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Hot topic



KRZYSZTOF KLOBUT

In an engaging interview **Krzysztof Klobut** and **Jyri Nieminen** from VTT and **Matti Laukkanen** from Hyvinkään Lämpövoima discuss their research which seeks to find solutions to district heating issues



To begin, could you describe what district heating is?

KK: It is about generating heat at one location, transferring it over a distance and using it at another location. There are different types of heat producers, eg. dedicated plants producing only heat, combined heat and power (CHP) generating plants, or industrial enterprises that create heat as a by-product of manufacturing processes.

Can you give an insight into the work you are conducting at present?

KK: In recent years my projects have dealt with the challenges of energy consumption in buildings. One of these current projects aims at finding district heating solutions adequate for residential low energy districts of the future. This is a national technology development project involving energy-providing companies.

Which factors are you assessing in finding the most cost-effective district heating solutions?

KK: Heat generated in CHP plants is 'waste' from the process of generating electricity. But the energy efficiency of CHP is typically 40 per cent higher than other options that separate electric power and heat generation – all of them using the same fuel. Typically CHP plants provide electricity to the grid and heat for large consumers like towns, eg. Helsinki. Therefore they represent the best option from a technological point of view.

Building the plant, distribution pipelines and heat distribution substations as well as

servicing the whole chain and running it with the right parameters is costly. In addition, tariffs must be created according to a business model that assures added value to the consumer (comfortable indoor climate and domestic hot water with stable parameters) at an affordable price. So, a cost-effective district heating solution is the right blend of all of these factors.

Which different research directions are you exploring?

KK: The idea to lower the temperature level in the network is being examined. We are investigating whether some new connection scheme in the heat distribution substation, other than standard today, will be helpful in this respect. Domestic hot water, whose consumption will not change considerably, will have an increasing share of total heat consumption (that will decrease) in the future. We envisage the dynamics of using hot water in buildings having a greater impact on the distribution network in the future. Therefore, we are exploring this effect at the design stage. Regarding heat generation, we are investigating the potential utilisation of municipal and construction waste. In addition, some new service concepts and business models are on the agenda.

ML: District heating in Finland has been gradually developed and used successfully for decades. Its share in heating Finnish cities is already very considerable, so it will require more than one project to achieve an improvement. However, the fundamental idea so far has been to satisfy demands of buildings using more energy than buildings in the future will use. Therefore, an adjustment in the

concept is necessary to facilitate combining effective technology with decreasing demand.

What are some of the main expected results of the project?

JN: The project will provide up-to-date information on the possibilities of CHP-based district heating in low energy buildings, and the ways and means of improving the competitiveness of such systems compared to other energy solutions.

KK: District heating solutions for single-family houses with 2012- and 2020-levels of heat consumption will be developed; the potential of using communal waste in energy generation will be assessed; and opportunities will be examined to expand the use of district heat to replace conventional heating in some household's electrical appliances.

New business and service models for district heating in single-family houses will also be developed; short- and long-term variations, eg. the presence of power peaks, in district heating consumption will be examined. We also think that the project will contribute to the future development of the national building code.

How will information be disseminated to consumers?

KK: Project results will be made public and will be reported actively during housing fairs in 2013 in Hyvinkää. Obviously, we will also write a project report, publish articles in scientific journals and make presentations at seminars and conferences.

Our partner in the project, the Energy Industries Association, will forward the project results directly to industry. We have also joined an international collaboration activity under IEA/DHC Annex TS1 on Low Temperature District Heating to share experiences of this project and learn from others.

ML: All of these activities are intended to strengthen general confidence in district heating as a reliable, environmentally friendly and efficient technology in the future.