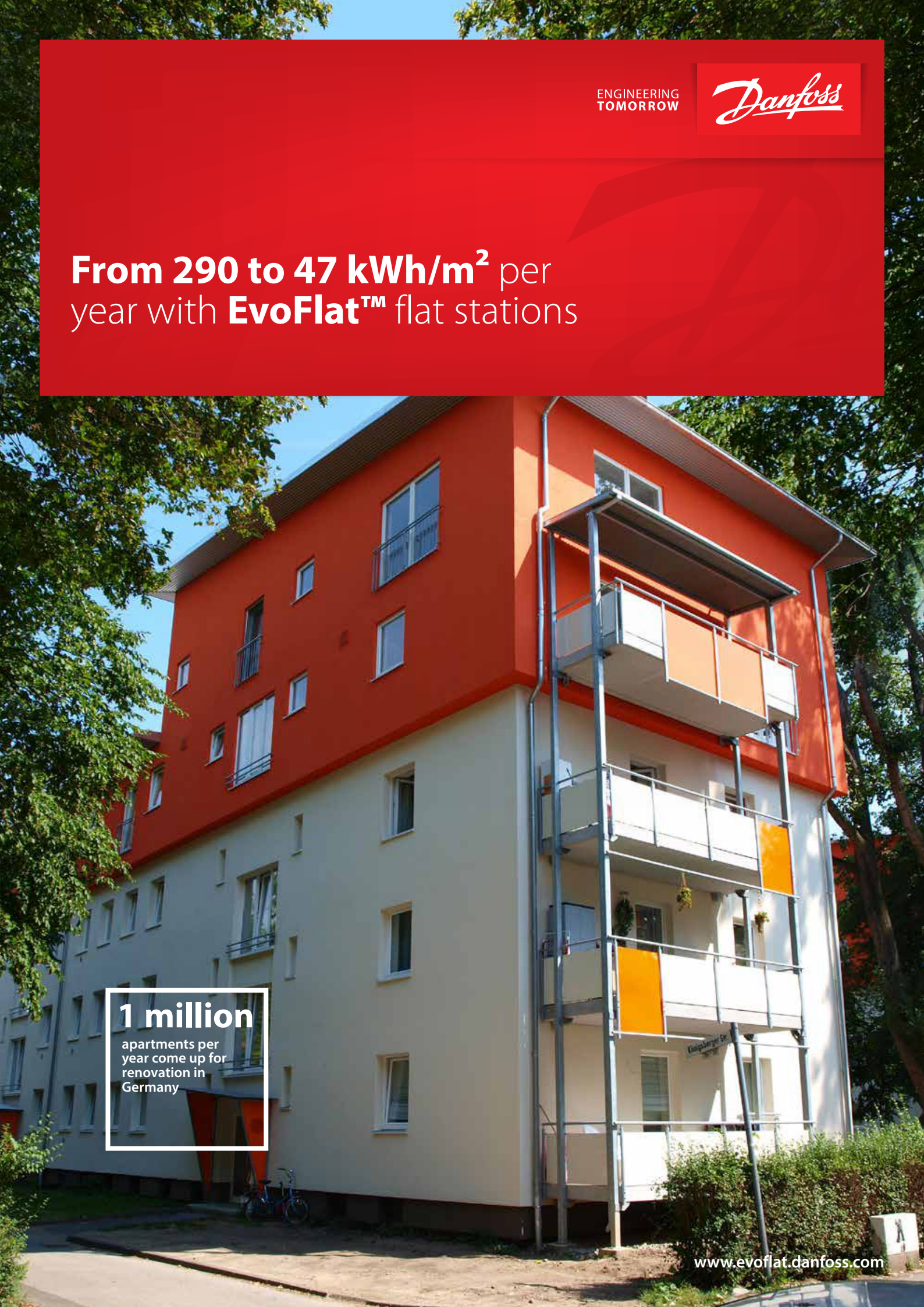
ENGINEERING
TOMORROW

Danfoss

From 290 to 47 kWh/m² per year with **EvoFlat™** flat stations



1 million
apartments per year come up for renovation in Germany

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> Following an architectural restoration and extensive modernization of building services, the simple apartments of the old Fordsiedlung in Köln-Niehl have given way to high quality yet still affordable housing units – and in a prime central location. Danfoss flat stations are now being used for heat distribution and DHW heating – all while capturing individual consumption costs.

Modernization of the Fordsiedlung in Cologne-Niehl

Decentralized local heating concept with individual flat stations

High-quality living spaces with energy-efficient building services

The total cost for LEG NRW GmbH's renovation project ran to €27.5 million.

After a two-and-a-half-year long conversion and addition project, the Fordsiedlung buildings of Cologne-Niehl, originally built in 1950/1951, now have a fresh, modern look. Working together with the architects of the Archplan architectural office, the real estate developer LEG implemented a new residential concept with an updated apartment mix: the original stock of 300 apartments, with an average size of 47 m^2, has given way to 264 family-sized and studio apartments. By adding another storey to the buildings with a total of 81 great new apartments, including 13 maisonettes, LEG also created additional living space.

Creative, powerful makeover

"Generally speaking, our objective was to improve the buildings' energy efficiency and to create more living space, but without building on empty lots – we also wanted to keep the apartments affordable." This is how Project Manager Rösener explains the specifications of the sustainable living concept, in which LEG invested around €27.5 million.

Using high-quality insulation in the façades and in the basement and attic ceilings, as well as new windows and doors with thermal insulation glazing, the buildings now beat the new-build standard established by the Energy Saving Ordinance (EnEV) by more than 30%. Featuring prefabricated wood construction, the new maisonettes downright excel, meeting the 3 l house standard. These energy standards reduce the need for space heating considerably. To provide the energy required, LEG has opted for an innovative solution that combines renewable and traditional heating technologies.

The energy concept was developed by Jürgen Kannegießer of the engineering firm KaTplan GmbH, based in Münster:

The space heating is supplied on demand by three local heating plants. The energy is supplied by a condensing gas boiler combined with solar panels mounted on the south-facing single pitch roofs of the newly built maisonette units. The solar heat is stored in three underground tanks with a capacity of 15,000 l each, from where it is fed into the local heating network. The heating arrives in the apartments in the form of hot water supplied via an individual transfer station. For this application, the specialist planners chose Termix VMTD-F flat stations by Danfoss.

Flat stations: Distribute energy ...

These flat stations are equipped with a distributor for the heating system, a powerful heat exchanger for decentralized DWH as well as a heat meter and water meter for each station. In this way, consumption is centrally recorded and individually billed; manual meter reading is not necessary – the best way to bill consumption for all parties concerned.

One key advantage offered by these flat stations is that little installation effort is required, keeping the installation costs low: only two heating pipes need to be laid (one for supply and one for return), plus an additional pipe for cold drinking water. Because there are no long DHW lines (inside the individual apartment the hot water volume in the pipework is below the 3 l DVGW limit), this eliminates the associated hygienic risk.

As complete, installation-ready flat stations, Danfoss' Termix VMTD-F are suitable for installation in new buildings and for use in projects to modernize existing housing stock – they require very little space and are available in both a wall-mounted variant with a hood and in a recess-mounted variant for installation in walls or shafts.

...while also capturing individual consumption costs

The heating circuit is designed for direct connection. The differential pressure controller provides just the right working pressure, thereby enabling individual temperature control in each room via the thermostatic valves.
Domestic hot water is heated by a powerful plate heat exchanger, and temperature is controlled using a thermostatic temperature controller. The patented sensor accelerator accelerates the closing of the valve and protects the heat exchanger against overheating (and therefore also against excess limescale, among other things). The heat exchanger cools the local (district) heating water very effectively, which makes this system especially economical to operate. The sensor accelerator and the controller also function as a bypass, keeping the building connection line warm. This cuts down the time spent waiting for hot water during times of reduced output in the local (district) heating network in the summer months. In short: The sensor accelerator ensures stable hot water temperature even with fluctuating power levels, supply temperatures and differential pressures, without the need to readjust the temperature.

Compared to the 10 l/min offered by conventional gas domestic water heaters, at 15 to 40 l/min, flat stations of the type Termix VMTD-F offer significantly improved hot water convenience. The tenant benefits from improved energy efficiency thanks to optimized system operation and lower operating temperatures in the heating station. This simple and reliable technology is also cost-effective in terms of maintenance and service.

When it comes to energy efficiency, state-of-the-art solutions are also on display "behind" the flat stations, inside the apartments of LEG's new Fordsiedlung: All living spaces are equipped with low-temperature radiators having room thermostats and a ventilation system with

Danfoss series Termix VMTD-F flat stations are complete hydronic interfaces with a compact but powerful plate heat exchanger that provides hot water immediately when the tap is opened. The station can also be supplied with connections for space heating, including fittings for controlling radiators or floor heating systems.

controlled supply and exhaust air – the radiators in the added story even feature heat recovery. "This is energy efficiency plain and simple," Monika Rösener comments with satisfaction. By way of comparison: Prior to the modernization, energy consumption was approx. 290 kWh/m2/year, with CO2 emissions of around 3,000 tons, corresponding to 10 tons per apartment. After the modernization, consumption comes down to approximately 47 kWh/m2/year, depending on the individual consumption patterns of the tenant. "This way we are able to cut CO2 emissions to around 180 tons in total, and around 0.7 tons per apartment per year – this is an amazing figure," says Rösener.

Conclusion:

The result of the renovation: high quality housing located in convenient proximity to the city. The energy concept implemented ensures significantly reduced heating costs, meaning that in spite of the higher rent, tenants are now living more affordably than before thanks to the low heating costs.

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