ENGINEERING TOMORROW

Case story | Danfoss Ally™

Danfoss Ally™ ensures comfort and wellbeing for school children

40%

Heat energy savings and 20% electricity savings on average per year

400 Danfoss Ally™ radiator thermostats have been combined with a pioneering new type of broadband heat distribution center for district heating and excess heat recovery.

The new system to control the indoor climate is invented by Hermosto Oy and Dimfrost Oy in collaboration with Iotoi Oy, Mawi Automation Oy and the local energy provider Porvoon Energia Oy and will benefit around 500 pupils at the Keskuskoulu School in Porvoo in Finland. As an additional win and because Ally™ has two open interfaces, Ally™ is a playground for system integrators or anyone who needs to tailor make their Business Management System.

"Based on all the products we have tried, utilized and encountered throughout our careers, I am still amazed at how great Danfoss products work together with our own solutions every time. To work with Danfoss Ally™ Thermostats is easy, and the specific temperature control offered by the Danfoss Thermostats gives us the perfect control platform. We have received superb local support at all times, and Danfoss is an easy choice since their products are top notch!"

Tomas Andersson concluded.

Worldwide, many children are exposed to poor indoor environments in schools with issues such as stuffy air, dampness, and mold, and uncomfortable temperatures. According to studies by the WHO, this not only causes illness and absenteeism but also reduces children's academic performance and wellbeing.

A new software engineering company in Finland has a solution to poor indoor comfort in schools, kindergardens and other facilities. They have developed an indoor energy ecosystem that utilizes low temperature excess heat produced by others to the return pipe in the same network. In combination with their Building Management System (BMS), the school is capable of optimizing its entire ecosystem including electricity and heat consumption with full control of all aspects of indoor comfort.

"The new Building Management System will save a lot of energy while striving for excellent conditions for the pupils. In addition to heat control, the system analyzes the air quality in each classroom. It also controls the air handling with multiple Ai´s and analytic applications running to decide the adjustments of individual rooms and segments of the school. The broadband heat distribution center will save not only the local energy company fuel costs but will also be able to heat up the school based on excess heat and heat recovery. In fact, the pupils and staff at the school can adjust their own comfort and feel the reaction because each and every Danfoss Ally™ thermostat is controlled separately by our system, "Tomas Andersson, cofounder of Dimfrost Oy and Hermosto Oy, explained.

40% heat energy savings and 20% electricity savings on average per year

At the school, they utilize low temperature heat from the district heating network´s return pipe to heat the building. The school will be running on return heat most of the year. The high temperature buffer will happen when it gets really cold outside. The high consumption peaks during winter will be fully controlled by the local energy company´s new platform without affecting comfort. But the system also recognizes much more than the temperature:

"The BMS recognizes volatile organic compounds inside and outside of the school building. It informs all system applications and suggests how to make adjustments based on facts such as contamination. For example, if the building is contaminated or in a bad shape, or if the wave of compounds is brought in by the people or if the outside air is momentarily contaminated by a truck running in the schoolyard or even recognizes when they are doing the dishes in the school kitchen. It also reports if everything is normal and healthy. CO2 levels, humidity, presence, lux (light), air pressure, temperature, and the number of people and their heatload are reported in every classroom separately as well. All this combined with detailed specific temperature control by the Danfoss thermostats gives us the perfect control platform. The best achievable indoor environment is our priority number 1 with this system, and the wellbeing and performance of the people inside the school will increase with our system," Tomas explained.

Danfoss Ally™ Radiator Thermostat is a connected radiator thermostat for residential use.

Danfoss thermostats gives us the perfect control platform. The best achievable indoor environment is our priority number 1 with this system

Tomas Andersson

System designers and co-founders Tomas Andersson & Ted Mellin

Keskuskoulu Elementary school in Porvoo, Finland

The Danfoss Ally™ Thermostats and the system have been implemented in late February 2021, and the estimated energy savings based on the recent tests are impressive:

The simulation shows 40% heat energy savings and 20% electricity savings on average per year based on a 5- year measurement of the school´s consumption history.

"We have been using Danfoss products in our production and in the field since 2007 mainly within refrigeration and HVAC. Based on all the products we have tried and utilized and encountered throughout our careers, I am still amazed at how great Danfoss products work together with our own solutions every time. To work with Danfoss Ally™ Thermostats is easy, and the specific temperature control offered by the Danfoss Thermostats gives us the perfect control platform. We have received superb local support at all times, and Danfoss is an easy choice since their products are top notch! Further, this combination of the Danfoss radiator thermostats and our two new technologies will benefit not only the energy producer Porvoon Energia, but also the building owner, the occupants, and even mother nature due to the energy savings. And most importantly, the combination of the Danfoss Thermostats and our technology will lead to less absenteeism and illness for the school kids," Tomas Andersson concluded.

The combination of the Danfoss Thermostats and our technology will lead to less absenteeism and illness for the school kids

Tomas Andersson

Fact box 1: The Building Management System communicates and controls the radiator thermostats through Modbus TCP/IP.

The school in Keskuskoulu is part of a project headed by the city of Porvoo by Porvoon Energia Oy (the local energy company) and consists of two parts:

1. **A completely new type of broadband heat distribution center for district heating, built and installed Dimfrost Oy.**

   Inventor: Tomas Andersson cofounder of Dimfrost Oy.
   System designers: Tomas Andersson and Hubbe Söderholm

2. **A completely new type of building management system that runs all the hardware in the school, connects to the grid, connects to other buildings and connects to the power production, built and installed by Hermosto Oy.**

   Inventor: Tomas Andersson.
   System designers and co-founders: Tomas Andersson, Ted Mellin and CEO Markus Wickholm

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Develop with **Danfoss**

Danfoss APIs gives you endless possibilities to securely access and operate data you demand to run your business both now and in the future.

Benefits of using our APIs

Data security

We use security standards like OAuth2 and our documentation is done via OpenAPI specifications.

One source of truth

All data you get is exactly the same data we operate with. You can trust the data in the API Products as you trust Danfoss.

Get started right away

Use our Sandbox products to start building in a flash. With just a few lines of code, our API's are ready to integrate with your applications.

Access the open API at https://developer.danfoss.com/ and try it out in your browser!

Fact box 2: Advantages with Danfoss Ally™

- Open API
- Zigbee 3.0 certified
- Full control of radiator and underfloor heating
- A higher level of comfort and energy efficiency by adapting room temperature to a daily schedule
- Easy to use and install with the intuitive app control
- Designed to bridge form and functionality
- Remote control from everywhere
- Fits 95% of all valves
- A maintenance-free thermostat – the battery lasts up to two years
- Works with Amazon Alexa & Google Assistant
- Superior temperature precision
- EPBD compliant

Read more: www.ally.danfoss.com

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