

Energy Regulations, Costs & Investment

Scope of Presentation

Focus on commercial, public and institutional sectors

Topics

- Legislation, costs and investment climate

Background

- Buildings responsible for 50% of the UK's CO₂ emissions
- 23 million dwellings account for 30% of UK and other buildings 20%
- Since 1973 commercial building energy use up by 70%
- The EU plans to cut energy use from 1990 to 2050 by 60%
- New Building Regulations are expected to achieve 22% of the savings by 2010

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Summary

- Major change for building owners, occupiers, managers, designers and investors
- Direct comparison of energy consumption between buildings
- Negative impact for poorly performing buildings
- Encourage the use of renewables and discourage air conditioning use
- 50% of target CO₂ savings to come from improved plant efficiencies

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Legislation

- EPBD Energy Performance of Buildings Directive (EU)
- Building Regulations Approved Document Part L Conservation of Fuel and Power (2006)
- Code for Sustainable Buildings

Aim is to reduce energy consumption in all building types

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Energy Performance of Buildings Directive

- Requires EU states to transpose Directive into national law by January 2006
- UK implementation through Building Regulations Approved Document Part L from April 2006. Will cover new construction and major alterations to existing buildings
- Energy Certification will apply to all buildings except churches, historic buildings, agricultural, temporary buildings, and industrial processes

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Energy Performance of Buildings Directive

- Upgraded standards to be applied to all new buildings
- Upgraded lesser standards for large refurbishments
- Certification, reports and assessments by independent experts

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Energy Performance of Buildings Directive

Certification

- Benchmarked system similar to white goods labelling
- Based on an A to G range where C is equivalent to new standards
- Certificate made available to purchasers & tenants
- Displayed in public buildings and those providing public services (initially for buildings over 1000 m²)
- Assessors to be approved experts
- Building log book and energy report to indicate cost-effective energy improvements

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Energy Performance of Buildings Directive

Implications

- Direct comparison between similar sector buildings
- Profound impact on commercial & institutional property sector
- Will encourage refurbishment of under performing assets
- Commercial investors may seek to dispose of poor assets
- Environmental groups will have a tool to target poor performers
- Property managers will need to undertake review and certification of portfolios
- Facility managers will need to install energy metering

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Building Regulations

- Approved Document L2A – New Non-residential Buildings
- Approved Document L2B – Existing Non-residential Buildings
- Effective April 2006
- Buildings with ‘start on site’ before 6th April 2006 are exempt
- Target improvement in carbon emissions over L2 2002 of between 24% and 28% for non-residential buildings

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Building Regulations

New buildings, first fit-out and extensions over 100m²

- Predicted CO₂ emission rate (BER) to be no greater than the target rate (TER)
- If no comfort cooling, solar heat gains to be limited by shading and/or solar glass to prevent overheating
- All plant to be more efficient
- Building and ventilation leakage testing
- Inspection and Commissioning to approved standards
- Logbook and energy certificate required

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Building Regulations

Target Emission Rate (TER)

- Calculated using SBEM Simplified Building Energy Model software (not yet completed) or other approved software
- Notional building to 2002 standards with improvement factors and a 10% Low or Zero Carbon (LZC) benchmark also applied

Building Emission Rate (BER)

- Calculated using SBEM (or other approved software) based on 'as constructed' information
- Used as Asset Rating for energy certificate

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Building Regulations

Certification

- Based on Asset (BER) ratings and possibly Operational Ratings
- Operational Ratings would provide an indication of building management performance
- Renewed at least every 10 years

Inspections

- Government to decide between mandatory intervals for inspections or a self assessment scheme
- If mandatory, boilers to be inspected every 2-4 years

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Building Regulations

Existing Building Categories

- Extensions
- Consequential improvement
- Material change of use
- Material alteration
- Provision or extension of controlled services or fittings
- Renovation of thermal elements
- Historic buildings

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Building Regulations

Extensions

- Over 100m² and 25% FA as new build
- Under 100 m² and 25% FA based on improved 2002 standards

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Building Regulations

Consequential Improvement

For an extension to an existing buildings over 1000m²

- Energy improvements must be made to whole building

1 - Where heating or cooling capacity increased

- Replace windows with a U value less than 3.3
- Upgrade insulation to better than 2002 standard

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Building Regulations

AND

2 - Other additional measures

- Replacing heating, cooling and air-handling systems over 15 yrs old
- Upgrading light fittings and controls
- Install energy metering
- Install LZC energy systems where less than 10% energy is from such sources provided the system would achieve a 7 year payback or less
- Overall costs limited to 10% of construction costs

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Building Regulations

For small extensions <100m², change of use, material alteration, provision or extension of controlled fittings and services

- Fabric upgraded to standards similar to L2 2002
- Improved plant & lighting efficiencies
- Ventilation leakage testing
- Energy metering
- Efficient controls
- Certified commissioning reports
- Conditional on reasonable cost and practicality

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Historic Buildings

- Historic buildings exempted but need to follow EH guidance on energy efficiency improvements
- Historic buildings include all Listed Buildings and ones which the designated by the Planning Authorities

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Questions & Issues

- Is industry able to supply sufficient assessors?
- Are Building Control Officers able to cope?
- Full details of Certification & Inspection regime yet to be released
- Building Regulations Part L are draft and subject to further change
- Many supporting technical guides not yet available

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Code for Sustainable Building

- Policy commitment from Government and other public bodies to use the code for housing projects and PPP's from April 2006
- Will set Lower Carbon targets than Approved Document Part L
- Includes water use efficiency
- Use of recycled materials
- Waste management
- Uncertainty about standards to be set
- Details anticipated to be released November 2005
(www.odpm.gov.uk)

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Low Energy Costs

Air-conditioned office with 100% glazing
(figures from Davis Langdon)

Three schemes all improved from L2 2002 to L2 2006

Glazing `u` values

Air tightness

Boiler efficiency

Added heat recovery and water cooled chillers

1 - Glazing reduced to 40%	<u>£(12 m²)</u>
2 - 100% high performance glazing	<u>£61 m²</u>
3 - Double Skin glazing and shading	<u>£73 m²</u>

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Low Energy Costs

Building Life Plans - Natural ventilation costs

- Glazing Costs doubled to £620 m²
(Fully automated vent system with rain and temperature sensors linked to BMS)
- Running costs reduced by 25-50% (BCO)
- Plant maintenance costs reduced

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Property investment

Drivers for Change

- Energy consumption in offices increasing due to AC and office equipment
- More onerous legislation standards
- Rising energy prices
- Planning Policy increasingly includes sustainable requirements
- Climate change
- Corporate social responsibility
- Government procuring properties with best energy ratings

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Property investment

Conclusions

- Energy intelligent property investors stand to gain market advantage
- Institutional investors will have to re-evaluate property portfolios
- Greater recognition of corporate social responsibility
- Government procurement will lead the way
- Commercial barriers preventing significant energy efficiency will be removed
- Reduced running and management costs