

Irish Construction Sector

1. Introduction

The World Business Council for Sustainable Development (WBCSD) has identified buildings as one of the five main users of energy where 'megatrends' are needed to transform energy efficiency. They account for 40% of primary energy (primary energy includes the energy required to generate, transmit and distribute electricity, as well as energy directly consumed on site) in most developed countries, and consumption is rising. [2007 WBCSD Energy Efficiency in Buildings (EEB) Project]
The International Energy Agency (IEA) estimates that current trends in energy demand for buildings will stimulate about half of energy supply investments up to 2030. [IEA World Energy Outlook 2006]

2. Positive Energy Building

Primary Energy Consumption is less than or equal to **(-)15 kWh/m²/yr**.
Renewable Energy Systems contribute a quantity of energy which covers

- the (negative) Primary Energy Consumption of the building ;
- the (negative) energy consumed, per year, by private transport associated with the building ;
- a Degradation Factor, per year, which takes account of the energy efficiency degradation normally expected during the building's life cycle, and/or caused by wasteful patterns of building management and/or use ;
- a (positive) energy contribution to an Intelligent District or Regional Grid exceeding the total energy consumed, per year, by the building.

3. Holistic Life Cycle Approach to Energy Efficiency

A holistic approach begins with spatial planning, takes the whole building life cycle into account and embraces integrated building design processes. This approach is essential to maximize the potential of individual technologies and innovations. It begins at a community planning level to gain efficiencies on a larger scale than can be achieved in individual buildings and to integrate other energy uses, such as transport. Spatial planning considers the community in its entirety as well as single buildings. Some new urban centres are being created from scratch with an entirely sustainable plan, like Dongtan near Shanghai, China. But many existing and rapidly growing cities have little room to manoeuvre due to existing constraints. In that case, spatial planning has to be implemented within the existing urban environment.

In individual buildings, energy efficiency is improved with a greater degree of collaboration between specialists from the earliest stages of the design process. Integration helps to adopt approaches, technologies and materials that can significantly lower energy use in buildings in economically attractive ways. Costs can be minimized with this holistic approach to integrated design and innovation. [2007 WBCSD Energy Efficiency in Buildings (EEB) Project]

4. Current Energy Technologies & Energy Efficiency Costs

Technologies available today can achieve dramatic improvements in building energy efficiency, but market failures and behavioural barriers are blocking progress towards the WBCSD vision of the Positive Energy Building. The challenge in the first phase of the EEB Project has been to understand those impediments. In the next phase, the Project will explore ways to overcome them and develop a roadmap with practical measures that businesses can implement.

WBCSD EEB Research has found that perceptions of the cost necessary to achieve more sustainable buildings are likely to be significantly higher than the actual cost. The average perception was a 17% premium, but cost studies on actual properties have shown much lower figures. For commercial properties, the Fraunhofer Institute in Germany has shown (2006) that the energy demand of new office buildings can be reduced by 50% compared with the existing building stock without increasing construction costs.

5. Essential Transition Period in Ireland 2008-2011

- 5.1 **Incentivize better than minimal, i.e. required by Building Regulations, Energy Conservation & Efficiency Performance in all New Buildings and a widespread, significant improvement in Existing Buildings.** A Transition Period will be essential for the Construction Industry to up-skill in order to meet new standards of 'real' building performance, for the many design practitioners to be re-educated, and design school curricula to be upgraded. Innovative Construction Products, Systems and Processes must be speedily introduced to the market, and approved as 'fit for intended use', to facilitate these measures.
- 5.2 **Incentivize better than minimal, i.e. token, installation of Renewable Energy Systems in all New and Existing Buildings.** A Transition Period will be essential for the Construction Industry to up-skill in order to install these new systems, for the many design practitioners to be re-educated, and design school curricula to be upgraded. Innovative Construction Products, Systems and Processes must be speedily introduced to the market, and approved as 'fit for intended use', to facilitate these measures.
- 5.3 The costs for Ireland of non-compliance with the 1997 Kyoto Protocol and a Kyoto II Instrument after 2012 must be fully considered when deciding on the levels and range of Incentives.

6. Sectoral Targets in Ireland to 2020

From the Beginning of 2012, i.e. after the Essential 4 Year Transition Period (2008-2011)

- Require all New Buildings to achieve a Minimum Building Energy Rating (BER) of 'A1' indicating a Primary Energy Consumption less than or equal to 25 kWh/m²/yr. And require 40% of Primary Energy Consumed to be, directly or indirectly, from Renewable Energy Sources ;
- Require all Existing Buildings to achieve a Minimum Building Energy Rating (BER) of 'B1' indicating a Primary Energy Consumption less than or

equal to 100 kWh/m²/yr. And require 15% of Primary Energy Consumed to be, directly or indirectly, from Renewable Energy Sources. Retain Incentive Measures to achieve better performance with regard to energy efficiency and/or renewable energies ;

- Require Buildings of Historical, Architectural or Cultural Importance to achieve a Minimum Building Energy Rating (BER) of 'C1' indicating a Primary Energy Consumption less than or equal to 175 kWh/m²/yr. Retain Incentive Measures to achieve better energy efficiency performance. No legal requirements or incentives with regard to Renewable Energies should apply to Buildings of Historical, Architectural or Cultural Importance.

From the Beginning of 2015

- Require all New Buildings to be 'Positive Energy Buildings'. See #2 ;
- Require all Existing Buildings to achieve a Minimum Building Energy Rating (BER) of 'A2' indicating a Primary Energy Consumption less than or equal to 50 kWh/m²/yr. And require a Positive Energy Contribution of (+)25 kWh/m²/yr to be from renewable Energy Systems installed in the building.
- Require Buildings of Historical, Architectural or Cultural Importance to achieve a Minimum Building Energy Rating (BER) of 'B1' indicating a Primary Energy Consumption less than or equal to 100 kWh/m²/yr. Retain Incentive Measures to achieve better energy efficiency performance. No legal requirements or incentives with regard to Renewable Energies shall apply to Buildings of Historical, Architectural or Cultural Importance.

Beginning in 2008, and at 4 Year Intervals thereafter

- Thoroughly review actual progress concerning 'real' energy efficiency / conservation performance and renewable energy output in buildings, and amend legislation and technical control procedures accordingly.

7. Technical Control of Construction & Post-Occupation Buildings

Any proposed Building Energy Efficiency/Conservation and Renewable Energy Improvements must take place in a context of stringent control during construction (by competent Local Authority Building Controllers and/or Independent Technical Controllers) and rigorous post-construction energy performance monitoring (using Long Wave Infra-Red Thermal Imagery, in conjunction with building roof and external wall Air Tightness Tests).

Observation of post-occupation building energy performance will also be necessary. Introduce mandatory 5-Yearly Energy Surveying of Buildings.

8. Certificates of Building Completion Performance

- 8.1 The current system of RIAI/Law Society 'Opinions on Compliance' is inadequate and offers no protection to the Irish Consumer.
- 8.2 Introduce a system which requires that before any building can be occupied, a Certificate of Completion Performance must be issued by an Independent Technical Controller. The Certificate will include a check on compliance of the Building with all relevant legislation and its 'real' performance.