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SLL Masterclass 2013-2014

L is for Lighting Control

L is for Lighting Control

Agenda

- The importance of lighting controls in the built environment
- Controlling LED and its benefits
- Part L and how lighting controls can help
- Integrating lighting control to optimise energy performance

Importance of lighting controls in the built environment

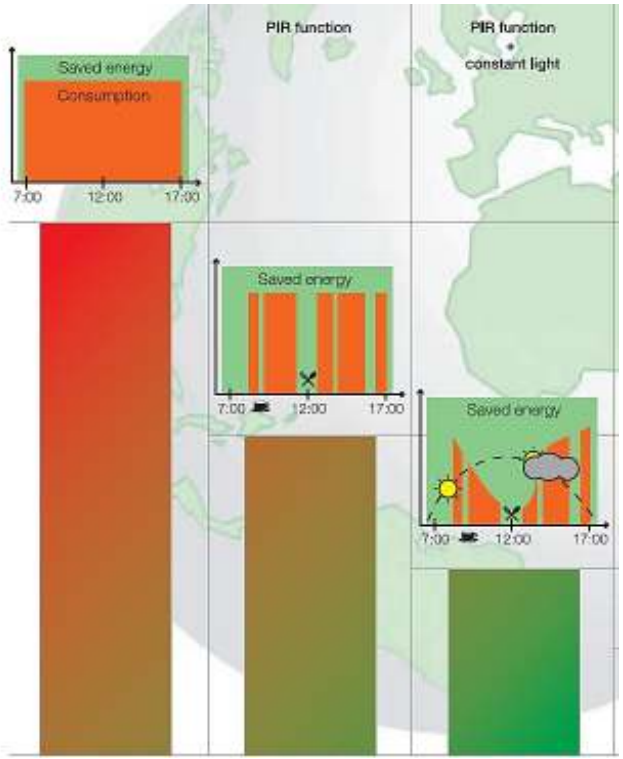
Fundamental component in our buildings

- Safety
- Comfort
- Productivity
- Health & Wellbeing

Importance of lighting controls in the built environment

Uncontrolled lighting results in substantial energy waste

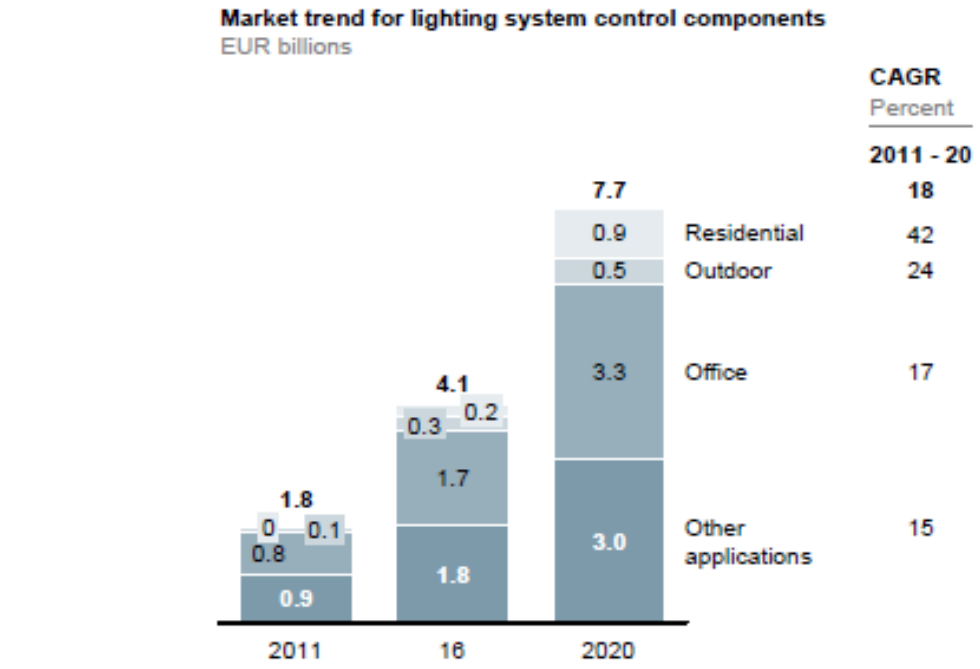
- Simplified graph showing the potential energy savings that can be achieved when presence / absence detection and daylight harvesting utilised in a lighting design



Importance of lighting controls in the built environment

Growth of Lighting Controls

- The market for lighting system control components is projected to grow very rapidly



NOTE: Numbers may not add up due to rounding

SOURCE: McKinsey's 2012 Global Lighting Market Model

Importance of lighting controls in the built environment

Be energy efficient and energy intelligent

- Turn off when spaces not in use
- Turn off when adequate daylight
- Dim lights when daylight levels vary
- Dim lights when task lighting is used

Importance of lighting controls in the built environment

Easy to overlook owner/occupier needs

- Efficient lighting system
- Easy to use
- Occupant needs to have control
- Occupant needs to understand

Importance of lighting controls in the built environment

Shift towards digital lighting

- Improved performance & reliability
- Economically sustainable
- Trend of Integration
- Future – Intelligent light sources

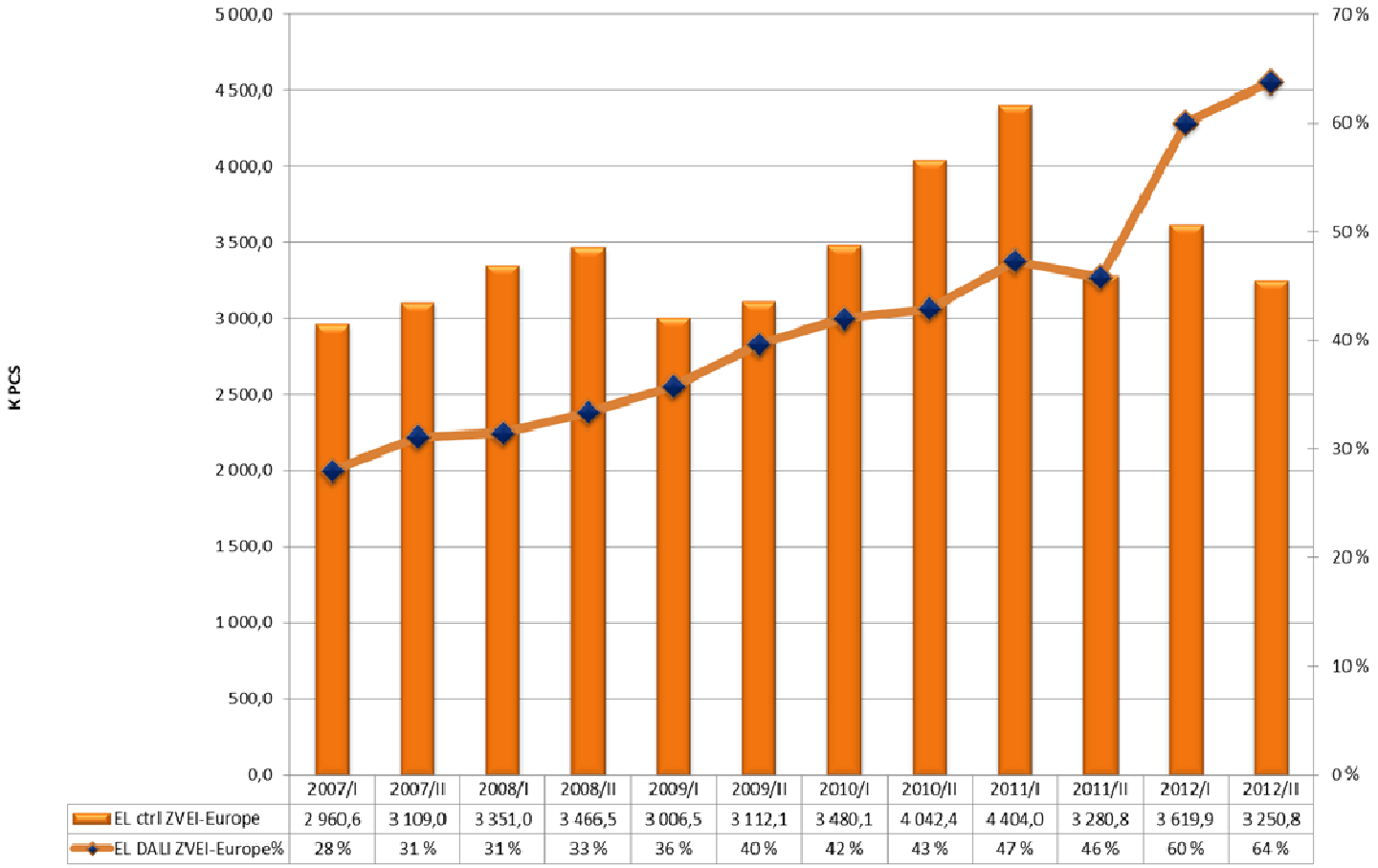
Importance of lighting controls in the built environment

Need for Industry/Open standards

- Interoperability
- Reduce complexity
- Promote integration with different systems
- ZigBee Light Link
- EnOcean
- DALI

DALI market development

- **DALI = 64%** from all EL-ctrl in Europe (2012)

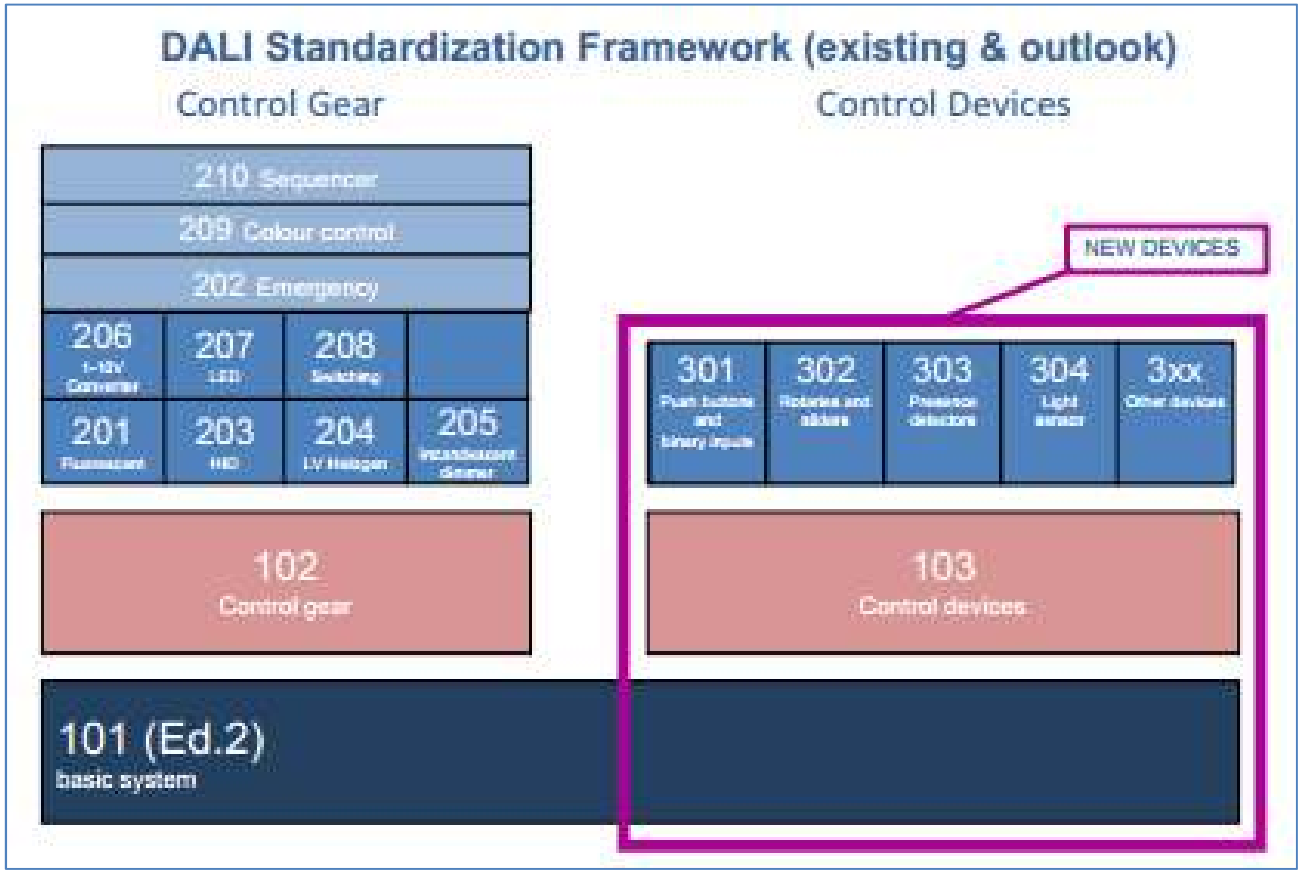


	2007/I	2007/II	2008/I	2008/II	2009/I	2009/II	2010/I	2010/II	2011/I	2011/II	2012/I	2012/II
EL ctrl ZVEI-Europe	2 960,6	3 109,0	3 351,0	3 466,5	3 006,5	3 112,1	3 480,1	4 042,4	4 404,0	3 280,8	3 619,9	3 250,8
EL DALI ZVEI-Europe%	28 %	31 %	31 %	33 %	36 %	40 %	42 %	43 %	47 %	46 %	60 %	64 %

Importance of lighting controls in the built environment

DALI Standard IEC62386

- Existing and planned outlook of the standard



Importance of lighting controls in the built environment

DALI interoperability

Logo License Procedure (end 2013)

1. Signed DALI member agreement
2. Conformity with IEC62386 + DALI tester
3. Registration of device + test results

DALI device

Official DALI bench tester

Software updates (IEC 62386)

Controlling LED and its benefits

Natural fit in our modern digital world

- Utilise existing digital technologies
- Far easier to dim
- Inherent long life & controllability
- High Durability
- Reduced Maintenance

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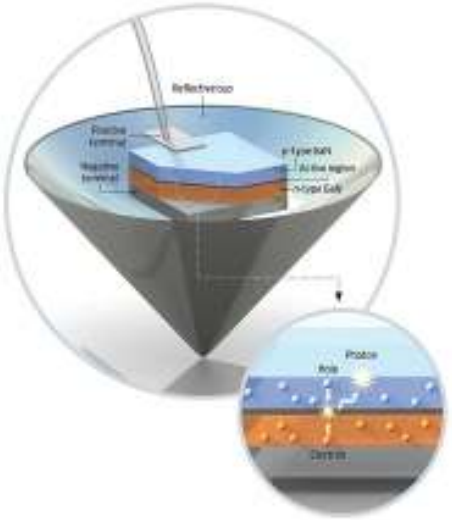
Controlling LED and its benefits

Adaptive Control Solutions

- Controllability
  - Greater Optical Control
  - Dimming range <1% - 100%
  - Instant On/Off
- Tuneability
  - Colour Control
  - Human-centric lighting
- Longevity
  - Lifetime
  - Reliability
  - Serviceability



Controlling LED and its benefits

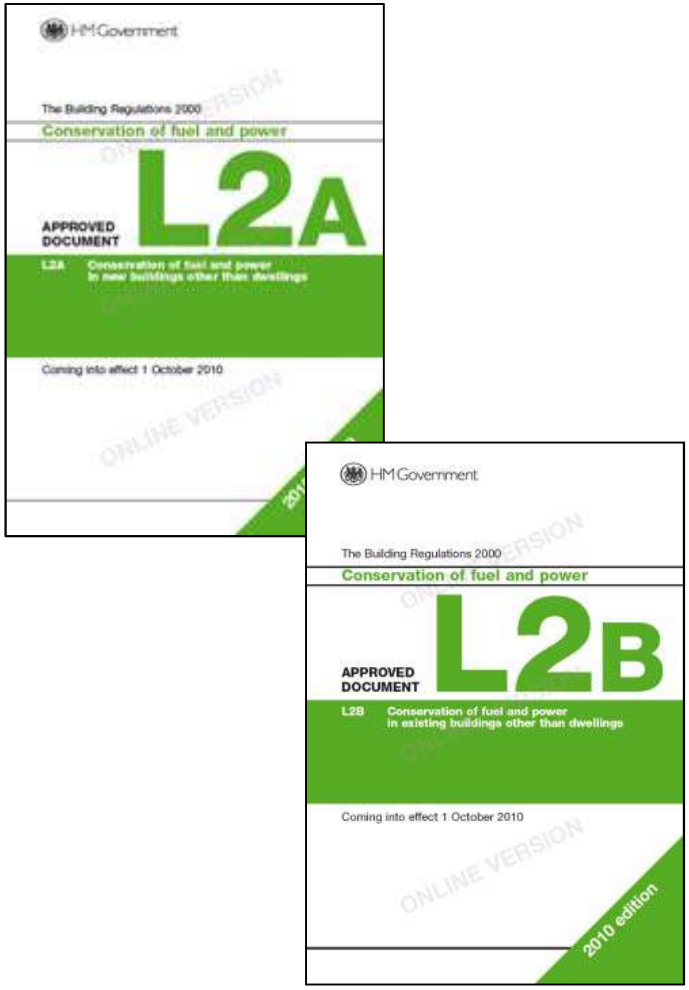
Innovation and need for standardisation

- Area of great innovation
- Emerging Standards
  - Optical
  - Form Factors (Zhaga)
  - Electrical Interfaces
- Beware low quality, low cost solutions

Part L & how lighting controls can help

Timescales and overview

- New regulations - 6th April 2014
- Luminaire Efficacy to increase by 10%
- 60 Lumens per circuit watt
- Comprehensive lighting control factors



Part L & how lighting controls can help

Advantages for using Lighting Control

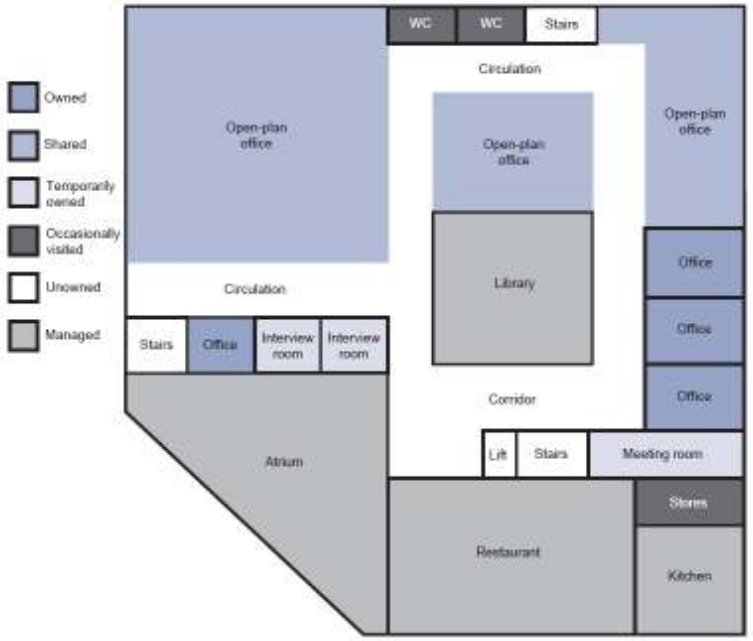
- With Lighting Controls may reduce to 42 Luminaire Lumens/circuit watt

Controls used	Control Factor	Efficacy target Llm/Wc
- No control	1.00	60
a. Daylit space with photo switching	0.90	54
b. Daylit space with photo switching and dimming	0.85	51
c. Unoccupied space with auto on/off occupancy	0.90	54
d. Unoccupied space with manual on / auto off	0.85	51
e. Space not daylit dimmed for constant illuminance	0.90	54
a + c	0.80	48
a + d	0.75	45
b + c	0.75	45
b + d	0.70	42
e + c	0.80	48
e + d	0.75	45

Part L & how lighting controls can help

LENI introduced as alternative calculation method

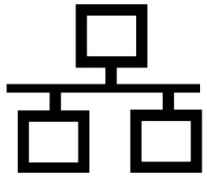
- Promotes efficient ***use*** lighting
- Considers lighting design as a whole
- Applicable control factors
  - Occupancy Factor (Fo)
  - Factor for Daylight (Fd)
  - Constant Luminance Factor (Fc)



Optimise energy performance via Integration

Integration required for high performance building

- Often rudimentary on/off switching only
  - Perceived lack of need (and budget)
  - Technical challenges
  - Division of design disciplines
- Industry/Open standards help facilitate integration
- BACnet
- DALI
- Standard Ethernet



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Optimise energy performance via Integration

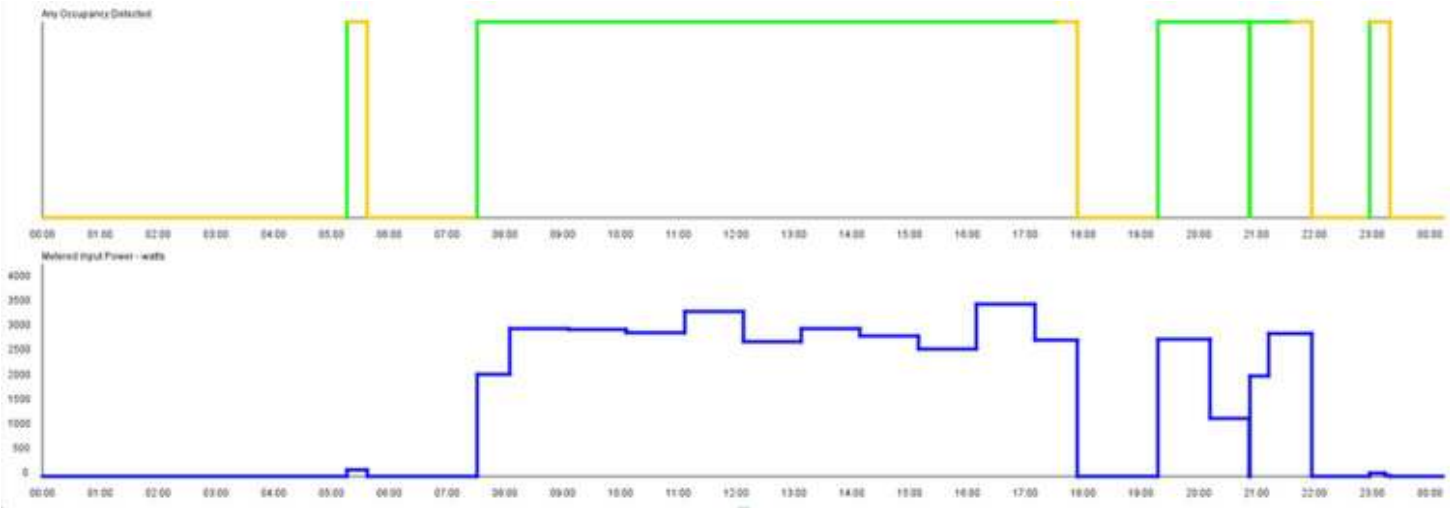
Common User Interface

- Easy of Use
- Flexibility
- Effective Maintenance Plans
- Remote Access

Optimise energy performance via Integration

Further energy reductions achievable

- Improve building efficiency via coordinated:
  - Scheduling
  - Occupancy Control
  - Light Level Optimisation
- Sharing of information
  - Actual building usage
  - Benchmarking



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Conclusions

- The landscape of the lighting industry is changing, and we NEED to adapt
  - Lighting Controls, LED, Integration
- Industry/Open standards will drive the digitalisation of lighting and controls
  - DALI, ZigBee, EnOcean, BACnet
- Not enough to specify high efficacy luminaires alone
  - Couple with lighting controls
- New legislation clearly identifies the need for lighting controls
  - The "nice to have" lighting controls option will become the "must have"
- New technologies in whole-building control will help provide greater overall energy savings and improve control, efficiency & reliability

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Thank you

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