform about subsidies and possibilities of funding.
- **Remove barriers**: Review financial support systems and incentives.
- **Act as facilitator:** Organise events that bring together the district heating partner with the local industry. Use examples and available data to connect actors from both sides.

THE KEY TAKEAWAYS FROM THE CASES

The key message is fairly simple: Sector integration of industry and district heating is possible and makes sense. To find examples in practice, take a closer look at the successful case stories in the next section.

IT IS POSSIBLE!

The cases highlight that there are multiple ways to use district heating as a heat source for industrial processes, which emphasises the vast potential for this energy setup.

CURIOSITY EVOLVED INTO INNOVATION!

The cases show that curiosity is a key element that drives the projects as the final solution often differs from the original plan. Curiosity fuels an open dialogue and helps discovering improved ways of using district heating as a heat source for industrial processes.

IT MAKES SENSE!

The synergies on the technical, business and collaboration side of the cases highlight that the holistic approach of integrating district heating in industrial processes are beneficial to all parties involved.

Picture: Arla

BEST PRACTICE CASES

5 Countries, 12 Cases, 1 Message: It is possible

SOME HIGHLIGHTS

- The food and beverages sector is particularly well-suited to use district heating to replace natural gas.
- The business case for new district areas improves when process industry is included.
- The concept has stood the test of time, with some projects being in operation for many years.
- It pays off for district heating companies to reach out to local industry.
- The initial dialogue was often about surplus heat, but ended up bringing a valuable solution for process heat.
- The combination of district heating and high-temperature heat pumps is very strong.

12 CASE STORIES ACROSS EUROPE

The cases in this catalogue display 12 success stories of how process heat based on district heat works. The cases are coming from five different countries and display a variety of possibilities.

NORWAY

1. High-temperature heat pump uses district heating to produce steam

DENMARK

2. Fifteen years of smooth daily operation
3. Meat producer helps to bring district heating to three villages
4. District heating utility reaches out to local industries
5. Partnership exchanges both waste and process heat

GERMANY

6. Heat infrastructure connects steel to beer
7. Transitioning steam production for the adjacent industry

FRANCE

8. Strasbourg port supplies industry with recovered heat
9. Seasonal seed drying with district heating in Pierrelatte
10. Farmea’s pharma production site balances Angers’ summer heat load
11. Industrial heat that revolutionised urban heating in Grenoble

CROATIA

12. District heating delivers 260°C steam to brewery in the heart of Zagreb

1

Case Norway: Tine Ålesund & Tafjord Kraftvarme & Olvondo Technology

HIGH-TEMPERATURE HEAT PUMP USES DISTRICT HEATING TO PRODUCE STEAM

There are three partners in this case from Norway. The utility supplies district heating to a dairy directly, but also to the owner of a high-temperature heat pump that produces steam for the dairy. The setup has been in operation since 2018.

Case Story

The production of milk (35 million litres/year), desserts, and other dairy products is highly automated in the Tine Ålesundin Norway. Some of the production processes require steam, and how the steam is produced does not affect the production processes. The dairy used to make all its steam (12,6 GWh in 2017) primarily from natural gas, but since 2018, part of the steam has been supplied by a high-temperature heat pump that uses hot water from the district heating system as the heat source.

Tine has installed an electric boiler, and two additional high-temperature heat pumps are on the way, and when they are in operation in 2026, the consumption of natural gas will have been reduced by two-thirds.

Collaboration

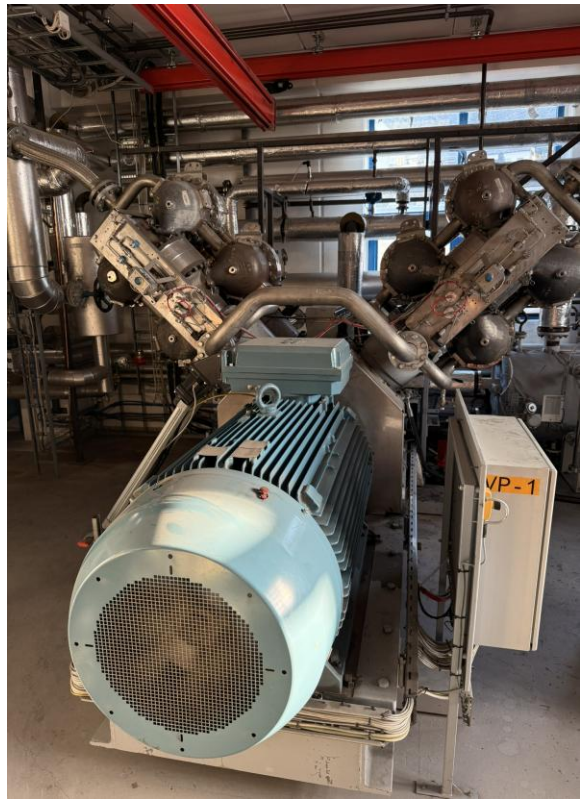
Tafjord Kraftvarme supplies district heating to homes and other buildings in the area, but they do not supply steam. Tine needs steam but would like to focus on the dairy processes and not on the energy supply. Olvondo develops and manufactures high-temperature heat pumps, and they saw a chance to bridge the gap by using their heat pump in combination with district heating to produce steam.

Actually, the first dialogue between Tafjord Kraftvarm and Tine goes back many years, when they investigated the potential to use surplus heat from Tine in the DH system. Today, focus is on the ambitious climate goals and how to reduce the use of natural gas.

Name of industry site	Tine Ålesund
Name of district heating Site	Tafjord Kraftvarme
Steam production partner	Olvondo (high-temperature heatpump)
Type of industry	Food & beverages (dairy)
Project status	Operation & planned
In operation by	2018 & 2026
CO_2 reduction	In 2026, a 2/3 reduction in NG consumption

“We are fortunate to have a district heating system nearby. Not all Norwegian industry is that lucky”

(Tine Ålesund)



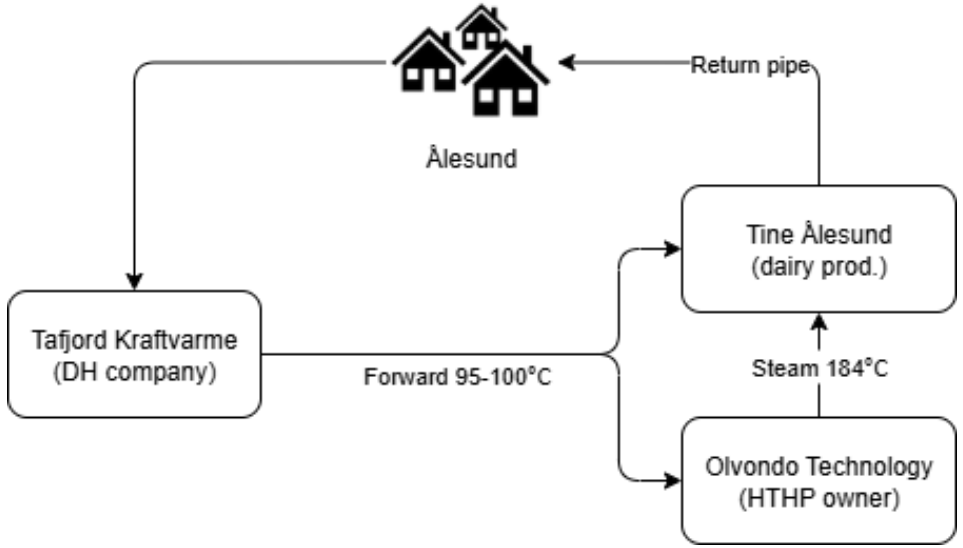
Business Case

The set-up is sustainable, both economically and otherwise. All three parties benefit from the solution, where Olvondo Technology owns the heat pump. Olvondo Technology had the incentive to demonstrate their heat pump product, whereas Tafjord Kraftvarme and Tine Ålesund had little incentive to own and operate a technology still under development.

The benefits for Tine come in the form of money, reduced risks, and meeting climate goals. They save money by buying heat from the utility and steam from Olvondo Technology. For Tafjord Kraftvarme, the set-up means they sell more heat, but also that the heat demand is higher during the summer period, where there is an excess of heat from the Waste-to-Energy plant. The project of 2018 was supported by national R&D funds because of the new technology, but the project scheduled for 2026 will be implemented without subsidies.

Technical Description

The pasteurisation process requires 76-97°C, which is supplied directly from the district heating system, whereas the sterilisation process requires steam at 143 °C. The high-temperature heat pump installed in 2018 was of the type SPP 4-106 HighLift and delivers steam at 10 bar and 184 °C.



Pictures: Case companies

2

CASE DENMARK: Thisted District Heating & Dragsbaek Malting Plant

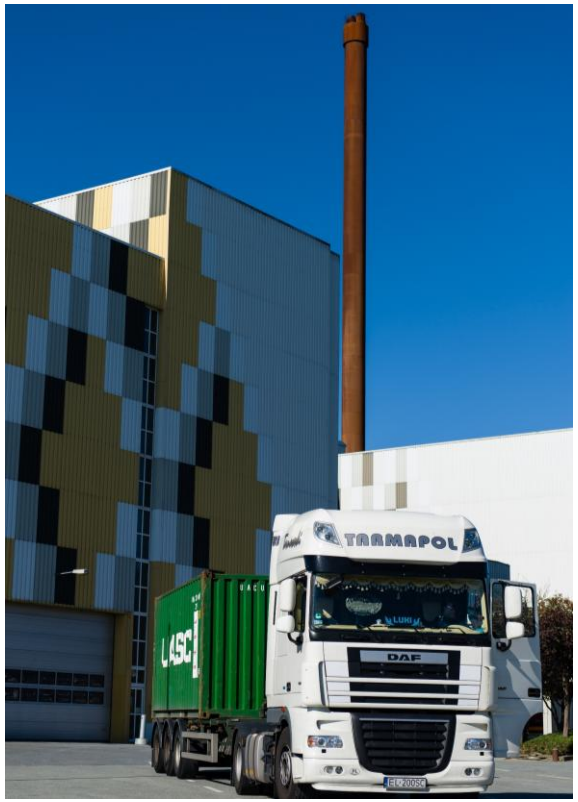
FIFTEEN YEARS OF SMOOTH DAILY OPERATION

The collaboration between Thisted District Heating and Dragsbaek Malting Plant demonstrates how process heat based on district heating can be realised with relatively modest investments and mutual flexibility. Trust and collaboration have grown between the utility and the plant over the years, since they took the first steps more than 15 years ago.

Case Story

The collaboration between Thisted District Heating and Dragsbaek Malting plant is an example of how local industry and district heating can be integrated to benefit both the climate and the economy. Dragsbaek Malting Plant, with roots dating back to 1865, has used a variety of energy sources over the years—from lignite to gas engines. Today, district heating covers a significant portion of the plant's process heat needs.

The collaboration began in the late 2000s, when a service pipe from the existing district heating network was extended to the plant. Initially, only one process line for drying was connected to district heating, but within a few years, the entire plant was connected.



On average, district heating accounts for approximately one-third of the annual heat demand for malt production. However, the actual amount varies depending on the heat production price, ranging from no heat supply to half the demand over the years.

Collaboration

The project is driven by a trusting and flexible partnership between the two parties. There are no binding obligations—both parties must 'want it' on the day, and the collaboration is continuously adjusted based on technical and economic conditions. Communication primarily occurs at the operational level, with daily coordination on volumes and timing.

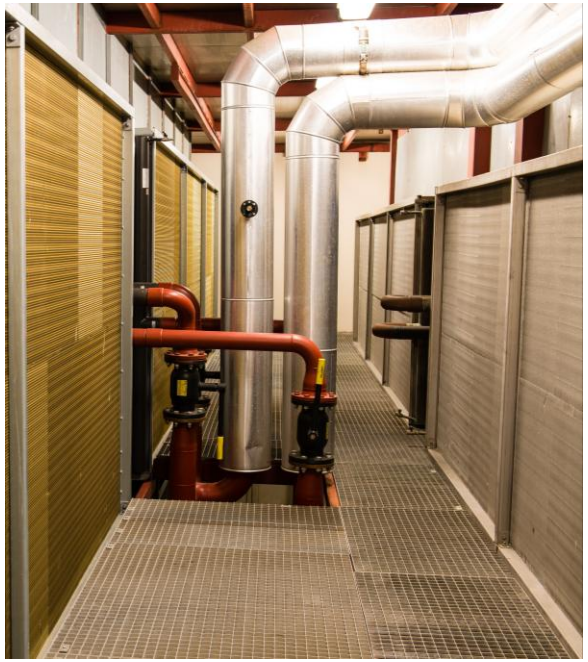
There is a formal contract between the two parties. It is about two pages long and focuses on ownership of equipment, responsibility with respect to operation, and the terms for heat delivery.

The collaboration has evolved over time, with both parties investing in necessary adjustments. Dragsbaek has upgraded internal heat exchangers and radiators for the drying process to ensure an efficient use of district heating.

Name of industry site	Dragsbaek Malting Plant (part of Sophus Fuglsang Export -Maltfabrik)
Name of district heating Site	Thisted District Heating
Type of industry	Food & beverages (malt production)
Project status	Operational
In operation since	2010
CO_2 reduction	1/3 reduction in natural gas consumption

"We started small with what made sense. From there, things have evolved gradually because we have learned and adapted. The next step involves examining the value of increasing our heat storage capacity for greater flexibility. We are proud of our local solution, where even the straws from the nearby barley fields are reused for heat production, which helps dry our malt."

(Claes Fuglsang, Dragsbaek Malting Plant)



In turn, the district heating utility has increased the supply temperature in the relevant part of town to meet more of the plant's needs without reducing the overall efficiency of the DH system.

Business Case

The collaboration between Thisted district heating and Dragsbaek Malting Plant is economically attractive for both parties. For the utility, it generates value from capacity that would otherwise go unused in the summer. For the malting plant, it reduces the need for gas and wood pellets, which makes the process both cheaper and more climate-friendly.

The agreement is flexible and based on the actual heat production price of each heat production unit. As Thisted has a Waste-to-Energy plant that runs year-round to incinerate residual waste and produce electricity, the heat available to the malting plant is usually cheapest in the summer, when heat demand from the city is low.

There are no minimum commitments, and the collaboration is continuously adjusted in response to fuel prices and tax regulations. Both during the initial business case analysis and following later changes in regulation, understanding legal requirements and CO_2 regulations has been a recurring challenge.

Pictures: Dragsbaek Malting Plant

Technical Description

The plant was located close to the existing DH grid, so only a service pipe connection of approximately 60–70 meters was needed. The heat exchanger is owned by Dragsbaek and can transfer up to 6 MW heat.

The drying process is a daily cycle with a gradual increase in the needed temperature. Starting at 60 °C at 9 o'clock and completing at 85 °C, so daily coordination determines when district heating is supplied and when the malting plant's own biomass and/or gas boiler takes over. As the temperature increases, the heat exchange becomes less efficient. To protect the efficiency of the district heating system, the return temperature must be kept below 50 °C, which determines when the plant switches to its own boilers.

3

CASE DENMARK: Danish Crown & Sønderborg Varme

MEAT PRODUCER HELPS TO BRING DISTRICT HEATING TO THREE VILLAGES

District heating from Sønderborg Varme will reach full carbon-neutrality by 2029, and from 2027, they will deliver process heat to the Danish Crown industrial slaughterhouse. This will reduce natural gas consumption at the industrial site by 50%. The decision to make this investment will also make it possible to establish new district heating systems in three nearby villages.

Case Story

The Blans project originated from Sønderborg Municipality's strategic objective of becoming CO_2-neutral by 2029. As part of this vision, ProjectZero, a local climate initiative involving key stakeholders, identified district heating as a critical component. Sønderborg Varme, the local district heating utility, was ready to play a central role in achieving this goal.

Sønderborg Varme is a cooperative formed through the merger of several smaller heating networks, unified by a shared price model and a common vision for the future. The largest city in the area is Sønderborg (28.333 inhabitants). The project was initiated through a regional mapping of surplus heat sources, which revealed untapped potential at Danish Crown's slaughterhouse in Blans.

While the initial focus was on surplus heat recovery, the scope expanded when it became clear that using district heating to deliver process heat could cut the natural gas consumption at the industrial site in half.

At the same time, the nearby villages of Avnbøl and Ullerup were struggling to find a solution for sustainable heating. Initial efforts to establish district heating on their own hadn't worked. Sønderborg Varme collaborated with Avnbøl and Ullerup and the analysis showed that are surcharge of 400 EUR/year per household would be needed to connect the villages to district heating.

However, while returning from a site visit to Danish Crown, the people from the utility realised, using the car's trip counter, that the proposed pipeline to Danish Crown passed directly by the two villages and that the additional distance was only 2 kilometres. This insight made it economically viable to extend the district heating network to include Avnbøl and Ullerup, and additionally the village of Blans, located adjacent to Danish Crown's facility.

As a result, residents of Avnbøl, Ullerup, and Blans will be able to access district heating at the same affordable rate as other customers, without the additional surcharge.

Name of industry site	Danish Crown
Name of district heating Site	Sønderborg Varme
Type of industry	Food & beverages (meat production)
Project status	Investment decision
Expected by	2027
CO_2 reduction	50% reduction in natural gas consumption

"Security of energy supply is critical for an industrial company. When a large industrial actor like Danish Crown demonstrates its strong faith in district heating, it sends a clear message to other industrial companies."

(Erik Wolff, CEO Sønderborg Varme)

Collaboration

A key success factor in the project was the strong and ongoing collaboration and communication between Sønderborg Varme, the industry, and the local communities. Even during periods with limited new information, the utility prioritised transparency and regular updates, which helped build trust and foster local engagement. The municipality also played a significant role, particularly through its strategic energy and heat planning, which actively involved district heating companies and local communities from an early stage.

This continuous collaboration proved highly productive. As challenges were addressed, new opportunities emerged—both in the villages and at the slaughterhouse. The most notable example was the shift in focus from surplus heat recovery to supplying process heat, which ultimately made the project feasible and significantly expanded its scope and impact. Technical constraints, such as the slaughterhouse's requirement for 120 °C in specific processes, became shared challenges that both parties have begun exploring solutions for.

As a sign of commitment, Danish Crown is now a member of the cooperative.

Business Case

The slaughterhouse, whose heat demand is equivalent to that of approximately 1,350 average households, significantly strengthened the economic foundation by increasing base load consumption. This enables Sønderborg Varme to distribute the infrastructure costs of the pipes across a broader user base and make it financially feasible to extend the district heating network to the nearby villages of Avnbøl, Ullerup, and Blans—without imposing a surcharge on residents. An experienced technical consultant carried out detailed techno-economic analyses, and the project proposal has been approved by the municipality.

For Danish Crown, the project will result in significant carbon reductions with the bonus of supporting the green transition of the local community. For the utility, the project is part of the journey to achieve carbon neutrality for existing and future customers affordably and reliably.

Pictures: Danish Crown Press Page

The negotiation process was effective, focusing on understanding the other side's needs and priorities and managing risks. The solution will last many years and involves significant investments, so efforts were made to discuss openly and find mutual solutions.

Technical Description

The main task for the utility is putting the pipes in the ground. The project centres around a new transmission line to Gråsten, branching out to Avnbøl, Ullerup, and Blans.

To meet the increased heat demand, a new air-to-water heat pump facility is being constructed in Gråsten, with plans to integrate surplus heat from nearby brickworks. A year-round steady heat demand from industry is attractive for a district heating system, and the need for new heat production comes primarily from connecting more households.

Danish Crown will upgrade its internal heating systems and retain its existing boiler as a backup, enhancing system resilience.

4

CASE DENMARK: TVIS & Arla

DISTRICT HEATING UTILITY REACHES OUT TO LOCAL INDUSTRIES

It started with the heat transmission company reaching out to industrial companies in the area. The dairy company Arla quickly saw an opportunity to reduce carbon emissions from their cheese production and engaged to investigate further. The project was completed within 2.5 years from initial contact to commissioning, with strong collaboration throughout.

Case Story

Reusing surplus heat is part of the DNA of the heat transmission company TVIS, and they made the strategic decision to expand their collaboration with local industry and offer them process heat. This would support the industrial partners to phase out natural gas and meet their climate goals. The availability of gas consumption data from the Danish gas distribution operator Evida enabled TVIS to identify large gas consumers near their transmission grid and to reach out to them for a partnership.

One of the first and most significant partnerships was with Arla's dairy in Taulov, which had a strong internal ambition to reduce CO_2 emissions. At the time, the dairy relied entirely on natural gas for its production, primarily for pasteurisation and cheese processing. The proximity of TVIS's transmission line—running just 500 meters from the site—reduced the need for infrastructure investments. On the other hand, there were initial concerns about the temperature requirements of 105 °C.

The following dialogue and analysis phase resulted in a positive business case and investment decision on both sides. Since then, other companies have been connected to the district heating grid, including European Protein, Moveero, and a local greenhouse. Across all partnerships, district heating has replaced gas—either partially or fully—contributing to climate goals and lowering prices for the heat customers. When reaching out to local industry, TVIS uses a model based on strategic analyses, proactive dialogue, flexibility in the contracts, and keeping a close eye on the risk assessments.

Collaboration

The collaboration with industry is driven by TVIS, and not by municipal mandates or political initiatives. With access to gas consumption data, TVIS identified relevant companies and contacted them directly. In the case of Arla, the initial outreach went through headquarters. From there, a local project team took over and worked closely with TVIS to explore technical feasibility and business potential. Arla's need for process heat is temperature-specific and constant throughout the year. As TVIS could not guarantee 105 °C at all times, a hybrid solution was developed: TVIS supplies heat when possible, and Arla boosts the temperature with an electric boiler, if the temperature is below 105 °C.

Name of industry site	Arla
Name of district heating Site	TVIS
Type of industry	Food & beverages (cheese production)
Project status	Operational
In operation since	2023
CO_2 reduction	75% reduction in natural gas consumption

"Our work with process heat demonstrates how district heating can play an active role in phasing out gas in industry. By being proactive, offering flexible solutions, and ensuring a solid business case for both the utility and the industrial customer, win-win partnerships can be created that reduce CO_2 emissions and strengthen energy security."

(Jørgen Nielsen, CEO of TVIS)

Over time, Arla optimized its internal systems and can now cover approximately 75% of its heat demand with district heating—well above the estimate of 50% in the original business case. The natural gas equipment supplies the remaining heat and acts as backup. District heating has been delivering as planned, so there has been no activation of the back-up since commissioning.

The collaboration was iterative and solution-oriented, with clear technical and contractual boundaries. A shared building was constructed to house the heat exchanger and buffer tank, with distinct zones for TVIS and Arla equipment. Quick, daily coordination between operations teams ensures smooth delivery, and annual meetings help refine the setup and coordination. Municipalities have supported the initiative, particularly through permitting and local sustainability forums, but have not played a direct role in the partnership.

Business Case

TVIS's business cases are based on specific analyses for each industrial customer. Investments are only made if they can be repaid through heat revenues without burdening existing district heating customers. For each customer, the risk profile is assessed, and contractual safeguards are put in place to ensure that investments are covered, even if the customer terminates the agreement early.

Arla was considered a low-risk case for TVIS, and this played a role in the negotiations about which parts of the investments would be owned and operated by TVIS and Arla, respectively. TVIS has also worked with smaller industrial companies, and based on these experiences, they will only pursue industrial customers who require larger amounts of process heat.

All industrial customers pay the same variable heat price as all other customers, but if the business case is positive, TVIS can offer a reduction on the fixed part of the heat bill for the first five years. The dairy also secured support from the Danish Energy Agency's CO_2 reduction fund, though this was not part of the initial decision-making. The internal approval process at Arla involved detailed business case modelling, CO_2 impact assessments, and budget reviews. Despite fluctuating energy prices, Arla prioritises sustainability and long-term resilience over short-term savings.

For TVIS, supplying process heat is a sound business that reduces the heat prices for existing customers. For industrial companies, district heating is a way to reduce carbon-emissions and dependence on natural gas at a competitive price.

Technical Description

TVIS supplies district heating at up to 120 °C, typically around 105 °C, but also at lower temperatures during some periods. Arla is responsible for all internal processes, which require a constant supply at 105 °C, so Arla invested in an electric boiler to be able to boost the temperature when needed.

The production processes were not in any way affected by the change of energy supply. In total, Arla invested approximately 1,3 million EUR for the heat exchanger station, piping, buffer tank, and electric boiler. TVIS installed, owns and operates the heat exchanger that ensures temperature compatibility.

5

CASE DENMARK: De Danske Gærfabrikker & Grenå Varmeværk

PARTNERSHIP EXCHANGES BOTH WASTE AND PROCESS HEAT

With the help of the local District Heating Utility, the De Danske Gærfabrikker will be able to reuse their surplus heat for their process heat demands at higher temperatures.

Case Story

The factory, which produces yeast through biological fermentation, generates large volumes of low-temperature heat as a byproduct. At the same time, the factory needs process heat at a high temperature, which is produced on-site from coal and liquified petroleum gas.

With a new design, surplus heat is captured and upgraded via a high-efficiency water-to-water heat pump system. The system raises the temperature from approximately 32–34 °C to 90 °C, making it suitable for distribution through Grenaa's district heating network, including the supply of process heat to the yeast facility.

The cold side of the heat pump is used to produce cooling for the yeast production. The new setup will significantly improve energy efficiency and reduce carbon emissions.

Collaboration

Actually, the two parties are neighbours, and for years the utility has watched the water vapours enter the air from across the street. There has been some dialogue along the way, but the circumstances were not there to make a business case. The use of surplus heat from the yeast production was especially discussed leading up to the utility's investments in a wood chip boiler and solar cells. Often, in direct dialogue between the managing directors.

With regulation changes, it has now been possible to develop a joint solution with a solid business case. The two parties have actively worked to build trust and understanding – insisting on finding win-win solutions and addressing potential problems through an open dialogue.

Name of industry site	De Danske Gærfabrikker
Name of district heating Site	Grenå Varmeværk
Type of industry	Food & beverages (yeast production)
Project status	Investment decision
In operation by	Q1, 2027

"Industrial companies don't have the necessary knowledge and resources internally. Support is needed from district heating utilities, technical consultants, and the municipality. If there are barriers, we need to speak up and help fix the issues."

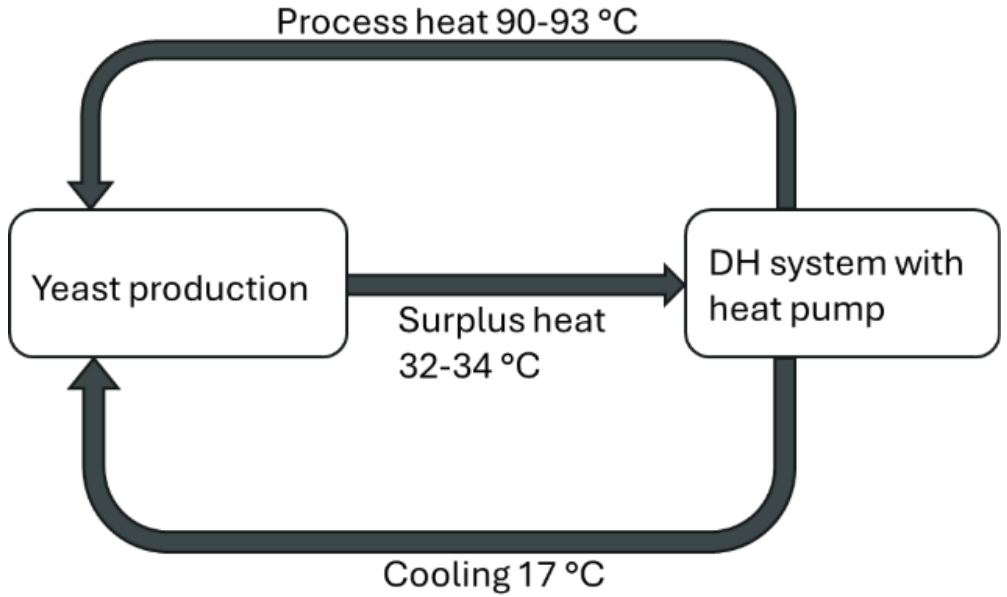
(Søren Gertsen, Grenå Varmeværk)

Business Case

A series of detailed techno-economic analyses and risk assessments came before the investment decision. The utility will invest 4 million EUR in a heat pump, and the analyses will help quantify the lowering of the heat price and the reduction in the use of wood chips. As the utility will have most of the investment costs, guarantees from the yeast company are included in the agreement. The agreement is about six pages excluding a few attachments specifying interfaces and operational setups. The yeast factory will become one of the utility's largest customers, representing a 15% increase in the utility's total heat sales.

Unfortunately, the return temperature from the factory (approx. 45-55 °C) will be higher than for the system in general (32-33 °C). To compensate for this, the yeast factory will pay a 10% higher heat price compared to the standard price specified in the tariff sheet.

Pictures: De Danske Gærfabrikker



Money is only exchanged to pay for the process heat. Otherwise, each party pays for their own investments, and there are no transactions regarding the use of surplus heat and cooling. For the yeast company, the benefits include cheaper process heat and a convenient solution that allows them to focus on their core business.

Technical Description

4 MW of surplus heat is constantly available for district heating, and this amounts to 30.000 MWh/year. About 8 MW could be delivered, but heat is mainly needed during the wintertime, so it is not economically feasible to invest in a larger heat pump.

The utility is investing in a new accumulation tank and flexible production capacity to manage peak loads and seasonal fluctuations. These measures enhance supply security and allow the utility to optimise production from its diverse mix of heat sources, enhancing system resilience.

6

CASE Germany: König-Brauerei, thyssenkrupp Steel, E.ON Business Solutions Deutschland

HEAT INFRASTRUCTURE CONNECTS STEEL TO BEER

The project demonstrates how cross-sector collaboration between steelmaking, energy services and the brewing industry enables significant CO_2-reduction.

Case Story

The project tells the story of how three strong partners joined forces to bring an ambitious sustainability vision to life. König-Brauerei, a company with deep regional roots and a long brewing tradition, set out to decarbonize its production processes and take a pioneering role in the brewing industry.

The solution was found just a few hundred meters away: thyssenkrupp Steel, one of Europe's largest steel providers, produces large volumes of high-quality steam as part of its steelmaking operations. Instead of letting this energy go to waste, it was redirected and transformed into a sustainable source of process heat for the brewery. Together with E.ON Business Solutions as developer and operator of the infrastructure, the partners

succeeded in linking two completely different industries with one common goal: climate protection through innovation.

By constructing a dedicated steam line between the steel plant and the brewery, König-Brauerei can now brew its beer using industrial waste heat. This step reduces CO_2 emissions by up to 75% compared to the previous system and replaces the use of lignite and natural gas with a clean and reliable alternative. The project is more than an energy solution, it is a symbol of regional cooperation, technological excellence, and the energy transition in practice.

Collaboration

The success of the project is based on close and trustful collaboration between the three partners. Each company contributed its unique expertise: thyssenkrupp Steel as provider of industrial steam, König-Brauerei as user of the heat in its brewing processes, and E.ON Business Solutions as developer and operator of the infrastructure. From the very beginning, the project was driven by a clear joint vision – to create a sustainable energy network that benefits all parties involved and demonstrates the potential of industrial sector coupling.

The cooperation was characterized by openness, transparency and strong commitment from management on all sides. The partners worked in an integrated way, combining technical know-how with entrepreneurial spirit. This collaboration made it possible to realize an idea that had been discussed for years but had never before been implemented. What emerged was not only a functioning technical solution but also a model of how traditional industries can jointly develop innovative approaches to sustainability.

Name of industry site	König-Brauerei GmbH
Partner companies	Thyssenkrupp Steel, E.ON Business Solutions Deutschland
Type of industry	Brewing & Steel
Project status	Operational
In operation since	2023
CO_2 reduction	Up to 7300 t / year

"The entire project is proof of how companies can effectively promote local climate protection in good neighborhoods."

(Wolfgang Wiese, Head of Power Plants and Energy Control, thyssenkrupp Steel)

Business Case

The business case behind the project is compelling. For König-Brauerei, the new steam supply represents a major step toward achieving climate targets and securing a long-term, future-proof energy solution. By using waste heat from steel production, the brewery significantly reduces its carbon footprint while ensuring a stable and cost-efficient energy supply for its core processes. For thyssenkrupp Steel, the project shows how industrial energy streams can be intelligently utilized, improving efficiency and creating added value beyond its own production.

For E.ON Business Solutions, the project demonstrates the feasibility of complex cross-sector infrastructures that combine ecological benefit with reliable operation. Beyond the immediate partners, the initiative generates positive visibility, strengthens stakeholder trust and contributes to regional sustainability goals. It shows how ecological progress and economic rationale can reinforce each other, turning climate protection into a business advantage.

Technical Description

The project is centered around a specially designed steam infrastructure that links thyssenkrupp Steel with König-Brauerei. The system consists of a steam extraction point at the steel plant, an underground pipeline of nearly half a kilometer in length, and a transfer station at the brewery. From there, the steam is distributed directly into the brewery's processes – from heating the mash and boiling the wort to cleaning operations – replacing the fossil-fired boiler technology previously in use. The installation integrates seamlessly into both production environments. The returned condensate is fed back into thyssenkrupp Steel's closed cycle, ensuring efficient use of resources.

Pictures: E.ON

Continuous monitoring of temperature, pressure and flow guarantees reliability and transparency of the supply. The result is a technically robust, safe and efficient solution that provides the brewery with renewable process heat while ensuring consistent quality and operational stability. By combining proven steam technology with innovative cross-industry cooperation, the project sets a strong example of how industrial waste heat can be harnessed for sustainable production. It demonstrates that with the right partners, even existing infrastructures can be transformed into powerful drivers of the energy transition.

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CASE Germany: Rheinenergie & Heizkraftwerk Köln Merkenich

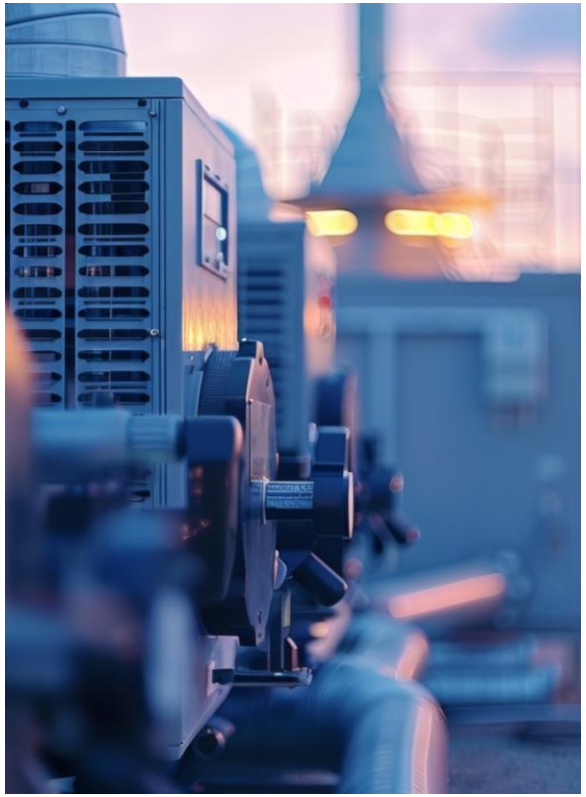
TRANSITIONING STEAM PRODUCTION FOR THE ADJACENT INDUSTRY

For decades, the Merkenich CHP plant has guaranteed a reliable supply of process heat to major industrial customers in the north of Cologne. Through continuous development of the power plant site, the efficiency, flexibility and ecology of heat supply have been continuously improved over the years.

Case Story

RheinEnergie AG is a regional energy and water supplier based in Cologne. It is responsible for around 2.5 million people, industry, trade and commerce in the supply of electricity, gas, water and heat. The company employs around 2,900 people and, in addition to traditional energy supply, is also involved in the development of renewable energies and the promotion of energy efficiency.

Since the end of the 1950s, the Merkenich combined heat and power plant has shaped the energy supply in the north of Cologne. The focus was always on steam generation for the adjacent industry.



The Merkenich combined heat and power plant was put into operation in 1958, from the beginning of the 1960s, district heating is also supplied to households in the north of Cologne. The neighbouring districts of Ossendorf, Bocklemünd and the emerging residential town of Chorweiler are connected to district heating.

With technological advances and evolving environmental awareness in the 1980s, natural gas replaced oil to reduce pollutant emissions and improve the economics of production. In 1990, a fluidized bed lignite plant also went into operation. For many years, the fluidized bed boiler supplied large quantities of process steam for industry and district heating. After the last modernization in 2010, it was therefore finally "fire out!" for the coal boiler on April 1, 2025 – its decommissioning marks the end of the era of coal-based steam generation in Cologne. In the future, an efficient and highly flexible gas and steam turbine plant (CCGT) takes on the main role at the Merkenich site. In operation at the site since 2004, it is currently undergoing extensive modernization. The combined cycle plant is integrated into a heating network with the local waste incineration plant as well as with peak load and reserve boilers. Among the largest industrial customers of the several kilometers long process steam network are Ford, Deutsche Infineum, and Vinnolit.

Name of industry site	Rheinenergie
Partner companies	Heizkraftwerk Köln Merkenich
Type of industry	A mix of industries
Project status	Operational
In operation since	1950s

“"The Merkenich site is not only the central heating system for the north of Cologne, but also the guarantor for a secure process steam supply to industry.”

(Power plant manager, Dr. Yves Noël)

From 2029, a new smaller sludge incineration plant will additionally provide climate-neutral steam capacity and climate-neutral heating. In addition, RheinEnergie AG is examining the use of large heat pumps or hydrogen in order to further diversify heat generation. A connection to the future hydrogen core network would be within reach – a real location advantage!

Business Case

In all investment cycles and operating times, optimization potential is always sought. As a result, steam generation has become increasingly energy-efficient: from oil to lignite, to gas and integration of waste incineration to the use of hydrogen or heat pumps in the future.

Pictures: DBDH acquired stock photos

Technical Description

From heavy fuel oil and lignite back then to natural gas and residual waste today, and possibly hydrogen and other renewable energies in the future – the history of steam generation in Merkenich is a reflection of technological development and a commitment to a climate-neutral future.

Some of the key technical data include that the process steam is around 12 bar pressure at a temperature of approx. 250 °C. In total, around 520 GWh of process steam and around 230 GWh of district heating are provided annually, making this collaboration a huge success.

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CASE FRANCE: Soufflet & R-PAS

STRASBOURG PORT SUPPLIES INDUSTRY WITH RECOVERED HEAT

The Soufflet malting plant in Strasbourg now covers 75% of its summer heat needs with recovered energy from nearby industries, supplied via the port's dedicated heating network. The operation is a success and might soon extend to supply during winter as well.

Case Story

The Port of Strasbourg is undergoing a major ecological transition, notably through an Industrial and Territorial Ecology initiative launched in 2013 in the port area. The stakeholders in this area, grouped together within the PAS (Port Autonome de Strasbourg), have created dedicated structures for the development of a heating network to recover and reuse waste heat from certain industries. R-CUA (Réseau de Chaleur Urbain d'Alsace) and R-PAS were created and projects multiplied: the paper manufacturer Blue Paper and the company Trédi (hazardous waste incineration) were the first two industrial players to inject their waste heat into the network. This will enable 120 GWh to be recovered in 2025, with future development planned to reach 150 GWh in 2026, 200 GWh in 2027 and then 250 GWh.

This carbon-free recovered energy is purchased and valorized by R-CUA via heat network public service delegation contracts with the city of Strasbourg. R-CUA has also contacted the PAS to organize exchange days with local industrialists to offer them their carbon-free heat.

The Soufflet malting plant has signed a heat supply contract, which has come into effect in March 2023. The malting plant receives heat at 100°C throughout its summer operating period (between 1 April and 31 October). The operation is a success and currently covers 75% of needs during the summer period. The next objective is to reach 100% in summer and to sign a contract for supply during the winter period, highlighting the projects long-term potential.

Collaboration

The project is rooted in the Port of Strasbourg's long-standing Industrial and Territorial Ecology initiative, which fosters cooperation between utilities and local industries. R-CUA and R-PAS have played a central role by building the network, organising exchanges, and coordinating investment. Through this framework, industries such as Blue Paper, Trédi, and Soufflet Malting are not only decarbonising their own operations but also strengthening the resilience of the regional energy system.

Name of industry site	Soufflet malting plant (Strasbourg)
Name of district heating Site	Strasbourg Autonomous Port heating network
Type of industry	Agri-food (malt drying)
Project status	Operational
In operation by	2023
CO_2 reduction	4,500 t / year

“The momentum of industrial symbiosis at the Port of Strasbourg is accelerating projects by facilitating collaboration between local stakeholders.”

(Director of Operations at R-CUA, Maxime Augst)

Business Case

A detailed business plan to assess the viability and profitability of the project was drawn up by both the industrial partner and the R-CUA operator. Once the economic profitability demonstrated, the industrial's decarbonization challenges motivated the investment decision. Heat supply prices are very competitive during the summer, which is a significant economic advantage for the industrial partner. These prices are less competitive during the winter due to constraints related to overall network demand.

The commercial model put in place is based on a clear division of responsibilities. R-PAS owns the equipment up to the heat exchanger outlet, including the heat recovery facilities and the associated transport network. A long-term contract, lasting up to 20 years, governs the relationship between the industrial company and the network operator. This contract ensures the stability and sustainability of the partnership over the long term.

The project was partly financed with own funds. The industrial operator financed its connection to the network, while R-PAS covered the remaining costs with the support of public subsidies totaling between €3 million and €4 million out of a total amount of approximately €15 million . The subsidies come mainly from the Heat Fund (recovery and transport network) and the DECARB FLASH scheme (connection to the network).

Pictures: Case Companies

Technical Description

The waste heat from Blue Paper and Trédi is supplied at a temperature of 105°C, as well as a 45°C temperature source enhanced by the use of a heat pump. The process requirement is 100°C for 6MW.

Several investments have been made at the malting plant to modernise the utilities network (modifications to the secondary circuit and replacement of the heating batteries in the kilns, for example). A turnkey connection to the network was proposed to the industrial: laying the network in the premises, dismantling the old hot water tanks, reinforcing the structure, installing the substation, modifying the secondary circuit and adding the summer/winter control unit. The industrial process was also already equipped with a heat pump that recovers heat for drying and cooling in the germination chamber.

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CASE FRANCE: Coriance & Mistral Semences

SEASONAL SEED DRYING WITH DISTRICT HEATING IN PIERRELATTE

The project in Pierrelatte demonstrates how a nearby district heating network can decarbonize industrial seed drying by replacing natural gas with biomass-based heat. Through a simple and cost-effective connection, the company benefits from lower energy costs while contributing to local climate goals and job creation.

Case Story

At its Pierrelatte site, Mistral Semences dries corn and sunflower seeds each year from late August to early November. Traditionally, this seasonal process was powered by natural gas, but the proximity of the district heating network opened a new opportunity. The industrial agri-food company's drying process is now powered by the district heating managed by Coriance. The long-term public service delegation contract is in effect since 2012. This collaboration made it possible to replace the gas boiler with process heat based on district heating.

The heat produced is low-carbon as it is generated from local biomass at a current rate of 80%, with a future target of 88%. By connecting to the network, Mistral Semences was able to replace its gas supply with renewable district heating, reducing emissions and ensuring stable energy costs.
The use of local energy and the creation of local jobs made this project a success: while initially only planned for a period of 10 years, the contract has been renewed until the end of the public service delegation in 2032.

Collaboration

The collaboration began when Coriance identified the potential of supplying Mistral Semences. The first contact was initiated by Coriance directly, as the industry site was near the heating network. Though the volumes delivered represent only 2% of the network's annual supply, the partnership illustrates how even small industrial demands can be integrated efficiently.

This case demonstrates that it can often be useful to look out for synergies to optimize the energy vector for industrial processes (e.g. hot water can be used for preheating rather than steam). Moreover, the proactive approach of Coriance can be a good example of how utilities can identify potential industrial customers and connect them to their grid.

Name of industry site	Mistral Semence
Name of district heating Site	Pierrelatte heating network
Type of industry	Agri-food (seeds drying)
Project status	Operational
In operation by	July 2014
CO_2 reduction	875t / year

“Municipalities have a key role to play in connecting local stakeholders. This is in their interest, as it contributes to the decarbonisation of the region and the development of local jobs.

Blandine Roche, Business Manager at Coriance)

Business Case

The business case was evaluated by considering the price of heat, consumption assumptions and the price of demand. The industrial partner provided financial health information to secure the investment. The model proved profitable over the term of the subscription due to the 20-year duration of the public service delegation contract with the local authority. This results in a lower energy price for the industrial compared to the gas network. They also contribute to local job creation in the management of the heating network. The project did receive a subsidy only for the decarbonization and feasibility studies (via the ADEME Heat Fund).

Pictures: Mistral Semences

Technical Description

The proximity of the district heating network to the industrial site helped to set up a straightforward solution. Hence, the additional construction work was rather minimal. Mistral Semences simply constructed a pipe from the industrial building to the front of the site. Coriance installed a new heat exchanger in a closed and secure room, connecting the existing grid to the site. The air/water exchangers powered by gas boilers could be reused. The work took less than six months and cost less than €80,000.

Now, the hot water required for the process is supplied at a minimum temperature of 80°C (the future objective is 87°C) and has a return temperature of 54°C. The heat is delivered to two separate delivery points, the first at 2,500 MWh/year and the second at 900 MWh/year. The property boundary is located at the substation heat exchanger, whose premises are close to those of the customer. Each party is responsible for their own section.

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FARMEA'S PHARMA PRODUCTION SITE BALANCES ANGERS' SUMMER HEAT LOAD

Located just 200 meters from the network's main site, Farmea partnered with Dalkia to cover a major share of Angers' summer heat load while decarbonising its pharmaceutical production. The long-standing collaboration has been renewed multiple times, underlining both technical fit and economic value.

Case Story

The pharmaceutical company Farmea uses a heating network operated by Dalkia to supply hot water for its processes. Dalkia is an energy services specialist in decarbonizing and reducing energy consumption of industrial plants but also municipalities and commercial buildings. The heat is delivered in the form of hot water, with 8 GWh supplied annually, representing 10% of the city's heating network volume in winter and 70% in summer! These figures highlight how process heat based on district heating can benefit both sites.

The network's renewable and recovered energy rate is currently 60%.

Collaboration

Contact was made directly by Dalkia, as Farmea's site is located just 200 meters from the heating network's main production site. The customer's site technical manager was convinced of the benefits of the project for his process in terms of heat quality and improved distribution.

This was a major decision for the industry partner, as it involved changes to the process (particularly to the secondary distribution network).

The contract is renegotiated regularly and has already been renewed twice, as Farmea is satisfied with the quality of the heat supplied in relation to its constraints and is seeking to decarbonize its production. The first contractual periods were established for durations of 5 years.

Name of industry site	Farmea (Angers)
Name of district heating Site	Angers heating network
Type of industry	Pharmaceutical
Project status	Operational
In operation by	2014
CO_2 reduction	2 000 t / year

“This project is a fine example of a win-win collaboration between our client and the heating network we operate. The quality of heat delivery and the assurance of reduced carbon emissions are key factors in renewing the contract at a time when gas prices are low.

Soazic Mary, Dalkia, Marketing manager

Business Case

A technical and economic study based on Farmea’s consumption analyses and Dalkia's audit of the industrial site identified improvements opportunities to the secondary distribution network. There is a specific price for industry support, as the project has received subsidies from the Heat Fund and French White Certificates.

Dalkia is funding the investment as part of the network development and charges a fee linked to the investment.

Picture: Hugues Falaise – Hélidrone Ouest

Technical Description

Several changes were made as part of the project, carried out in around six months.

Firstly, a skid with an exchanger and a control system was added. Secondly, the burners on the auxiliary and emergency gas boilers were replaced to improve the heat supplied. Lastly, the secondary distribution network was improved, with the cost borne entirely by the industrial partner, representing around €80.000. The cost of the work on the supply and control systems amounted to approximately €250,000.

The hot water requirement is approximately 85°C, and the exchanger is supplied at between 95 and 105°C at the inlet.

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France: Solvay and CCIAG Heating system project

INDUSTRIAL HEAT THAT REVOLUTIONIZED URBAN HEATING IN GRENOBLE

The CCIAG-SOLVAY project is turning industrial waste heat into clean energy for Grenoble, cutting CO_2 and powering over 100,000 homes.

Case Story

At Solvay's plant located on the Pont-de-Claix chemical platform, the idea of recovering waste heat had already been envisioned since the 1980s. Nearly four decades later, with support from the French Environment and Energy Management Agency (ADEME) and in collaboration with the Compagnie de Chauffage Intercommunale de l'Agglomération Grenobloise (CCIAG), this dream took concrete shape with the CCIAG-SOLVAY collaboration project. The initial ambition of the project was to connect the platform to the city's heating network by creating a system capable of exchanging heat in both directions. From an environmental perspective, the goal was to find a more sustainable solution for heating homes

without relying on fossil fuels. In 2018, the construction work that gave shape to this vision began, with the installation of approximately three kilometers of pipes connecting Pont-de-Claix to the CCIAG heating network. This "invisible bridge" of energy became a pioneer in France by enabling a two-way exchange of heat. How it works? In wintertime, Solvay supplies up to 30 megawatts to the city, reducing fuel oil use and increasing supply security, while in summer the flow is reversed and CCIAG delivers around 8 megawatts from waste recovery to the industrial platform, avoiding losses and supplying part of its needs. Proof of success came in the first year, when around 64,000 MWh were transferred, compared to the 37,000 MWh initial forecast.

In winter, the chemical platform supplies the district heating network by transferring 30 MW of thermal energy. This heat is produced from waste hydrogen from its activities and natural gas, enabling the metropolitan heating network to avoid using fossil fuels such as heavy fuel oil. In summer, the opposite is true. The amount of heat produced by the Incineration and Energy Recovery Unit exceeds the needs of the community and its subscribers. Part of this excess waste heat is then recovered by the Pont-de-Claix industrial platform, at a rate of 8 MW, enabling Solvay to reduce its natural gas consumption. This project permits to save around 2100 tons of CO_2 each year and is the second largest heating network in France in terms of volume (177 km).

Collaboration

The project's governance clearly illustrates the collaboration between industrial and public actors. On the industrial side, Solvay, through its Energy Services division, took on the coordination of the project and the supply of heat to the platform.

Name of industry site	Pont-de-Claix chemical platform
Name of district heating Site	CCIAG
Type of industry	Chemicals and advanced materials
Project status	Operational
In operation by	2018

“Renewable heat is profitable in many ways: both ecologically and economically. It is one of our group's strategic development priorities at industrial sites.”

(Director of the Solvay unit in Grenoble, Jérôme Gardey de Soos)

CCIAG, the network concessionaire, acted as delegated project manager and is responsible for the operation and optimization of the system, reconciling industrial and urban flows. More than 100,000 housing equivalents are now connected to the metropolis' historic heating network, which serves seven municipalities—Grenoble, Saint-Martin-d'Hères, Échirolles, Pont-de-Claix, Eybens, La Tronche, and Gières—in addition to small independent networks operated by CCIAG in Gières, Fontaine, and Pont-de-Claix.

Grenoble-Alpes Métropole, as the public authority responsible for the network since 2015, acted as an institutional partner and decision-making body to validate investments, aligning them with local decarbonization goals. The City of Grenoble participated indirectly as the main shareholder of CCIAG and directly as a beneficiary municipality, since a significant part of the population connected to the network is located within its territory. Finally, ADEME made a decisive contribution through the Fonds Chaleur, which financed 57% of the total investment of €7 million (2 million € for CCIAG, and 5 million € for Solvay)—i.e., approximately €4 million in public subsidies making the interconnection economically viable. In addition to reducing emissions and ensuring security of supply, the project brought local benefits, such as the expansion of the network in Pont-de-Claix, new connection opportunities for neighboring industries, and greater economic and environmental attractiveness for the Grenoble metropolitan area.

Business Case

Focused on leveraging industrial waste heat and optimizing the supply of thermal energy from the urban network, the SOLCIA project's financial arrangement lowered the barrier to entry for industry and public operators, ensuring the economic viability of an infrastructure considered complex. From an economic standpoint, Solvay began generating revenue by selling heat in the winter and reduced its energy bill in the summer by consuming heat from the urban system instead of natural gas. CCIAG increased the resilience and diversity of its network, improving cost stability for consumers. The Grenoble Metropolis has strengthened its path to carbon neutrality: the network reached 80% renewable and recovered energy in 2022 and aims for 100% by 2033. The operational results validated the business case: in 2019, 64 GWh of heat circulated between the platform and the network, of which 53.4 GWh was supplied to the city and 11 GWh to industry. Emissions avoided reached 2,600 tons of CO_2 per year, in addition to reductions in local pollutants such as SO_2 and NO_x.

Technical Description

The CCIAG-SOLVAY project represents an innovative technical solution for the integrated management of thermal energy. The system therefore optimizes energy flows according to seasonal demand and supply, while reducing fossil fuel consumption in both industry and the collective heating network.

The project involved not only the construction of public and private pipelines, but also an exchange station capable of ensuring the quality and safety of energy transfers. The studies and works were organized around four complementary dimensions: economics and characterization of energy exchanges, design and execution of works, financial modelling, and definition of contractual modalities. The integration of these elements made it possible to develop operating scenarios tailored to seasonal needs, calculate predictable energy flows, distribute responsibilities, and enable investment.

The implementation also faced practical challenges that required constant cooperation between partners. It was necessary to resolve valve vibration issues, fine-tune temperature parameters to avoid efficiency losses, and adapt the piloting scheme according to the maintenance windows of the incineration units. These technical aspects reinforce the complex nature of the CCIAG-SOLVAY, which is not just a hydraulic project, but a truly strategic energy infrastructure.

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CASE CROATIA: Zagreb Brewery & HEP

DISTRICT HEATING DELIVERS 260°C STEAM TO BREWERY IN THE HEART OF ZAGREB

Zagreb Brewery is one of the few industrial sites in Europe to receive 260°C high-pressure steam via district heating. The urban solution replaces on-site boilers and frees scarce city-centre space, covering all process heat needs without local emissions.

Case Story

In the heart of Croatia's capital, where space is scarce and environmental targets are becoming increasingly ambitious, Zagrebačka Pivovara d.o.o. (Zagreb Brewery) partnered with HEP Toplinarstvo, the country's leading district heating utility, to revolutionize the way process heat is delivered to industrial operations. The result is an innovative, high-temperature steam supply system that meets the brewery's heating needs with a clean, reliable energy source from district heating.

This collaboration is a rare example of high-pressure, high-temperature steam (260°C, 13 MPa) being delivered via district heating to an industrial site located in a dense urban area. The project contributes to Croatia's low-carbon goals and provides a blueprint for similar industrial facilities limited by space and local emissions constraints.

Collaboration

The partnership between Zagreb Brewery and HEP was driven by necessity and opportunity. As the brewery lacked space to build its heat generation plant in the city centre, and had high thermal energy needs for processes such as pasteurization, sanitation, and disinfection, district heating emerged as the only feasible long-term solution. The collaboration began during the construction of the brewery's production facilities, when HEP and the brewery aligned their interests around shared infrastructure. The city municipality played a regulatory role by issuing necessary permits for the steam pipelines, ensuring legal and infrastructural integration into the urban environment.

The roles within this case are clear: Zagreb Brewery is the process heat consumer and HEP the process heat supplier. The brewery is responsible for the internal heat integration, while HEP is the owner of the external pipelines and the steam delivery infrastructure.

Regular communication and technical coordination were key during planning and implementation. Both sides contributed to techno-economic feasibility studies, laying a clear foundation for investment and operational alignment.

Name of industry site	Zagreb Brewery
Name of district heating Site	HEP Toplinarstvo
Type of industry	Beverage
Project status	Operational
In operation by	2015
CO_2 reduction	375 t / year (after new CHP started-up by HEP)

When innovation meets necessity, sustainability becomes reality. At HEP, we are proud to show that even in the heart of a crowded city, cleaner energy can power industry without compromise."

(Mario Marjanović, Director, HEP Toplinarstvo)

Business Case

The business model is built around long-term supply security and efficient resource use. HEP owns and operates the steam supply infrastructure. They deliver 36,700 tons of steam annually, which is equivalent to 28,407,500 kWh per year of heat energy.

The investment driver for Zagreb Brewery was to find a suitable solution to cover the need for reliable high-grade heat sources under space constraints in the city center. For HEP the project secured a stable industrial consumer which helped to strengthen the base load utilization of the district heating system.

The decision was considered a significant strategic investment for Zagreb Brewery, ensuring not only operational continuity but also environmental compliance and long-term energy security. The district heating provider HEP can demonstrate the reliability and long-term value of their services to industrial users.

Pictures: Zagreb Brewery

Technical Description

This project stands out for the extreme parameters involved.

The high temperature Steam supply (260°C temperature and 13 MPa pressure) showcases what can be possible. Moreover, the brewery uses the steam directly for process heating, eliminating the need for combustion-based systems on-site. This Integration required customized engineering solutions at the brewery to handle high-pressure steam safely and efficiently. This solution freed up valuable inner-city space as the brewery did not need additional generation facilities

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THE PROJECT IS FUNDED BY

Danish Energy Agency

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