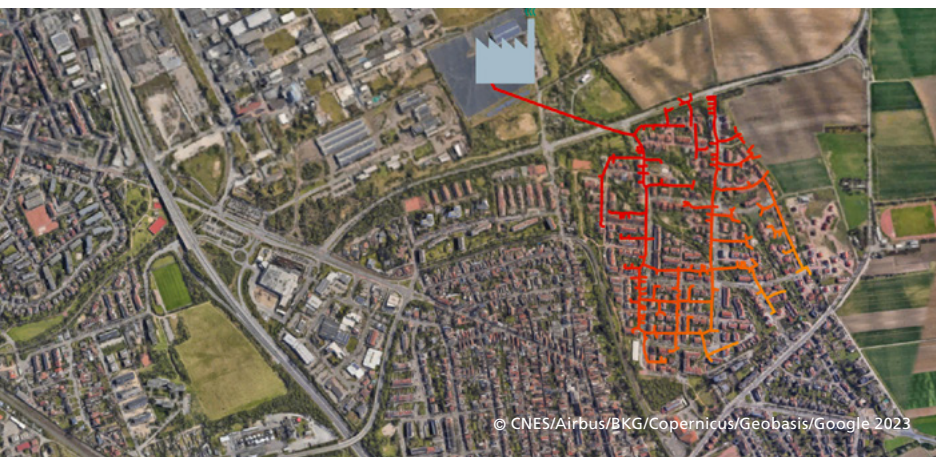


AD-Net – Intelligent Control of District Heating Networks

District heating is considered a central component of future energy supply. The optimal control of networks is currently a lively area of research in which researchers from the “Transport Processes” department are also involved. Their software tool “AD-Net District Heating” dynamically simulates and optimizes the operation of heating networks in real time. The software has been developed since 2015 in close collaboration with Technische Werke Ludwigshafen AG and GEF Ingenieur AG.



Heating network with temperature distribution

District heating suppliers often operate their systems at a constant temperature of around 90° C. In this operating mode, the feed-in power follows consumption, which fluctuates greatly throughout the day. In order to cushion the consumption peaks in the morning and evening, an additional gas boiler often has to be started up, which results in high costs and additional fuel consumption. The researchers therefore looked into the question of whether this additional firing could be avoided, at least during the transitional periods, by feeding water at a variable temperature into the pipe system.

Cut Load Peaks by Preheating

Like the drinking water supply, the district heating network also works via pressure equalization; this means that what is withdrawn by end consumers must be added at the plant at such a pressure that the heat exchangers in the households can work properly – but certainly at different temperatures. “In our model, the producer sends water at a high temperature but low speed into the grid before the consumption peak, which keeps the feed-in rate moderate. When the hot water reaches the customers, the plant feeds in a lot of water, but at a low temperature. This allows a high extraction rate while maintaining a moderate feed-in rate,” explains project manager Dr. Jan Mohring. This principle of pre-heating is well known, but can now be systematically optimized.

AD-Net Plans Two Days in Advance

AD-Net’s data is based not only on empirical values for consumption and temperature curves in the district heating network, but also on weather forecasts. This allows providers to plan even better, usually for two days. This facilitates the reliable supply of heat when large heat pumps or solar parks are also included in the energy mix in the near future.

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