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Towards Net-Zero Energy Buildings - Integration of Renewable Energy Sources in Buildings

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Abstract

There is a significant concern within the international community regarding the use of fossil-fuel based energy sources and the associated release of harmful emissions and its impact on global worming and the subsequent sever weather changes encountered globally. Buildings account for approximately 40% of the worldwide annual energy consumption (WBCSD 2009). Total global energy consumption in 2007 was about 500 quadrillion British thermal units (Btu), meaning the buildings sector consumed about 200 quadrillion Btu. According to the Energy Information Agency, worldwide energy consumption is expected to increase by about 1.4% per year through 2035, implying that buildings will consume about 300 quadrillion Btu by the year 2035 (EIA 2010). Therefore, the global community must urgently consider the transition from fossil-fuel based energy sources in buildings to renewable energy sources, targeting Net-zero Energy Buildings (NZEB). This talk provides an overview of such transition, addressing renewable energy technologies suitable for the use in new and existing buildings. Some case studies and findings of the research team at the Thermal Processing Laboratory (TPL) at McMaster University, Canada, considering the use of passive renewable energy systems for new and existing buildings, will be presented and discussed.

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