



## A summary of the “Buildings and climate change - summary for decision makers” report

### How do buildings contribute to climate change?

Buildings are currently responsible for more than 40% of global energy and one third of global greenhouse gas emissions. As well as being already significant in absolute and relative terms, emissions from the building sector are increasing. Between 1971 and 2004, carbon dioxide (CO<sub>2</sub>) emissions grew 2.5% per year for commercial buildings and 1.7% per year for residential buildings.

In addition to emitting CO<sub>2</sub>, the building sector also contributes other greenhouse gases such as halocarbons, chlorofluorocarbon, Hydrochlorofluorocarbons and hydrofluorocarbons which are used in appliances within the building e.g. for refrigeration and insulation.

The good news is that the building sector has proven and commercially available technologies which are capable of cutting energy consumption in both new and existing buildings by 30 - 80%.

### What are the barriers to energy efficiency within the building sector?

Most countries have already introduced policies to improve energy efficiency within the building sector. However these policies have often not resulted in actual reductions in emissions. The reasons are:

#### **A large number of small reduction opportunities**

– The building sector has many small reduction opportunities spread across millions of buildings. These are known by scientists as “long tail” projects – it is relatively easy to achieve large emission reductions in a small number of large buildings, but becomes increasingly difficult as the size of the buildings gets smaller. Given the large number of buildings, the aggregate savings from the “long tail” are likely to exceed the savings from the top end.

**Fragmentation of the building sector** – Buildings have a long life cycle with many different stakeholders involved in different phases of a building’s life. There are very few opportunities or incentives for coordination between them.

**Perceived “first cost” barrier and split economic interests** – An occupant may only live in a building

for a short period in the buildings lifetime. Significant investment in energy efficiency might not be cost effective for an occupant.

**Lack of awareness about low cost energy efficiency measures** – There needs to be greater awareness among stakeholders about low-cost energy efficiency measures which are proven to be equal to or more effective than high cost technologies.

**Lack of indicators to measure energy performance in buildings** – Most building occupants have little or no information about the energy saving potentials of their building. A lack of clear indicators to measure energy consumption makes it difficult to gauge savings from energy efficiency improvements.

### What needs to be in place before emissions reduction strategies can be developed within the building sector?

- **Data and information about the Building Sector.** Without a good understanding of the existing type, size, age, construction etc. of buildings and what emissions currently are, it is difficult to design and implement suitable reduction policies.
- **Energy performance requirements and indicators.** Once energy performance indicators are in place, building codes can set energy performance standards. Users will be able to assess the costs and benefits of their energy efficiency investments. Energy performance indicators will also be critical in informing reliable national inventories of energy consumption.
- **The capacity to design and implement efficiency measures.** Without the capacity to collect, analyse and use data on energy consumption in buildings, government officials and building professionals will not be able to adhere to new policies, therefore training and equipment is needed. Enforcement of regulatory policies is vital to ensuring building codes and energy efficiency standards are met. In order for building professionals to apply new technologies and standards they will need the technical knowledge and skills.

- **Consultative frameworks for policy making and communication.** National governments must take the lead in bringing together stakeholders and facilitating greenhouse gas mitigation policies.

## What are the policy options for reducing emissions from buildings?

The five major policy objectives for reducing greenhouse gas emissions from buildings are:

1. **Improve energy efficiency in new and existing buildings.** This can be achieved through the use of measures such as mandatory *building codes* which stipulate energy efficiency standards for new and existing buildings. *Periodic building commissioning and mandatory energy audits* ensure that a building's systems have been designed, installed and are performing as they were intended to. *Capital subsidies, grants, subsidized loans and rebates* are useful incentives to engage the residential sector. *Energy Performance Contracting (EPC)* means a contractor guarantees certain energy savings over a certain period.
2. **Improve the energy efficiency of household and business appliances.** This can be done by introducing measures such as *appliance standards* which are periodically updated to reflect the development of evermore efficient technologies. *Fiscal incentives* such as reductions on import tax of VAT can be used to incentivise consumers to buy energy efficient equipment. *Procurement policies* enable customers who procure large quantities of energy-using appliances to influence the market towards more efficient products.
3. **Encourage energy suppliers to support emission reductions** using *demand-side management (DSM)* activities whereby utilities suppliers change consumers energy behaviour e.g. via public information campaigns. *Energy efficiency obligations* provide energy suppliers with a legal obligation to save energy in their customer's premises. *Energy efficiency certificate schemes* ("white certificates") confirm energy savings which have been made by suppliers. *Public benefit charges* tax the energy market and funds raised can be reinvested into energy efficiency measures.
4. **Changes in attitudes and behaviour** can be brought about by *increasing energy prices* to encourage consumers to think about how they are using energy. *Advertising* campaigns can also affect behaviour change. *Green mortgages*

provide consumers with lower interest rates or larger loans based on the logic that efficient homes will save the home-owner money enabling them to afford a larger loan.

5. **Substituting fossil fuels with renewable energies** by implementing policies to increase the share of renewables in the energy market. Policies to encourage off-grid applications of renewable energy have been made mandatory in some countries e.g. new buildings must be fitted with solar water heaters, whilst in other countries fiscal incentives have been used. Increasingly countries are moving towards zero-carbon buildings which combine design and technology to achieve low or zero emissions.

## How can international cooperation help?

There are several reasons why it makes sense for countries to work together to make the building sector more sustainable;

1. The potential for large emission reductions in buildings exists in all countries.
2. There is the opportunity for country-to-country technology sharing agreements and international capacity building support.
3. If the metrics used for energy efficiency and emissions reductions in buildings can be internationally agreed, the actions undertaken will also be internationally measurable, reportable and verifiable.
4. The financing need for energy efficiency improvements in buildings can be offset by reduced energy costs during the life time of buildings.
5. Targeted energy efficiency in buildings efforts under Nationally Appropriate Mitigation Actions (NAMA) would not only reduce greenhouse gas emissions but would also contribute towards other national priorities.
6. The Clean Development Mechanism (CDM) awards Certified Emissions Reductions Credits to developed countries investing in projects that reduce emissions in developing countries.

## What are the priority actions for decision makers?

A more efficient building sector will deliver economic as well as environmental benefits. Decision-makers have a vast array of policy options available, namely improving the energy efficiency of buildings, appliances, energy suppliers and distributors; changing attitudes and behaviour towards energy use in buildings; and substituting fossil fuels with renewable sources of energy. International cooperation is vital.

For further information please read the full report: [Buildings and Climate Change a Summary for Decision Makers](#)

# Action Checklists

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|--|-------------------------------------|
| <b>MAKING REDUCTIONS FROM THE BUILDING SECTOR:</b>   |                                     |
| <b>National and International Policy Makers</b>  | <input checked="" type="checkbox"/> |
| Establish national regulations that make energy efficiency investments mandatory in new buildings and in renovation of existing buildings  |                                     |
| Conduct inventories of energy consumption, energy efficiency and emissions from the national building stock to establish base-lines and set performance goals to reduce greenhouse gas emissions in existing and new buildings in accordance with their location, type and use.  |                                     |
| Establish an energy efficiency in buildings investment fund that can be used promote initial investments and renovations for energy efficiency in buildings, meeting the minimum energy use benchmark for that particular building type in the country. Such a fund can be financed through taxations of energy use above the national average, thereby always providing additional incentives to high energy users to reduce energy use. It can also be funded by redirecting investments in additional energy production that will be avoided by reduced energy demand in buildings. |                                     |
| Support the inclusion of measures in the new global climate-change treaty that encourage investments in both new building and building renovation projects that reduce or eliminate emissions.   |                                     |
| Include in the technology transfer framework/measures, support to capacity building to enable and increase energy efficiency in existing and new buildings.  |                                     |
| Support the development and reform of all flexible mechanisms to encourage investment in reducing the energy demand and greenhouse gas emissions from building operations.   |                                     |
| Retrofit all publicly owned buildings for high-level energy efficiency and deep greenhouse gas emission reductions. Ensure all new public buildings constructed achieve the highest possible energy efficiency, the lowest possible greenhouse gas emissions and do not 'lock-in' inefficiencies and greenhouse gas emissions burdens over their life-span.  |                                     |
| <b>Municipalities</b>  | <input checked="" type="checkbox"/> |
| Lead by example: conduct retrofitting programs that deliver deep energy consumption and greenhouse gas emission cuts.  |                                     |
| Support climate adaptive measures and goals through twinning programmes between cities and towns in developed countries and in developing countries and economies in transition.   |                                     |
| Develop climate change strategies and action-plans with strategic goals to be achieved by 2020.  |                                     |
| Make all publicly owned buildings climate neutral, and all new buildings energy-positive by 2020.  |                                     |
| Agree on a common assessment and evaluation process to monitor progress on tackling climate change.  |                                     |
| <b>NGO &amp; Civil Society</b>   | <input checked="" type="checkbox"/> |
| Advocate, communicate and share information  |                                     |
| Train professionals and trades-people currently working in the building sector and educate the next generation of professionals to implement sustainable building principles and practices.  |                                     |
| Facilitate the leadership and bridging efforts   |                                     |
| Help monitor quality assurance and standards of low greenhouse gas emissions building performance.   |                                     |
| Help communities adopt climate-friendly behaviours and lifestyles.   |                                     |
| <b>Private sector</b>  | <input checked="" type="checkbox"/> |
| Work with governments to develop policies that make a difference and act as agents of change.  |                                     |
| Work to introduce a carbon trade mechanism for buildings.  |                                     |
| Renovate buildings to maximise the reduction in their emissions and improve climate adaptability.  |                                     |
| Demonstrate technology and know-how frontiers on their own buildings and rented offices.   |                                     |
| Move to holistic and system solutions to sustainable buildings   |                                     |
| Dedicate Research and Development to climate neutral, zero net buildings   |                                     |

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|--|-------------------------------------|
| Educate the supply chain.  |                                     |
| <b>Research &amp; Educational Institutions</b>   | <input checked="" type="checkbox"/> |
| Encourage educational institutions to renovate and build schools to reduce greenhouse emissions and foster long term responsible lifestyles.       |                                     |
| Implement interdisciplinary curriculum and research on energy, greenhouse emissions and social performance.  |                                     |
| Educational institutions should be encouraged to collaborate to provide a data repository and ongoing analysis of the climate impact of buildings. |                                     |
| Develop curriculum and tools for building energy efficiency and environmental responsibility.  |                                     |
| Develop regional and sub-regional centres of excellence, focusing on buildings role in climate change mitigation & adaptation.                     |                                     |