Energy and carbon emissions of buildings

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Abstract (300 word limit)

The built environment is responsible about half of the greenhouse gas emissions in the U.S. and 30–40% of the total carbon emissions in the UK. It has been reported at attributing 48% of all energy consumption in the US with around 75% of all the electricity produced in the US and 20–40% of the total energy consumption in Europe and other advanced countries. Buildings also contribute indirectly to greenhouse gas emissions. Production of construction materials is primarily dependent on conventional energy sources in many parts of the world. Construction sector in India emits about 22% of the total annual emission of CO_2 resulting from the Indian economy. Out of the emissions from the construction sector, around 80% are resulting mainly from the products/industrial processes of energy intensive building materials (i.e. cement, lime, steel, bricks and aluminum.) Over the next three decades, the building stock is projected to grow extensively, which creates an extraordinary opportunity to achieve significant emissions reductions in the building sector. Pressure to slash CO_2 emissions continues to mount with growing levels of legislation and incentives to preserve our environment. To meet these targets, considerable research into energy efficiency is underway. This review helps in developing an insight for the role of city planning and buildings in global carbon emission and identifies potential design solutions and key technologies that help to improve energy efficiency in the building sector.

Image

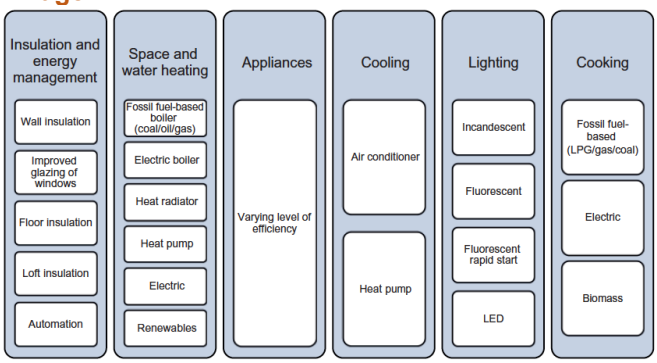


Figure 2. Technical potentials identifying key technologies to improve energy efficiency in the building sector.

Recent Publications (minimum 5)

1. Al-Sallal, KA (2017) Learning Sustainability from Arab Gulf Vernacular Architecture. In: Sayigh A. (eds) Mediterranean Green Buildings & Renewable Energy. Springer, Cham. PP. 885-96.
2. Al-Sallal, KA (2016), Low Energy Low Carbon Architecture: Recent Advances & Future Directions, a book in the book series "Sustainable Energy Developments", CRC Taylor and Francis Group.
3. Hasan, A., KA Al-Sallal, H. Alnoman, Y. Rashid, S. Abdelbaqi (2016), Effect of integrating phase change materials (PCMs) into the concrete blocks on heat gain prevention in hot climate. Sustainability — Sustainability 2016, 8(10), 1009
4. Al-Sallal, KA (2014), A Review of Buildings' Energy Challenges and Tactics. International Journal of Environment and Sustainability Vol 3, No 1 (2014) Special Issue, Science Target, Canada.
5. Al-Sallal, KA, L. Al-Rais (2012), A Novel Method to Model Trees for Building Daylighting Simulation Using Hemispherical Photography. Journal of Building Performance Simulation (2012) 1-15, Taylor & Francis.
6. Al-Sallal, KA, Al-Rais L, Bin Dalmouk M (2012), Designing a Sustainable House in the Desert of Abu Dhabi. Renewable Energy (2012) 1-5, Elsevier.
7. Al-Sallal, KA, L. Al-Rais (2012), Outdoor airflow analysis and potential for passive cooling in the modern urban context of Dubai. Renewable Energy 38 (2012) 40-49, Elsevier.



Biography (150 word limit)

Khaled A. Al-Sallal is currently a professor of architectural engineering and the director of the Daylighting Simulation Laboratory at UAE University. His area of expertise is sustainable design with emphasis on building energy. He has a Ph.D. from Texas A&M University and a Master's degree from Arizona State University. His teaching and research has focused on building performance and simulation and carbon-neutral design. In 2011, he established the state-of-the-art Daylighting Simulation Laboratory at UAE University that runs under his technical management. He has produced numerous publications in international refereed journals and books, and gave presentations in many international key conferences. He served as Editor-in-Chief of EJER and a member of editorial boards of other scientific journals. He is a member of the IBPSA BOD and founder and president of IBPSA-UAE, WSSET Vice President Middle East, and active full member of ASHRAE and Vice President/BOG member of ASHRAE Falcon Chapter.

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Notes/Comments: