IEA HPP Annex 32 Japan

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Economical heating and cooling systems for low energy houses

Japan

Japan is represented by a large national team where 4 Universities, 3 utilities and 16 companies are taking part in the Japanese national activities in the frame of IEA HPP Annex 32. In the following the national team leaders of the **University of Hokkaido** and **TEPCO** are given as contact persons.

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Japanese national project

The Japanese national project in Annex 32 deals with the redesign and further development of heat pump systems for low energy houses in two different climatic zones of Japan. (Fig.1).

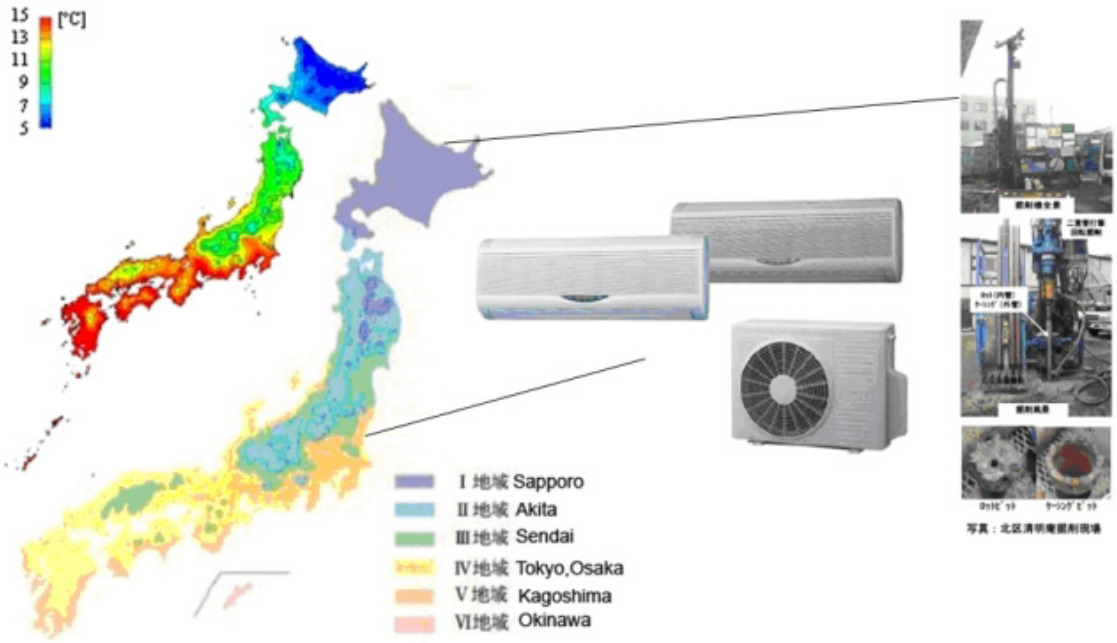

Fig. 1 Climatic regions of Japan and heating systems used in this areas

In the cold region of Hokkaido Island, most of today's heating systems are using fuel oil. For this area, adequate heat pump solutions shall be developed for the low energy house applications. Two ground-coupled systems have been field-monitored by Hokkaido University. The systems use inverter-controlled ground-coupled heat pumps with borehole heat exchangers, mechanical ventilations systems, heat pump water heaters as well as solar technologies. Moreover, other prototype technologies like a passive humidity control by packed beds of siliceous shale in the ventilation system are evaluated in the field monitoring. Results are documented in Best Practice Sheets and in the field monitoring report.

However, 80% of the Japanese population lives in the moderate climate zone (Tokyo, Osaka), where space heating and space cooling requirements exist. Reverse operating heat pump air con-ditioners for space heating in winter and air-conditioning in summer are very popular. However, the design of the system is not adequate for highly-insulated dwellings. In the frame of the Japanese project, a design method has been derived, which matches the heat load of low energy buildings and yields a better seasonal performance due to higher part load efficiency.

Moreover, the control of the systems has been evaluated. Last but not least, developed methods have been integrated in the new Energy Efficiency Act enacted in 2009.

Results are documented in the field monitoring report.

Japanese links

Heat Pump and Thermal Storage Centre of Japan (HPTCJ)
HPTCJ hosts the Japanese National Team, which cooperates on an international level with the IEA Heat Pump Programme and the IEA Energy Conservation through Energy Storage Programme.
The website includes news, publications, etc. in Japanese and parts in English at
http://www.hptcj.or.jp

NEDO
NEDO is Japan's largest public R&D management organisation for promoting the development of advanced industrial, environmental, new energy and energy conservation technologies.
The website is in Japanese and parts of the information are in English at
http://www.nedo.go.jp