

BRINGING EXISTING BUILDINGS INTO THE SUSTAINABILITY EQUATION

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ABSTRACT

A cursory look at statistics reveals that the approach taken to existing buildings will be critical in progressing sustainability within the built environment. For example, there are c. 1.6 million dwellings in New Zealand; c. 1.04 million homes were built before 1977 and of these, a third have wholly inadequate insulation (Amitrano, 2006). In contrast, only c. 25,000 new homes, or thereabouts, are built each year (EECA, 2007). To ignore the role of existing buildings will provide the greatest stumbling block towards fostering a sustainable built environment and will raise doubts concerning the Government's true commitment to the issue. Unfortunately, the Building Act 2004 does not require work to existing buildings to comply with the updated code (save that provisions for disabled access and escape from fire must comply "as nearly as is reasonably practicable"). This is a huge loophole and contrary to the approach taken by a number of European States. Various mechanisms are used in Europe to ensure that existing buildings become part of the sustainability equation and meet regulation standards. This paper considers some of the most pertinent. Whilst any attempt to improve the existing building stock may seem daunting, a raft of measures are applied in Europe; New Zealand should analyse such to gauge efficacy and follow suit.

KEYWORDS:

Law; Policy; Existing buildings; Sustainability

INTRODUCTION

Buildings and the building industry are responsible for significant environmental damage. By way of example, the building industry alone consumes some 40% of the world's energy, 25% of forest timber and 16% of the world's fresh water (Dimson, 1996). Given the enormity of this damage, without radical reform of the construction industry, it may become impossible to "meet the needs of the present without compromising the ability of future generations to meet their own needs." (WCED, 1987) As a result, global interest in promoting *sustainable* building and construction is gaining momentum. The United Nations Environment Programme in conjunction with UN HABITAT has identified the 'sustainability of buildings' as a significant work programme for the coming decades (UNEP, 2007a). The Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report 'Climate Change 2007: Mitigation of Climate Change', places pre-eminent emphasis on buildings (IPCC, 2007). The report notes that the highest rate of greenhouse gas emissions from all the sectors studied are linked to commercial and residential buildings.

Researchers in Europe have noted however that, given the market failure in promoting environmentally sustainable buildings, state intervention is required to catalyse the move towards sustainability in the construction industry (Harman, 2005). Within the Asia-Pacific region, the Chinese Vice-Minister of Construction has recently acknowledged that there must be a wholesale national review of the law and policy to promote green building (Marrakech, 2007) and the IPCC urges all governments to introduce policies and remove market barriers to promote sustainable construction and buildings (IPCC, 2007).

In countries around the world, plans are a pace to introduce legislation and policy measures to promote sustainability in buildings and particular focus has been placed upon minimising the emissions of greenhouse gases from new buildings. Policy makers view buildings as a relatively easy sector to address (compared to, for example, agriculture or transport) in terms of introducing effective measures that will result in significant emissions savings. The technology and knowledge already exist to construct buildings that are considered 'carbon-neutral' or 'carbon-zero' and the greening of buildings promises a win-win scenario whereby the cost of the initial capital expenditure is recouped over time. In the UK, for example, the government has announced the intention that all new-build

homes will be 'zero-carbon' emitters by 2016 and proposes to use three main 'policy levers' to achieve this target: the Code for Sustainable Homes (to become mandatory), the planning system and (the incremental ratcheting upwards of) the Building Regulations (UK DCLG, 2007).¹

Within New Zealand, the Government has also suggested that the 'future is 'carbon neutral''² and has introduced a raft of strategic instruments that provide a theoretical basis for developing a sustainable construction and buildings policy. Strategies include the Sustainable Development for New Zealand Programme of Action (Department of Prime Minister and Cabinet, 2003) which encompasses work on 'Sustainable Cities' and the 'Urban Design Protocol', the National Energy Efficiency and Conservation Strategy (Ministry for the Environment, 2001), the New Zealand Waste Strategy (Ministry for the Environment, 2002), and the New Zealand Housing Strategy (Housing New Zealand Corporation, 2006). But the actual, *practical* move towards sustainability in construction and buildings thus far, is embryonic to say the least.

The New Zealand Building Act has only recently been amended, in 2004, to incorporate the objective of sustainable development and a primary difficulty at present is that the operative Building Code does not tally with the revised Act. To bring the Code into line with the present statutory goals, the Department of Building and Housing (DBH) is in the process of conducting a wholesale review of the Code and public participation is an integral part to that process. A revised Code must ensure that, in accordance with section 3(d) of the Act, buildings will be "designed, constructed and able to be used in ways that promote sustainable development". The DBH should be in a position to advise the minister as to the scope for change by November 2007. Clearly, building legislation and regulations will drive the sustainability agenda but economic instruments are also important; financial incentives encourage innovation and result in higher levels of sustainability than mere regulation alone. In light of this fact, the New Zealand Government has started to introduce enabling economic instruments, geared towards making new buildings more sustainable.³

However, a cursory look at statistics reveals that the approach taken to *existing* buildings will be critical in progressing sustainability within the built environment.⁴ In relation to the residential sector, there are c. 1.6 million dwellings in New Zealand; c. 1.04 million homes were built before 1977 and of these, a third have wholly inadequate insulation (Amitrano, 2006). In contrast, only 25,000 new homes, or thereabouts, are built each year (EECA, 2007). To marginalise the role of

¹ UK Department for Communities and Local Government (2007) *Building a Greener Future; Policy Statement* July 2007 available at <http://www.communities.gov.uk/pub/970/BuildingaGreenerFuturepolicystatement_id1511970.pdf> last accessed 25th July 2007.

² Rt Hon PM Helen Clarke, keynote speech made on 28.10.06 at the New Zealand Labour Party Annual Conference, Rotorua.

³ The Government has recently launched a scheme that will encourage 'volume' builders to put solar water heating into new homes by offering a \$3000 grant to install a solar water heater in a show home and, on the provision that builders commit to installing the systems in at least 20 homes each year, a \$500 grant per home is available. See Hon Jeanette Fitzsimons MP, statement made on 17.07.07, "Solar water heating grants to volume builders" available on The Official Website of the New Zealand Government at <http://www.beehive.govt.nz/ViewDocument.aspx?DocumentID=30075> last accessed 25th July 2007.

⁴ As the authors of the United Nations Environment Programme Report on Buildings and Climate Change note, "[i]n Finland a study calculated the overall impact of energy-efficient buildings on energy consumption... Assuming that all new houses built from 2006 onwards were to be passive houses with an energy consumption of 30kWh/m², the total energy saving compared to Business as Usual would be 15% in year 2003. The relatively low percentage is due to the building stock's long life cycle. From these calculations we can draw the conclusion that in order to achieve significant results in the following decades much emphasis needs to be put on the existing building stock and its renovation, at least in the more developed countries." UNEP 2007 *Buildings and Climate Change: Status, Challenges and Opportunities* available on the website of the Marrakech Task Force on Sustainable Buildings and Construction at <http://www.environment.fi/default.asp?contentid=233068&lan=EN> last accessed 20th July 2007.

existing buildings will provide the greatest stumbling block towards fostering a sustainable built environment and will raise doubts concerning the Government's true commitment to the issue. Unfortunately, the Building Act 2004 does not require work to existing buildings to comply with the updated Code (save that provisions for disabled access and escape from fire must comply "as nearly as is reasonably practicable")⁵. This is a huge loophole and contrary to the approach taken by leading 'green building' nations around the world. Within European states in particular, various mechanisms are used to ensure that existing buildings become part of the sustainability equation and meet updated standards and direct or diffuse policies can be identified in relation to the five phases of a building's life cycle: manufacture of components; transportation to site; construction or renovation; operation and demolition.

This paper considers some of the direct mechanisms introduced in other nations to bring existing buildings into the sustainability equation. Of necessity, the paper focuses on promoting energy efficiency in existing buildings. The paper contains four parts. Firstly, a review of present policies within New Zealand is undertaken. Secondly, some of the more pertinent policies from other nations, and from European states in particular, are highlighted. The third part considers justifications for increasing the performance standards of existing buildings. Finally, within the conclusion, consideration is given to what additional policies New Zealand might adopt.

NEW ZEALAND: POLICIES THAT APPLY TO EXISTING BUILDINGS

As indicated above, there are no legislative measures to ensure that existing buildings are brought up to higher standards of energy efficiency following renovation. The Government has indicated that imminent revisions to the Building Code will require higher standards of energy efficient lighting in retrofitted commercial buildings and that additional compliance documents will be prepared in order to facilitate the installation of solar water heaters in both new and existing buildings.⁶ In terms of economic instruments, central government offers grants through the Energy Efficiency and Conservation Authority (EECA) of up to NZD \$500 towards the cost of solar water heating systems or towards the cost of interest on a loan to pay for a system (EECA, 2007). Only systems from participating suppliers are eligible for funding assistance and the cost of the system, including the installation and building consent cost, must not exceed a threshold set by EECA. EECA also offers grants to low-income families in order to fund home insulation and other energy efficiency measures. To be eligible for funding, a property must have been built prior to 1978 and the programme gives preference to people with health problems such as asthma and other respiratory illnesses. EECA is also instigating a 'nationwide rental project' to provide retrofits of insulation and other energy efficiency measures to rental properties occupied by low-income tenants. This project follows the private-public partnership between EECA and the New Zealand Property Investors Federation (NZPIF) wherein a 55% subsidy was offered to rental property owners towards energy efficient retrofitting of houses. The NZPIF-EECA project expired in May 2007.

Local government has also played a role in promoting the energy efficiency of existing buildings. Perhaps the most notable project is Environment Canterbury's 'Clean Heat' programme. Environment Canterbury has committed NZD \$38 million until 2010 towards upgrading heating equipment and insulation in 26,000 homes occupied by low-income families (Environment Canterbury, 2007).

Further, a strong focus has been placed on informing the public as to the benefits of energy efficient homes and the DBH has taken the lead on various publicity campaigns.

⁵ Although ss 112, 115 and 116 of the Building Act 2004 relating to alterations to existing buildings, change of use and extension of life and subdivision respectively, are rather imprecise, the Building Amendment Act 2005 appears to confirm that alterations to existing buildings will not be required to meet increased environmental performance standards.

⁶ Hon Clayton Cosgrove MP, statement made on 04.10.06, "Energy efficient buildings a top priority" available on The Official Website of the New Zealand Government at <http://www.beehive.govt.nz/ViewDocument.aspx?DocumentID=27293> last accessed 22nd July 2007.

MEASURES INTRODUCED IN OTHER STATES

Command-control measures

There can be little doubt that the global push towards sustainability in buildings and construction has been given added impetus by concerns relating to climate change. Following from this, the general approach taken by states within the European Union (EU) is to enshrine in legislation national reduction targets for greenhouse gas emissions and then to develop sectoral policies to achieve these targets. By way of example, France has launched the “Factor 4” programme that aims to reduce national greenhouse gas emissions by 75% between 1990 and 2050. To achieve the necessary radical cuts in the building sector, the ‘PREBAT Programme (2005-2009)’ has been launched and brings together industry and government to develop mechanisms to achieve the target. The modernisation of existing buildings is a critical component (UNEP, 2007b).

Specific action within the EU has been co-ordinated by the European Parliament and on 1st January 2003, the Directive on the Energy Performance of Buildings 2002/91/EC (the Directive) was introduced (EPB, 2002). The Directive harmonizes minimum mandatory requirements within the EU member states in relation to sustainable construction and buildings. In relation to existing buildings, the Directive provides for: minimum energy performance requirements for major renovations of existing buildings larger than 1000m²; energy performance certificates for all buildings; regular inspections of boilers/ heating and air conditioning systems; for energy savings targets to be ratcheted up periodically and rules concerning tendering, education and information. It is possible for individual member states to introduce more stringent national requirements and many have done so.

The authors of the 2007 UNEP study, *Buildings and Climate Change: Status, Challenges and Opportunities*, have affirmed that “regulations should as far as possible cover the energy use over the entire life span of buildings and be applicable to new buildings as well as existing ones” (UNEP, 2007b). Most EU states require specific alterations to buildings below the EU Directive threshold of 1000 m² to meet revised performance standards. There are many examples of additional command-control measures that have been implemented to encompass existing buildings. Over 60 local authorities in Spain have solar ordinances, mandating solar water heating in both new build and renovation projects that encompass water heating (BEA, 2007). In the Netherlands, the Government aims to bring all houses up to 1975 standards of insulation by making this a mandatory requirement when a house is sold and providing a rates subsidy as a fiscal incentive (Halliday, 2004). Particular states have begun to consider how planning regulations might be used to actively encourage the greening of buildings and in the UK a more permissive regime for micro-generation equipment attached to domestic properties is to be implemented⁷.

Economic measures

In addition to including renovated buildings within revised regulatory standards, the leading ‘green building’ nations have introduced a raft of economic measures to promote energy efficiency in existing buildings. These take the form of both constraining measures (such as taxes, fees, price levies) and enabling measures (tax rebates, subsidies, grants). The priority given by such nations to promoting this goal can be demonstrated by the budgets provided. By way of example, Finland (with a population of c. 5.2 million) has a current annual budget of 17 million euros (c. NZD \$30 million) set aside to promote energy-efficient renovations of residential buildings (UNEP, 2007b)⁸. The German Government has announced a 20-year programme to bring all pre-1978 housing stock up to contemporary energy standards and has provided a significant budget to achieve this end (House of Commons, 2006). Specific economic policies of note include the German ‘green audits’ consisting of a grant of up to 250 euros to fund an ‘on-site’ consultation with an architect or other professional to detail what energy efficiency improvements could be made to a building. In addition, the German

⁷ UK Consultation paper on proposed regulations under Town and Country Planning (General Permitted Development) Order 1995 (SI 1995/418) – *Changes to Permitted Development – Permitted Development Rights of Householder Microgeneration*

⁸ Grants are offered for changing heating systems from oil to solar, installing wood pellet heating system, connecting to district heating, building ground heat pump system and so on.

Federal Government, in conjunction with the KfW Forderbank, has undertaken a large-scale research and educative project that has resulted, to date, in the renovation of c. 2,230 housing units. The renovated units are on average 50% more energy efficient than the Energy Conservation Regulations require of new buildings. The project serves to highlight best practice case studies and demonstrates how different buildings can meet present day energy efficiency standards (German FMTBUA, 2007). Other examples of notable economic measures include the preferential lending rates offered by the Husbanken (State Housing Bank) in Norway to disadvantaged members of the community undertaking renovations that meet environmental criteria. The criteria are established in environmental design guides established by the Bank (Husbanken, 2007).⁹ A public-private partnership between the Piedmonte Region, Italy and local banks offers preferential loans in relation to new or renovated buildings that attain a high performance rating on the Protocollo ITACA (a rating tool based on the Green Building Challenge assessment tool) (iisBE Italia, 2007). Outside Europe, the United States, Canadian and Australian federal and state governments offer panoplies of financial incentives (Industry Canada, 2006). By way of example, the Photovoltaic Rebate Program funded by a partnership between the Victoria State and the Australian Federal Governments offers rebates of up to AUD \$1,500 towards the installation of solar water heating systems and AUD \$4,000 to householders, schools and community buildings who install photovoltaic systems. This programme is also intended to provide a boost to the Australian photovoltaic industry.¹⁰

Voluntary measures

In terms of voluntary models and partnerships between industry and government, the Dutch 'National Packages for Sustainable Buildings' scheme is of particular note. The scheme has led to the production of manuals detailing sustainable building measures for both new and existing buildings. The aim is to ensure that all actors agree as to the measures and standards that should be adopted to create a sustainable building and to increase the capacity of builders to provide this service (UNEP, 2007b).

Labelling

Arguably the most significant policy introduced in the EU to date has been the requirement for the labelling of buildings. It has long been acknowledged that improvements cannot be made to the existing building stock until the present energy efficient status of property is measured. Further, the housing market in particular has long lacked "the features of choice, reliable labelling, product information and comparability which characterises consumer-led markets in most other goods"¹¹ and this has contributed to the apparent market failure in green building¹². The EU Directive mandates Energy Performance Certificates (EPC) for all buildings and member states have until 2009 to fully implement the terms of the Directive. An EPC must report on the present performance of the building (grading the building on a scale of A-G based on present building regulations) and also contain recommendations for improvements in the energy performance of that building. An EPC is required for all new buildings and where an existing building is to be sold or let. The vendor, landlord or builder is responsible for providing and bearing the costs of the EPC. The Directive provides that an EPC may be valid for ten years but individual states can set more stringent regulations in this regard. The UK, for example, is proposing that an EPC must be less than twelve months old at the date of sale or lease. Within the UK, the Energy Performance of Buildings (Certificates and Inspections) Regulations 2007 (SI 2007/991) provide that local authorities will be responsible for enforcing the

⁹ Further, see SBIS *Policies and Programs* for Norway, available at <http://www.sbis.info/database/dbsearch/details/polprogdetails.jsp?index+4> last accessed 20th July 2007.

¹⁰ See <http://www.greenhouse.gov.au/renewable/pv/index.html> last accessed 25th July 2007

¹¹ Harman (2005) at p. 14.

¹² On this point, the success of energy labels in the EU for household appliances is irrefutable. In 1999 only 2% of fridge freezers sold in the UK were A rated. Eight years later, following implementation of the EU Directive 92/75/EEC on Labelling Household Appliances more than 66% sold in the UK are A rated, see Culnane (2007).

EPC regulations and that local authority officials will be able to issue penalty charges for non-compliance.

It is anticipated that the introduction of mandatory certification will have far reaching effects. Given purchasers' fears with regards to fuel insecurity and the expectation of increasingly stringent climate change policies, energy efficient homes will arguably be at an advantage in the market; people will actively seek them out and they will be more valuable. Energy inefficient homes will be devalued. Although empirical evidence to support such a contention is not yet available in terms of the residential market, research in relation to the letting of commercial buildings supports this assumption (Jones Lang LaSalle, 2007)(Myers, 2007). Labelling will certainly affect the type of buildings that housing associations and public bodies purchase or lease and will influence the investment decisions of the trustees of investment and pension funds bound by certain fiduciary duties (Freshfields (2005)).¹³ Energy Performance Certificates may be used as a point of negotiation in property sales and leasing agreements (as surveys are at present). Purchasers may negotiate for a reduced price or insist that the seller incorporate some of the recommended energy efficient features prior to sale.

A logical next step is for labelling simply to become the first stage in a legislative process that requires the recommended improvements to be carried out. Alternatively, the EPC may provide a means of differentiating between buildings for the purposes of rates or taxes. Given the commitment within the EU to reduce carbon dioxide emissions by at least 60% by 2050 the necessary political will is present and in the present market of buoyant property prices, requiring energy efficient property is not a difficult political argument to make.

WHY SHOULD THE PERFORMANCE OF EXISTING BUILDINGS BE ADDRESSED IN NEW ZEALAND?

New Zealand has an international legal obligation to mitigate the emission of greenhouse gases and to slow climate change. The IPCC sees the 'greening of buildings' as a critical means to addressing both the mitigation of and adaptation to climate change and efforts to increase the performance of existing buildings are integral to this. The building sector is an important contributor to greenhouse gas emissions in New Zealand. More than half of the electricity used in New Zealand is used in buildings in some way and in excess of NZD \$2.2 billion is spent on electricity in residential buildings alone each year¹⁴. The argument may be posited that as New Zealand obtains c. 70 % of its electricity from renewable resources, the pressures to conserve energy are not akin to those in other nations. This is a fallacy. Energy sourced from renewable sources does not negate environmental impacts. Significant amounts of greenhouse gas emissions are associated with the construction and operation of wind farms and hydroelectric power plants for example. Intrusion into areas of outstanding landscapes and the monopolisation of bodies of inland water is creating an increasing public backlash against such developments. The ever-increasing demand for electricity in New Zealand has resulted, at present, in their being nine proposed or pending developments of fossil fuel power plants with a planned output of 1855MW (Reference Group on Electricity Generation, 2006). Energy conservation in buildings must be seen as an imperative.

To improve the performance of existing buildings is also a matter of equity. Poor housing results in poor health for the occupants. The 'New Zealand Housing, Heating and Health Study' revealed that the savings in health costs as a result of insulating homes outweighed the cost of the insulation by almost two to one (HHHS, 2007).

¹³ On the legal necessity for trustees to incorporate 'environmental sustainable governance' principles into investment decisions see, Freshfields Bruckhaus Deringer (2005) *A legal framework for the integration of environmental, social and governance issues into institutional investment*, UNEP FI, available from UNEP FI, Publications, at http://www.unepfi.org/fileadmin/documents/freshfields_legal_resp_20051123.pdf last accessed 25th July 2007.

¹⁴ Hon Clayton Cosgrove, supra note 6.

In terms of economics, to focus on raising the performance standards of new buildings and to ignore existing buildings risks creating a sharp division between high and low performing buildings. This will have ramifications for the value of property and may influence financial institutions lending and investing decisions. High performing buildings are arguably less of a credit and / or investment risk. Within the EU, economists have calculated that the savings from expenditure on energy following implementation of the Directive far exceed the capital investment costs (Eurima, 2005).

CONCLUSION

Additional policies that New Zealand should implement

It is clear that the New Zealand Government should introduce a comprehensive raft of policies to bring existing buildings into the sustainability equation. Most importantly, the Building Act and Code should be revised to require buildings to achieve higher performance standards post renovation. Secondly, a greater financial commitment via economic enabling instruments needs to be made by central government. The 2007 OECD Environmental Performance Report for New Zealand, states that countries with cost-effective environmental management use a mix of regulatory, economic, and voluntary instruments to achieve their policy objectives. The OECD questions the efficacy of using wholly voluntary approaches and notes, that within New Zealand, economic instruments are still under-represented in the policy mix (OECD, 2007). Finally, the requirement that all buildings have an energy performance certificate should be considered. No doubt there would be significant ramifications in establishing such a scheme not least the creation of a new industry (with approximately 200 to 300 newly trained accredited energy assessors required)¹⁵ but given the potential of this scheme the results of EU 'experiment' should be closely monitored.

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¹⁵ Potentially 200 to 300 assessors would be required in New Zealand (based on the UK ratio of 1 assessor per c. 8,000 properties). The costs of assessment in the UK range from GBP 250 to 2000 depending on size of premises. The author is not entirely clear how this figure has been reached and it is therefore difficult to translate this into NZD.

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