Building Better Buildings

Building Performance Evaluation

Joseph A Birt
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Building Better Buildings
Building Performance Evaluation

A ‘Building Control’ perspective
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Building Performance Evaluation

“A” Building Control perspective
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**High level objectives:**

- Conserve fuel & power, and reduce carbon
  - Limited unwanted heat losses and gains
  - Ensure efficient building services
  - Assist users to manage the building efficiently
  - Reduce carbon outputs from buildings
  - Improve the efficiency of existing buildings
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Building Performance Evaluation

Building Regulations (Northern Ireland) Order 1979*

Building Regulations (Northern Ireland) 2012*
43B
Where a building is erected, it must be a ‘nearly zero energy building’
- Building occupied by public authorities
  from 1st January 2019
- All other new buildings
  from 31st December 2020

43A
Where a building is erected, consideration must be given to the use of available ‘high efficiency alternative systems.
Eg. District renewables, CHP, heat pumps
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Building Regulations (NI) NZEB Standard 2018 / 2020

Building Regulations (NI) 2012

Building Regulations (NI) 2006 (amendment)

Building Regulations (NI) 2000

+ 40%

+ 25%

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Protecting people and the environment
Article 2 of the Directive defines a nearly zero energy building as ‘…a building that has a very high energy performance, as determined in accordance with Annex I. The nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby.’

National plans should include, ‘detailed application in practice of the definition of nearly zero energy buildings reflecting their national, regional or local conditions, and including a numerical indicator of primary energy use expressed in kWh/m2 per year….’
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2010/31/EU

- Energy Performance Certificates
- Servicing and inspection of air conditioning units
- Member States shall “draw up national plans for increasing the number of nearly zero-energy buildings”; and
- “develop policies and take measures such as the setting of targets in order to stimulate the transformation of buildings that are refurbished into nearly zero-energy buildings”.

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Cost optimal level
Consequential improvements – outcome of consultation proposal
(a) extensions or increases in habitable space, or
(b) the replacement of a boiler or the home’s windows.

Proposals were coined as a ‘conservatory tax’

Energy Saving Trust research:
  38% of small and medium firms; and
  34% of households from going ahead with building work

Focus groups: the majority of the installers registered with Gas Safe Register
(or members of competent person schemes) were very negative towards the idea of being responsible for informing homeowners of the consequential improvement requirements.
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UK Government

Building Regulations 2013
- 6% improvement (carbon) for domestic
- 9%* improvement (carbon) for non-domestic
- Minimum – Fabric Efficiency Rate (space heating/cooling – KWh/m²-year)

‘Fixing the foundations: creating a more prosperous nation’ a plan for increasing Britain’s productivity.

'The government does not intend to proceed with the zero carbon ‘allowable solutions carbon offsetting scheme’, or the proposed 2016 increase in on-site energy efficiency standards, but will keep energy efficiency standards under review, recognising that existing measures to increase energy efficiency of new buildings should be allowed time to become established.'
“Optional Building Regulations”
… these will only apply where it is right to do so; with each Council deciding whether to apply the optional requirements.

The ‘optional measures could include:
• Water efficiency – in areas facing water shortages
• Accessibility standards – where enhanced standards are needed for homes to be accessible for older people and wheelchair users
• New “National Space Standards” *
• “Security standard” for new homes (cost effectiveness)

Energy – Nationally – with 2016 target for Zero Carbon Homes
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Building Regulations in South of Ireland

Energy & Carbon targets

• Primary Energy Targets
• Limit on carbon output
• Target for ‘renewable energy’

Passive house standard

• Dun Laoghaire – Rathdown Council
  Draft local development plan
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Building Regulations in South of Ireland

Longboat Quay, Dublin

- Built in 2006
- 298 apartments
- Architect & Consultant signed off the building in 2006
- 2014 Report “...a dozen serious fire safety concerns”

Taoiseach Enda Kenny: “...convinced other buildings throughout the country were in a similar condition to the Longboat Quay... Prospect Hill, Finglas, ... Riverwalk Court, Meath”
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Building Control in Northern Ireland

- Local Government Reform
- 26 Councils to 11 Councils
- Removal of Group co-ordination
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Building Control in Northern Ireland

• 30,000 Applications per year
• 135,000 Inspections per year
• Value of work: £1.57 Billion
• Each project inspected on multiple occasions
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Defects
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Defects
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Building Control in Northern Ireland

- 30,000 Applications per year
- 135,000 Inspections per year
- Value of work: £1.57 Billion
- Each project inspected on multiple occasions
- NI Annual interventions - 170,000
  - 50% plan - 50% site
  - 15% related to energy
## Future Regulations

<table>
<thead>
<tr>
<th>Element</th>
<th>2006</th>
<th>2012</th>
</tr>
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<tbody>
<tr>
<td>Roof</td>
<td>0.25</td>
<td>0.20</td>
</tr>
<tr>
<td>Wall</td>
<td>0.35</td>
<td>0.30</td>
</tr>
<tr>
<td>Party Wall</td>
<td>N/A</td>
<td>0.20</td>
</tr>
<tr>
<td>Floor</td>
<td>0.25</td>
<td>0.25</td>
</tr>
<tr>
<td>Windows</td>
<td>2.20</td>
<td>2.00</td>
</tr>
<tr>
<td>Boiler Efficiency</td>
<td>86%</td>
<td>88% - 90%</td>
</tr>
<tr>
<td>Air Permeability</td>
<td>10</td>
<td>10 (8)</td>
</tr>
<tr>
<td>Swimming Pool Basins</td>
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<td>0.25</td>
</tr>
</tbody>
</table>

Greater focus on Thermal bridging
Focus on thermal bridges

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Building Regulations (NI) 2000

kWh/m² per year
Thanks

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