SHS

Systemic Heat Shift

HELSINKI, FINLAND

Emissions domains addressed by the Pilot Activity

Consumption of non-electricity energy for thermal uses in buildings & facilities

Consumption of electricity generated for buildings, facilities & infrastructure

Key Terms

District heating demand response | Building automation | Virtual heat battery | Algorithm development | Non-residential buildings | Educational buildings | Price signal optimisation | Cybersecurity | Energy flexibility

Levers of Change

Data and Digitalisation | Democracy and participation | Financing and funding | Governance and policy | Learning and capabilities | Social innovation | Technology/infrastructure

Description of the Pilot Activity

Systemic Heat Shift connects city-owned buildings to intelligent heating control operated by the city's energy company — reducing energy consumption and CO_2 emissions by avoiding overheating and using connected buildings as a "virtual heat battery" that provides flexibility to the district heating system.
Year 1: A secure IT connection was established between the energy company's control system and the city's internal network, and the first pilot building was integrated. But developing an optimisation algorithm for educational buildings proved more challenging than anticipated. Sports arenas were removed from scope entirely. Personnel changes further slowed progress.

Year One Highlights

A functional secure connection between the energy company's control system and the city's internal network was established — more complex than expected given cybersecurity requirements following a recent data breach. Integration to the first pilot building was completed, with initial optimisation experiments conducted in spring 2025. Energy consumption modelling was completed to support algorithm development. The city's energy company phased out coal entirely in April 2025, district heating is now fully clean. A demand response product for residential buildings offering reduced prices for minor comfort flexibility was also launched and has been well received by housing companies.
Rather than continue with in-house algorithm development unlikely to be ready for the next heating season, the project is shifting to a price signal approach: hourly varying energy fees correlated to marginal production cost and CO_2 emissions, with an existing building automation partner optimising each building's consumption timing.

Innovation Highlights

The price signal model is a transferable alternative to centralised algorithm control — buildings self-optimise based on published hourly fees rather than requiring bespoke optimisation for each building type. The energy savings methodology, based on the relationship between water temperature changes and energy consumption rather than simple comparison, addresses a genuine measurement challenge in buildings where hot water use creates noise in the data.

Twinning with Newcastle-upon-Tyne (UK)

Both cities are working on energy and transport transitions and face challenges around public perception of district heating. Newcastle's stakeholder engagement experience is informing Helsinki's communications planning ahead of a public campaign on heating demand response in winter/spring 2026.

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