

Solar Design in Architecture and Urban Planning

Status quo and Perspectives

In recent years, society has become aware and therefore sensitive for the destruction of the natural environment with its unpredictable economic and ecological consequences.

With the purpose of conservation, goals have now been set to reduce the consumption of fossil fuels and to utilise energy more efficiently and cost-effectively. As a result of these goals, specifications and requirements for the construction and design of buildings are changing. One key to meet these objectives will be the successful utilisation of active and passive solar design principles in urban planning and building construction.

Already the first sketches for a new town planning concept have an impact on the future energy demand of the buildings. Employing solar design principles, such as securing the "right of sunlight", help to cut down the future energy demand for heating up to 35%, without the need to invest in higher construction costs. Structural and technical measures used later within the buildings, such as heat insulation, rational energy use or renewable energy technologies, etc., should consequently follow these initial efforts, but are not able to replace them.

Already today sufficient scientific know-how and technical information do exist to provide effective solar design solutions. Together with the system components available on the market or under development, architecturally and conceptually successful solar urban plans and solar buildings can be realised. Visionary projects have shown this with success.

In order to achieve this on broad scale in particular non-technical problems still need to be solved. Some of them will be mentioned in the presentation.

So far the vocabulary of solar and ecological design has not been widely accepted among architects and urban planners. The majority of them still feels that solar design implies rigid design limitations rather than new design opportunities. Occupants feel a restriction of their life style by requiring them to give up old habits or to take care for the operation of technical equipment.

These kinds of attitudes can be traced back to a lack of understanding and knowledge about today's achievements and design varieties of such technologies. It need to be made clear, that solar design is not about a fashion, far more it describes an opportunity to secure the future energy demand of our buildings.

Such a value change in urban planning and building construction is not easy to attain. Most likely it will take the time of more than one generation to achieve a major breakthrough because old habits and thought processes need to be suspended and pointed in the right direction.



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Biography of Dr. Ingo B. Hagemann

CV

1964: Born in Recklinghausen, Germany

1990: Diploma Degree in Architecture (Dipl.-Ing.), RWTH Aachen University, Germany

2002: Ph.D. in Engineering Science (Dr.-Ing.), RWTH Aachen University, Germany

2002: Master of Technology in Environmental Science (M.Techn.),
RWTH Aachen University, Germany

Dr. Ingo B. Hagemann is a chartered architect and consultant focussed on renewable energy technologies and sustainable building design. With his work he bridges conventional scientific and design disciplines and aims to provide a knowledge and information base for the successful application of solar- and ecological design concepts and products in buildings.

From 1991 to 1994 he took part in a multi-disciplinary research programme, called "Interdisciplinary strategies for the protection of the environment" at RWTH Aachen University, Germany. For more than 10 years he served as a German representative to the International Energy Agency's (IEA), SHCP, Task force 16 „Photovoltaics in Buildings“ (1992 – 1996) and the IEA, PVPS Task force 7 „Photovoltaics in the Built Environment“ (1997 – 2002).

In 1996 he joined the Alternative Energy Programme (FY1996) “Solar Energy (Solar Cells)”. He got invited to take part in it by the “EU-Japan Centre for Industrial Cooperation of IIST” on behalf of NEDO. In 1997 he acted as a consultant for “Building Integrated Photovoltaics” to the German secretary of the “German-Japanese Council for High-Technology and Environmental Technology (GJCC)”.

In summer 2002 he published the German book „Building Integrated Photovoltaics. The Architectural Integration of Photovoltaics in the Building Envelope”. This book is considered as the German standard reference book about “Building Integrated Photovoltaics” and received the German “Solar Book Award 2002”.

He is head of the architect’s office ARCHITEKTURBÜRO HAGEMANN, a small but flexible and high profile architectural consulting firm. With his office he provides services in the field of architectural design, building research and as a consultant for ecological building design and educational programs.

Scholarships

- Three years research scholarship of the Deutsche Forschungsgemeinschaft (German Research Foundation)
- Several travel-scholarships

Publications

- More than 40 book contributions, scientific papers or articles in professional journals, published in English, German, French or Japanese
- Hagemann, Ingo B. “Gebäudeintegrierte Photovoltaik. Architektonische Integration der Photovoltaik in die Gebäudehülle”. Köln: Müller. 2002. ISBN 3-481-01776-6 (432 pages; further informationo: www.baufachmedien.de/photovoltaik)