World Academy of Science, Engineering and Technology
International Journal of Architectural and Environmental Engineering
Vol:9, No:05, 2015

Energy Efficiency Retrofitting of Residential Buildings Case Study: Multi-Family Apartment Building in Tripoli, Lebanon

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Abstract : Energy efficiency retrofitting of existing buildings was long ignored by public authorities who favored energy efficiency policies in new buildings, which are easier to implement. Indeed, retrofitting is more complex and difficult to organize because of the extreme diversity in existing buildings, administrative situations and occupation. Energy efficiency retrofitting of existing buildings has now become indispensable in all economies—even emerging countries—given the constraints imposed by energy security and climate change, and because it represents considerable potential energy savings. Addressing energy efficiency in the existing building stock has been acknowledged as one of the most critical yet challenging aspects of reducing our environmental footprint on the ecosystem. Tripoli, Lebanon chosen as case study area is a typical Mediterranean metropolis in the North Lebanon, where multifamily residential buildings are all around the city. This generally implies that the density of energy demand is extremely high, even the renewable energy facilities are involved, they can just play as a minor energy provider at the current technology level in the single family house. It seems only the low energy design for buildings can be made possible, not the zero energy certainly in developing country. This study reviews the latest research and experience and provides recommendations for deep energy retrofits that aim to save more than 50% of the energy used in a typical Tripoli apartment building.

Keywords : energy-efficiency, existing building, multifamily residential building, retrofit
Conference Title : ICSBAE 2015 : International Conference on Sustainable Building and Architectural Engineering
Conference Location : Paris, France
Conference Dates : May 18-19, 2015