

# *L2A 2010 – In 30 Minutes!!*



## **The Stroma Group**

*Building Sustainability  
& Compliance*

**Presented by:**

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# *Part L 2010 - Agenda*

- Summary of changes
- Criterion 1
- Criterion 2
- The “Notional Building”
- Criterion 3
- Design Process and Design Team



# *A History of Part L*

- First introduced in 1985 following 1984 Building Act. Regulated heating systems and insulation of services.
- Revised in 1990 and again in 1995 to regulate the “conservation of fuel and power”
  - Limits on building element performance
- 2002:
  - L1 (Dwellings) & L2 (Non-Dwellings)
  - 3 Methods for Compliance
  - Elemental, Whole Building Method or Carbon Emissions Calculation Method
  - SAP used to calculate Carbon Emissions for dwellings
- 2006:
  - L1A and L2A (New Build) & L1B and L2B (Existing Buildings)
  - Introduction of SBEM for Non-Dwelling compliance
  - 1 single method of compliance through 5 Criteria
  - BER vs TER or DER vs TER
  - Improved standards for U-Values and plant efficiency etc



# *The Last Change... Part L 2006*

- Last major changes to Part L was 2006
- Approved Documents split for New and Existing Buildings
  - L1A, L1B, L2A, L2B
- Compliance through 5 Criteria
  1. Achieving an acceptable CO<sub>2</sub> emission rate (BER or DER)
  2. Limits on Design Flexibility (U-Values, plant efficiencies etc)
  3. Limiting the effects of solar gain in summer
  4. Quality of construction and commissioning
  5. Providing Information
- Dwellings DER required 25% improvement over 2002
- Non-Dwellings required 23% (natural ventilation) to 28% (Mech Vent or Air Con)

*Building Control enforced compliance*

*L1B or L2B often unenforced – Regulations complex and requirements unclear*



# *Drivers behind change*

- Biggest driver remains threat of Climate Change
- UK Government made commitments to tough CO<sub>2</sub> reduction targets
  - Climate Change Act: Obligation to reduce emissions by 80% by 2050
- Part L is just one step towards meeting targets
  - Government commitment to zero carbon homes from 2016
  - Zero Carbon Non-Domestic Buildings by 2019
  - Schools and Public Buildings lead the way in 2016 and 2018
  - Good Part L Standard key to success of Zero Carbon
- Part L not the only Driver
  - Heat and Energy Saving Strategy (DECC 2009)
  - Explores range of policies to reduce emissions from existing building stock
- Fuel Availability
  - Will we run out of Gas?



# *L2A 2010 – In Summary*

- Design Stage Compliance Calculation submissions required pre-start
- 25% Improvement over 2006 standards for New Build
- Criterion 3 - Overheating calculations simplified calculation
- 5 Criteria for compliance remain
- Thermal Bridging constraints
- Air Test procedures changes



# Criterion 1 - 25% Improvement

- Consultation considered a Flat or Aggregate reduction
- Flat approach favoured for dwellings due to simplicity
  - 25% over 2006 levels would Code Level 3 standard for all new dwellings
- Aggregated approach favoured for non-dwellings
  - Means that 25% improvement achieved over new building stock

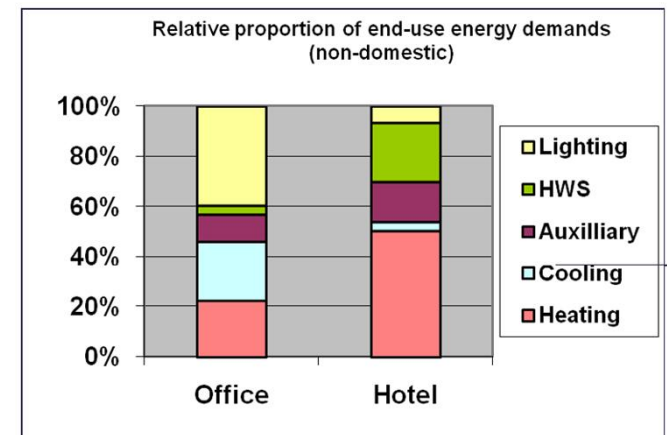
*Approach recognises different way energy is used within different building types*

*25% over 2006 = 46% over 2002*

*Thought of impact required in design*

*Compliance calculations will form part of design process*

*Intention to reward good design, rather than "Greenwash"*



# Criterion 2 - Limits on Design

- Limiting Values ***NOT*** changed
  - Area Weighted U-Value limits not changed
  - Air Tightness limit not changed
- New Building Services Compliance Guides
  - Replaces Non-Domestic Heating Cooling and Ventilation Compliance Guide and LZC Guide
  - New minimum efficiencies stipulated
- Principle objective to reduce 'Greenwash'
  - Fuel based TER
  - Easier for off grid, but renewable fuel is tougher than 2006
- Stricter Specific Fan Power and Lighting Efficacy limits imposed
  - Compliance with these elements now evident within submission document
- Limiting Air Tightness value remains 10m<sup>2</sup>/hr.m<sup>2</sup> @ 50Pa



*But...*

There's always a but...



# *The Notional Building - 2006*

- Target Emission Rate was;

$$TER = C_{notional} \times (1 - IF) \times (1 - LZC)$$

- Improvement Factor and LZC Benchmark meant 23% or 28% improvement
  - This meant clarity and understanding of what was needed
- Notional Building was understood to be 2002 regs building

*This gives freedom to designers to make chosen improvements*

*Worst case building performance could be offset by efficient or low carbon services*

*Improved thermal efficiency and air tightness allowed cheap inefficient systems*



# *The Notional Building - 2010*

- Now...

$$TER = C_{notional}$$

- No Improvement Factor, No LZC Benchmark
- 25% improvement must be hidden IN the Notional Building

*Understanding the Notional Building is key to understanding compliance*

*Designing to the Notional Building should mean compliance – Shouldn't it?*

*So what is the Notional Specification?*



# *The Notional Building - 2010*

Element Type	U-Value (W/m <sup>2</sup> K)	Limits (W/m <sup>2</sup> K)	Improvement
External Walls	0.26	0.35	26%
Roofs	0.18	0.25	28%
Ground Floors	0.22	0.25	12%
Windows/ Rooflights	1.8	2.2	18%
Vehicle Access	1.5	1.5	-
High Usage Doors	2.2	3.5	37%
Air Tightness	5.0 m <sup>3</sup> /hr.m <sup>2</sup>	10 m <sup>3</sup> /hr.m <sup>2</sup>	50%



# The Notional Building - 2010

- Emission factors changed to include other greenhouse gases - kgCO<sub>2e</sub>/kWh

Fuel	2006	2010	% Increase
Natural Gas	0.194	0.198	2.1%
Oil	0.265	0.297	12.1%
Biomass	0.025	0.013	- 52%
Grid Supplied Electricity	0.422	0.517	22.5%

*But... Notional Building uses same Fuel as Actual Building*

Grid Displaced Electricity	0.568	0.529	-7%
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*And... Grid Displaced much closer to Grid Supplied Electricity*

*So far less advantage for renewable energy generation*



# *The Notional Building - 2010*

- Building Services system efficiencies improved from 2006 calculation

Fuel	2006	2010
Gas Boiler – Heating CoP	73%	79.2%
Biomass Boiler – Heating CoP	73%	63%
Gas Boiler – DHW CoP	45%	83.6%
Electric Heat Pumps CoP	x	2.655
Cooling SEER	1.67	3.6
Ventilation Heat Recovery	x	70%
Mechanical Ventilation SFP	2 W//s	1.8 W//s
Pumps with VSDs	x	



# *The Notional Building - 2010*

In addition;

- Certain spaces have daylight controlled lighting

*So...*

*The Building specification is good  
The Building Services specification is good  
The impact of renewable energy generation is reduced*

*Also, compliance calculations submitted prior to construction*

*No longer can compliance be made through the building or the services...  
...It has to come from good, complimentary 'holistic' design*

*And reliance on PV or Wind Turbines to 'save' compliance is more costly*



*And...*

There's more yet...



# Criterion 3 - Solar Gains

- Significant change Criterion 3 in Non-Dwellings in L2A
- Overheating becomes a design issue
  - Strictly assessing solar gains, not combined internal gains
  - Complexity of compliance removed
  - Design team will have to ensure they meet comfort criteria separately within design
- Solar Gain limit stipulated for all occupied internal spaces
  - Irrelevant of provision of mechanical cooling – air conditioning
- Comparison is against a 'reference glazing' of specific G-value
  - For side-lit; compared against East facing façade, 40% glazed
  - For top-lit; compared against 15% glazed flat roof
  - Unclear how regulation will compare zones with mix of top and side lit.
- Use of shading, high performance glazing and orientation will become key to achieving compliance
- Trade off against daylighting must be considered – solar gains or daylight?



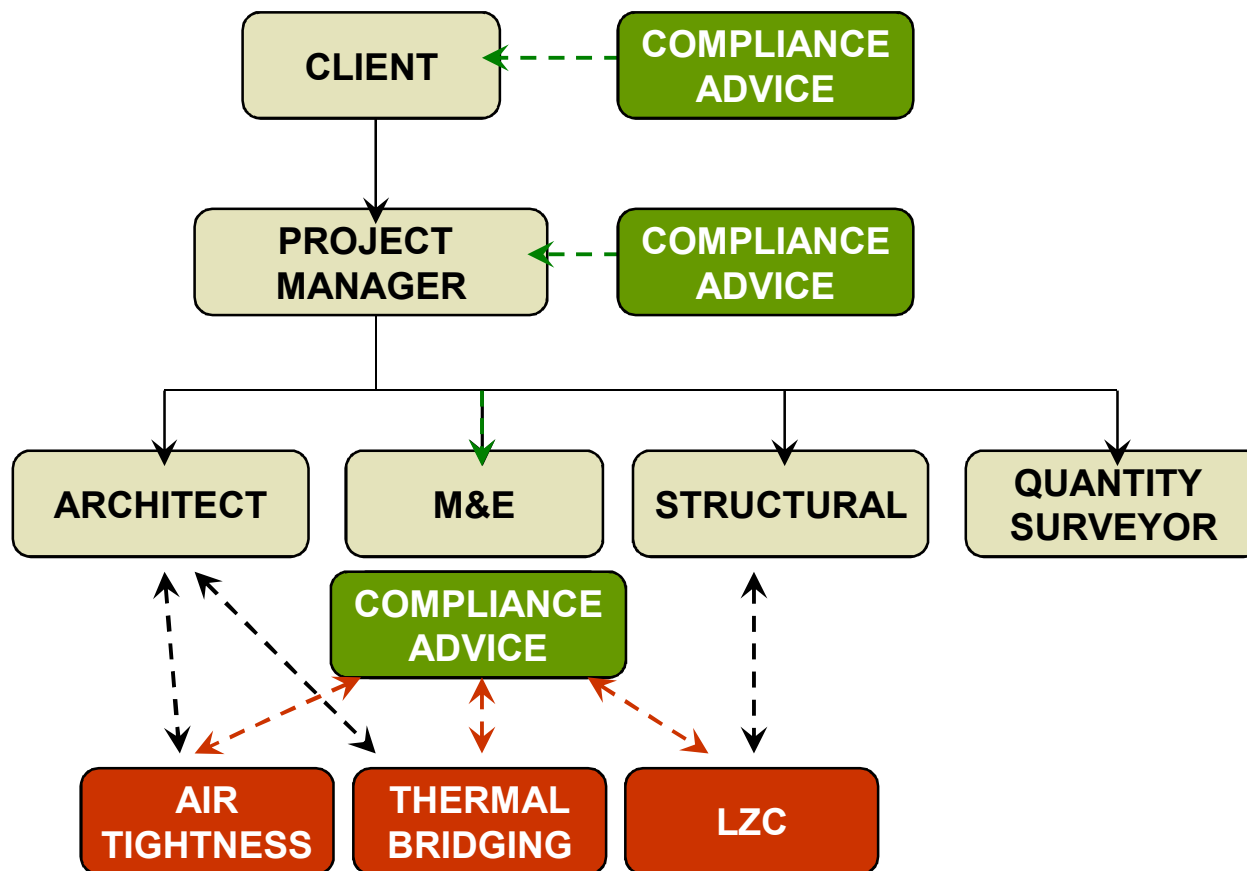
# Summary

- 25% Improvement over 2006 standards for New Build
  - Achieved through Aggregated Approach
- Minor alterations to SBEM to reflect changes
- Criterion 3 - Overheating calculations simplified calculation, onerous compliance
  - Spaces with Air Con included
- Thermal Bridging constraints
  - Accredited Construction Details or Private Calculation to limit penalty
- Compliance required with Design Stage submission pre-start
- 25% improvement is onerous
  - Good 'holistic' design, and design team involvement is key
- Impact of renewable generation is reduced
- Part L is one step towards Government commitment to Zero Carbon
  - Homes by 2016
  - Schools by 2016
  - All 'Public' buildings by 2018
  - **All** new build by 2019



# Part L & the Design Team

## Typical Design Team Structure

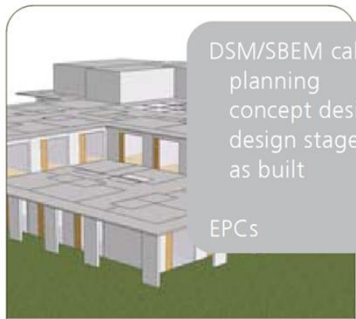


# *Stroma and Part L Assistance*

- Energy Assessment and Air Tightness core skills
- Dynamic Simulation Modelling (DSM), Solar Shading Analysis, Daylighting Calculations
- Overheating calculations for comfort assessment as well as compliance
- Air Tightness design assistance, pre-test inspections and air sealing work
- BREEAM Assessment
- Finite Element Analysis for Thermal Bridging
- Renewable Energy Feasibility Studies, Renewable Energy Statements, low carbon design assistance
- All complementary services to assist from concept to completion



# Stroma and Part L Assistance



DSM/SBEM calculations at:  
planning  
concept design  
design stage  
as built

EPCs

DSM/SBEM



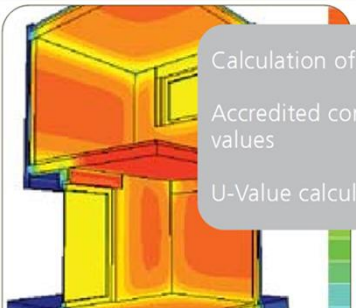
Criterion 3 compliance  
Thermal comfort calculations  
(non Building Regs.)  
BREEAM thermal modelling  
Impact of facade & building  
form

OVERHEATING



Pre-assessment  
Design stage assessment  
Post construction  
Consultancy/advice  
Compliance consultancy

BREEAM



Calculation of  $\psi$  values  
Accredited construction  
values  
U-Value calculation

FEA



Design, review, workshops &  
seminars  
Air-sealing, pre test inspection  
component testing  
UKAS final test, post test  
diagnostics remedial air seal

AIR-TIGHTNESS



On site contribution/renewable  
energy statements (planning)  
ENE5 feasibility studies (BREEAM)  
Low carbon design for  
SBEM compliance

RENEWABLES/LZC



*Stroma's Co-ordinated approach to  
Building Sustainability & Compliance*

"Stroma's ultimate objective is to ensure that all buildings, new and existing, reach their full energy performance potential and comply with legislation without sacrificing client satisfaction or occupier comfort+

*We welcome any Questions??*

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