Zero and Low Energy Buildings

Description: Essential research for anyone involved in reducing one of the major sources of carbon emissions - the construction and property industry.

- Reducing the carbon footprint of commercial and private buildings.
- Installing low emission technology during renovation.
- Low emission technology and the construction companies.
- The impact of the property market slowdown on low emission initiatives.
- Low emission technology as a market differentiator for architects.
- Opportunities for low emission technology and materials vendors.
- In this report: The Peabody Trust, DENA, Clarum Homes, Bill Dunster Architects, Mazria, Seattle Green Building Program and Encraft.

Buildings make a large contribution to the energy consumption of a country. It is estimated that, of the total energy generated in the industrialised world, 40% of it is used in the construction and operation of residential, public, and commercial buildings. Approximately one third of primary energy worldwide is consumed in non-industrial buildings such as dwellings, offices, hospitals, and schools where it is utilised for space heating and cooling, lighting and the operation of appliances. In the European Union (EU), energy consumption for buildings-related services accounts for between 33% and 40% of total EU energy consumption. Energy used for heating, lighting and powering buildings can account for up to half of a country's total energy consumption. In an industrial economy, domestic water heating can account for over 5% of total energy use, domestic space heating up to 20% and appliances and lighting up to 30%. In terms of the total energy end use, consumption of energy in the building sector is comparable to that used in the entire transport sector.

This high percentage of energy use in buildings compels us to look at the potential for energy savings in the light of dwindling fossil fuel resources, insecurity of energy supply, and the risk of climate change proving to be caused by the emissions of greenhouse gases from the burning of fossil fuels. The financial benefits of using less energy are clear – energy-efficient dwellings and work places cut energy bills for householders and businesses.

The creation of an energy-efficient building starts with the design process itself. There are software packages on the market that not only assist in solving particular problems related to the building envelope, orientation, materials, and the design of heating, ventilation and air conditioning systems, but also enlist the use of artificial intelligence in helping the designer to reduce the energy consumption of a building.

Renewable energy sources such as solar, wind, and geothermal can be used to reduce the carbon footprint of a building. Solar energy can be captured using hot water solar collectors, photovoltaic panels or designing the building so that its actual structure acts as a solar collector. In some cases medium-scale wind turbines can be used to generate electricity for large buildings or groups of residential properties.

Perhaps the largest contribution that architects and builders can make to carbon emission reductions is to reduce a building's energy demand by increasing the efficiency of heating and cooling systems, lighting systems and appliances, and ensure the building itself does not 'leak' energy.

This report examines a range of technologies and building techniques that could revolutionise the building industry worldwide and provide both architects and builders with a competitive edge as governments put in place legislation to reduce carbon emissions and energy dependency.

The research in this report will be of interest to:-

- Architects.
- Property developers.
- Low emission technology suppliers.
- Energy providers.
- City planners.
Investors.
Energy strategists and policymakers.

The reports are written for organisations who wish to exploit the growing market for renewable energy.

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