

Addressing the scale and complexity of the global energy challenge.



LOW-ENERGY COOLING AND HEATING CONCEPTS FOR COMMERCIAL BUILDINGS FROM A EUROPEAN PERSPECTIVE

Building Systems Engineering Seminar Series

Jens Pfafferott, Team Leader Solar Building Group
Fraunhofer Institute for Solar Energy Systems in Freiburg, Germany

Monday, February 28, 2011
3:00 p.m., ECCR 139 (Engineering Center)

Summary:

Beginning with a motivation for low-energy cooling and heating concepts in the context of substantial energy consumption associated with the built environment, the talk will introduce opportunities for harnessing environmental energy sources and sinks (geothermal exchange and ambient air) and compare the primary energy performance of conventional and several low-energy designs. A particular focus will be on low-exergy cooling systems without any need for vapor compression systems. An argument is made for a new holistic evaluation rubric for commercial building concepts, including human comfort, building envelope and HVAC system energy efficiency. This rubric is applied to the comparison of a range of building energy designs concepts, revealing few buildings perform well on all metrics, but confirming that the inclusion of environmental energy holds the key to substantial efficiency improvements in a wide range of building types.

Jens Pfafferott, Ph.D.

Dr. Jens Pfafferott has been team manager at the Solar Building Group at Fraunhofer Institute for Solar Energy Systems in Freiburg, Germany since 2001 and leader of the passive and energy-efficient cooling research. He received his Diplom-Ingenieur degree from the Technical University Berlin in Energy and Process Engineering in 1997 and worked in the power industry for four years as a group manager for energy management. His doctoral thesis at University of Karlsruhe aimed at the enhancing of the design and operation of passive cooling concepts. He has published about 50 publications, of which 12 appeared in international peer reviewed journals, and he is reviewer for international journals and committee member in conferences. He is involved in German standardization work VDI 4706 "indoor climate". He is directing co-financed research projects with industrial partners concerning refurbishment of buildings, certification of low-energy buildings with passive / low-energy cooling, thermal comfort and low-energy cooling, design projects, and low-exergy heating and cooling concepts.

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