CIBSE Young Energy Performance Group (YEPG) presents

CARBON BITE NIGHTS

MAR – APR – MAY 2016  🦅 #CARBONBITES
The YEPG

Provide a platform for discussion and dissemination of innovative ideas and research regarding energy performance in buildings

To reach out to young professionals and those aspiring to join the industry by providing an open forum for discussions
The YEPG

Enable networking opportunities promoting collaboration amongst members

Support our members in their continuing professional development
The Committee

CIBSE Young Energy Performance Group
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To become an official member of the group – please email groups@cibse.org stating that you would like to join the Young Energy Performance Group
Legal background of Building Energy Performance Requirements

Dr Hywel Davies (CIBSE)
Netza Jack (Hurley Palmer Flatt)
Building Energy Performance Requirements: the Legal Background

9th March 2016

Dr Hywel Davies

Technical Director
Chartered Institution of Building Services Engineers
www.cibse.org
Need a slide that shows I am going to go fast!

- I will try to introduce all three (or four or five) letter acronyms.

- If I don’t, please stop me!!
Presentation Outline

- Introduction to the Policy Landscape
- Part L and “nearly zero”
- “Zero carbon” buildings
- Other Related Policy Issues
  - Treasury Review of Business Energy Taxation
  - Minimum Energy Efficiency Standards
Introduction – Buildings, Energy & Carbon

1. CRC Energy Efficiency Scheme (CRC)
2. Climate Change Agreements (CCAs) & Climate Change Levy (CCL)
3. Energy Performance Certificates (EPCs), Display Energy Certificates (DECs) & Air conditioning inspections
4. F-Gas Regulation & related requirements
5. Smart Meters
6. Metering and Billing Regulations
7. Enhanced Capital Allowances (ECAs)
8. EU minimum energy performance standards and labelling (ErP)
10. Mandatory Greenhouse Gas (GHG) reporting
11. Energy Savings Opportunity Scheme (ESOS)
12. Minimum Energy Efficiency Standards (for rented buildings)
What’s in the current policy mix?

Who leads on what policy?

- DECC
- DEFRA
- CLG
- MEES

Housing Standards Review

Energy related Products

EPCs

EPCs and CRC Energy Efficiency Scheme

EDR

Planning Policy

Smart Meters

Decs and Air conditioning inspections

Energy Efficiency Directive - ESOS

Building Regulations

GHG reporting

Zero carbon buildings

Renewable Heat Incentives

Feed in tariffs

EPBD revie

Reduce demand for energy

Energy Efficient equipment

Energy Efficient systems

Renewables

Adaptable solutions

Metering and Billing Regs

F-Gas

Green Deal

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Key energy policies for buildings

- **Building Regulations Part L**
  - carbon emissions targets for new build
  - reducing emissions from existing buildings
  - building services compliance guides

- **EPBD “nearly Zero Energy Buildings”**
  - “nearly zero energy” buildings – new and refurb!

- **Minimum Energy Efficiency Standards**
  - requiring poorly (F or G) rated rented buildings to be improved

- **Energy Efficiency Directive & ESOS**
  - Identifying cost effective energy efficiency measures in existing buildings
Key energy policies for manufacturers

- **Eco Design**
  - ever tighter performance standards for appliances

- **F-gas and the HFC phasedown**
  - what does the future product catalogue look like in this market segment?

- **Renewable Heat and All That**
  - incentives for the renewable market
  - skills to deliver the incentivised products without triggering a PR disaster in an SME dominated supply chain where training is an overhead and poaching seen as a major threat

- **Minimum Energy Efficiency Standards**
  - products to improve poorly rated buildings?
Complexity and unintended consequences

- We also have planning rules, renewable energy directives, incentives and obligations, the energy efficiency directive and ESOS, carbon reduction commitment, climate change levy, Eco design Framework Directive and F-gas & Ozone Depleting Substances Regulations.

- It is a classic recipe for unintended consequences

- Treasury Review of Business Energy Efficiency Taxation may address some of this
Building Regulations

Part L
The Building Regulations 2010

Conservation of fuel and power

L2A

APPROVED DOCUMENT

L2A Conservation of fuel and power in new buildings other than dwellings

2013 edition – for use in England*
Building Regulations for England

- Building Regulations are now devolved – Wales has its own “Part L”
- We now have four Building Regulations regimes in the UK
The Building Regulations 2010

Conservation of fuel and power

L12A

L2A Conservation of fuel and power in new buildings other than dwellings
Zero Carbon Buildings
Known Knowns

- The EPBD requires “nearly zero energy” buildings from 31 December 2020
‘Nearly zero energy’ buildings are already in the Building Regulations

Nearly zero-energy requirements for new buildings

- **25B.** Where a building is erected, it must be a nearly zero-energy building.

The Building Regulations &c. (Amendment) Regulations 2012, SI 2012 No.3119
Known Unknowns

- The EPBD (and Building Regulations in England) require “nearly zero energy” buildings from 31 December 2020
- But it is not clear what a “nearly zero energy” building actually looks like, yet…
“nearly zero energy buildings”

‘nearly zero-energy building’ means 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;

This is a requirement of the EPBD, and applies to all new buildings from 1st January 2021, and to new publicly owned and occupied buildings from 1st January 2019.
European Commission have undertaken to define

- “nearly”
- “significant”

This may help us to understand when a building is a “nearly zero energy” building.
Cost Optimal Review

- The EPBD requires Member States to review their minimum energy efficiency standards using a methodology set out in a Commission Regulation.
- First review was due in 2012 but was delayed to 2013 by the late arrival of the Regulation. Next review due in 2017.
- Part L was broadly cost optimal in the first report to EU.
- With the reduced prices of some energy efficiency measures, learning rates and innovation we can expect a shortfall in 2017.
- Early industry engagement in this review is essential.
Review of ‘minimum energy efficiency standards’ – Part L in England

- This must be done at least every five years, so next review is due to be complete in 2018;
- Must be informed by the cost optimal analysis;
- Will need to adopt those measures that are deemed to be cost optimal;
- Does NOT need to go beyond “cost optimal”!
- Given the timetable for nzeb in 2021 and 2019 in some public buildings, this is the version of Part L that will apply for nzeb.
- So from an energy efficiency perspective, anything that is needed to deliver nzeb needs to be cost optimal and be adopted in 2018.
Unknown unknowns
The Energy Performance of Buildings Directive – the EPBD

- First adopted in 2003, implemented in two phases
  - labelling and whole building calculations (2006)
  - air conditioning and boiler inspections (2009)

- Recast adopted in May 2010, replaces the original EPBD from 1st February 2012
  - expands the scope of the Directive

- Consolidated Regulations adopted in UK In December 2012
Extended Scope of the EPBD as Recast

- Display Energy Certificates required in public buildings over 500m² (previously over 1,000m²)
- All buildings over 250m² and frequently visited by the public which have an energy certificate must display it
- Article 27, Penalties, requires that
  
  “Member States shall lay down the rules on penalties applicable to infringements of the national provisions adopted pursuant to this Directive and shall take all measures necessary to ensure that they are implemented. The penalties provided for must be effective, proportionate and dissuasive.”
Energy Efficiency Directive:

Energy Savings Opportunity Scheme
Energy Efficiency Directive

- Published in November 2012
- Comes into force in stages over next 3 years
- Introduces four yearly energy audits for “large enterprises”
  - may be based on ISO 50001 (was BS EN 16001)
  - may also use Display Energy Certificates, Green Deal assessments
  - Implementing Regulations and initial guidance published late June 2014
  - CIBSE now manages the largest register of ESOS Lead Assessors

First cycle of audits to be complete by 5th December 2015
How will it work?

All “large organisations” (on a given qualifying date) will need to carry out an energy audit overseen by a “lead assessor” every four years, covering their buildings, transport and industrial uses of energy. The first round of audits are to be complete by 5th December 2015.

Audit should identify realistic cost effective improvements to energy use in the business
Metering & Billing Regulations
What are these?

- Regulations which require all communal heating systems to be separately metered (unless it is not cost effective to do so).
- Communal heating means a central boiler in a multi tenanted building
- A case study in unintended impact and consequence
- Another unfolding saga…. 
Treasury review of business energy efficiency taxation
Treasury review of business energy efficiency taxation

- Looking at Carbon Reduction Commitment, Climate Change Levy and mandatory reporting
- Consultation out now – closes 9\textsuperscript{th} November
Minimum Energy Efficiency Standards
Minimum Energy Efficiency Standards

If you want to let or sell a property with an F or G rated EPC then you will have to improve it;
    I can’t afford that!
    Well, you can take out a Green Deal plan…
    Oh no you can’t…

Or I could just not get an EPC in the first place….?
    nearly 3 out of 5 buildings said their owners currently prefer that option….
A final thought……
We’ve been too concerned with “regulated loads”, renewables and mandated bling …

Over half the annual emissions go through server room and kitchen.

With thanks to Bill Bordass OBE
“The definition of stupidity is doing the same thing over and over again and expecting different results.” — Albert Einstein
Time to focus on outcomes!

- Building occupants and owners are interested in what happens, not what regulations someone claims that the building complies with;
- The evidence that we are promising dreams and delivering nightmares is there for all to see;
- We can produce buildings that deliver the dreams

But we have to want to do it…!
Building Energy Performance Requirements: ESOS

Netza Jack MEng CIBSE
Associate at Hurley Palmer Flatt
The Mandatory Minefield

ESOS

Department of Energy & Climate Change

CCA climate change levy agreements

EU ETS emissions trading scheme

HATE RISING ENERGY COSTS?
GREEN DEAL WITH IT.

ARE YOU READY for 2018 Energy Act Compliance?

Netza Jack

Legal background of Building Energy Performance requirements
Compliance Outlook

2014

- BREEAM & CfSH + Part L 2013
- CO₂
  - 35% Reduction (London Plan)
- Solar panels
  - 20% Energy from renewables (London Plan)
- Zero Carbon Dwellings
  - 80 lit/person/day

2016

- Zero Carbon Non-Dwellings
  - 100% Reduction
- LCZ Technologies
- Alternative Fuel

2018

- Energy Act 2018
- ESOS

2019

- EUETS Phase III

2020 - 2050

- Innovation

Legal background of Building Energy Performance requirements

Netza Jack
Compliance Outlook

• Energy Performance of Buildings Directive
• Each requires an understanding of energy consumption and have a financial burden on business
• Considering the complete compliance approach within your business could save significant cost.
• The site based audits, data collection and reporting mythologies are complementary across different compliance requirements
• **Consolidation of compliance will save significant time and money!!**
Compliance Outlook – ESOS

• The latest of these schemes, launched in June this year, is the Energy Savings Opportunity Scheme or ESOS

• The first compliance date is 5th December 2015....please note, the fines are tough!

_Every big enterprise in Britain (with 250+ employees or an annual turnover in excess of €50 million and a balance sheet in excess of €43 million) has to get an energy audit of their buildings, industrial processes and transport once every four years by law._

• ESOS could be a way of limiting the compliance burden
ESOS- The Basics

• The Energy Savings Opportunity Scheme (ESOS) is a mandatory report which considers the total energy consumption of large enterprises, broken down into three strands;
  – Process (and general)
  – Transport
  – Buildings
ESOS - The Basics

• In short, you are required to;
  – Measure all of your energy consumption
  – Conduct energy audits to identify cost effective energy saving measures
  – Report your compliance to the Environment Agency

• A company Director and the Lead Assessor must sign off the ESOS report

• The final report will not just look at energy use/cost, it will seek to find and must demonstrate cost effective energy saving measures.

You will not be compelled to undertake any of the identified measures
ESOS – Do we have to comply?

• This is EU legislation affects all Member States.
• It is now Law
• The scheme administrator is the Environment Agency
  • England – Environment Agency
  • Northern Ireland – The Northern Ireland Environment Agency
  • Scotland – The Scottish Environment Protection Agency
  • Wales – The Natural Resources Body for Wales
  • Offshore – The Secretary of State for Energy & Climate Change

• The above are all duty bound to co-operate and share information.
  • So there is no escape.
  • They know who you are – EA has about 11,000 letters ready to be sent out in November, so expect one to drop through the post.
ESOS – Am I caught by the Regulation

- Over 250 Employees, or
- Annual turnover of 50 million euros and
- Annual balance sheet of 43 million euros
- There are complex strands of the Regulation if you are a small part of a larger Group, or a subsidiary of a large International Group
- Certain Trusts need to comply
- Certain Charities need to comply
- Public Bodies are exempt
- Franchises are mostly exempt
- Exclude non-UK activities (this will form part of the Member States reporting activity if EU)
ESOS – Scheme compliance periods

• No longer a need to register – participants are responsible for ensuring they are undertaking relevant compliance activities

• The subsequent compliance period – the date by which ESOS reports should be complete, signed off by a Director, and information given to the EA

• ESOS is a 4 year cycle – Next is December 2019

• The scheme administrator - putting together a Notification System

5th December 2015
OK, so what if we don’t comply?

- There are financial penalties for non-compliance

<table>
<thead>
<tr>
<th>Date</th>
<th>Reason</th>
<th>Base Fine</th>
<th>Additional Penalty</th>
<th>Maximum imposable penalty</th>
</tr>
</thead>
<tbody>
<tr>
<td>31st December 2014</td>
<td>Failure to Register</td>
<td>£5,000</td>
<td>£500.00 per day</td>
<td>£45,000</td>
</tr>
<tr>
<td>Failure to maintain records</td>
<td>£5,000.00 fine plus the cost of EA investigating you up to remedy of breach</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5th December 2015</td>
<td>Failure to submit audits</td>
<td>£50,000</td>
<td>£500.00 per day</td>
<td>£90,000</td>
</tr>
</tbody>
</table>

- The Environment Agency will display the details of non-compliant Companies, and the fines, on their website.

- In addition, £5,000 plus £500 per day for ignoring notifications from EA, plus **£50,000 for giving misleading information**
ESOS – The Energy Audit

- The ESOS final report **must** contain energy audits addressing specific issues
  - Analyse energy consumption and efficiency
  - Identify energy efficiency improvements
  - Recommend practical cost effective measures
  - Identify any estimated costs and benefits
  - Create and keep an “evidence pack” of all findings and methodology
ESOS – Who does all the work?

• A “Lead Assessor” must be appointed
  – Your Lead Assessor is key, this person will scope out how to comply.
  – The Lead Assessor Approval Bodies were announced in October and training courses have now started
  – Like all new Professions, there will be good and bad - be careful

• Much of the financial data collection, information on estate, environmental data can be done by yourselves (under instruction/supervision) – for most the biggest issue is buildings

• The lead assessor can appoint specialist surveyors to look at buildings, the lead assessor does not need to undertake the audit /survey work
ESOS – How do I measure?

• Over a preceding period of 12 consecutive months
• 90% of the energy consumption only needs to be considered, so you can exclude the most difficult 10%.
• Choose an Energy Measurement Unit – such as kWh
• You can base the whole report on energy spend if you wish, but there must be a common approach
• It is all the energy supplied to or consumed by the participant, or consumed by its activities
• Data, where verifiable, must be measured, but in the absence can be estimated
ESOS – Alternative routes to compliance

- **ISO 50001** – this one gets you completely off the hook

- **Green Deal Assessments**; nobody will realistically use this

- **Display Energy Certificates (DECs)** – low cost approach combined with sampling on buildings.

- **ESOS compliant Energy Audits** – provides greater information level on initiatives
ESOS – Buildings and sampling

- Sampling methodology of similar building types, if properly set out, is acceptable, but verifiable data must be included.
  - Agree methods with the Lead Assessor
  - Schedule all buildings in the portfolio
  - Determine survey sample methodology
  - Survey all unique buildings individually
  - Group all similar building types together (i.e. High Street retail)
    - Determine metrics for the building group
    - Desktop gather all relevant data
    - Select and site visit/survey sample set
    - Produce building by building Energy survey
ESOS – Case Studies

UK Based Organisations
• Chelsea Football Club
• JP Morgan Chase
• Sky UK Ltd
• Prudential Insurance

ROI Based Organisations
• State Street
• Bank of New York (BNY Mellon)
• Bank of America (Merrill Lynch)
ESOS – Chelsea FC

Daily Consumption Profile
June 2014

Daily Consumption Profile
December 2014

Legal background of Building Energy Performance requirements
ESOS – Case Studies

**Stamford Bridge**
Heating & DHW Demand

- **Heating Demand (kW)**
  - Jan: 1,200
  - Feb: 1,100
  - Mar: 1,000
  - Apr: 900
  - May: 800
  - Jun: 700
  - Jul: 600
  - Aug: 500
  - Sep: 400
  - Oct: 300
  - Nov: 200
  - Dec: 100

**CHP**

**Baseload**
ESOS – Chelsea FC

Chelsea FC Training Ground, Cobham
Energy Efficiency Initiatives CO₂ Savings per £ Capex
Priority by Category

Stamford Bridge
Energy Efficiency Initiatives CO₂ Savings per £ Capex
Priority by Category

- Behavioural Change
- EMS (Energy Management System)
- Chilled Water Pumps
- Primary LTHW Pumps
- Gas-Fired Boilers
- Pipework Insulation
- Ventilation
- Constant Temperature LTHW Secondary Pumps
- Primary Chilled Water Pumps
- Under-Pitch Heating Pumps
- Constant Temperature LTHW Primary Pumps
- Combined Heat and Power (CHP)
- Chillers
- Low & Zero Carbon Technology (LZC)

kgCO₂/£ Capex
ESOS – Chelsea FC

Capital Expenditure ECMs
- 6,609 MWh in Energy Savings
- 1,784 tonnes CO₂
- £386k (based on current energy tariff)
- 30% reduction based on 2014 energy baseline
- £2.9M to realise savings
- Simple payback of approx. 7.5 years

Low and Zero Carbon Technologies
- 316 MWh from LZC technologies (off-set)
- 156 tonnes CO₂
- £52M (based on current RHi scheme and utility savings)
- 2% reduction based on 2014 energy baseline
- £553k to realise savings
- Payback of approx. 11 years (based on current RHi scheme and utility savings)