

## ENVIRONMENTALLY SUSTAINABLE BUILDINGS: CHALLENGES AND POLICIES

### EXECUTIVE SUMMARY

*This book indicates the direction of policy development in the area of environmentally sustainable buildings.*

*The building sector has significant impact on the environment.*

*Government policies are expected to play an important role.*

*The building sector has unique characteristics that have created barriers to improvements.*

*The effectiveness of building regulation is limited.*

*Energy audit may be an effective tool.*

*A landfill tax effectively reduces the final disposal.*

This book presents an analysis of the environmental impacts of the building sector, and characteristics of main policy instruments with regard to reduction of CO<sub>2</sub> emissions, minimisation of construction and demolition waste, and prevention of indoor air pollution, and indicates the direction in which environmental policies for the building sector should be strengthened.

The building sector has major impacts not only on economic and social life, but also on the natural and built environment. Various building activities, such as the design, construction, use, refurbishment and demolition of buildings, directly and indirectly affect the environmental performance of the sector.

- The building sector accounts for around 25-40% of final energy consumption in OECD countries.
- The construction sector accounts for between one-third and one-half of the commodity flow in selected OECD countries. Consequently, a great amount of construction and demolition waste (C&DW) is being generated.
- Indoor air quality can significantly affect human health. People usually spend as much as 90% of their time indoors.

It is apparent that there is much room for improvement and for reducing the environmental impact of the building sector, but various barriers stand in the way and these may be difficult to overcome solely through market mechanisms. Under such circumstances, government policies are expected to play an important role in reducing the building sector's environmental impacts, and various policy instruments have been developed in OECD countries.

The building sector has several unique characteristics in terms of its product, production process, and the way the product is used. (e.g. long-lived nature, spatially fixed nature, discrepancy between owners and users). These unique characteristics have created specific barriers to improving the environmental performance of buildings and building activities.

Both theoretical and empirical analysis have been undertaken to evaluate the main policy instruments, and the findings have provided valuable insights into policy instrument characteristics and their implications.

#### *Policy instruments for reducing CO<sub>2</sub> emissions from buildings*

- It is often difficult to set mandatory standards for building design that are strict enough to have a substantial impact on a significant proportion of new buildings.
- Views on the potential impact of energy taxes on investment in energy efficiency measures are mixed and further studies are necessary to draw any conclusion.
- Energy audit programmes can encourage energy efficiency investment in existing buildings.

#### *Policy instruments for minimising C&DW*

- A landfill tax can effectively reduce the final disposal of C&DW if the tax rate is set high enough.
- Although regulatory instruments, such as a ban on landfill, may have great potential to reduce the final disposal of C&DW, there appears to be no empirical evidence to clearly indicate their effectiveness.

- At downstream stages, virgin material taxes may have great potential to promote recycling with modest administrative cost.

*Policy instruments for preventing indoor air pollution*

- Regulations on the quality of building materials could effectively improve indoor air quality with modest administrative costs.
- Environmental labelling schemes directly encourage manufacturers to produce materials that are better for health.

**A number of recommendations to OECD countries can be made.**

Key policy recommendations to OECD countries for improving the policy design for environmentally sustainable buildings include:

*General policy framework*

- Establish a national strategy for improving the environmental performance of the building sector.
- Establish a framework to regularly monitor the environmental performance of the building sector.
- Develop a close partnership between government and industry for the support of R&D and technology diffusion.

*Policy instruments for reducing CO2 emissions from buildings*

- Appropriately co-ordinate regulatory instruments and non-regulatory instruments.
- Develop synergies by combining economic instruments and information tools.
- Place more emphasis on energy efficiency improvement in existing buildings.

*Policy instruments for minimising C&DW*

- Create synergies for minimising C&DW by co-ordinating policy instruments across the stages of the life-cycle of buildings.
- Reduce the final disposal of C&DW with a combination of economic and regulatory instruments.
- Establish sustainable material flows within the building sector by promoting the use of recycled building materials in building construction.

*Policy instruments for preventing indoor air pollution*

- Improve the quality of building materials by implementing instruments that target building materials manufacturers.
- Avoid providing misleading information to consumers.
- Establish a framework to identify newly emerging indoor health problems.

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