

Design for performance: Securing commercial buildings by creating efficient, high quality assets

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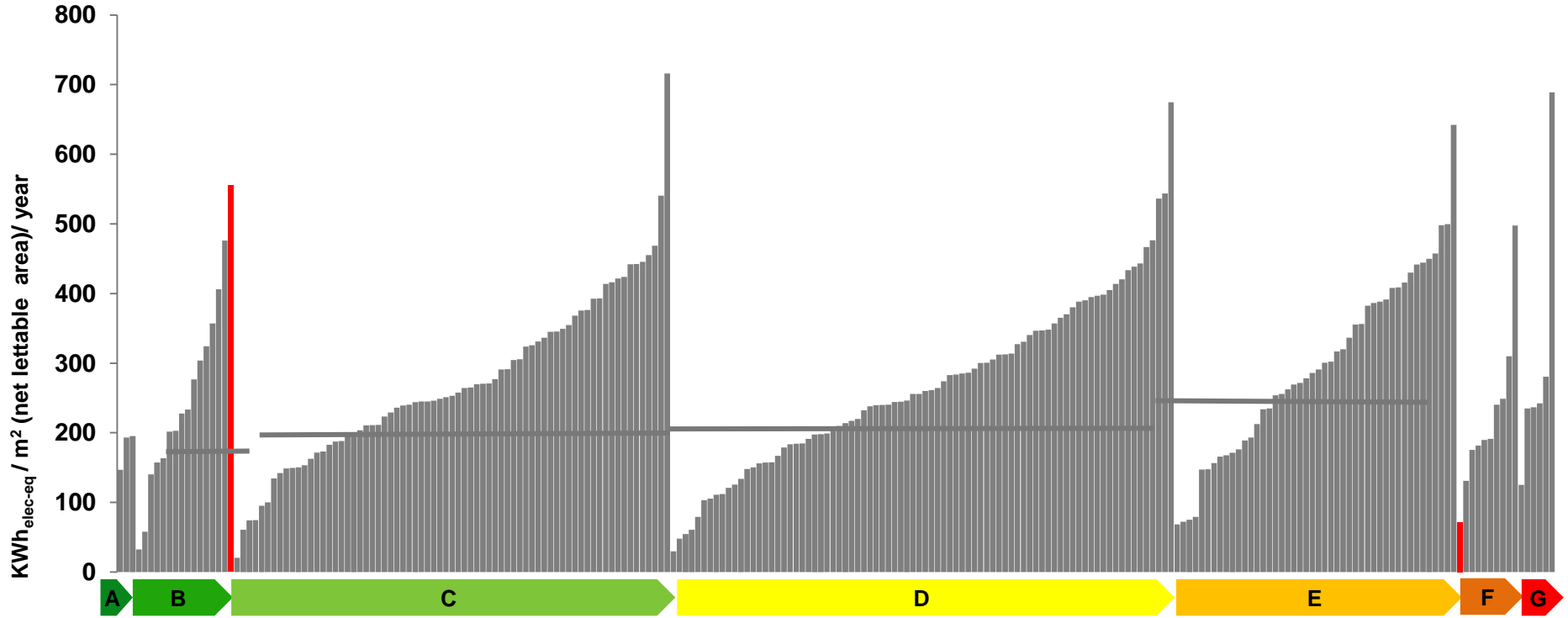




- We are blind as to the energy efficiency of new commercial buildings
- There is a world-leading solution
- Can we replicate that solution in the UK?



Not surprisingly EPCs are a poor indicator of whole building energy intensity



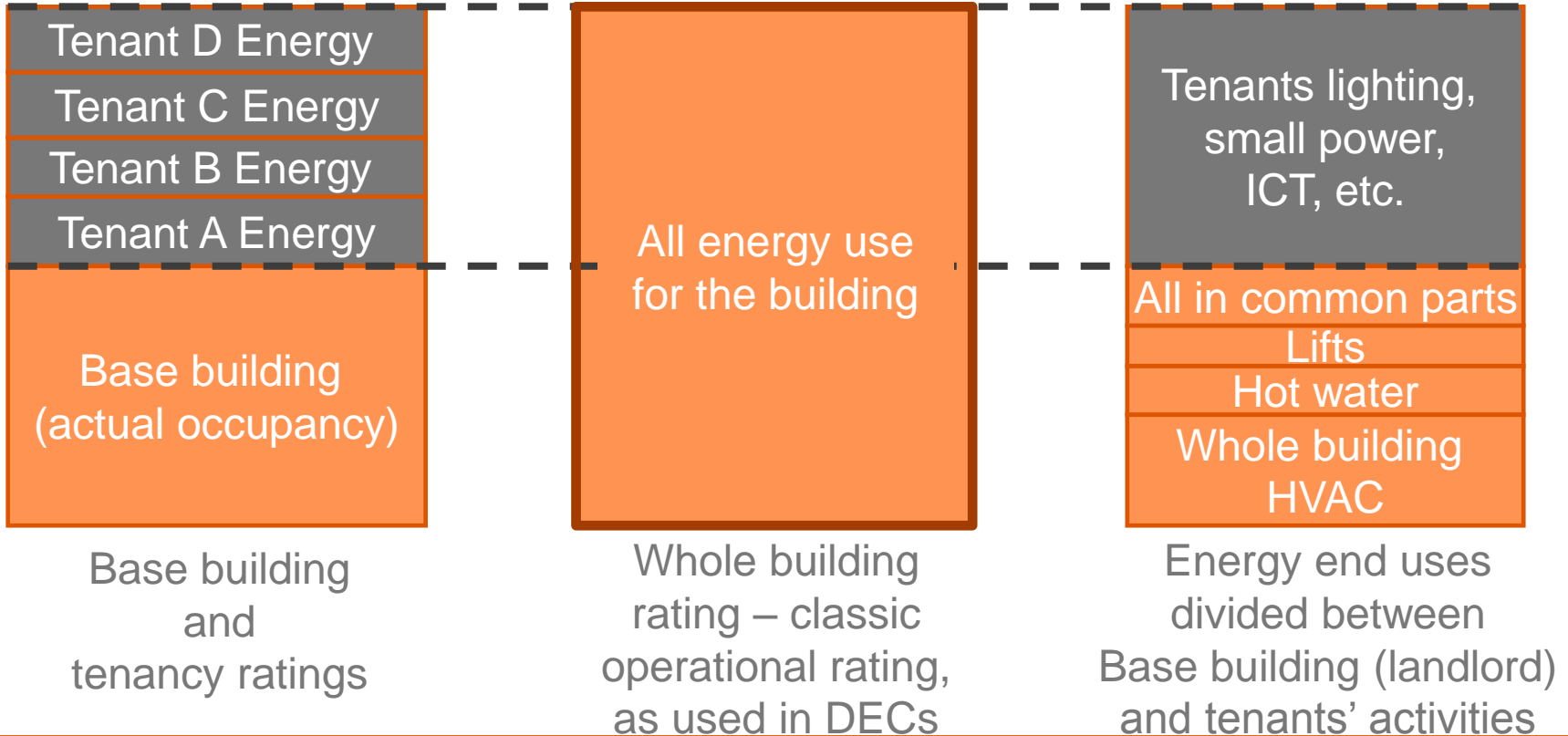
Source: Real Estate Environmental Benchmark Update, BBP, 2016



Let's instead define a measurable metric for a building's energy efficiency



giving each party the data they need to manage the environmental impacts they are able to control directly





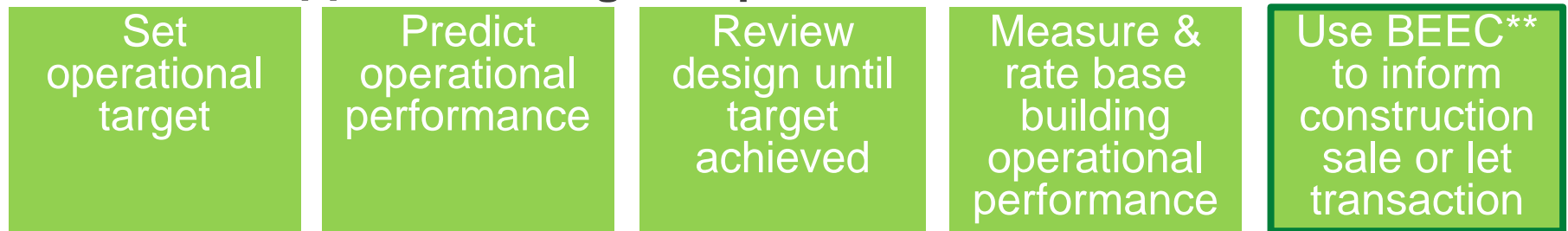
UK approach: design for compliance



*A DEC (whole building operational rating) is produced for public buildings

Building in operation

Australian approach: design for performance



**A Building Energy Efficiency Certificate (BEEC) comprises a NABERS base building operational rating and Tenancy Lighting Assessment



NABERS *consumer-friendly* stars scale (half stars also available)



6 stars..... Market leading performance



5 stars..... Excellent performance



4 stars..... Good performance



3 stars..... Average performance



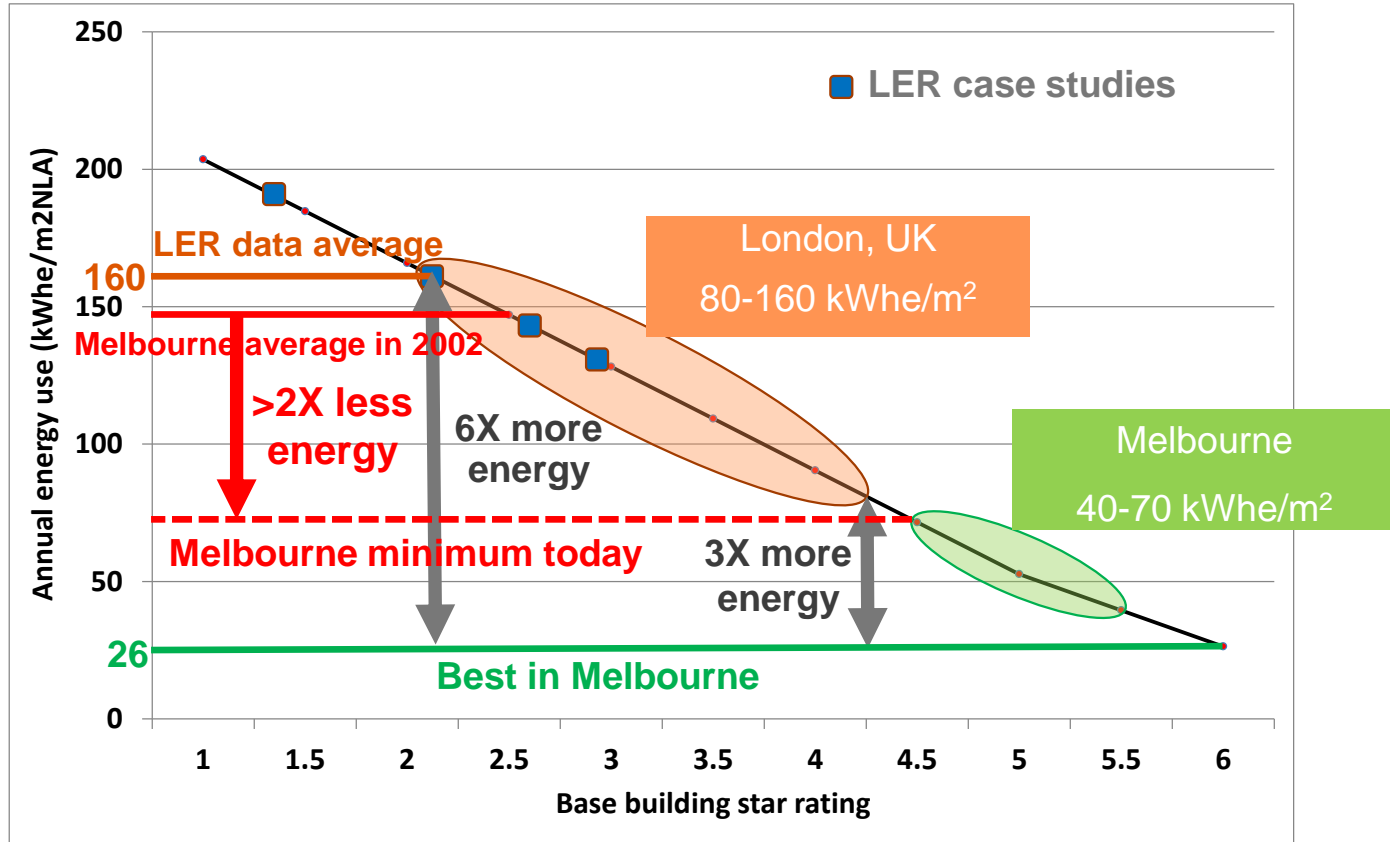
2 stars..... Below average performance



1 star..... Poor performance



London base building energy intensity 3 to 6 times higher than Melbourne



Is it plausible new UK commercial buildings are not energy efficient?



- Energy efficiency performance is invisible – not measured, not even measurable, let alone rated or disclosed
- The market does care but must resort to EPC or BREEAM - **no decent metric**
- So design focuses on technology that improves EPC, not measureable improvements in actual performance
- Regulation of inputs (Part L) ratcheted up for last 30 years with little evidence it is having intended outcomes in air-conditioned offices
- Most large new office buildings are air-conditioned, but air-conditioning system and its controls are a blind spot in Part L, treated by model as black box
- Was this because perceived need for a/c is marginal in UK's climate, so expected energy penalty will be modest? ECON 19 exposed this myth in 1990

“The UK’s energy policy for commercial office buildings is broken”

London Energy Transformation Initiative, May ‘17 (30 years of ignoring the problem – Volkswagen moment?)





So what is going wrong, specifically?

- Control systems are not being designed and specified in sufficient detail
- Controls do not enable (HVAC, lighting) service level to be tailored to demand
- Ditto, design intent rarely sets out to limit services to unoccupied parts of a building (voids and when out of hours use requested by some tenants, etc.)
- BMS controls are often not working effectively for energy efficiency
 - set to avoid complaints rather than also achieve efficient operation
- Metering systems are mandated in new buildings but are ignored or do not work
- Building managers / FM teams lack skills needed to operate a building efficiently
 - and it is rarely in their contract to do so





So what do we do?

- Replicate proven Australian approach in new build
- Then use experience to inform upgrades of existing stock

STRATEGY:

- Mandate performance based labelling to complement **input-based** regulations in *Part L2 and EPCs*
recommended by Committee on Climate Change independent assessment of BEIS CGS, Jan 2018
- Relentless focus on **performance outcomes**
- **Set targets** within context of transition to net zero emissions
- **Disclosure:** use power of transparency around performance outcomes to mobilise all involved
- Investors will start favouring assets with better measured performance





Energy Commitment Agreements in Australia

- Established to empower developers to design, construct and manage buildings to achieve an agreed *Base Building* rating measured in-use
- Effect on market has been transformational - typical new office Base Buildings use half the energy they did in 2002 and the best one-fifth
- Scheme is essentially market driven but infrastructure developed by government
- Mandatory performance disclosure law (on sale or let) informs market
- Office development in Australia has a design-for-performance culture and innovation across the whole supply chain is flourishing
- Better rating commands rent premium - Base building energy rating used by leaseholders as proxy for building quality: better designed, better constructed, better commissioned, better operated and maintained
- For developers and investors, office buildings with better energy ratings have higher asset values, reduced vacancy rates and increased yields





Above average NABERS Energy ratings deliver higher returns

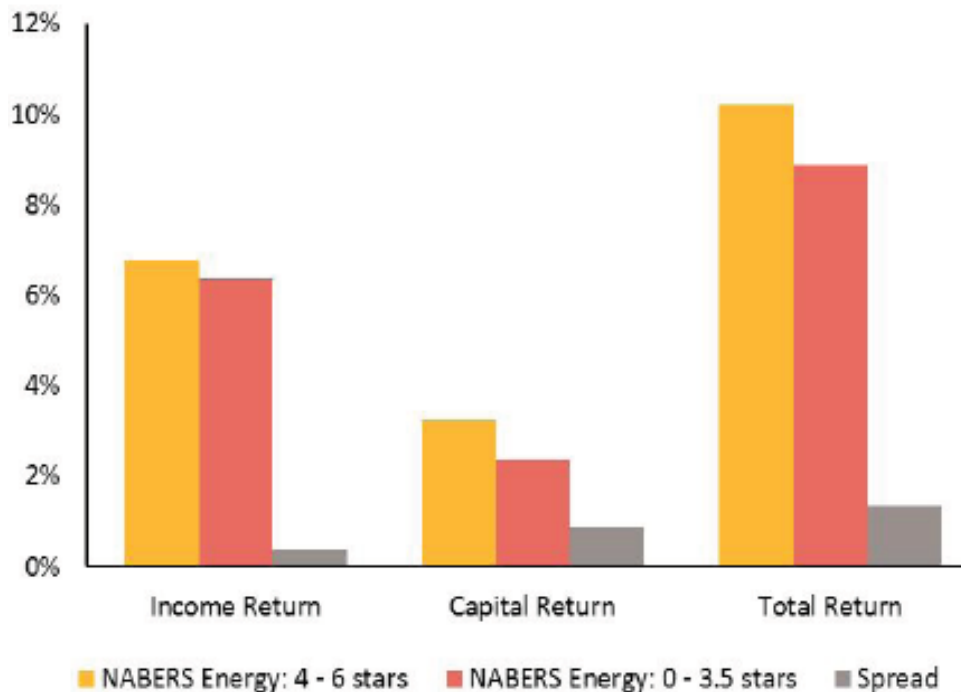
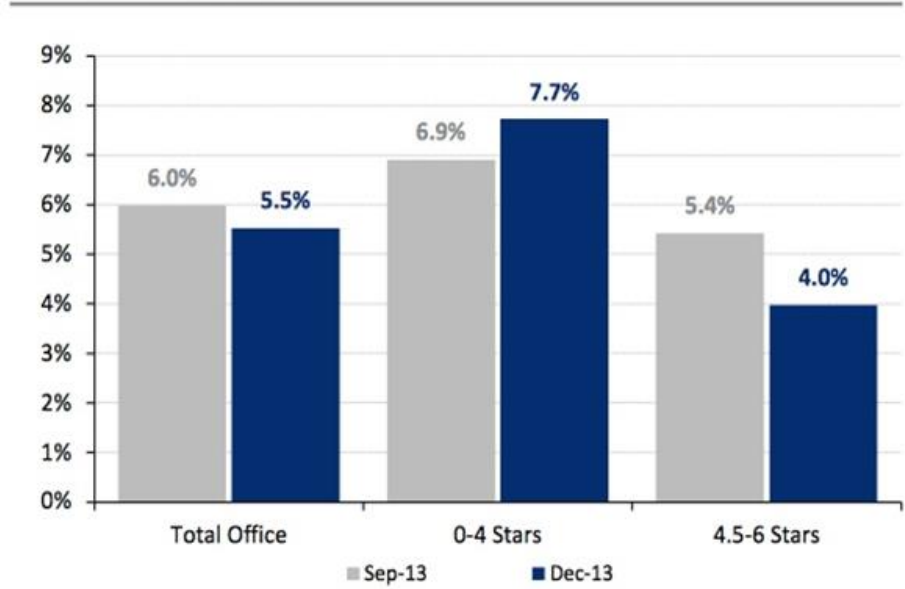


Figure 16. Market Vacancy Rate comparisons
Percentage, Period End



Source: NABERS, IPD

Source: The Property Council/IPD Green Property Index, MSCI, March 2015



The UK Design for Performance (DfP) initiative funders and supporters



Australian expert support from Energy Action, designers of the NABERS Energy system



Landlord Energy Rating 2012 – 2013 developed for BBP

- NABERS style system aimed at existing multi-let commercial offices

Commitment Agreement Feasibility study October 2015 – April 2016

- Review and comparison of the situations in the UK and in Australia
 - Report published on technical, legal and financial issues:

<http://www.betterbuildingspartnership.co.uk/our-priorities/measuring-reporting/design-performance>

Design for Performance Pilot projects May 2016 – March 2018

- Apply DfP at various points in procurement and operational journey

Transition phase to fully-fledged Scheme April 2018 – March 2019

- Develop rating scheme, governance, administration and support

What Design for Performance entails

DESIGN AND CONSTRUCTION

1. **Set a target** base building energy performance level
2. Include performance target and process in **contractual documentation**
3. **Advanced computer simulation** to check target achievable and set budgets for each meter
4. **Independent design review** of design package and the simulation work

OPERATION

1. **Monthly monitoring reports** comparing performance vs targets and tracking rating
2. **Intensive fine-tuning** during first year, including 4 detailed BMS reviews
3. Third party **validation** of **rating**
4. **Disclosure** to affected parties (tenants, investors) of the achievement or otherwise of target

Progress with pilots testing the key DfP processes



| | DESIGN AND CONSTRUCTION | | EARLY OPERATION | | |
|--------------------------|-------------------------|---------|-----------------|-----|------------|
| | IDR | Adv Sim | BMS tune up | M&V | Get Rating |
| 245 Hammersmith Road | X | X | | | |
| 1 Angel Court | | X | | | |
| 10 Burlington Street | | | X | X | X |
| York House plant upgrade | | X | | | |
| TfL building S6 at IQL | X | X | X | X | X |
| Office refurb, Wimbledon | X | X | X | X | X |

IDR = Independent Design Review

M&V = Monitoring and verification

X = key Commitment Agreement process included in pilot

X = activity will extend beyond March 2018

| | |
|-------------------|----------------------|
| Activity underway | Activity ~ completed |
|-------------------|----------------------|





Pilot study key findings

- Client leadership and target setting critical
- Performance outcome needs to matter to the market
- Advanced simulation should drive design and operation
- Intensive fine tuning of controls remains essential
- Building managers must be contracted to target comfort AND efficiency
- Ensure oversight of tenant fit-outs
- Need central point visibility of HVAC operation throughout building
- Avoid divided responsibilities for HVAC control and maintenance



Design for Performance Transition Phase

- Business plan
- **Building the market – DfP Pioneers**
- Developing the infrastructure
 - Project agreement
 - MEP brief
 - Scheme administrator
 - Governance structure
 - UK IDR panel
 - Development of advanced simulation capacity
- **Fully-fledged Scheme in place by EcoBuild 2019**

- **BREEAM New Construction** Verification stage to be launched by BRE summer 2018



Supportive context: market transformation drivers towards DfP



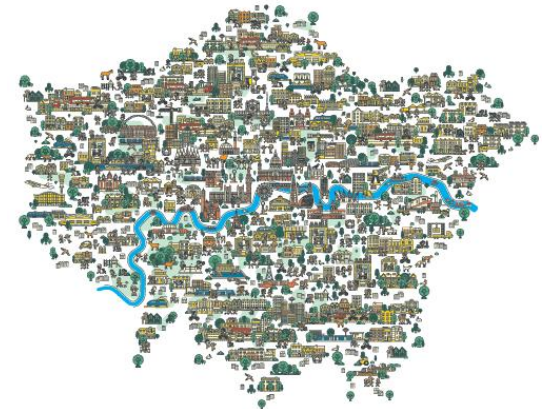
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- **GLA's London Plan** may mandate performance reporting for all major new development

MAYOR OF LONDON

THE LONDON PLAN

THE SPATIAL DEVELOPMENT
STRATEGY FOR GREATER LONDON
DRAFT FOR PUBLIC CONSULTATION

DECEMBER 2017



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Soft Landings guides



Free to download Soft Landings guides including Framework and Core Principles



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Building energy metering



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- **UKGBC "Advancing Net Zero"** synergies



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Advancing Net Zero Carbon

Inspired by the WorldGBC campaign, we are planning two significant pieces of work in summer 2018 surrounding net zero, which would represent the foundations for a major new programme in the UK.



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- **UKGBC “Advancing Net Zero”** synergies
- **Aldersgate Group** advocates **Commitment Agreements** and **performance based labelling**

ALDERSGATE GROUP: ENVIRONMENTAL REGULATION



Policy design: The processes that support the delivery of regulation could be improved, possibly through better target setting and compliance monitoring. This situation is exacerbated because the tools (i.e. the energy modelling software) use metrics that poorly predict operational performance, so are difficult for occupiers to use. Together these factors mean **there is a danger of designing for regulation rather than actual performance.**

Because compliance with the London Plan is primarily assessed at design stage there is a reduced incentive for ensuring actual performance is improved in terms of outcomes that matter to end users.

Furthermore, because the GLA has few powers in later stages of planning & construction it can be challenging to monitor the progression of buildings effectively.

However, the Better Buildings Partnership has identified potential solutions to this through setting performance-based outcomes targets which would be enforced through Commitment Agreement Protocols. These would commit a developer and their main contractor to achieving a specific base building energy performance rating verified by measurement. Approaches such as these should be considered in future.



Place simulation at centre of design and operation

