

Development of web-based information technology infrastructures and regulatory repositories for green building codes in China (iCodes)

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Abstract

With the unprecedented pace of construction in China, reliable and consistent communication between the various building industry players (both local and international) throughout the whole building delivery process is of paramount importance for the successful achievement of green building improvement in China. In order to achieve the goals of the green building standards through integrated team work in a reformed building delivery process, a web-based information technology (IT) infrastructure named China Green Building Codes and Standards Online (iCodes) is developed based on advanced web application and database technologies. The principal strategic thrust of the work is to develop an integrated bi-lingual platform to support the processes involved in building energy efficiency practices as well as research and development (R&D) purposes. It aims to provide a consistent knowledge repository for generating educational material for teaching and training purposes that cover the life-cycle building delivery process. With the help of the fast growing and wide spread Internet technology in China, this integrated IT framework and features will enable efficient dissemination of green building practice related information throughout China.

Keywords

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1 Introduction

China has been experiencing an unprecedented building boom in scale and pace. It is estimated that over 40 billion square meters of construction spread over some 5 million buildings will be added to the urban building stock by 2030, which is equivalent doubling the existing floor areas in the country. Total building related construction accounts for about 25% of China's GDP currently. Such demand is generated by the rising urbanization rate in China (expected to reach 75%) whereby over 400 million people will move to cities and the urban population will reach one billion by 2030.

It is estimated that the building sector accounts for between one quarter and one third of the total energy use in China. This is expected to increase, not just due to the urbanization process but also the continuously rising UNDP's (United Nations Development Programme) "Human Development Index" which considers the living standard

improvements (Klugman 2011). According to the McKinsey's report (Tomas and Enkvist 2009), 619 million tons of CO₂, or 17% of the global GHG (greenhouse gas) emission mitigation potential in the building sector in 2030 is forecast to come from China.

Building energy code development and enforcement is commonly regarded as one of the most important and effective instruments for mitigating GHG emission attributed to the building sector's energy consumption. China has a relatively short history in building energy related code development. It is a challenging task due to the fact that China is a vast and diverse country. It has an area of 9.6 million square kilometers, spans 49 degrees in latitude and 62 degrees in longitude. It includes 5 thermal climate zones, from severe cold to the subtropics. The population consists of 56 races spread over 34 provinces and 333 cities and has generated different cultures as well as local architectural/construction styles (NBSC 2011).

The first mandatory national building energy code was

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