Horizon 2020
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How you will heat your home in 2017

The EU's building stock is old, is mainly heated by fossil fuels and accounts for 40% of EU energy consumption and 36% of CO2 emissions. No surprise then that the EU has set itself a target of 20% final energy consumption from renewable sources by 2020. Working towards that goal is the Horizon 2020 consortium "MPC-GT" (Model Predictive Control and Innovative System Integration of GEOTABS in Hybrid Low Grade Thermal Energy Systems – Hybrid MPC GEOTABS.

GEOTABS is an acronym for geothermal heat pumps (GEO) combined with thermally activated building systems (TABS). The latter includes technology such as pipes embedded in concrete floors through which warm/cold water is pumped to regulate thermal mass. When optimised, GEOTABS will be the perfect marriage of tech-nology for heating and cooling buildings, and promise tremendous energy savings over conventional systems.

So far the technologies are only 'engaged', explains Anne Caminade, project manager at Lemon Consult AG, a member of the MPC-GT consortium. "GEO-TABS are not yet commercially viable and there is still an information gap among architects and developers. We think that robust model predictive control (MPC) strategies, already used in the chemical, aerospace and automotive industries, could ensure smooth, efficient operation.

We also plan to simplify the design process to identify the heating/cooling base load, apply a systematic sizing approach to components early in the design, and let a fast reacting secondary system take care of peak disturbances, like unusual cold spells."

"Our consortium aims to improve the system efficiencies and real market uptake of hybrid MPC GEOTAB technologies"
Anne Caminde
Lemon Consult AG

Clear guidelines
"Our consortium intends to exploit the results of previous projects and take them a lot further," Caminade adds. "The challenge is to lower costs, streamline design and provide a step-by-step 'sizing' hand-book that engineers and architects can use from the feasibility stage."

Renovations
For older buildings, where recasting foundations would be expensive if not impossible, the consortium is working on an alternative approach using radiant ceiling panels with phase-change materials (PCM). "Materials with a higher thermal mass can help to thermally activate the building structure and recreate the selfregulating effect inherent in TABS". Coordinated by Ghent University, the consortium includes research institutes, industry and SMEs like Lemon Consult. "SMEs are in touch with clients and installers," Caminade says. "We can validate the concept, control models and look at benefits from a business point of view - it's a reality check."

"An MPC system predicts a building's thermal behaviour so that it can correct itself and deliver the best performance"

FACTS & FIGURES

Project Name
MPC-GT Model Predictive Control and Innovative System Integration of GEOTABS in Hybrid Low Grade Thermal Energy Systems – Hybrid MPC GEOTABS

Research Area
New heating and cooling solutions using low grade sources of thermal energy; Model predictive control

Organisations Ghent University, Belgium (Coordinator) and 11 partners

Start Date – End Date
01.09.2016 – 31.08.2020
Duration
48 months
Project Cost & Funding
€4.26 million Programme
Programme
Horizon 2020 Societal Challenges: Secure, Clean and Efficient Energy