

Climate Change Forum cum Workshops –
GHG Reduction Solutions for a Low Carbon HongKong
30 Sep 2010 (Thu)

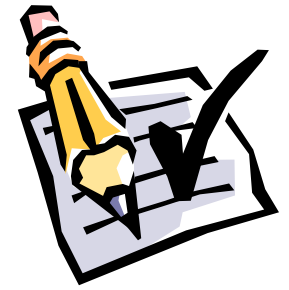


Zero energy and zero carbon buildings



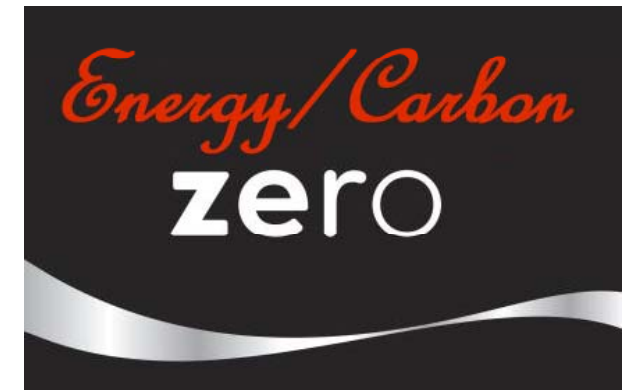
Dr. Sam C M Hui
Department of Mechanical Engineering
The University of Hong Kong
E-mail: cmhui@hku.hk

Basic Concepts



- Zero energy building (ZEB)
 - A building that produces as much energy on-site as it consumes on an annual basis
 - “Net” zero energy building
- Advantages of ZEB:
 - Reduce energy consumption and costs
 - Reduce carbon emissions
 - Reduce dependence on fossil fuels

"0"



Comparison of low energy, zero energy/carbon and green buildings [adapted from ECEEE (2009)]

	Pros	Cons
Low energy building (LEB) (e.g. passive house)	Cost optimal; well established principles with thousands of buildings constructed	Does not achieve greatest energy/carbon saving potential
Zero energy building (ZEB)/ Zero carbon building (ZCB)	Greatest energy/carbon saving	More expensive; limited practical experience
Green Building (GB)	Takes account of wider sustainability and resource use issues	May not be realistic across all new buildings

Initiatives and Pilot Projects



- Major initiatives in the world
 - UK
 - 2016 Zero Carbon Homes and Zero Carbon Schools
 - 2018 Zero Carbon Public Buildings
 - 2019 Zero Carbon Buildings
 - Europe
 - Amending of the 2002 Energy Performance of Buildings Directive (recast)
 - By 2019, ZEB mandatory for new buildings and zero energy to a certain percentage of refurbished buildings

Initiatives and Pilot Projects



- Major initiatives in the world (cont'd)
 - USA
 - Architecture 2030 (www.architecture2030.org)
 - AIA 2030 Carbon Neutral Design Commitment (www.aia.org)
 - ASHRAE Vision 2020
 - Develop the tools by 2020 to enable viable ZEB by 2030
 - U.S. Department of Energy:
 - Net-Zero Energy Commercial Building Initiative
 - Net zero for all U.S. commercial buildings by 2050
 - Zero Energy Homes research initiative

Examples of ZEB/ZCB projects in the world



Pearl River Tower, Guangdong,
China [2010]



Self-sufficient solar house, Freiburg,
Germany [1992]



Pusat Tenaga Malaysia's ZEO
Building, Malaysia [2007]



BCA Academy, Singapore [2009]

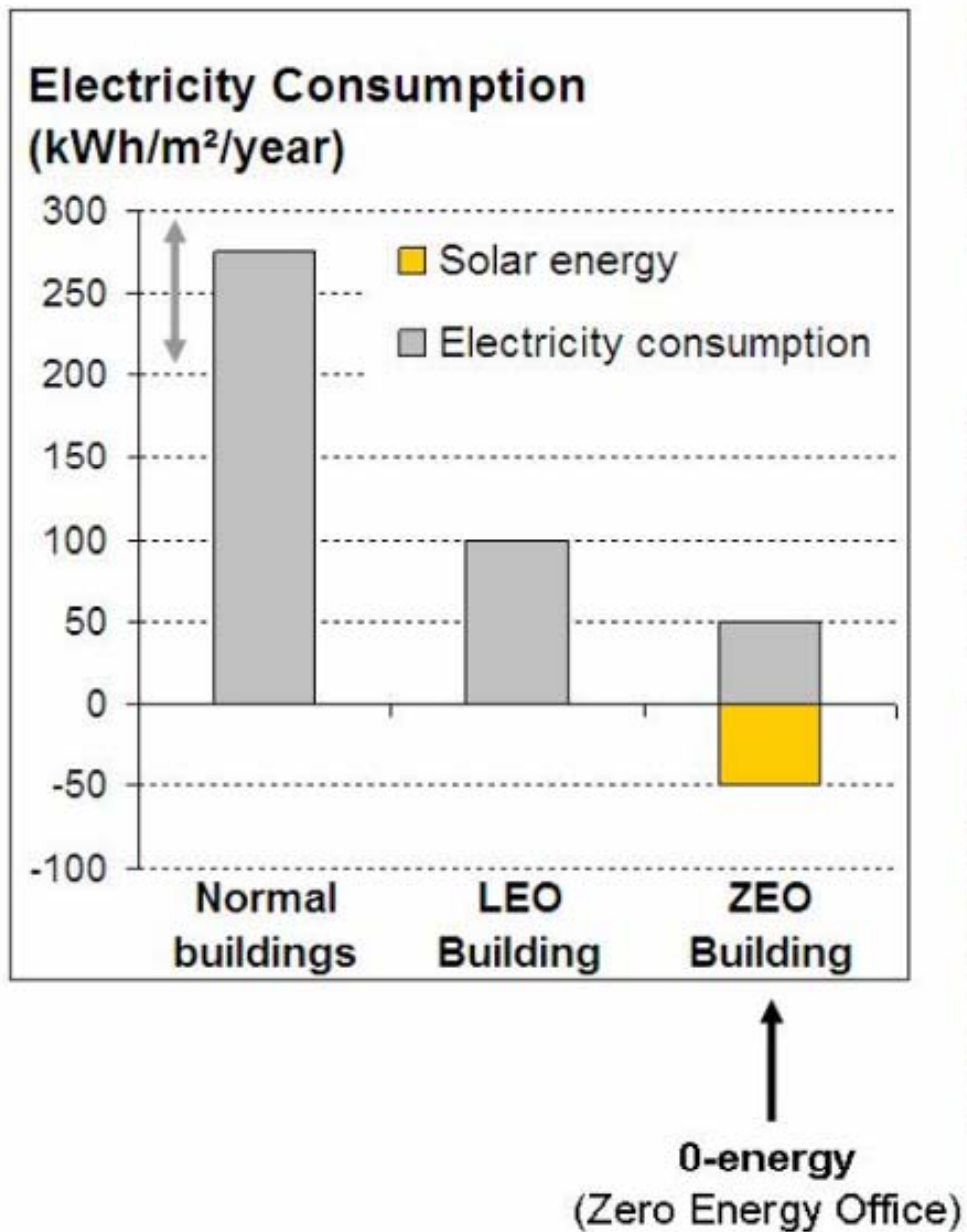


Beddington Zero Energy
Development (BedZED), London
[2002]

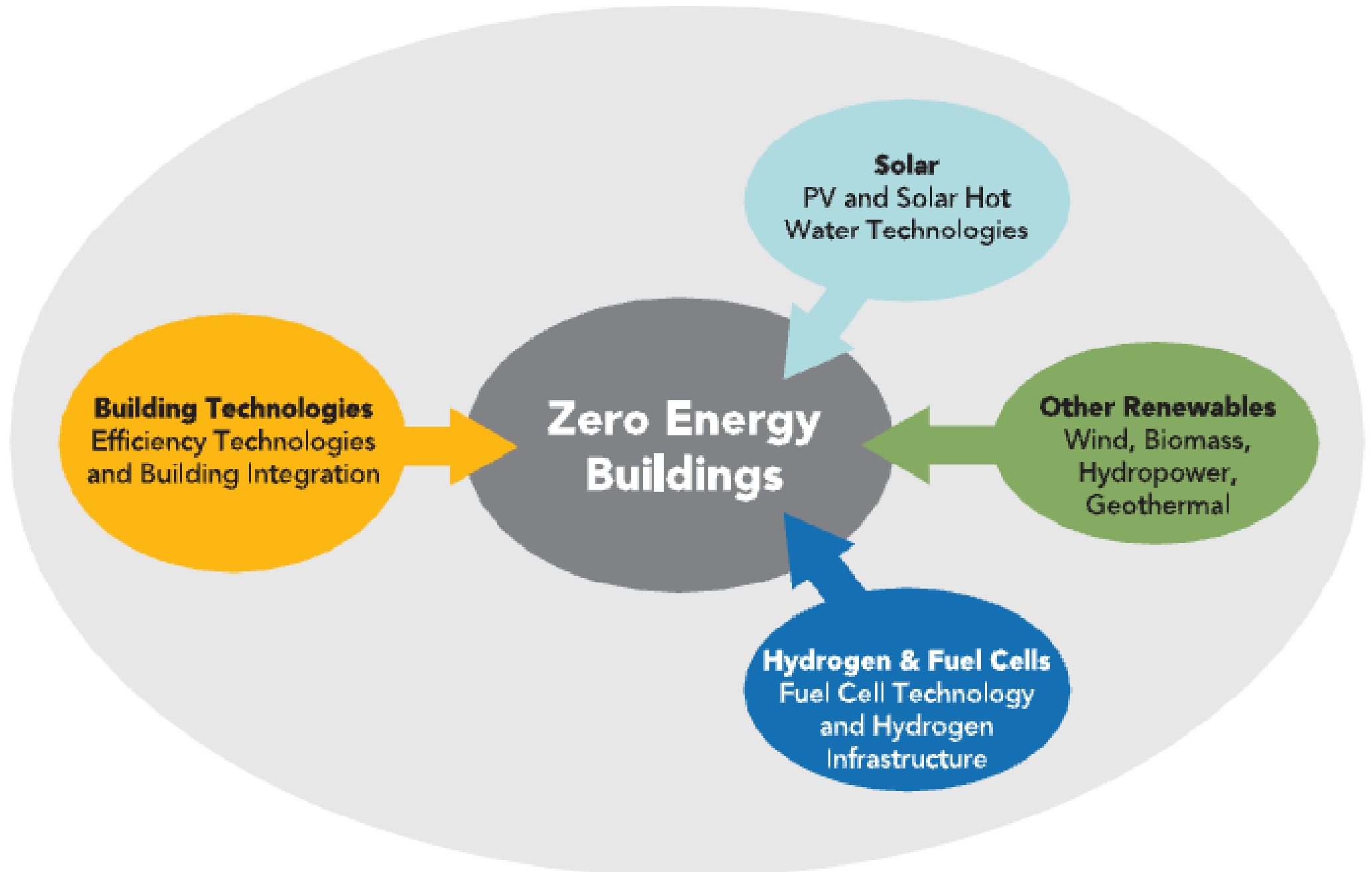


The Barratt Green House in
Watford, UK [2008]

Malaysia low energy building and zero energy building



Strategies for net zero energy building [Source: NSTC (2008)]



THANK YOU

