

The energy consumption of swimming baths

The main goal of the project is to generate new knowledge of energy-consuming processes in swimming baths, the main focus being to optimise energy systems. This main goal will be achieved through mapping, modelling, fieldwork and analysis. The PhD project will be prepared from the perspective of mechanical installations, focusing on developing both climate targets and the energy supply system in terms of both supply capacity and economy. By developing success criteria for planning, evaluation and design, this PhD project will contribute to upgrading competencies with COWI, the university sector and the industry in general. The project will achieve its main goal through the following sub-goals:

- **Sub-goal 1** – Mapping and analysis of the special properties of the building type as regards use, energy demand and system complexity. Through a thorough literature study of international research, mapping of the special properties of the building type, and operational experience from existing buildings in operation with a state-of-the-art summary, the special properties of the building type will be systematized and analysed. This sub-goal will form the basis for the next steps under sub-goal 2.
- **Sub-goal 2** – Modelling and simulation of the energy and power consumption of the building type using an advanced simulation program. The results and experiences from the first sub-goal will be implemented in the model using extracts of data on power and energy consumption. Resources from the resource groups, both the corporate and university environments, will play a key role in this development.
- **Sub-goal 3** – Using the results from sub-goals 1 and 2, the energy system of the building type will be analysed, applying different scenarios. When developing the scenarios, the resource groups at COWI and the university will be immensely useful. This will also include mapping future external scenarios regarding climate targets and supply capacity. In a building type of this character and with this kind of complexity, there is a large potential for load control integrated in the very nature of the building type, both long-term and short-term storage of thermal energy. Combined with the possibilities relating to different system structures, this will result in a lot of interesting findings.

The project will be part of SIAT's (Senter for idrett og teknologi) research in energy consumption related to sports facilities, and this project will be their next step in their work with swimming baths. There is a well-founded basis for this project, including several studies carried out at bachelor, master and PhD level. On 18 September 2015, Wolfgang Kampel defended his PhD. His thesis mapped and described the vast potential in reducing energy consumption in this building segment. To COWI AS as project owner, this is in line with our objective and our strategy towards 2020, where the vision is to be the leading engineering consultant in complex buildings by 2020. Swimming baths are considered a highly complex building type, similar to hospitals. COWI AS's

Trondheim unit is today considered the leading consultant in hospital planning.
The project will both feed and nourish this professional environment.