HOFOR
3D-design of pipe “bridge”

HOFOR (Greater Copenhagen Utility) has more than 1,100 employees and supplies 1.1 million customers in the Copenhagen metropolitan area. It is Denmark largest utility.

Damgaard Consulting Engineers designed a new pipe system (bridge) that crosses one of the busiest streets of Copenhagen, where planning and design was crucial.

A 3D model was made and the design of several physical bearings was done by mechanical engineering. Stress calculations were also done.

The planned installation went well without any delays or physical problems.

Execution: 2016
Client: HOFOR, Torben Hald
HOFOR
Construction management and supervision

HOFOR (Greater Copenhagen Utility) has more than 1,100 employees and supplies 1.1 million customers in the Copenhagen metropolitan area. It is Denmark’s largest utility.

Damgaard Consulting Engineers provides continuous construction management and supervision for challenging large-scale projects. This includes new buildings in the outskirts of Copenhagen and the refurbishment and rebuilding of the Carlsberg area from a brewery to a residential area.

Some projects also comprise a conversion from steam-based district heating to low-temperature district heating.

Execution: 2016
Client: HOFOR, Michael Sepstrup Nielsen
Norfors I/S
Pipe refurbishment

Norfors I/S is replacing 40-year-old DH pipes. Damgaard provides A to Z services for this project, including, planning, design, construction management, etc.

The project is challenging because the pipes are located in very narrow areas between old buildings. Consumers need to be provided with heat at all times which requires detailed planning.

Damgaard also participates in the dialog with consumers to ensure a future understanding of the project. A district-heating project will always inconvenience local residents to some extent, particularly in densely populated areas. Therefore, communication and information are very important.

The are three different construction contracts and Damgaard is managing all three on behalf of Norfors I/S.

Execution: 2016
Client: Norfors, Jørgen Søtoft
Hillerød Varme A/S - Drafting of project proposals for Gørløsegaard and the Møllebro neighbourhood

Regulatory projects are drawn up to obtain approval for supplying district heating to residential areas near Gørløsegaard and in Møllebro.

The project proposals were drawn up because Hillerød Municipality and Hillerød Varme A/S wanted to examine the possibilities of supplying district heating to the area sited for the construction of new low-energy houses, densely-situated low houses, residential properties and small commercial properties, all built within the framework of 2020 building projects.

The results were that a positive societal, commercial and user economy could be achieved by implementing the proposed building project, compared to the reference scenario which was heat pumps. The project proposal was adopted in the autumn of 2015 without objection.

The tasks of Damgaard Consulting Engineers include the drawing up of a complete project proposal, as well as carrying out calculations and sensitivity analyses.

Execution: 2015
Client: Hillerød Varme A/S, Kjeld Oksbjerg
Høje Taastrup Fjernvarme
Large heat pumps for heating

The closing down of a water catchment bore by HOFOR requires preventive drillings, as the groundwater level in a residential area would otherwise be too high.

HOFOR does not need this water. At a workshop, Høje Taastrup Municipality and Høje Taastrup Fjernvarme (HTF) mapped out the possible synergies in water and heating projects. Here, it was assessed that the water in the preventive drillings could be used as an energy source in big heat pumps.

In relation to this, an overall profitability analysis was carried out. However, heat pumps may not be set up in areas of Denmark designated for central heating and power. An application for an exemption was sent to the Danish Energy Agency, and the next phase of the project will be local environmental approval and plant design.
Guldborgsund Varme A/S (Brøndum)
Installation of new transmission lines

Guldborgsund Varme A/S has produced a pilot project regarding the establishment of a new district-heating connection under a railway area. The connection will replace the existing district-heating connection across the bridge that was removed in the winter of 2014/2015, in connection with electrification of the railway line between Ringsted and Rødbyhavn.

Damgaard is consultant for Brøndum in a turnkey contract. The district heating system consists of two Ø323 district heating lines and two Ø40 conduits.

The district heating lines are led from Højbrogade through a booster station, across a car park to Brovejen, under the railway area to the grounds of the sugar factory and continue on through Østerbrogade.

The consultancy is expanded to include consultancy regarding a railway-crossing application.

Execution: 2014–2015
Client: Guldborgsund Varme A/S, Cindie Holm Kaare
VEKS I/S - New heat exchanger station and transmission line

VEKS – via Glostrup Fjernvarme – is going to expand its selling of heat to Glostrup Hospital. In relation to this, a new transmission line plus a heat exchanger station at the hospital are being established. Damgaard is responsible for the detailed design of both the transmission line and the heat exchanger station. Furthermore, Damgaard participates in the coordinating of these activities with hospital operations to ensure that the construction works do not affect the emergency room or other construction works on the hospital’s premises.

As part of the detailed design, a 3D model of the heat exchanger station is being worked up, along with detailed design of piping and components, risk assessment, etc.

Execution: 2014–2015
Client: VEKS I/S, Flemming Andersen
Glostrup Varme A/S - Establishment of transmission line to Glostrup Hospital

Glostrup Varme has entered into an agreement with Glostrup Hospital regarding the supply of heat based on sustainable district heating.

In relation to this, a new transmission line from VEKS’ heat exchanger station at the hospital to the hospital’s existing heating installation is going to be established.

Damgaard is responsible for the detailed design of the transmission line. Furthermore, Damgaard is participating in the coordination with the hospital, to ensure that the initialisation of the transmission line is on time with minimum inconvenience.

As part of the detailed design, a 3D model of the heat exchanger unit has been made, along with the detailed design of piping and components, static calculations, etc. Furthermore, Damgaard is responsible for construction management and supervision during the construction phase.

Execution: 2015
Client: Glostrup varme A/S, Jens Peder Pedersen
Hillerød Varme A/S – Establishment of a 20-MW woodchip-fired heating plant and 25-km transmission line, including connection to stations

Hillerød Varme A/S is building a 20 MW woodchip–fired heating plant in Hillerød, plus 15 km of transmission line between the towns of Hillerød, Skævinge, Gørløse and Meløse. Damgaard won the contract for the consultancy, along with the company Niras.

Damgaard is responsible for all consultancy regarding the transmission line, as well as the overall strategy and functional description, in the context of the connection of the transmission line to the local heat and power stations.

The assignments include:

- detailed design
- hydraulic analyses
- review and determination of the final trench line of the transmission line
- identification of difficult stretches/crossings and similar
- agreements with the road authorities
- preparation of tender documents
- tendering and contracting
- construction management and supervision

Execution: 2014–2015
Client: Hillerød Varme A/S, Louise Anderson
VEKS I/S - Establishment of 20-km transmission line and pumping station

VEKS recently bought the Køge Combined Heat and Power Plant (CHP Plant). The new plant is to be connected to the remaining distribution system through a new 20-km transmission pipeline between Greve and Køge, plus a pumping station in Solrød.

The aim is for the pipe to be established within 18 months, as substantial savings will be achieved by putting the pipe into operation.

Damgaard is lent out to VEKS on this assignment and is in charge of VEKS’ project management in this project, which ranges from participation in designing the pumping station to participation in construction meetings regarding the transmission pipe routing.

To be able to realise Køge Municipality’s wish to establish district heating in Køge, VEKS has chosen to buy the biomass-fuelled Køge CHP Plant.

The district heating project in Køge reduces carbon emissions equivalent to the annual carbon emissions of 4,000 individuals, making it VEKS’ tangible contribution to converting natural gas areas into district heating areas.

Execution: 2013–2015
Client: VEKS I/S, Jørgen Eigaard.
Roskilde Varme A/S – Establishment of a heat exchanger and district-heating pipe system

The National Laboratory for Sustainable Energy, Risø, will be supplied with district heating in the future.

In this respect, Damgaard – on behalf of Roskilde Forsyning – has made a complete tender for the establishment of a heat exchanger and district heating pipe system for Risø and Risøhuse.

An overall functional description of the system and its components, along with principle drawings and contract negotiations have been carried out. Moreover, Damgaard will provide construction management and project supervision.

Execution: 2013–2014
Client: Roskilde Varme A/S, Anette Hejnfelt Strandberg
Roskilde Forsyning A/S – Renovation of district-heating pipes

This job concerns engineering consultancy in the main design and construction of district heating renovation in Hersegade and Stændertorvet. Existing Apurit/concrete channels with district lines must be replaced with new pre-insulated district-heating pipes.

The job in Hersegade demands focus on traffic management in particular and showing consideration for old buildings, as Hersegade is situated in the narrow streets of Roskilde’s old town centre.

The Stændertorvet job was carried out before a major renovation of the square in 2014/2015. Furthermore, the many pedestrians on the square need to be taken into consideration, and close coordination with the many shops in the area is crucial for the project.

Hersegade/Store Gråbrødrestræde

Hersegade is now supplied with district heating.

The supply lines are predominantly old Apurit/concrete channels that need to be replaced. The section is approximately 400 m long and includes approximately 20 service lines (approximately 300 m) and is situated between Algade and Jernbanegade.

The side street Store Gråbrødrestræde is also scheduled for renovation. The task requires additional traffic management and additional resources, as it is a small, narrow street situated in the old section of Roskilde.

Stændertorvet

As part of the renovation of Stændertorvet, there is a wish to replace the district-heating pipeline crossing the square. The main pipeline is about 100 m long and includes 8 service lines (approximately 100 m). The existing pipes are predominantly old Apurit/concrete channels. The task requires additional coordination with Roskilde Municipality concerning time schedules for square refurbishment.

Execution: 2013–2014
Client: Roskilde Varme A/S, Anette Hejnfelt Strandberg
Høje Taastrup Fjernvarme
Analysis of return temperatures

Technical consultancy in connection with the preparation of a model for analysing return temperatures.

The model is intended to analyse existing measurements of return temperatures from all customers. The model can assess the economic consequences of optimised return temperature at new rates with return-temperature incentives.

The results show how many customers will be affected economically differently, compared to the existing system, by a possible new rate, and how the rate needs to be configured to obtain the desired effect. The analysis also assesses what is required for customers to be sufficiently incentivised to optimise the return temperature.

Last but not least, the analysis will result in an overall technical and financial assessment of the optimisation potential.

Execution: 2013–2014
Client: Høje Taastrup Fjernvarme, Rudi Bjerregaard
Gentofte Fjernvarme
4th-generation district heating

Gentofte Fjernvarme is currently expanding the district heating network in several areas of the municipality. Ensuring a competitive, eco-friendly district heating system requires ongoing optimisation of both investments and continuous service needs. The purpose of the project is to illustrate the potential and possibilities of implementing a 4th-generation district heating system in one or more areas of the district-heating expansion in Gentofte.

The following subjects were analysed:

1. Assessment of areas (type of buildings, etc.)
2. Preparation of technical concept for 4th-generation district-heating grid
3. Hydraulic optimisation (Termis) of the grid to 4th-generation district heating
4. Investment and assessment of savings compared to a reference scenario (the present rate structure)

Execution: 2013
Client: Gentofte Fjernvarme, Johan Sølvhøj Heinesen
Gentofte Fjernvarme
Expansion of district heating, phases 1 and 2

Gentofte Municipality has adopted an ambitious district-heating development plan for the entire municipality that will contribute to making the energy supply in the Capital Region more climate-friendly.

The development will take place in five phases, where phases 1 and 2 are currently in progress. The existing grid will be expanded by approximately 17 km of mains in phase 1 and 15 km in phase 2.

Damgaard is sub-consultant for the expansion which, for instance, comprises preparation of preliminary studies, project engineering, construction management, technical inspection, hydraulic calculations, load prognoses, contractor tendering with contract negotiation, budgets, financial management, schedules, etc.

Execution: 2010–2015
Client: Gentofte Fjernvarme, Henrik Hansen
Egedal Municipality
Biomass-based district-heating plant

Stenløse South has become an attractive new urban area. The sale of lots began in 2006. Stenløse South comprises a total of 750 dwellings, which includes both private and non-profit housing, divided among terraced houses, cluster houses, tower blocks and single-family houses.

All homes are being built in accordance with Agenda 21 as low-energy houses using eco-friendly materials. The construction of the low-energy urban area demands close cooperation between several participants.

Based on the positive experiences from stages 1 and 2, Stenløse Municipality (before it became Egedal Municipality) chose to tighten up the requirements for the upcoming phases in Stenløse South.

These requirements corresponded to low energy class 1 in the new, revised building regulations. Furthermore, Stenløse Municipality submitted a project application to the EU CONCERTO programme seeking financial support for the project.

The application was accepted and the project’s overall experiences are being communicated through an EFP project, supported by the Danish Energy Agency’s Energy Research Programme 20.

A biomass-based district-heating plant and power grid are being established in Stenløse South. This system is capable of supplying the existing buildings and those to come in the new urban area of Stenløse South. In the long term, the biomass-based district heating plant in Stenløse South will be expanded to include the production of biomass-based combined heat and power and renewable solar and geothermal energy.

Execution: 2010–2015
Client: Egedal Municipality, Jørgen Larsen