



Energy Consultant Niels Hansen (right) watches Charles Hansen, Senior Application Specialist of Grundfos, inspect the Grundfos iGRID shunt station/mixing valve at Porsager Road in Albertslund, Denmark. The iGRID is making a low-temperature district heating zone for the 100-some houses on Porsager, reducing the outward temperature to 60°C.

DANISH UTILITY ENJOYS EASE OF GRUNDFOS IGRID TO CONTROL LOW-TEMPERATURE DISTRICT HEATING

Albertslund Forsyning, a district heating utility for a suburb of Copenhagen, wants to reduce its district heating outward temperature to 60°C – from up to 100°C – in order to reduce heat loss in the pipes and save energy. After experimenting with its own above-ground low-temp shunts for years, it installed a submerged Grundfos iGrid shunt/low temperature mixing station. Not only is it proving that it is a cost-beneficial solution for the low-temperature strategy, but the utility is also seeing the benefits of now being able to use renewable energy sources and surplus heat from buildings – plus making the overall system more efficient. See the case video or read the full story.

TOPIC:	Low Temperature District Heating
LOCATION:	Albertslund, Denmark
CUSTOMER:	Albertslund Forsyning municipal district heating company



One of the above-ground, homemade mixing-valve shunts that Albertslund Forsyning uses in order to create a low-temperature zone in a residential area. They prefer the way Grundfos iGRID can be submerged and hidden.

THE SITUATION

Albertslund, a suburb of Copenhagen, Denmark, supplies nearly all of its 28,000 residents and light industry with district heating. Its network stretches out on a finely branched system to row houses, villas and some multi-storey buildings as well as three industrial areas. In 2016, the municipality had a heat loss of 20% in its district heating network.

That year, Albertslund adopted a strategy for district heating. The objective was that by 2026, it would deliver low-temperature district heating of 60°C to its customers, according to Energy Consultant Niels Hansen of Albertslund Forsyning, the municipality's district heating company. Previously the outgoing temperature was between 85°-100°C.

"The lower the temperature, the lower the heat loss and energy loss," Niels Hansen says. "An added bonus is that with a lower temperature, we have a greater opportunity to utilize sustainable energy sources and surplus heat in town. So that's sort of a double-sided win-win."

By using the low-temperature strategy, Albertslund Forsyning estimates it can cut its heat losses by 50%, says Operation Manager Steen Westring.

LOW TEMPERATURE ZONES

Low-temperature district heating is best possible by supplying the heating into smaller sections, or zones.

"If we don't divide our heating district into smaller zones, we may have to send out 75-85 degrees from this plant in order to ensure 60 degrees to the end user farthest away," says Steen Westring. "Instead, we use shunts – or mixing valves – to divide our grid, and we have the zones behind those where we can mix down the temperature. In the shunt, hot and cold water are mixed to get the appropriate flow temperature to the supplied area. You control the pressure, the flow, with the pumps."

For several years, Albertslund Forsyning had been building its own shunts – experimenting with six different kinds. "They were all closet or container models – above ground models," says Steen Westring. "But you always want your infrastructure to look nice. District heating is known for not being seen or heard. It was something in the ground. So when we suddenly use mixing valves placed above ground, they pop up everywhere. They are in 20-foot containers. Even if you wrap them nicely, they're not pretty."



THE SOLUTION

As a better alternative, Albertslund is testing a new technology, the Grundfos iGRID. This is a submerged shunt station.

Niels Hansen says, “We found it smart that with the Grundfos iGRID, we could take an off-the-shelf solution, submerge it, and avoid having a ‘box’ above the ground.”

Albertslund tested the iGRID in a low-temperature zone with about 100 villas from the 1960s on a street called Porsager. They installed it in a pit at the start of Porsager Road in 2020.

“We envisioned that a great deal of the homes would have problems,” he says. “But it turned out that even on the coldest February day, only five houses experienced problems. And of those five, our own energy adviser could adjust the installations and achieve cooling and utilization of the lower temperature.” Only one villa needed to have components replaced in its own connection unit.

“We could have done all this with our own shunts, but Grundfos iGRID is a cheaper solution for us, because you get a package solution that is plug-and-pump, so to speak.”



Grundfos iGRID, submerged at Porsager Road in Albertslund, Denmark, to create a low-temperature heating zone (above), and Niels Hansen, Energy Consultant, Albertslund Forsyning. “The lower the temperature, the lower the heat loss and energy loss,” he says about the district heating network.

EU PROJECT FUNDING

Albertslund Forsyning received funding for the shunt at Porsager from the European Union’s Horizon 2020 research and innovation programme under grant agreement N. 857811. For more information see <https://www.rewardheat.eu/>



Albertslund Forsyning has tested the Grundfos iGRID with a low-temperature zone in the neighbourhood on Porsager Road. Here, Albertslund Forsyning and Grundfos are inspecting the Grundfos iGRID under the open lid. Normally, the lid is closed and secured at ground level.

THE OUTCOME

As of summer 2021, it is too early to post results of any heat loss reduction in the Porsager Road low-temperature heating zone network. But Albertslund Forsyning is optimistic.

“It turns out that our objective of delivering only low-temperature district heating to our customers by 2026 is not as impossible a task as we may have feared,” says Niels Hansen. He adds that collaborators from around Europe and Denmark have been stopping by to learn how they are tackling the strategy. There is a consensus of the role low-temperature district heating has to play in ways to mitigate climate change and save energy and carbon emissions, he says. “Because when you lower the temperature, the utilization of electricity, surplus heat and natural resources becomes much more efficient.”

The Grundfos iGRID gives Albertslund potential to lower the temperature in a smart, cost-effective way, adds Steen Westring.

“What I find really great about our project is that we, in collaboration with industrial suppliers such as Grundfos and Aalborg University, have been able to perform experiments that have changed our somewhat traditional idea of how to operate district heating systems. They’ve shown us a new way of doing things that may very well be better.”

GRUNDFOS SUPPLIED

Grundfos supplied a prefabricated Grundfos iGRID unit for Albertslund Forsyning. The iGRID includes a digital customer platform and pre-engineered Temperature Zones. These come with intelligent algorithms that secure precise temperature adjustments.



“In our collaboration, we’ve found a new way of doing things that may be better,” says Steen Westring, Operation Manager at Albertslund Forsyning, about the Grundfos iGRID.

“It turns out that our objective of delivering only low-temperature district heating to our customers by 2026 is not as impossible a task as we may have feared.”

Niels Hansen, Energy Consultant, Albertslund Forsyning

SOURCES

Facts and results published in this story come from on-site interviews in Albertslund, Denmark, with Albertslund Forsyning on 24 June 2021.