Woodhead Publishing Series in Civil and Structural Engineering

Cost-Effective Energy-Efficient Building Retrofitting

Materials, Technologies, Optimization and Case Studies

Edited by Fernando Pacheco-Torgal, Claes-Göran Granqvist, Bjørn Petter Jelle, Giuseppe Peter Vanoli, Nicola Bianco, and Jarek Kurnitski

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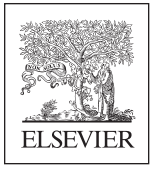

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The building sector is responsible for high energy consumption and its global demand is expected to grow as each day, there are approximately 200,000 new inhabitants on planet Earth. The majority of electric energy will continue to be generated from the combustion of fossil fuels releasing not only carbon dioxide, but also methane and nitrous oxide. Energy efficiency measures are therefore crucial to reduce greenhouse gas emissions of the building sector.

Energy-efficient building retrofitting needs not only to be technically feasible, but also economically viable. New building materials and advanced technologies already exist, but the knowledge to integrate all active components is still scarce and far from being widespread among building industry stakeholders.

Part One of this book addresses thermal insulation materials, phase change materials, reflective materials, smart windows, solar collectors and building integrated photovoltaics. Part Two reviews measurement and verification models, smart energy systems and optimization with genetic algorithms and neural networks. The book concludes with several interesting case studies on energy efficient retrofitting for various building types in different climatic zones.

This book provides essential knowledge for civil engineers, architects and other professionals working in the field of cost-effective energy efficient building retrofitting.

Fernando Pacheco-Torgal is an investigator in the C-TAC Research Centre at the University of Minho, Portugal. **Claes-Göran Granqvist** is a Professor of Solid State Physics at Uppsala University, Sweden. **Bjørn Petter Jelle** is a Professor at Norwegian University of Science and Technology and a Chief Scientist at SINTEF, Norway. **Giuseppe Peter Vanoli** is an Associate Professor at University of Sannio, Italy. **Nicola Bianco** is an Associate Professor at University of Naples Federico II, Italy. **Jarek Kurnitski** is a Professor at Tallinn University of Technology, Estonia.

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