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Design Guidelines for Low Energy Housing with Validated Effectiveness: Hot Humid Region Edition

**-House Design to Achieve 50% Reduction
in Energy Consumption-**

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Foreword to English version

Building Research Institute and National Institute for Land and Infrastructure Management published the design guidelines for Japanese practitioners, who aim at substantial energy saving for residential buildings (detached houses) in mild climate regions (June 2005) and hot humid climate regions (August 2010). The guidelines were developed on the basis of the research outputs, especially experimental validation and prudent application of simulation programs, by the above-mentioned research institutes.

In Asia and Oceania regions, there are many countries, which have hot humid regions and are growing rapidly in population and economy. The fact means that energy consumption and resultant CO₂ emission due to the use of houses and other kinds of buildings is increasing and there is a need to help practitioners and various decision makers with much more reliable information on how to design residential buildings. This is the reason why Building Research Institute decided to publish this English version of the design guidelines for energy-saving detached houses in hot humid regions, which was originally published in Japanese by Building Research Institute and National Institute for Land and Infrastructure Management.

As mentioned in the design guidelines, the optimized solution for a best possible energy saving house depends on its design conditions, such as detailed characteristics of the climate, surrounding outdoor conditions, lifestyle of the residents, economical aspect of building components and delivered energy and so on. Therefore, though the framework of this design guidelines and qualitative explanation can be universal, the detailed quantitative information should be carefully interpreted and applied to the situation other than Japanese ones.

I hope the English version of the design guidelines, entitled “Design Guidelines for Low Energy Housing with Validated Effectiveness; Hot Humid Region Edition”, will be utilized by practitioners and various decision makers when they aim at finding practical and economically feasible solutions for energy-saving houses in their countries.

December, 2010

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Foreword

Japan aims to reduce CO₂ emissions by 80% compared to the emissions in 1990 by 2050 as a long-term goal in order to achieve a low-carbon society. In order to achieve this long-term goal, it is essential to make efforts toward controlling CO₂ emissions due to residential and commercial buildings through the promotion of energy conservation. Meanwhile, in terms of health promotion and improvement in convenience and comfort, houses in Japan still need improvement and quality enhancement. Therefore, it can be said that the establishment and spread of more rational building technology is in demand in order to solve the two tasks, energy conservation and quality enhancement, at the same time.

In June, 2005, the National Institute for Land and Infrastructure Management (NILIM) and the Building Research Institute (BRI) published the Design Guidelines for Low Energy Housing with Validated Effectiveness: House Design to Achieve 50% Reduction in Energy Consumption as a result of housing technology development research conducted between 2001 and 2004. After that, as energy-efficient technology development research, the National Institute for Land and Infrastructure Management has been conducting a research project named “Research on promoting technologies for improving energy efficiency of residential buildings (2005 – 2007)” and the Building Research Institute has also been implementing “Research on validated technologies for enhancing the energy performance in buildings and methods of application to existing stocks (2006– 2008)”. This book, which contains the guidelines for hot and humid climate, was developed as one of the results of those research projects and summarizes the design technologies for low energy housing with validated effectiveness in hot and humid regions of Japan. The framework for evaluating energy performance was developed mainly by the NILIM, and energy-saving elemental technologies were validated and prescribed mainly by the BRI.

In the research and development, the “Low Energy Housing with Validated Effectiveness Development Committee” (Chairperson: Professor Yuzo Sakamoto, Graduate School of the University of Tokyo; Adviser: Professor Emeritus Kiyonori Miisho, Shibaura Institute of Technology), a study group in which experts from the fields of industry, universities and government were requested to participate, was established within the Institute of Building Environment and Energy Conservation. This committee has implemented measures for developing technology while seeking expertise and a wide range of knowledge from outside.

Lastly, we would like to sincerely pay our respects to the many researchers and engineers from research institutes, universities and companies, who were involved in the planning and writing of these guidelines, local practitioners who cooperated in the research on hot humid regions, and other people concerned for their efforts and cooperation. At the same time, we hope that these guidelines will help deepen the understanding of those readers involved in housing construction and contribute to the improvement in the energy efficiency, convenience and comfort of Japanese housing in the future.

August, 2010

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