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Buildings and Climate Change: Current Status, Challenges and Opportunities

Worldwide, 30% to 40% of all primary energy is used in buildings. Patterns of energy consumption are environmentally intensive and are not expected to change in the near future without proper policy interventions and technological improvement. In this context, the United Nation Environment Programme (UNEP) has recently published its conclusions on climate change and buildings. While significant improvement opportunities exist in the building sector, there are major challenges to be met, both in low and high income countries.

The building and construction sector is a key sector for sustainable development. From a global perspective, this sector typically provides 5% to 10% employment nationally and generates between 5% and 15% of a country's GDP. On one hand, it provides the framework for social development and economic growth at micro level, but on the other hand, the building and construction sector accounts for the largest share in the use of natural resources, by land use and material extraction. In Europe, buildings account for 40%-45% of energy consumption and therefore contribute to significant greenhouse gas emissions. As such, this sector offers important opportunities for energy saving and greenhouse gas emission mitigation and could play a significant role in meeting the Kyoto targets.

In this context, the United Nations Environment Programme has recently published a report investigating the links between the building and construction sector and climate change. In this study, an international team of scientists provides an overview of energy consumption patterns in buildings, identifies energy saving opportunities and concrete solutions, and explores policy aspects and possible ways of integrating the energy efficiency of buildings into the instruments of the Kyoto protocol. The main conclusions of this study are as follows:

- The pattern of energy use in a building is strongly related to the building type and the climate zone where it is located. The level of development also has important effects. CO_2 emissions are currently higher in industrialised countries but estimates suggest that developing countries will increasingly contribute to global warming in the coming decades. The challenge is thus to determine how industrialised countries can manage their environmental impact while helping developing countries achieve economic growth in sustainable ways.
- Most energy consumption occurs during the occupational phase for heating, cooling, and lighting purposes. It is therefore important to make buildings more energy-efficient through better insulation or the use of heat/cold recovery systems, for example. As occupants play a significant role in the energy consumption patterns of buildings, educational and awareness raising campaigns are therefore crucial as well.
- The building and construction sector has considerable potential for positive change, and can become more efficient in terms of resource use, less environmentally intensive, and more profitable. The stakeholders must keep in mind that there are no universal solutions for improving a building's sustainability. General guidelines must be adjusted to the climate, economic, and social contexts of different countries. Sustainable buildings can also be seen as a significant opportunity for mitigating greenhouse gas emissions as part of the Kyoto protocol.
- The main obstacles to energy improvement in buildings are high investment costs, lack of information on energy-efficient solutions at all levels as well as perceived or real lack of specific available solutions.

The authors conclude that there are both needs and opportunities for supporting improved energy efficiency and reduced greenhouse gas emissions from the building and construction sector. Due to climate conditions, as well as economic and social disparities in different countries, solutions need to be adapted to local conditions. Economic incentives, policies, and educational efforts are some examples of attractive instruments that may help achieve these objectives.

For more information: see the 2nd ETAP forum on Eco-Innovation http://ec.europa.eu/environment/ecoinnovation2007/index.htm

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