

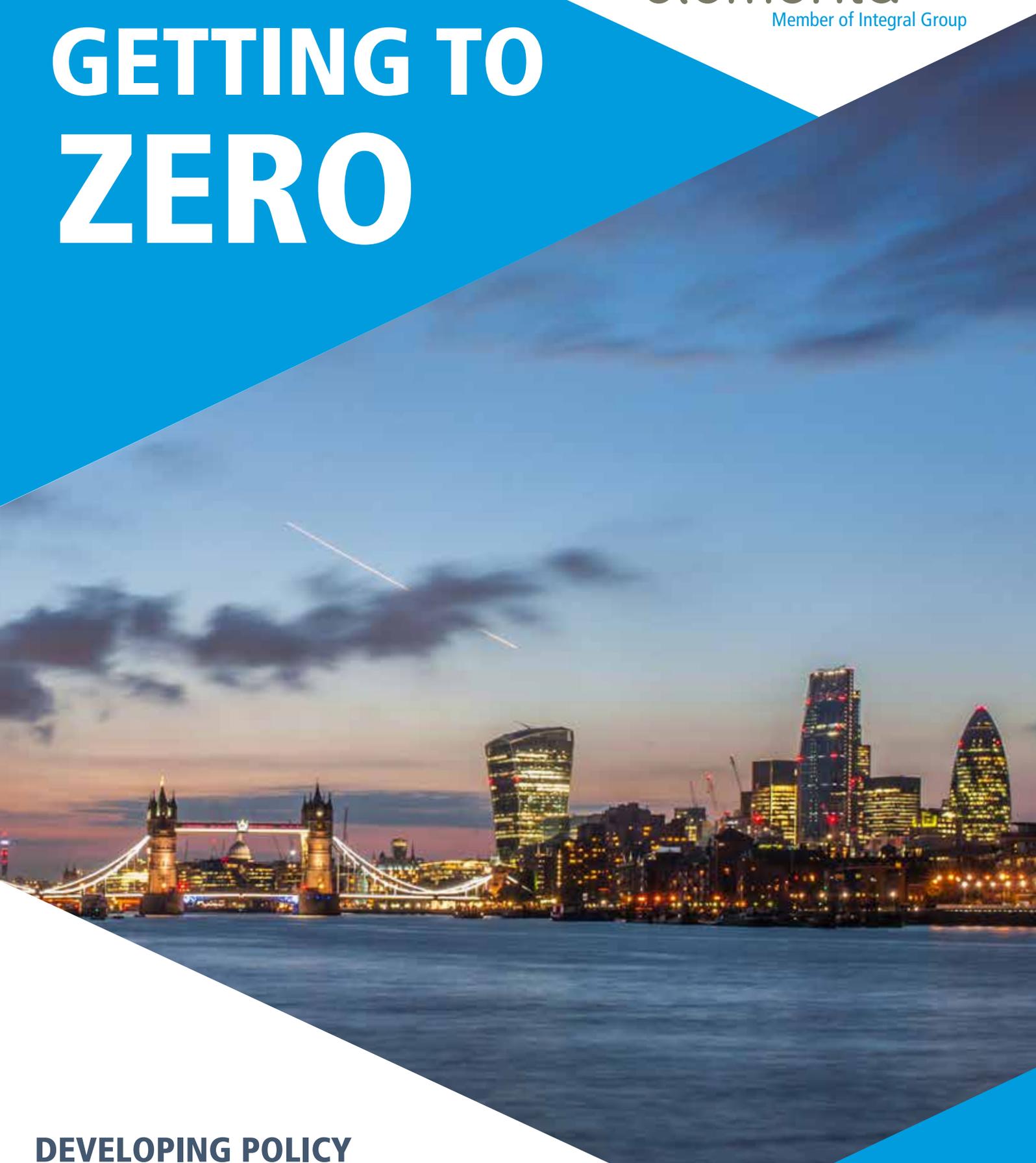
An initiative by

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Member of Integral Group



GETTING TO ZERO



**DEVELOPING POLICY
RECOMMENDATIONS FOR A
ZERO EMISSIONS CAPITAL**

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Acknowledgements

Elementa Consulting initiated this cross sector response, facilitated the 'Fixing London's Broken Energy Policy' workshop and edited this summary report.

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Clara was recently recognised as the UKGBC Rising Star of 2017 partly in recognition of her work on energy policy and low energy building design. Her initiative to develop a road-map to a Zero Carbon London was published in April's CIBSE Journal.



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A special thanks to the below for facilitating or notekeeping the working group tables at the workshop and their input in this report

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Sara Kassam

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Hugh Dugdale

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Foreword

Climate change is real and is affecting our cities today.

As centres of innovation, intense collaboration and creativity, cities are a key part of the solution to the challenges presented by global warming. We need to both adapt to its sadly inevitable impacts and ensure that our generation meets its obligation to prevent catastrophic climate change for the next. This is all the more important as we know that cities will be hit the hardest – with London alongside cities like New York, Mumbai and Shanghai particularly susceptible to sea level rise.

Helping North American cities of all scales create a roadmap to zero emissions has been my day job for the past decade – starting in my home city of Vancouver and spreading across Canada and the United States, as city after city signs up to aggressive and systematic carbon reduction goals, policies and performance metrics.

In 2017 alone we have seen Vancouver and Toronto commit to policies that will deliver zero carbon buildings, the development of a national standard for Zero Carbon development across Canada and the advance of net zero energy projects across California and beyond. Whilst the US Federal Government has set aside its Paris climate change commitments, it has been cities across the US that have stepped up to the plate and emphatically stated – “We Are Still In”. Internationally the World Green Building Council has published its Zero Carbon Roadmap, with 10 countries already signed up to develop national standards that will see the number of net zero energy buildings increase from thousands today to billions within a generation.

London has been an inspiration for this transformation – an early torch bearer for energy and climate change policy, initiator of the C40 network of global cities sharing best practice and aligned in their mission to tackle climate change head on. Today, as London reshapes its policy landscape with updates to the London Environment Strategy and London Plan, it has a once in a generation opportunity to lead once again on the global stage.

So – naturally - I was excited to be invited by my colleagues at Elementa Consulting to facilitate a cross-sector workshop in London that brought together over 100 stakeholders drawn from more than 80 organisations from public, private and NGO sectors to generate ideas that could inform this process. That the Greater London Authority has engaged so enthusiastically with this initiative is testament to their willingness to work with stakeholders from across the buildings sector. The best policy is always developed as a partnership between cities and their citizens.

The decarbonisation of the UK’s electricity grid has been as dramatic as it has been unexpected. This is truly good news. And yet it also poses fundamental challenges to policy makers - trying to respond to an energy landscape that is in rapid flux. How can urban policy makers influence the climate change impact of the

built environment, for new and existing buildings, and for the complex and inter-dependent network of systems that enable our cities to thrive?

Every city has limits on which parts of this complex puzzle it can control and those it can influence – whilst having an undeniable interest in every part of the system. What works in one city will not necessarily work in the next. However, through our work we have seen recurring themes emerge that are enabled by the increasing pace of change in digital systems and building technology:

- End-use energy and carbon performance metrics driving design
- Platforms that enable disclosure of energy performance
- Stretch goals signalling the direction of future policy
- Measures to increase resilience
- A systematic view of carbon at an urban scale
- A growing awareness of embodied energy as well as operational impacts

In a workshop like this our challenge was not only to consider what is possible today but also to think of a future where current constraints have been lifted. In this spirit you will see in this document a satisfyingly broad and unedited array of bold ideas, integrated strategies and unbounded solutions – all missing pieces of the puzzle. Not all of them can – or necessarily should – find their way into London’s Energy Policy, but amongst them are the seeds from which evidence based, performance-led and ambitious climate change policy can be grown.

Over the coming months I am pleased to know that firm policy proposals will crystallise from this initiative via focused task forces co-ordinated under the new banner of the London Energy Transformation Initiative (LETI). They will present their proposals during World Green Building Week in late September 2017 with the hope of providing policy makers with a clear roadmap to re-position London as the world’s leading Climate Change City.

All I ask is that you continue to lend your time, support and enthusiasm. If you’re “all in” then Zero truly can be the hero in London.



Dave Ramsle,
Principal, Head of Policy and Urban Innovation
Integral Group, Vancouver

Executive Summary

Greenhouse gas emissions from London's buildings need to be rapidly reduced to meet our climate change targets. This will require a dramatic shift in the way we design, construct, refurbish and operate our buildings.

London's climate change policy for buildings was once seen as world leading, but after over a decade of refinement now requires a radical rethink. To that end, on May 8th Elementa Consulting brought together over 100 stakeholders to participate in a workshop at the Building Centre. Attendees included developers, engineers, housing associations, architects, planners, academics, sustainability professionals, contractors and facilities managers. They were joined by representatives from the GLA and London Boroughs. Their task – to develop ideas and build consensus around recommendations for 2 pieces of policy – the new London Environment Strategy and the rewrite of the London Plan. This report summarises the outcomes of the workshop and outlines next steps towards developing policy that can enable London to become a Zero Emissions Capital.

4 Key Policy Areas emerged:

1. Energy Use Disclosure

Driving down energy consumption is only possible with access to credible performance data. Mandatory in-use energy disclosure for all non-domestic buildings, multi-family housing and district heating schemes, was the most popular recommendation. There was broad consensus that this data should be publicly accessible through an online platform that would enable benchmarking of performance across London's building stock. By reconciling anticipated energy savings in design against real performance in use it would provide an opportunity to narrow the gap between predictions of building performance and how they perform in operation.

2. Better Performance Metrics

Absolute performance metrics are a more effective way to influence design and specification of new buildings than existing building regulations. With grid carbon intensity no longer a stable measure we need to establish outcome-based metrics – becoming widely adopted globally - for building envelope performance and overall energy use intensity.

3. Decarbonising Energy and Heating

As our electricity grid becomes dominated by intermittent renewable energy sources the need to manage and reduce peak energy demands becomes more important. Decentralised energy storage capacity (both electric and thermal) and demand response 'peak shaving measures' should be encouraged and incentivised by London policy. This will enable London's buildings to harness opportunities presented by real-time variable energy pricing.

Heating and domestic hot water can be generated locally, per dwelling, or generated by a district heating system. Careful consideration should be given as to which option will deliver the greatest carbon emission reductions over the long term, taking into account future grid carbon intensity scenarios. To better inform consumers, community heating schemes should provide transparent billing that should be disclosed at lease or sale of connected buildings.

Additionally, all developments and district heating schemes that depend upon fossil fuel combustion should establish a Zero Emissions Transition Plan ensuring that they can be adapted to achieve zero emissions goals in the future without the need for fundamental redesign.

4. Delivery Mechanisms

The workshop dot vote suggested that policy should be "technology neutral", supporting innovation by prescribing outcomes and not the means by which they are achieved. The existing 'energy hierarchy' would therefore need to be reconsidered.

Incentives should be provided based on operational performance data, as a method to encourage deep retrofit for existing buildings as well as high performing new buildings. Suggestions included: reduced business rates or council tax, rent reviews/ rent caps and removing VAT on any major refurbishment initiatives.

The Net Zero Energy skills base needs to increase across the industry and ongoing user education needs to be encouraged. Clients should demand more - with developers specifying in-use energy performance targets, supported by better metering and monitoring in operation.

Related Priorities

Embodied Impacts of Construction

As buildings become more energy efficient, embodied carbon becomes increasingly important as it represents a greater proportion of the total lifecycle carbon emissions of a development. A policy framework to support reduction of embodied carbon needs to be considered.

Overheating

Overheating risk is a growing problem particularly within new residential buildings. There needs to be a clear policy direction with a requirement for developments to comply with specific overheating criteria, with modelling that includes future weather file analysis. Internal temperature monitoring should be encouraged with league tables potentially showcasing developments that perform well. A resiliency metric to assess thermal stability when power is cut from a development should be considered.

Stakeholder Identification

A community group registry to enable already established groups to engage early in the design process and establish opportunities for longer term ownership should be encouraged.



Strength in Numbers:

Announcing the London Energy Transformation Initiative (LETI)

The workshop demonstrated the level of interest and willingness across the buildings sector to contribute time and expertise to policy development. Building on this momentum, the priorities that emerged in the workshop will now form the basis for the establishment of working groups. These will be tasked with developing robust policy recommendations and an implementation plan supported by an evidence base. They will operate under a newly created taskforce – LETI the London Energy Transformation Initiative.

We are building a list of supporters, to show the GLA that the industry is in favour of this initiative. Email Clara Bagenal George on clara.bg@elementaconsulting.com to sign up as a supporter of this initiative or if you are interested in joining one of the LETI working groups.

LETI Intent

1. Work collaboratively towards solutions that can enable a zero emissions future for London
2. Translate and test ideas from the policy workshop into tangible, evidence based recommendations for energy and climate change policy for London.
3. Bring together volunteer expertise and experience in each working group theme
4. Commit to technology neutrality and the development of performance led policy
5. Provide an inclusive and collaborative platform that reflects the diversity of the buildings sector

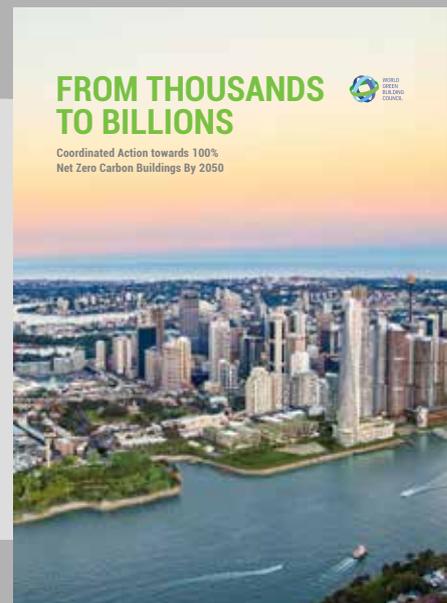
Introduction

Climate Change Context

To prevent catastrophic climate change we need to rapidly reduce greenhouse gas emissions with the buildings sector leading the way. The World Green Building Council has called for an “ambitious and dramatic transformation” of the building sector if global warming is to remain under 2°C, the limit enshrined in the Paris Agreement.

From Thousands to Billions¹ calls for all new buildings to operate at Net Zero Carbon by 2030, and every building by 2050. This target cannot be achieved by building regulation and planning policy alone - we require a systematic approach including increased energy efficiency of new and existing buildings, on-site and local emissions free energy generation, and the decarbonisation of electricity grid. This transformation will also deliver associated benefits of reduced fuel poverty, improved air quality, and resilience to climate change.

There is widespread concern within the London buildings sector that the current policy framework in London is contributing to - rather than reducing - the risk of climate change. It is time for change.



Diagnosis: Current Policy No Longer Works

The London Plan controls only new development. The performance of existing buildings is not addressed by the London Plan and the GLA's powers to influence existing building performance are untested. If only 1% of building stock is replaced in a given year then controls on new construction alone will never address the carbon footprint of London's building stock.

If we are to achieve Net Zero Carbon for all buildings by 2050 then we will need to implement a comprehensive program of energy retrofits and upgrades across London's building stock. Opportunities to implement a retrofit program exist at lease, sale or fit-out of buildings.

If it's broken – let's fix it

London's policy framework and the Building Regulations against which it measures performance are no longer delivering the outcomes that Londoners want or our planet needs.

- By maintaining the existing policy framework London risks falling further behind other global cities who have embraced performance-led policies and outcome based regulatory frameworks.
- Progressive energy and climate change policy in these cities is also a spur for innovation and the development of skills in low carbon design, construction, operation and maintenance.

The question is what to do about it? The workshop initiated by Elementa Consulting at the Building Centre in London aimed to generate ideas and share perspectives drawn from across the buildings sector in London.

Buildings Sector Workshop

The workshop was facilitated by Dave Ramslie from Elementa Consulting's Vancouver office. An expert in energy policy, Dave is a leading figure in the development of stretch codes and zero energy building policies for cities across North America.

As a warm up the participants were encouraged to envision brighter energy future for London, see the appendix for a summary.

Participants then developed ideas and recommendations that could influence London's Energy policy, working at ten tables - each focused on a specific theme. Having identified their priorities a member of each table presented to the entire room culminating in a 'dotmocracy' where each participant was given 10 dot stickers and could vote on which ideas they thought most important.

The key priorities were distilled from the group presentations, the dot sticker voting and the summary notes from each workshop table group.

A summary of each workshop table group discussions is presented in the appendix. These notes were initially written up by the group facilitator or note keeper and then the members of each group were given the opportunity to comment on the notes, in order to ensure that they fairly represented the discussions.

[Click here for the dot voting explanation video](#)



10 Workshop Table Groups

- 01 New Buildings - Regulation
- 02 Existing Buildings - Regulation
- 03 New Buildings - Incentives
- 04 Existing Buildings - Incentives
- 05 Decarbonising Energy Supply
- 06 Buildings as Part of a Bigger Ecosystem
- 07 Capacity Building and Engagement
- 08 Lifecycle Carbon
- 09 Resilience
- 10 Other

Key Priorities



Key priorities for getting London's built environment to zero emissions were distilled from the group presentations, the dot sticker voting outcomes and the summary notes prepared by each working group. These priorities received the strongest support amongst the workshop attendees. Inevitably they do not capture every idea that was contributed – these are recorded in the workshop table group notes provided in the appendix.



1. Energy Use Disclosure

Disclosure of energy consumption emerged as a priority for most workshop table groups, and received around 30% of all dot votes at the workshop.

To close the performance gap we need to create a positive feedback loop: monitoring the actual energy use of buildings, and using this data to inform design decisions for future projects and improvements to energy modelling methods.

Currently there is no requirement for energy consumption of London's buildings to be reported or shared. Energy use disclosure is a common feature of many advanced energy codes and campus energy management programs.

Mandatory public disclosure of energy performance data is required from London's buildings. A platform is needed to share this data transparently so that it can be used to inform decision making by the GLA, utility companies, building owners, operators and bill paying tenants. It will also enable designers to understand how different design strategies perform compared to their modelled predictions.

Potential Actions or Initiatives

Energy usage data (total energy demand in kWh and energy use intensity in kWh/m²) should be disclosed annually for all commercial and major residential developments. Data to be:

1. Broken down into at regulated energy consumption and unregulated consumption.
 2. Displayed on a transparent online platform compared with design stage energy use predictions, the difference investigated - this should be used to fine tune the buildings and inform design decisions for future projects.
 3. Used to benchmark developments, to understand relative performance, perhaps using building types/ construction dates as categories for comparison.
- Legislation needs to empower building users to pursue issues if the building is not performing as intended.
 - Energy data disclosure could be introduced as voluntary acting as a signpost before becoming mandatory at a later date.
 - Smart meters to be utilised to create production of accurate time based load maps to better understand demand profiles and facilitate infrastructure planning (for example reducing the need for standby generation facilities).
 - Better use of Display Energy Performance Certificates (DEC's) and mandatory improvements on DEC's for buildings.
 - Where metering of energy consumption is not available by tenancy or split by system this should be disclosed. These buildings would self-identify as candidates for metering upgrades.

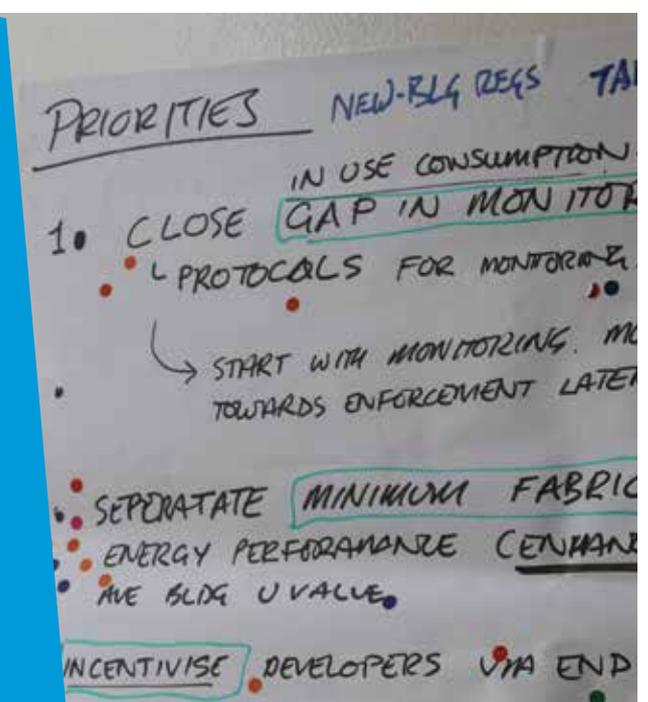
Case Studies

Australia's NABERS scheme

An operational energy rating, based on in-use data, must be disclosed on all sale and let transactions and this requirement alone has proved sufficient for the market to drive striking improvements in the energy efficiency of office buildings. Tenant organisations are prepared to pay higher rent for a building with a better rating because this indicates it is a better building: better designed, better constructed, better commissioned and better operated and maintained.

London's Business Energy Challenge

A successful current incentive is the London's Business Energy Challenge (BEC) program, where the carbon emissions from buildings are measured annually and compared against a baseline, this should be used as a framework for wider positive change.



2. Better Performance Metrics

The current London plan asks for a 35% operational carbon emission reduction, compared with a notional building, based on the Part L building regulations framework. This tackles only 'regulated' energy demands – so ignores everything except heating, cooling, ventilation, pumps, lighting, and hot water.

Currently the only metric that is used is $\text{kgCO}_2/\text{m}^2/\text{year}$ calculated using out-of-date emissions factors. There is widespread concern that this approach can actively encourage the implementation of building and district scale strategies that do not deliver anticipated emissions reductions.

At present there is no policy that enforces energy performance improvements in refurbishment works and fit outs to premises such as offices, retail and restaurants; unless there is change of use, external visual impact or major work to a fabric element, and then only limiting parameters apply under the building regulations.

We need performance metrics that drive zero emissions design.

Potential Actions or Initiatives

New Buildings

- Include metrics that provide a measure of full building energy use, including plug and process loads and in-use cost metrics, for example design on Total Energy Use Intensity (TEUI) - Measured in $\text{kWh}(\text{energy})/\text{m}^2/\text{year}$.
- Include a fabric performance metric; an assessment of heating and cooling demand, compared with the notional building, (this is already included within the BRUKL compliance energy modelling report output); approached in a similar way to BREEAM Ene04; or Australia's National Construction Code Section J.
- The policy should be technology neutral with a framework to compare systems options, based on long term carbon reduction trajectories such as the UK Government's own energy and emissions projections.
- Clear Zero Carbon Policy for non-domestic buildings – as well as domestic building. This could include a future route-map to include Regulated energy, then Unregulated, Embodied, Whole Life, etc., as the assessment methods become progressively refined and robust.
- If developments fail to meet their targets this could be interpreted as a breach of the planning conditions.

Existing Buildings

- Energy targets for Fit-out and Refurbishment works should be included in policy (anything with building control to require energy targets).
- Strengthen the building regulation for existing buildings (Part L2A/Part L2B).
- Procurement process to include energy performance metrics.
- Requirement for landlords to develop strategy on how to improve their building stock.
- Rolling upgrades of energy performance improvement.
- Identification of 'Nega-watts'- the energy demand savings that could be realised through retrofit measures



Case Studies

City Energy codes

The Vancouver zero emissions plan, the Toronto zero emissions buildings framework, and the new CaGBC zero carbon building standard are all also using Energy Use Intensity and/or Thermal Energy Demand Intensity metrics. The Brussels PEB 2015 regulation mandates the PassivHaus standard for all new builds and retrofits- which includes a thermal energy demand intensity metrics.

Click for links



[Zero Carbon Building Standard - Canada Green Building Council](#)

[Vancouver Zero Emissions Plan - City of Vancouver](#)

[City of Toronto Zero Emissions Buildings Framework](#)

3. Decarbonising Energy and Heating

The operational greenhouse gas impact of buildings is a function of their demand for energy and the carbon intensity of the energy supplied.

As the carbon intensity of the UK electricity grid continues to fall, greenhouse gas impact of utilising electricity in buildings will fall proportionately. Decentralised and local renewable energy generation will contribute to the further decarbonisation of the electricity supply.

Potential Actions or Initiatives

- District and communal heating systems, with or without electricity co-generation, will need to demonstrate that they have been sized based on realistic demand profiles and that they will deliver greater GHG savings over their lifecycle than alternative feasible and viable technologies.
- New and existing decentralised heating and power infrastructure that depends upon combustion will need to develop and publish a zero emissions roadmap – a transition plan to reduce greenhouse gas footprint. Fuel switching for energy and heating systems from fossil fuels to sources of waste heat, lower carbon grid electricity or renewable forms of bio-fuels will be necessary. This needs to be considered from the outset and involves careful consideration about distribution temperatures.
- All district and communal heating and energy systems should be required to disclose their carbon emissions intensity annually. This should be made available as an hourly data set, as well as annual average performance.
- Billing for community heating schemes must be transparent and disclosed at lease or sale.
- When considering new district heating systems a heat mapping exercise should include a mapping of potential ‘negawatts’-the energy demand savings that could be realised through retrofit measures which should be discounted from the potential heat demands served by the system.
- Careful consideration will need to be given to the climate change impact of biomass combustion options, reflecting both air quality impacts and the imperative to avoid climate change impact of greenhouse gas release into the atmosphere (even if subsequently returned to the carbon cycle).
- Local energy storage – both thermal and electric – are likely to be required at the building, neighbourhood and grid scale if London’s electricity grid is to cope with a significantly higher contribution from intermittent renewable sources of energy, new demands for electricity such as electric vehicles and a likely transition away from natural gas combustion.
- Policy should incentivise demand response technologies that enable buildings to shift their demand profiles and reduce peak thermal and electrical demand. Fluctuating energy tariffs could help promote this. Support should be provided for communities to take ownership of energy projects serving their communities if there is demand and a viable long term business plan that is robust in the face of energy market price fluctuations.

Case Study

Sewage heat pump district heating scheme

The heating and hot water for the False Creek Neighborhood in Vancouver is delivered through a district heating scheme, with 70% of the annual energy demand supplied by a sewage heat pump that recovers waste heat from untreated urban wastewater. Solar thermal collectors on the roofs of the development supplement this.



4. Delivery Mechanisms

The first three priorities are all tools that drive high performing buildings, however the potential carbon savings will only be realised through the following delivery mechanisms.

Policy

Policy should remain technology neutral and kept flexible enough to drive innovation. It should not use a prescriptive approach to design, but provide a framework for intelligent decision making; prioritising technologies that achieve long-term carbon savings and should be reviewed and updated regularly.

Incentives

Many of the workshop table groups focused on providing incentives based on operational performance data, as a method to drive deep retrofit for existing buildings as well as better performing new builds - this topic received 20% of the votes.



Potential Actions or Initiatives

- Incentives such as reduced business rates or council tax for developments that exceed the mandatory minimum targets. Rewarding those buildings which performed as predicted, and penalising those that failed to perform.
- Rent reviews/ rent caps give financial incentive for building owner to insist the developer delivers the performance claimed at design.
- Larger loans for house/ lower interest rates on mortgages for low energy housing.
- Accelerate retrofit of existing building stock by removing VAT on any major refurbishment initiatives.
- Raise the minimum EPC rating of E for rentable buildings, this will encourage retrofit.
- Issue league table of disclosed energy use to encourage high performing buildings.
- Consider a cost-neutral funding mechanism with penalties for low performers transferred as rewards to highest performers. This could be implemented through reform to business rates.

Capacity Building

Knowledge sharing platforms are key to sharing best practice, toolkits and experiences to increase awareness and build capacity across the construction industry. Barriers to Net Zero emissions growth must be established and industry needs to collaborate with universities and think-tanks to develop solutions based on open and transparent research.

Training and guidance needs to be provided to local authorities on implications of energy policy implementation. Ongoing user education needs to be encouraged to ensure that buildings continue to be operated effectively during the building's lifecycle. This education needs to permeate through generations of building operators and users, so that it doesn't stop with the first tenant. Sales people need to learn to communicate sustainability features clearly for new properties.

Industry - Demand More

Consumers, clients, developers and owners of property should demand more from their own internal teams, as well as external design and construction teams. Clients should specify energy targets, performance metrics and in-use energy performance. Consultants need to embrace new working methods and new technologies. Contractors need to price new working methods reasonably.



Related Priorities



The workshop highlighted a number of issues directly related to operational energy performance and greenhouse gas emissions. These include:

- Measuring and controlling for embodied carbon in building construction
- Managing the risk of overheating and resilience to loss of heating or cooling provision
- Community engagement around building design and operation - to address knowledge gaps and increase awareness of energy saving behaviours

Community Engagement

Bring community into development early to be part of the design and establish opportunities for longer term ownership (energy, landscape, transport and social).

Potential Actions or Initiatives

- Set up community group registry to enable already established groups to put themselves forward to engage.
- Communicate the value of social benefits of community engagement clearly to all involved.
- Provide capacity building skills to help community groups fully engage in planning.

Embodied Impacts of Construction

As buildings become more energy efficient, embodied impacts (often described as embodied carbon but representing greenhouse gas impacts) become increasingly important as they represent a greater proportion of the total lifecycle carbon emissions of a development. A policy framework to support reducing embodied carbon needs to be considered. Additionally environmental impacts of materials could be addressed in order to protect Londoners from exposure to chemicals of concern.

Potential Actions or Initiatives

- 80/20 strategy – policy should focus on the 20% of building elements that are responsible for 80% of embodied impacts. This approach would limit the regulatory burden on applications by streamlining reporting and calculation requirements.
- Policy to require that embodied impacts are calculated and submitted for major planning applications. Initially no performance target would be set and a single method of calculation would not be prescribed. This would encourage development of capacity within the building sector. By allowing applicants to explore available metrics the GLA would be able to review and compare outputs from embodied impact frameworks available within the marketplace.
- Planning policy to encourage adaptation of structures to accommodate alternative uses and avoid need for demolition and rebuilding. This could be achieved through the specification minimum floor to floor heights in locations where swing between demand for commercial and housing needs can be expected in response to demographic and economic change.
- GLA and Boroughs to aggregate existing materials data from projects that have pursued mandatory and voluntary sustainability reporting requirements materials from BREEAM, LEED, SKA, Code for Sustainable Homes.



Click for embodied carbon links

[Tackling embodied carbon in buildings - UK-GBC and The Crown Estate](#)

[Carbon Profiling as a solution to Whole-life carbon emission measurement in buildings - RICS Research](#)

[Whole-life carbon footprint measurement and offices - British Council for Offices](#)

Overheating

Overheating is a major concern for London's building stock, especially within new dwellings. The drive towards energy efficiency, cost reduction and concerns around air quality have led to a generation of buildings that are more prone to overheating. This situation is set to become more severe as future climate change increases summer temperature extremes.

In dwellings overheating represents a health risk for occupants, particularly the most vulnerable. Overheating creates demand for retrofitting of comfort cooling using portable equipment that sits outside of the scope of the Building Regulations.

For non-domestic buildings there is a general lack of awareness of the requirements to limit solar gains within the existing Building Regulations, alongside widespread abuse of loopholes and confusion in modelling methods to achieve compliance. This is particularly evident in highly glazed buildings, glazed atria spaces and glazed reception areas.

London Plan guidance on Energy Statements makes reference to CIBSES TM49 and TM52.

Potential Actions or Initiatives

- Require all future planning applications to comply with CIBSE TM59 criteria for residential developments and assess the design against future weather files to understand the mitigation measures that will need to be applied in the future.
- Enforcement of solar gains limits in Part L and ability to require third party scrutiny of thermal models to create a disincentive for rule breaking.
- Create planning incentives for resilient design, this could use the metrics in the LEED Credit IPp100 – Passive Survivability and Functionality During Emergencies. This requires the buildings to maintain 'liveable' temperatures in both peak winter and summer conditions during a 7 day power cut.



Click for overheating links

[The limits of thermal comfort: avoiding overheating in European buildings CIBSE TM52 – CIBSE](#)

[Design methodology for assessment of overheating risk in homes TM59 – CIBSE](#)

[Design Summer Years for London CIBSE TM49 – CIBSE](#)

Next Steps

The workshop achieved its primary objective – to bring together a cross-section of stakeholders involved in London’s buildings sector to identify strategies that could help fix London’s broken energy policy. It was a clear demonstration of the willingness of both the private and public sector to collaborate to inform policy by sharing experience and expertise from practice.

The half day workshop focused on idea generation rather than detailed policy implementation. To fix London’s Energy Policy these ideas need to be transformed into robust policy recommendations with an implementation plan supported by an evidence base that includes best practice drawn from cities across the globe.

To deliver this next phase a group of attendees have agreed to establish a Task Force under the banner of the London Energy Transformation Initiative - LETI.

LETI will assemble 4 working groups bringing together deep expertise and experience in each of the individual working group themes, with time efficient input for maximum output.

Contact Clara Bagenal George by email at clara.bg@elementaconsulting.com if you would like to contribute to the LETI initiative.

LETI Intent

Work collaboratively towards solutions that can enable a zero emissions future for London

Translate and test ideas from the policy workshop into tangible, evidence based recommendations for energy and climate change policy for London.

Bring together volunteer expertise and experience in each working group theme

Commit to technology neutrality and the development of performance led policy

Provide an inclusive and collaborative platform that reflects the diversity of the buildings sector



Click here to watch the video of Dave Ramslie's Wrap up talk



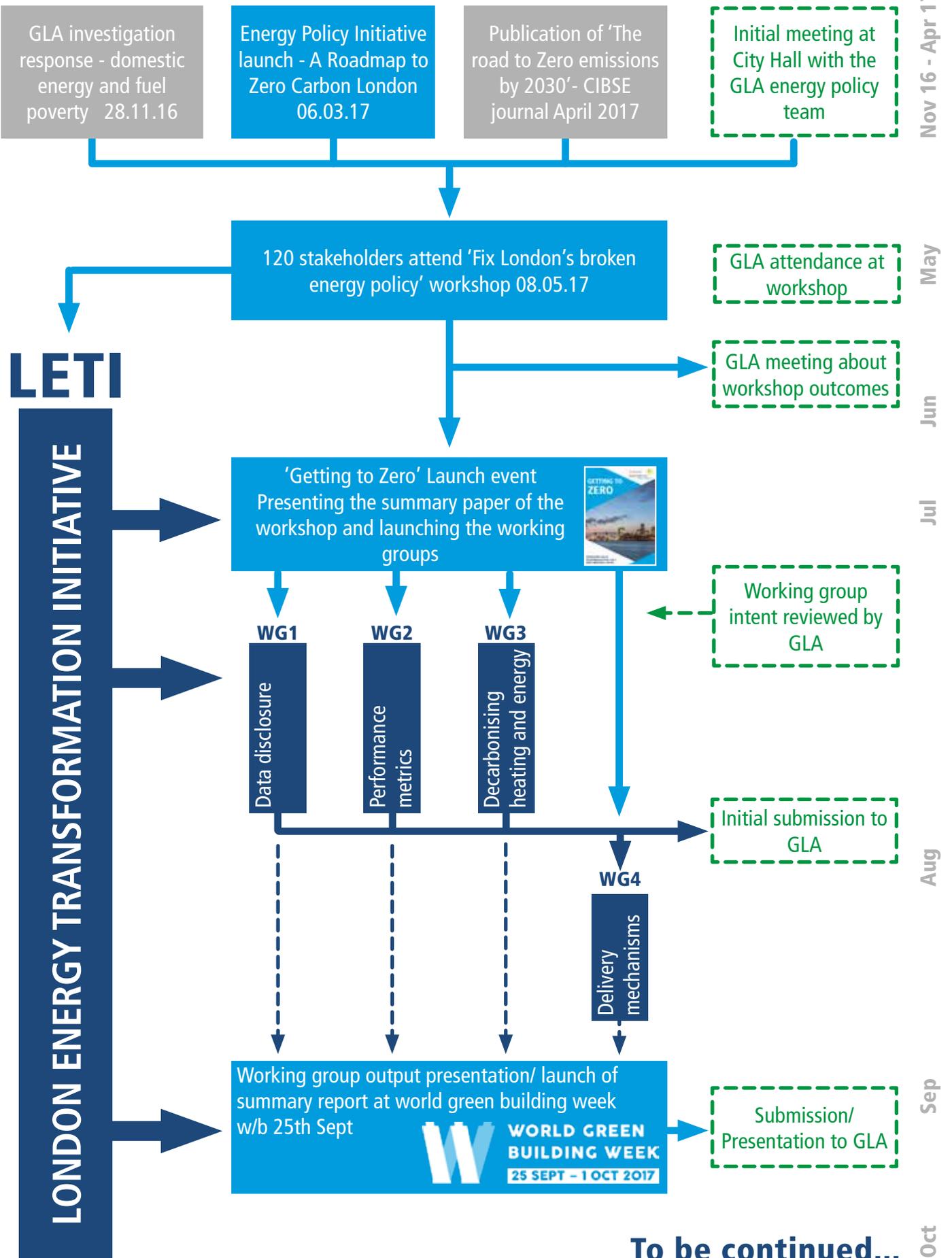
Click here to watch the video of Kevin Hydes' Wrap up talk



Click here to watch the Video of GLA's Wrap up talk

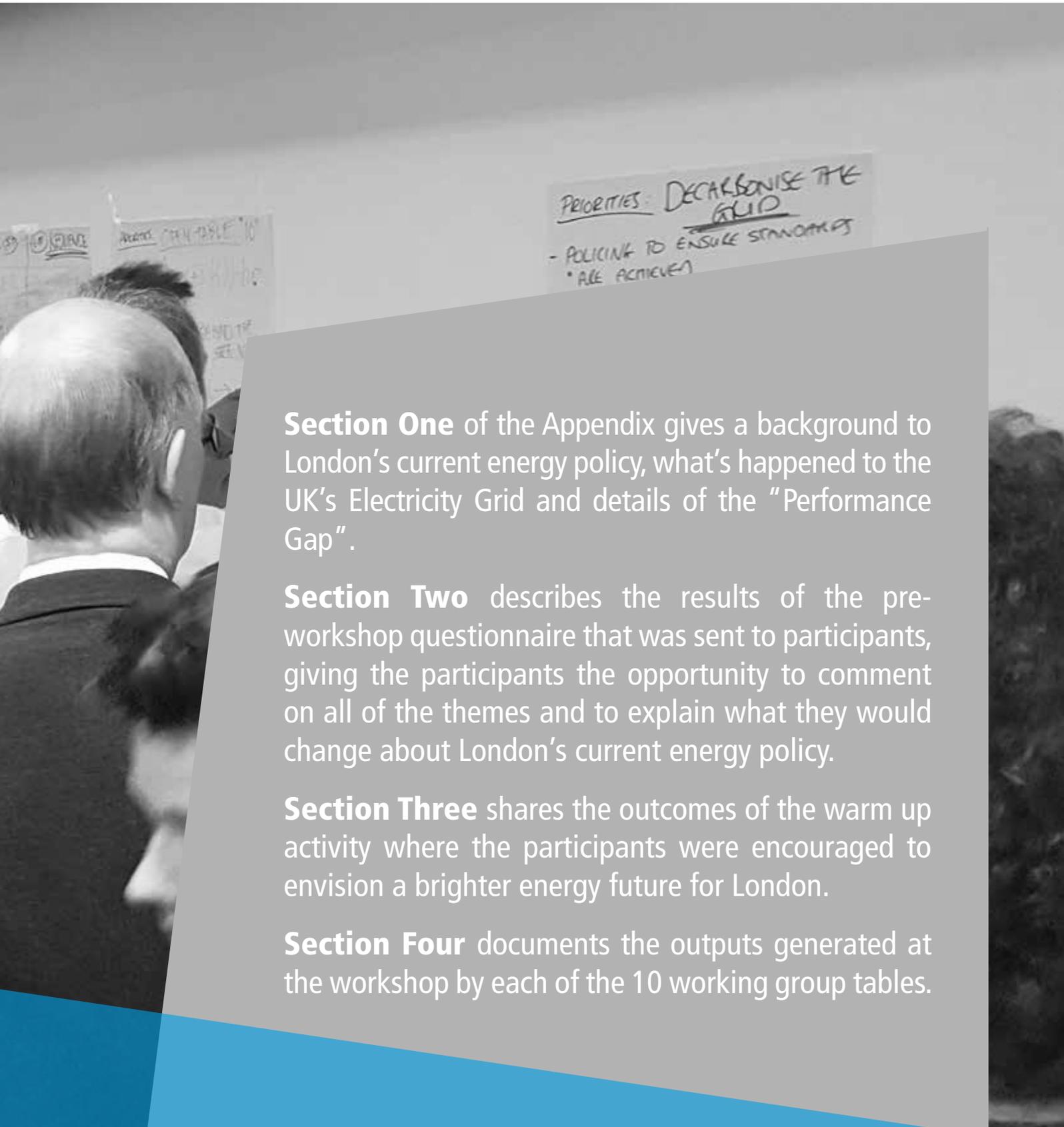


Timeline



Appendix





Section One of the Appendix gives a background to London's current energy policy, what's happened to the UK's Electricity Grid and details of the "Performance Gap".

Section Two describes the results of the pre-workshop questionnaire that was sent to participants, giving the participants the opportunity to comment on all of the themes and to explain what they would change about London's current energy policy.

Section Three shares the outcomes of the warm up activity where the participants were encouraged to envision a brighter energy future for London.

Section Four documents the outputs generated at the workshop by each of the 10 working group tables.

Section 1

London Energy Policy Background

Through the London Plan, the Greater London Authority has since 2004 exerted significant influence on the design and construction of new buildings in London and their energy and greenhouse gas performance.

Current London Plan Policy 5.2 Minimising Carbon Dioxide Emissions provides a framework for realising 'zero carbon' residential and non-domestic buildings from 2016 and 2019 respectively. Critically this definition of 'zero carbon' falls far short of the World GBC target – excluding greenhouse gas emissions from sources that are not regulated by Part L of the Building Regulations.

Energy Statements are required from major developments detailing their approach to meeting London Plan requirements. The basis for calculation of carbon emissions reductions has changed significantly since the requirement was first established in 2004, with changes to the scope of emissions addressed and the position of technologies within the GLA's "Energy Hierarchy".

In England and Wales all new buildings must meet the requirements of Part L of the Building Regulations that seeks to limit operational greenhouse gas emissions in new buildings and upgrades to existing buildings by establishing minimum building fabric and building services efficiencies. The London Plan's policy framework relies upon outputs generated by Part L calculations to measure performance against its energy policy goals.

Currently new commercial developments must go beyond Building Regulations compliance to achieve a 35% modelled reduction in regulated carbon emissions. New residential developments must achieve at least a 35% modelled reduction in carbon emissions on-site with any shortfall provided off-site or through a cash in lieu contribution to the relevant Borough to be ring fenced to secure delivery of carbon dioxide savings elsewhere².

Cash in lieu contributions are calculated based on offsetting carbon emissions over a 30 year period using 2016 Part L grid carbon factors – i.e. they take no account of future reductions in grid carbon intensity over the life of the building.

By requiring percentage improvements against a baseline defined by Part L, the London Plan it is dependent on the accuracy and validity of the modelling methods required by Part L to inform planning decisions. Unfortunately Part L is neither an accurate means by which to predict performance nor a valid method by which to assess greenhouse gas emissions from London's buildings.

The London Plan in its current form also includes requirements to connect to existing or planned decentralised energy networks and combined heat and power systems irrespective of their greenhouse gas intensity. This requirement is prioritised by the positioning of these approaches within the Energy Hierarchy as 'clean' strategies that must be pursued before 'green' strategies – renewable energy systems.

Calculation of demands for these systems depend upon Part L methodology that typically significantly over-estimates thermal demands for domestic hot water – which are reducing as water savings technologies become standard practice. It predicts carbon emissions by comparing to the carbon intensity of the electricity grid in 2012 - before the grid began its rapid decarbonisation in recent years. The result: demands that are not realised and carbon emissions savings that are not real, before we even consider the challenges of installing, commissioning and operating these buildings to achieving energy efficiency objectives.

These issues need to be considered within a broader context that includes embodied impacts of materials in construction and the role that buildings play through their interaction with how we move around our city, our natural environment, how we eat and goods and services that we consume as citizens.

What's Happened to The UK's Electricity Grid

The good news is that the decarbonisation of the UK's Electricity Grid has happened far more quickly than had been predicted only a few years ago. However, this is a serious problem if a city's climate change policy is predicated on outdated figures: you may accidentally incentivise design strategies and technologies that do not achieve the greenhouse gas savings that are claimed – or worse still may actually contribute to climate change rather than its mitigation.

There has been a significant increase in renewable energy generation and a shift away from burning coal to burning natural gas with a significantly lower carbon emissions intensity. Since 1990 the carbon intensity of the UK electricity grid has halved, including a 35% fall between 2010 and 2015³. The 2016 version of Part L of the Building Regulations uses a grid carbon emissions factor of 0.519 kg CO₂/kWh, whilst the measured annual emissions factor for 2016 was 0.298 CO₂/kWh.

The impact of this shift on the potential reduction of carbon emissions of combined heat and power and district heating systems that are fossil fuelled is huge. Current London Plan policies are actively encouraging technologies that have far higher lifecycle carbon emissions than alternatives.

- The carbon intensity of the UK electricity grid is changing but building regulations have not kept pace with the change
- Planning policy that references building regulations can create undesirable incentives that work against policy intent
- Calculating cash-in-lieu payments using 2012 emissions factors creates financial incentives to invest in technologies that may contribute to climate change

Why is Part L Not a Reliable Way to Predict Demand

Part L provides flexibility in design by providing a 'notional building' with defined fabric and systems efficiencies. New non-domestic buildings using the NCM thermal modelling protocol, and residential buildings SAP method. They must not produce more regulated (emissions associated with heating, ventilation and lighting) carbon emissions than the notional building. Throughout Part L and planning policies that reference it greenhouse gas emissions are measured using CO₂ as a proxy – when we talk about carbon emissions we are actually referring to CO₂ equivalent emissions – other greenhouse gases are captured by the Part L metric.

The SAP methodology is essentially a complex spreadsheet and whilst it draws upon empirical data to improve the robustness of calculation it is a crude calculation method whose results are unreliable.

The NCM methodology is designed to produce reliable and comparable outputs between different non-domestic buildings for the purposes of regulation and energy labelling. It therefore requires the use standard profiles for occupancy, and historic weather files for simulation. To limit complexity it also uses simplified algorithms for the simulation of building services.

It is not a reliable prediction of future energy performance – nor was it ever intended to be. A large part of the 'performance gap' between Part L and the energy bills of new buildings can be accounted for by this disconnect.

- Part L simulations are not a reliable way to assess energy demands
- Performance-led simulation offers greater accuracy and should be encouraged
- Energy billing data in use is the only way to capture actual energy consumption

The Performance Gap

The Performance Gap is a widely used term to describe the mismatch between predicted energy consumption of a building and the actual energy consumed as measured by energy bills. There are many factors at play:

Part L Simulations:

- Calculate 'regulated' emissions only – so 'unregulated' energy demands from anything that we plug in aren't captured
- Are limited by the accuracy of the calculation method and skill of the modeller
- Use standardised occupancy and demand profiles that rarely match actual profiles
- Standardise weather – not the weather that the building experiences
- Assume the building was built as designed – which rarely happens
- Assume that the building will be effectively managed – which rarely happens

Additionally:

- Billing data is often aggregated rather than metered by tenancy
- There is poor transparency of billing data
- There is poor access to data and ability to benchmark with comparable buildings to identify out of range values



What About Other Sources of Greenhouse Gas Emissions

Greenhouse Gas Emissions reporting from buildings is typically limited in scope to the operational energy that they consume and the related GHG emissions resulting from meeting that energy demand. Embodied impacts of construction – both in the materials used and the process of building itself are rarely tracked. Buildings are part of a bigger system that has climate change impacts including issues such as transportation, blue and green infrastructure, lifestyle choices and the food that we eat.

²<https://www.london.gov.uk/what-we-do/planning/london-plan/current-london-plan/london-plan-2016-pdf> p.180

³https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/599539/Updated_energy_and_emissions_projections_2016.pdf

If you had one thing you could change about London's Current Energy Policy what would it be?

The pre-workshop survey also asked the participants what they would change about London's current energy policy. Answers have been anonymised and are shown below:

- More consistent implementation and monitoring
- Change the flawed energy and carbon reduction calculation methodology
- Ensure sufficient follow up to understand the real performance and costs for occupants and feed this into future policy.
- Make it less prescriptive and more evidence-based.
- Real life comparison of estimated targets vs actual building performance.
- The GLA is imposing tougher standards than Part L building regulations on new developments in London, aiming to retain something akin to the so-called zero carbon building by 2016 ambition the new government abandoned following the 2015 election. For commercial development this requires calculated regulated loads to be 35% below the level set by Part L 2013 and imposes a carbon penalty of £60/tonne CO₂ for 30 years on any excess, based on these design calculations. There is currently no recognition of the energy consumption that transpires when the building becomes operational, thereby perpetuating and reinforcing the 'design for compliance' culture in the UK. I would advocate to the GLA that the carbon penalty for office buildings should be reset according to the measured operational performance, once this becomes known, and a lower rate set for developers choosing this option, say £30/tonne CO₂. This would lend the GLA policy a commendable reality check and incentivise developers (and their contractors) financially to achieve their target base building performance.
- Fragmented approach based on short election cycles
- Currently there are many demanding targets for carbon dioxide emissions reduction outlined in the existing Energy Policy. These targets include zero carbon residential buildings from 2016 and zero carbon non-domestic buildings from 2019. However, not an equal emphasis has been placed to the carbon dioxide reduction targets that should be met on-site. Thus I would suggest, specific targets to be set for achievement on-site. Only by having well-defined and clear targets and criteria, carbon dioxide emissions can be reduced on-site as well.
- To create flexibility that reflects the long build-out time scales to which designers are working to.
- More flexibility on selecting and using energy modelling softwares
- Measurement of each School campus environmental quality, to build a GLA database of quarterly monitoring.
- Change the preference for CHP systems
- It would be to reduce the energy used
- I would change the push for CHP's
- Based on good quality technical standards that work - not SAP. Regulation should not favour particular technical solutions over others.
- It is a hoop to jump through, it doesn't encourage or allow people to design energy efficient buildings
- Establish targets for in-use performance
- What appears to be a miss-match between the old technologies that LA are asking the construction industry to follow and the new ones that appear more relevant controlling climate change
- Clarity.
- Greater understanding of the measuring of performance of the policy
- I would change that Be Clean = CHP
- Further work should be conducted to analyse technology savings in relation to building types and sizes. This will help provide an indication of the best technology applications for different building types.
- Incentivise building fabric energy efficiency better
- I would change the carbon offsetting fund.
- Embodied Carbon of construction to be proven and limits to it to be set. Building Control processes to ensure quality of construction is delivered.
- Greater freedom to interpretation and less reliance on Building Regulations
- Establish clarity on why district heating may be appropriate for the existing stock - not inappropriate for next step new-build
- Not to be focused only on carbon.
- Post occupancy review of energy strategies - the primary aim being to learn what's worked what hasn't and why. Comparison of successes and less successful developments in terms of meeting their energy strategy.
- Enforcing residential design that doesn't overheat - designing in climate change adaptation. Enforcing standards to reduce embodied carbon in materials
- Introduce operational ratings for commercial buildings and use these to set public procurement standards.
- Prioritising fabric performance over energy sources

Section 3

Future Casting - What Could the Future Look Like

As a warm up the participants were encouraged to envision a brighter energy future for London. The reason for this exercise was to enable participants be receptive to new thoughts, rather than being constrained by what isn't possible or is not working today.

Highlights from this exercise are listed below:

Designing and developing buildings

Designing and building for a longer outlook – 50 years – flexible and adaptable to future building needs

Appreciation of good quality sustainable design, with buildings that are designed around people, not just to comply with regulations

A focus on social interaction and human element of design.

Total team engagement into the design stage

Cooler city through landscape integrated with the built environment by more open/green spaces which will also enhance biodiversity

Living building and One Planet Living challenge integrated into design

Designing less complex buildings

2 streams - Master planning side for cities/Individual buildings

MEES – Impacting Decisions – Become real driver for change

All stakeholders (investors, city, contractors) to push for energy efficiency not just for the end users

Education

Improved education for end-user and better understanding of technologies

Sustainability in education

Informing research centres, consultancies and policy makers about Net zero energy

Next generation of young scientists / engineers/architects/ managers bringing/contributing real motivation for change

More access to more skilled green workforce

Better information for designers and occupiers – teaching how to design and operate differently

Occupants engaged in and aware of their energy use towering energy demand

People understanding of how buildings operate

Market demand for efficient buildings

Energy/Carbon

Improved performance management to eliminate performance gap. Obligation to measure actual performance against predicted.

Unregulated energy consumption and life cycle carbon emissions is included in calculations

Considerably high use of renewables integrated with storage to all buildings. (self-powered buildings)

Movement towards zero combustion in urban zones - Renewable electricity to form 100% of national grid

Low emissions grid and urban transport

All electric heat becoming the norm

Energy storage mainstream and part of the grid with transport energy balancing building energy profiles

Greater use of solar-storage-DSR-smart grids interacting with one another

Network challenges - Stress on electricity will have to be managed

Local energy production-local storage- local grids

Energy efficiency becomes a universal language

Zero carbon route to be seen as easy

Beyond Buildings

Affordable homes for everyone

Resilience to political and economic uncertainty

Renewal of building stock on a regular basis – longer term plan

Local control water, waste and power

Circular economy

Sharing economy - people don't own cars

More local engagement with communities

Local councils will continue to be reduced and resources to undertake non-statutory functions will be very limited. Carbon in currently non statutory

Social inclusion – focus on community – equity

Low carbon transport

Local Food Production

Equality

Eradication of world hunger

Equitable access to energy and greater community ownership

THE FUTURE LOOK LIKE:
 LOCAL COMMUNITIES
 ED STANDARD FOR
 VSS - ENERGY economy
 AIR
 EDUCATE YOUNG
 OF EXISTING BLDGS →
 FLAME RETARDANT. (PEACH)
 SENSITIVE ENVIRONMENT + POLITICS
 BUILDINGS - EAST-OPP. FOR
 CLIMATE HEAT TO
 US IN LANGUAGE - ESS
 ENERGY CONSUMPTION
 FOR EXISTING BLDGS
 ENV. BETTER INFORM
 AS A LEADER HEALTHY
 ENERGY STORAGE. SHARED
 OUR OWN LOVE - TRA
 USING + WORK BETTER
 UTILISATION LESS ILL
 SMART BUILDINGS

Section 4

Workshop Table Group Notes

This section contains the notes of the discussions of each workshop table group

1. New Buildings - Developing regulations and planning policies
2. Existing Buildings - Developing regulations and planning policies
3. New Buildings - Developing incentives to drive energy innovation and performance
4. Existing Buildings - Developing incentives to drive energy innovation and performance
5. Decarbonising Energy Supply - at building, district, borough and city scale
6. Buildings as Part of a Bigger Ecosystem - including transport, landscape, land use, lifestyles, environmental quality
7. Capacity Building and Engagement - how we fill gaps in knowledge and understanding
8. Lifecycle Carbon - addressing offset strategies, embodied carbon and operational carbon measurement
9. Resilience - ensuring that energy policy enables climate change adaptation
10. Other - an open table to discuss anything that is missing



2nd Exercise: How Do We Get There?

The purpose of this exercise is to discuss and record ideas for how we realize our ideas from the 1st exercise:

Use the questions below to guide your discussion.

Key Questions:

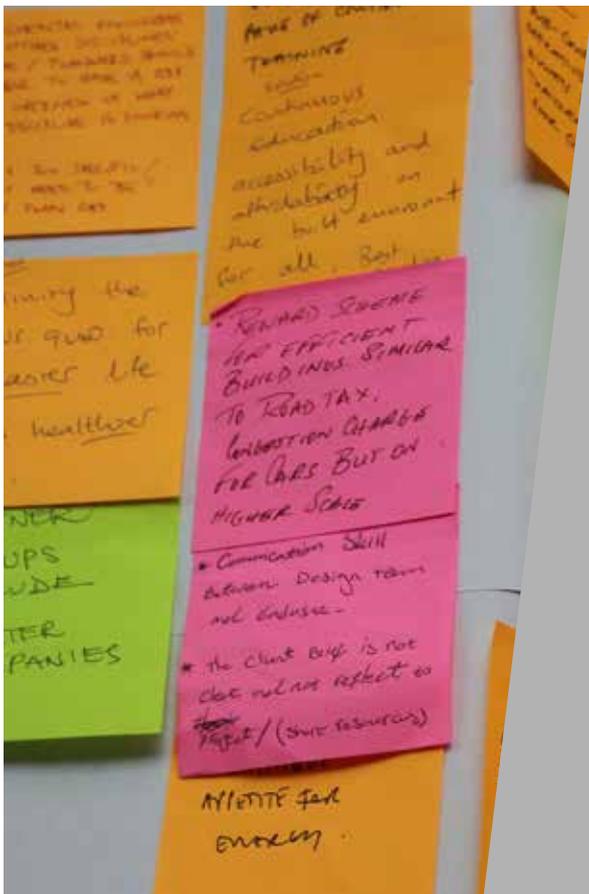
- What needs to change now to set-up the future that needs to happen?
- What are the short term steps? Quick Starts?
- What knowledge or data do we need that we do not have?
- What are the difficult conversations we need to have?

Barriers:

Money	Barriers out of money	Barriers out of money
VAT	Barriers out of money	Barriers out of money
People	Barriers out of money	Barriers out of money

Short Term Ideas (3+):

- Finance that works
- Mandate data sharing
- Mandate doing improvements or lease or sale
- Mandate doing other data share?



Participants who had expressed a particular interest in joining a specific table via the pre-workshop survey were by-and-large assigned to their first choice. Facilitators and note keepers were assigned to each table drawn from individuals who had expressed a willingness or offered relevant expertise.

Other places were filled based on a desire to provide a broad range of perspectives drawn from across the diverse backgrounds and organisational affiliations of the attendees.

During the workshop all attendees (other than facilitators and note keepers) had the opportunity to switch to alternative table if they felt they had something that they wished to contribute that did not fall within the remit of their table. Very few participants chose to move tables.

In the pre-workshop survey the attendees were given the opportunity to express an interest in facilitating a table discussion or keep notes of the discussion.

Workbooks were completed by the note keeper, and an initial draft written up by the notekeeper and facilitator. The participants were then given the opportunity to comment on the draft notes to ensure that the whole discussion was captured. These comments were then incorporated into the notes shown in this Appendix.



Table 1 – New Buildings - Regulation

Introduction to the theme

Building Regulations are falling well short of providing their predicted building performance. The resulting buildings are not meeting the needs of London's citizens. London needs to recover its position of leadership in economic, social and environmental sustainability for its own benefit, but also as a platform for exporting London's deep expertise in this field worldwide. London planning policy framework has the ability to provide enhancement to the 'worst allowable' national building regulations standards, as well as helping prepare industry for future higher standards.



Participants

Facilitator: Sara Kassam - CIBSE Services Limited

Note keeper: Simon Ebbatson-Elementa Consulting

Anne-Marie Robinson - Greater London Authority

Brian Goldsmith - Elementa Consulting

Chris Twinn - Twinn Sustainability Innovation

Damian Hemmings - London borough of Merton

Debby Ray - Perkins + Will

Joe Baker - London Borough of Haringey

Katherine Hydes - Univeristy of Reading

Ronan Leyden - Bioregional

Shaun Kelly - Peabody

Theo Mourtis - Robert Bird Group

Thomas Lefevre - Etude

Will Morris - Robert Bird Group

Issues/ Barriers

- Political buy in (not just GLA also local Boroughs) – time frames which extend beyond the tenure of one political administration. How do we ensure that the next mayor / Councils continue to deliver this aspiration?
- What is the local / London priority? I.e.: affordable housing numbers and other 'major' issues often override carbon when schemes get to planning committee
- Lack of enforcement resource, plus deregulation private sector building control tend to provide a lighter touch. Inability of Local Authorities to condition CSH thereby delegating verification
- Lack of capability/knowledge of the enforcement resource
- Lack of elicitation of the co-benefits
- The opacity of the compliance tools and not intuitive for others in design team, construction team and for those who are expected to operate the buildings
- Electric grid doesn't have the capacity for a switch to Heat Pumps en masse. Not resilient

- Planning cannot influence building operation
- Not understanding life-cycle costing (currently this isn't part of consideration/conversation?)
- Most buildings are constructed as a financial commodity, not for the end user. Viability is always used as a get out from developers
- General lack of outside world understanding of metrics – kgCO₂. Lack of Energy literacy and of future consequences.
- Lack of useable data, lack of feedback to real emissions reductions
- No feedback loop of in practice performance and POE informing process and actual realisation of CO₂ reductions
- Market buoyancy (in residential) – sustainability is not a priority as market simply want affordable homes and isn't informed by choice.
- Consequences of rapid change
- Should London diverge from practice of other (worldwide etc.) cities?
- Requiring a minimum "on site" standard rather than it being cheaper to offset emissions

Key Priorities

- In use monitored consumption data used to close performance gap – establish common protocol (through planning requirements) for monitoring provision. Start with monitoring/common reporting requirement and move towards enforcement where underperformance exists
- Separate Minimum Fabric energy performance (enhanced well beyond the minimum values in Part L). Consider an area weighted average U value requirement (as reported in BRUKL) to discourage over glazed architecture – because current all-glass buildings are bringing regulations into disrepute
- Supplement regulations with incentivising developer to perform well via end users being informed – i.e.: align incentives, e.g. using poor performance as consideration in rent reviews gives financial incentive for building owner to insist the developer delivers the performance claimed at design
- Get visible and viable enforcement mechanism – including harness 'TripAdvisor' to name and shame buildings that do not perform. Key part of this is getting performance defined in commonly understood metrics (e.g. kWh/m²) so all parties to a buildings whole life can start to reconcile claimed and actual performance
- Clear Zero Carbon Policy for non-domestic. This to include a future route-map taking us through Regulated energy, then Unregulated, Embodied, Whole Life, etc., as the assessment methods become progressively refined/robust.
- Empowerment of end users of energy, not just education/ engagement e.g. occupants of private rented properties. How to make sure that everyone involved in a building understands how to reduce energy and is given the tools/information/ capability to do so.

- Research and Analysis; what key pieces are needed.
- Identify the coalitions and partnerships that are needed to effect change

Short term recommendations/actions

- Add requirement for a years' worth of monitoring (Soft Landings Post Occupancy Evaluation)
- Planning to require submission of performance and gives a protocol in which to do this, including presenting performance in more intuitively understood metrics understood by all the building's whole-life stakeholders. Use DQIs, Design Quality Indicators.
- Incentivise (not penalise) developers to use that data. e.g.: 'NABERS' for both housing and non-dom. Hence building quality is judged by their end performance.
- End user motivation: Identify sustainability quality indicators, then use rent reviews as means to create more direct financial motivation for performance
- Requiring a minimum "on site" standard rather than it being cheaper to offset emissions. Not least this reduces occupant bills and hence improves affordability (due to lower outgoings).
- Policy to outline zero carbon non-domestic policy, including for the long term (not just current carbon intensities). Just as requirement for judging future overheating: 2050 scenarios for energy supply availability should be tested (eg:Joined up DH networks served from EfW, overloaded Grid with peak-time high £/kWh, also across-policy implications, like electric vehicle quiet/clean streets allowing operable windows retrofit).
- Introduction of new (national?) mechanism for assessing energy performance (Code but not Code). Put the onus back on developers to demonstrate how they achieved good energy performance and reduce burden on local planning authorities.

Long term recommendations/actions

- For better and comprehensive POE freely available to inform decisions
- Penalise developers based on recorded data showing underperformance
- Create market demand for (Align incentives between end users and building supply chain)
- Requirement for yearly 'MOT'
- Require companies to work together re. Jointly owned capital assets; but what would be the planning push here.

Table 2 – Existing Buildings - Regulation

Click here to watch the video of the summary presentation



Introduction to the theme

The theme for our table was to focus on existing buildings and the application of regulations during refurbishment. To achieve the carbon reduction targets set by the government and to achieve an 80% reduction in carbon emissions below 1990 levels then significant upgrades are required to existing building stock to achieve this reduction. It is anticipated the 70% of building stock from 2010 will be in use by 2050, with 40% of that building stock pre dating 1985.

With renovation of existing building stock this brings great challenges but also great opportunity to enhance buildings to better serve their users. In 2015 carbon emissions from the UK have been reduced by 38% below 1990 levels however the majority of these reductions have come from other sectors than the built environment, which will put even more pressure on the built environment to achieve further savings.



Participants

Facilitator: Adam Mactavish - Currie & Brown UK

Note keeper: Ronan Pigott - Elementa Consulting

Alan Calcott - Carbon Plan Limited

Dominique Haslam - Wilson Mason

Joe Jack Williams - FCB Studios

Owen Connick - Breathing Buildings

Richard Twinn - UK Green Building Council

Tim Barnett - Tangram Architects

Tom Kordel - XCO2 Energy

Tom Spurrier - Hoare Lea

William Ray - Clarion Housing Group

Issues/ Barriers

- The main barrier to realise significant carbon savings in existing buildings is that current legislation presents many opportunities for the Client / Developer to avoid implementing strategies to deliver real carbon savings. There are currently few incentives or funding mechanisms being made widely available to Clients / Developers to implement real change in existing building stock.
- Another barrier to delivering real change is there not being a significant demand within the UK for low energy buildings and there is no perceived benefit to the end users to seeking out an energy efficient building. This is linked to a paucity of information on the real performance of buildings (rather than their EPC rating) and therefore a lack of occupier awareness of the overall costs of running one building in comparison to another.
- The high rents in London mean that energy is, relatively, a smaller cost than in other parts of the country and so energy

costs may not motivate some occupiers. However, reputation and a link to the overall quality of the building and its management should mean that most occupiers (other things being equal) would prefer an energy efficient space. Currently there is little information to enable them to make informed decisions on these matters.

- With a push to more electrical based solutions this will impact the existing utility infrastructure which will require upgrading.
- There is a disconnect between who develops the building and who ends up paying the bills – creating little incentive for developers to go past the minimum standards.

Key Priorities

- Mandatory auditing of existing building stock energy usage and improvements being undertaken based on the audit findings where paybacks are demonstrated to be below a predefined period
- Public disclosure of energy usage data for buildings to help better inform design decision making (i.e. by knowing what works and what doesn't) and to help create a market for good performance by making this more visible and accessible to occupiers and investors
- Enforcement of a minimum operation standard, so that where loads for specific uses are above an agreed minimum standard there is a need to invest to improve performance. This analysis should complement the minimum asset ratings required under MEES regulations
- Funding vehicles to be developed for improvements which are enforced by local councils. This would provide access to low cost finance for improvement measures, e.g. in a similar way to Salix Finance in the public sector.

Short term recommendations/actions

1. Identify opportunities to influence refurbishment / life cycle activities that are not formally regulated or notifiable for planning control. These projects represent big opportunities for improvement but typically go unnoticed
2. Better use of DEC's and mandatory improvements on DEC's for buildings
3. Funds generated from the carbon offset policy and their usage to be disclosed
4. Performance metrics / Carbon Offset to be derived from actual energy used not theoretical models

Long term recommendations/actions

1. Usage sensitive energy pricing with developments being given quotas
2. Leverage the funds generated from the carbon offset with financial institutions to make more funding available for energy improvements
3. Strengthen Part L2B
4. Procurement process to encompass energy performance metrics
5. Requirement for Landlords to develop strategy on how to improve their building stock

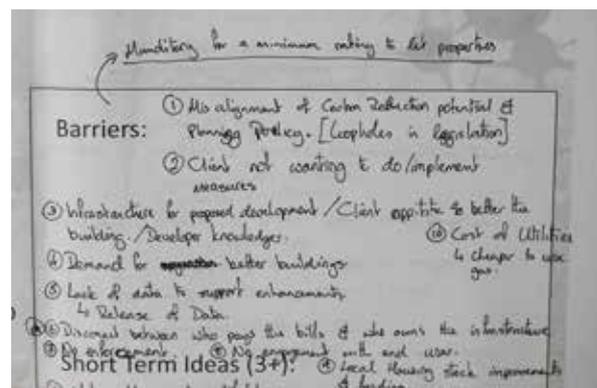


Table 3 – New Building - Incentives

Click here to watch the video of the summary presentation



Introduction to the theme

If regulation is the stick to deliver carbon emissions reductions in the design, delivery and operation of new buildings then incentives are the carrot. This table explored how the value chain for new buildings could be provided with financial and non-financial incentives that can be broadly described as: reputation, risk and reward. The need to educate consumers of buildings around energy performance emerged as an important driver for demand to which the new buildings sector could respond.



Participants

Facilitator: Robert Cohen - Verco Global

Note keeper: Hugh Dugdale - Elementa Consulting

Anca Giurgiu - The Royal Borough of Kensington and Chelsea

Cristina Portillo - Perkins + Will

Elliott Sharpe - Vital Energi

Nicola Cadogan - ADP Architects

Rita Dimitri - Bouygues UK

Rokia Raslan - The Bartlett Faculty UCL

Susie Diamond - Inkling

Issues/ Barriers

- Return on investment – a lot of schemes are funded by developers who then sell the building on completion. Ongoing energy performance is not a key consideration for them, unless there is a more direct link to the value of the building
- Funding stream from local / national budgets – public spending is very tight, so any financial incentive needs to be funded by an associated penalty
- Consumer opinion – this was seen as the main thing that needs to change. There was scepticism that typical companies would currently be willing to pay more for a lower carbon emission building. Similarly, there was scepticism that energy performance would heavily influence the purchase of a dwelling. As Channel 4 have identified, when it comes to property – Location, Location, Location. To make the proposed solutions viable then Users / Consumers must want it.
- Agents - the empirical evidence associating improved comfort in dwellings or well-being in commercial buildings with energy efficiency has yet to influence valuations by property agents. This indicates that energy efficiency is not on the wish lists of most of their clients, paradoxically given that there is no shortage of user/consumer complaints about high energy costs and uncomfortable buildings. Or perhaps this brings us back to the lack of a robust metric consumers can ask for.
- In the extreme, to still have families in the UK who must choose 'heat or eat' shames us all.

Key Priorities

- Users/consumers must want it

- It must be real (not EPC)
- Non-domestic users pay more rent for better building- well-being etc.
- Proven by measured energy efficiency
- Residential- incentivise with moderated council tax
- Reverse tariffs for energy suppliers
- Transparency about energy performance by disclosure to drive reputation
- A common theme throughout the discussions was the fact that financial incentives and reputational pressure are the most powerful drivers.
- Enhanced monitoring, collection of data and performance disclosure were seen as 'must haves' for informing the future. Whether this is incentivised or legislated (or both) needs to be thought about.
- Increased local engagement with community-led schemes to get wider 'buy-in' were suggested; this could be incentivised by central funding.

Recommendations:

- A key element of the discussions was initially around what constituted an incentive.
- There were mixed opinions as to whether the market was in a place yet where consumers/tenants were motivated by energy performance and they would be willing to pay more for a more energy efficient building. It seemed there needs to be a strong link to wellness standards rather than just carbon emissions, as wellness will have a more direct effect on the occupants— their level of satisfaction with the building and by extension their productivity. Most companies spend far more on wages than anything else, and improvement in working conditions should provide a significant improvement in output.
- It was noted that evidence from the commercial office sector in Australia supports this thesis, but presents a different but more compelling perspective. There the energy efficiency of an office building (represented by measuring and rating the efficiency of the 'base building' services) is taken as a proxy for the quality of the building. This operational energy rating must be disclosed on all sale and let transactions and this requirement alone has proved sufficient for the market to drive striking improvements in the energy efficiency of office buildings. The market transformation in Australia is driven by the commercial interest of investors and developers who secure better yields (via rent premiums, fewer voids and longer retentions) from better rated buildings and the self-interest of occupiers who seek better rated buildings. Hard-nosed tenant organisations are prepared to pay higher rent for a building with a better rating because this indicates it is a better building: better designed, better constructed, better commissioned and better operated and maintained.
- This market dynamic led to developers needing to be able to guarantee to investors and tenants the base building operational performance of their new office buildings. So a Commitment Agreement process was conceived to empower a developer and their main contractor to achieve a target base building rating for a new office building, verified by measurement.
- The fact that the performance gap is rife in the UK, by contrast with Australia, was a concern to all involved, and anything that can be done to close this would be beneficial. Incentivising the accuracy of in-use energy modelling was considered, rewarding those buildings which performed as predicted, and penalising those that failed to perform. A new metric needs to be found as too often Part L is used as an indicator of expected performance, which it is not intended to do. Replicating Australia's Commitment Agreement process and upgrades of the BREEAM New Construction process are hopeful initiatives in the pipeline intended to address this performance gap in commercial buildings.
- With an increase in renewable technology deployment, it was discussed whether this would lead to lower energy bills, which would produce a massive push from the domestic market for further decarbonisation of the grid.
- A popular proposal was to make it mandatory to publicise energy in-use figures (based on real data) and issue League Tables. This would incentivise certain companies who wanted to be near the top of the league, and potentially create reputational pressure on companies at the bottom of the table. It would also create a market driven average, which would be expected to climb gradually as companies tried to improve. In this respect, it was noted that the separation of the base building performance has been the key factor for success of the Australian approach. Their measurement and rating system focus on the operational energy performance of the base building, rather than whole building energy use which is driven by both the base building and the energy intensity of the activities of the occupants. Developers, owners and landlords have control of the base building and its performance; investors are interested in the operational efficiency of a property asset more than the efficiency of the activities undertaken by the asset's occupiers. The base building energy uses also coincide with the sphere of interest of building energy regulations.
- There was discussion about improving the transparency of certification schemes such as BREEAM / LEED. Could these schemes allow greater design flexibility and avoid the risks of incentivising inappropriate 'features'. The end product should be a building with better measurable outcomes rather than a reward for completing a tick-box exercise.
- Potential to link business rates / council tax to energy performance, penalising poor efficiency in order to fund reductions for high efficiency.
- Link 'help to buy' scheme to energy performance, offering larger or lower interest loans for better performing buildings.
- Create a link between planning and a wellness rating, potentially making it easier to obtain planning for better designed buildings and healthier outdoor environments.
- Reverse energy tariffs with cheaper unit costs for initial consumption and more expensive unit costs for further usage. This incentivises low energy use and also helps towards reducing fuel poverty.
- Cap rent based on energy performance. Poor performing buildings can only charge low rents. It was also discussed as to whether the minimum E grade for rentable buildings would be gradually raised?
- Link building performance to rent reviews and leases. If buildings fail to meet performance then rent is reduced.
- All data in the future needs to be real. EPCs are not fit for the task, and new metrics need to be established against which measured data can be compared, such as a rating system for the base building operational energy performance of new commercial buildings.

Table 4 – Existing Buildings - Incentives

Click here to watch the video of the summary presentation



Introduction to the theme

In its current form the London Plan focuses on the energy performance of new development, yet by definition existing stock is responsible for 100% of the energy consumed by the city's buildings. International experience suggests that the most cost-effective reductions in energy demand and related greenhouse gas emissions can be achieved by focusing on the poorest performing existing buildings with focused retrofit programs supported by comprehensive energy performance data collection.

This table drew together expertise from architecture, facilities management, behaviour change, engineering and energy management. It explored the most significant barriers to improving energy performance of existing buildings and identified a broad range of connected incentive programmes that could enable and empower building owners, operators and tenants to reduce climate change impacts and improve environmental quality.



Participants

Facilitator: Ed Garrod - Elementa Consulting

Note keeper: Louise Quarrell - Carbon Smart

Andy Mytom - David Morley Architects

Darren Crossley - Wilson Mason

Loreana Padron - ECD Architects

Philip Draper - Broadgate Estates

Rachel Ward - London Metropolitan University

Robin Nicholson - Cullinan Studio

Ross Ackland - Workman

Sarah Walters - New London Architecture

Scott Crease - Max Fordham

Sue Lee - Syntegra Consulting

Thurstan Crockett - Thurstan Crockett

Issues/ Barriers

Political

- Uncertainty over future direction of policy particularly with track record on initiatives like Carbon Reporting Commitment
- Focus of policy is on new build
- Local authorities lack the expertise to assess potential for existing building upgrades
- Technical
- Lack of skills in effective energy management and operation of buildings
- Lack of expertise in making use of waste heat
- Accuracy of billing and recharge systems is poor
- Constraints on fabric upgrades to existing buildings
- Challenges of different building typologies – e.g. towers
- Impact of upgrades to users in-situ
- Existing energy benchmarks for existing buildings are out-of-date and therefore give a false comparison

Economic

- Energy costs are too low to create significant cost driver for change
- Lack of financial incentives
- Investment horizons for some retrofit actions require significant capital expenditure which is a challenge for individual homeowners
- Expenditure with least disruption typically relates to change of ownership or lease, this can create significant delay in action
- VAT charged on building works creates a significant cost
- Repair and maintenance works are driven by minimising first cost

Legislative

- EPCs do not create a useful measure of likely energy cost and this is corrosive to trust
- No mandatory disclosure of energy performance based on real energy consumption
- Part L does not recognise the complexity of working with existing buildings
- Part L calculation methods based on theoretical rather than actual energy use
- For rented buildings, lease negotiations are the prime time to discuss energy efficiency responsibilities/benefits to be discussed. The people negotiating the leases are often different from those targeted with energy management.

Behavioural

- There are a lack of public advocates for retrofit – not receiving the same attention or co-ordinated publicity as issues such as mental health
- General lack of 'climate change literacy' – leads to lack of demand
- For many buildings where energy costs are shared rather than metered by tenant there is little incentive for individual action as benefits will be diluted
- Tendency for incremental repairs to replace like-for-like rather than consider potential for upgrades or systems change.

Key Priorities

- Clear policy direction - for existing buildings – a stretch code to inspire early action.
- Performance Based Targets - based on energy use intensity with no restrictions on how savings should be realised
- Shared data platform - providing public access to energy performance
- Transparency on billing - Empower consumers to understand energy costs by requiring transparency on billing in multi-tenant buildings and disclosure at lease or sale
- Establish current energy benchmarks - for existing buildings in London based on measured data - enable performance comparisons by owners and tenants

- Mandatory audit and action - for low performing buildings
- Raise Awareness - share best practice, toolkits and experiences to increase awareness and build capacity

Short term recommendations/actions

- Create a common platform for energy demand data disclosure and publication for all buildings – voluntary disclosure at first mandatory later.
- Support better decision making by creating a toolkit to assess lifecycle cost benefits of retrofit actions connected to long term funding mechanisms to spread cost

Long term recommendations/actions

- Demand energy data from suppliers for each building – cut out the middle man
- Enforcement of energy upgrades on lowest performing buildings based on energy audits that must be completed at lease or sale - or through expanding ESOS requirements?
- Lobby to change VAT rules to incentivise investment in energy upgrades in all buildings. This could be by classifying major retrofits as 'new build'
- Mandatory reporting for all buildings once voluntary reporting platform is established
- Consider a cost-neutral funding mechanism with penalties to low performers transferred as rewards to highest performers. This could be implemented through reform to business rates



Table 5 – Decarbonising the Grid

Click here to watch the video of the summary presentation



Introduction to the theme

The UK's electricity grid has experienced a rapid reduction in its carbon intensity as natural gas has displaced coal as the primary fossil fuel and as solar, wind and biomass have rapidly increased in scale. This has created challenges for low energy design and performance measurement - since carbon emissions are used as a key metric and are no longer stable.

The National Grid and natural gas networks are supplemented in London by an increasing number of planned and realised district heating and combined heat and power networks. Transparency on billing and systems performance and 'right sizing' these systems to take into account changing demand profiles emerged as a concern.

The contribution of these decentralised networks to London's climate change goals is not fixed – as the electricity grid becomes cleaner they potentially become 'dirty' rather than 'clean'. The table explored how fuel switching, access to waste heat sources and energy sharing between complementary uses could help to decarbonise these local networks.



Participants

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Grace Loseby - Greater London Authority

Jon Gregg - Buro Happold

Kate De Selincourt - Kate de Selincourt

Martin Crane - Carbon Alternatives

Owain Mortimer - London Councils

Sydney Charles - en10ergy

Tim Starley-Grainger - Westminster City Council

Issues/ Barriers

Infrastructure: Generation, distribution and storage of energy. There is a disconnect between; the design of the grid (based upon the idea that energy is available any time, with unlimited capacity) and the fundamentals of a decarbonised grid (renewables operating intermittently, limited peak capacity). The issues and value of intermittency needs to be brought to the consumer, with greater opportunities for interconnection, storage and local generation.

There is poor coordination between the utility providers on a national and international scale. Nationally the breakup and privatisation of utilities has led to poor coordination and limited investment. This complexity is further demonstrated when cooperation between international energy providers is considered. How do you increase the coordination and investment across separate entities? Further consideration should be given to providing consistent policy in relation to network reinforcement for renewable technologies

Planning system is dogmatic in its backing of particular technologies with no understanding, control or feedback on how they operate. This has led to technologies such as biomass boilers, CHP's linked with district heating networks being installed in preference to improving the building fabric. Biomass and now CHP is largely discredited as a low carbon source and the district heating systems installed consume more energy and cost more than a simpler system. It is recognised that there are situations where

Biomass and CHP may be appropriate, however a standardised assessment route should be developed to support selection of such technologies.

The financial model for investment in decarbonised technology usage on both a development and a grid scale does not promote innovation, but enforces mandatory minimums.

The GLA guidance does not require a fixed Low to Zero Carbon Technology provision on each new development, instead, a proportional energy reduction is required using a baseline of the building regulations.

Poor historical data relating to the performance of in use buildings and other systems such as community heating systems limits the opportunity for learning which strategies have been effective and which have not.

There are no reporting mechanisms or sanctions against systems that produce more carbon than promised.

Key Priorities

- Provide policing to establish if the emissions targets promised by a development at the planning stage are actually delivered in use. This approach should be applied to all developments.
- Establish an Energy Authority to provide strategic leadership on a national level for the energy – creation of a London Energy minister as part of the Mayoral team would provide leadership.
- Promote the creation of financial vehicles to facilitate investment in decarbonising the grid.

Short Term Recommendations

- Provide policing to establish if the emissions targets promised by a development at the planning stage are actually delivered in use
- Ensure carbon, energy and occupant environmental outcomes are assessed using a reliable methodology that gives absolute and relative results
- Provide flexibility within policy to encourage the use of innovation to meet the emissions reduction targets
- Rather than providing mandatory minimum targets alone, consider incentives such as reduced business rates or council tax for developments that exceed the targets. Collate and share historical building performance data to inform policy. Require utilities to provide actual usage data
- Give Planning departments teeth to enforce policy, and not to be afraid to reject non-compliant schemes or fine them if they fail to meet their targets as a breach of the planning conditions.

Long Term Recommendations

- Energy providers – electricity generation in case of US, but potentially DH as well
- Require a financial assessment between the costs of enhancing energy efficiency compared to providing new generation capacity, to demonstrate the need for new generation
- Require smart meter data to be available to allow the production of accurate time based load maps, and facilitate infrastructure planning (for example reducing the need for standby generation facilities)

- Require new buildings to have an enhanced standard of metering to allow greater assessment of the in use performance
- Use data to link supply and demand of energy across the grid
- Link waste heat sources to heat users

How best can we decarbonise energy supply, keep it local? Centralise? What scales?

Consensus was not achieved on how to decarbonise the grid, however there was lively debate on a number of options. Key points raised were:

Some of the energy London needs could be collected on site with PV's. However we do not believe London has the ability to meet its own energy needs, therefore whatever strategy is adopted, energy needs to be sourced from outside of London

New build and even refurbishments represent a very small proportion of the building stock within London, so whatever we do must include existing buildings as a first step, any heat mapping exercise should include a mapping of potential 'megawatts'. This would have two crucial benefits: to prevent the expensive and inefficient oversizing of any heat network that is imposed on the area, but perhaps more constructively, to highlight areas where fabric and services retrofit would be most worthwhile.

It is unlikely that a one size fits all approach will work, given the complexity of the building stock, flexibility and innovation is required, rather than a dogmatic approach

Realism about the ability of policy to influence certain types of building is required: for example, it would be very challenging to upgrade the performance of a converted Victorian building with 3 demises, a freeholder, due to the legal complexity. It's therefore important to focus on what can deliver value.

How can we best use our existing heat networks? So that they are part of the solution to achieving zero carbon?

It was stated that approximately 40% of dwellings are linked to communal heating systems, so realistically any decarbonisation needs to recognise this. The key is to provide the heat from low or zero carbon sources; Waste streams, Biogas, Heat pumps

The costs and losses of the district heating schemes are offset by the ability to more easily change fuel sources and seasonally store energy for the winter peak. This trade off was not accepted by some of the panel who needed justification. How can we better secure our energy needs from low carbon sources and put in place the energy infrastructure we need to supply it reliably to our homes and workplaces?

The focus of the discussion was on the need for data to understand what is needed and when, and also to assess how well buildings work. Greater transparency is required at all levels, from the utility providers, ESCOs and building designers to allow data to be used.

With regards providing future low carbon sources, the method of financing was considered key. The idea of a "green bank" was discussed. Allowing payment in lieu of onsite renewables/specific emissions target was suggested, however the money would need to be ring fenced for infrastructure, and ensure this is harmonised across all boroughs. It was also suggested that the GLA encourage the establishment of financial vehicles for pension funds to invest in infrastructure.

Table 6 – Building Ecosystems

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Introduction to the theme

Measurements of the greenhouse gas emissions of buildings are typically restricted to their direct impacts stemming from operational energy demands. However, this is not the only way in which London's buildings impact the carbon footprint of the city:

- Their construction imposes embodied impacts both in the materials and construction activities.
- The density and pattern of development influence the viability of public transit infrastructure or the ability to combine living with working, learning, care and play.
- The design of buildings either limits or enables short term flexibility in use or longer term adaptation between uses – buildings that can have many uses over a longer period will have a lower lifecycle impact than single-use strategies.
- The landscapes, gardens and habitats that they support or displace contribute to London's urban heat island, with attendant impacts on the risk of overheating and scale of cooling demands.
- The communities that our buildings serve can be strengthened or diminished by their built environment.



Participants

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Christian Spencer-Davies - AMODELS

Linnea Luuppala - Energy Futures Lab at Imperial College London

Lucy Townsend - BDP

Maria Eleni Papadaki - Lendlease

Nick Hufton - Shephard Epstein Hunter

Sabbir Sidat - WSP

Theclalin Cheung - Curl la Tourelle Head Architecture

Issues/ Barriers

- Consumer – energy literacy/ communication around sustainability. People do not understand what the biggest impacts/opportunities for improvement are / what information is available to help them lower their impact. Example given where sales person had never heard of EcoHomes when showing round an EcoHomes certified apartment.
- General consensus that Community energy is a good thing – it gives more value back to the community but also is a good way to engage the community. The same goes for gardening / custodianship of green spaces
- As designers or speculative developers it is difficult to enable a community energy project, particularly when there is no community yet to move in. Designers would like an easier way to engage with locals
- Aspirational living- a shift happening towards more sustainable living but is slow and needs to be accelerated
- Generational- better energy / sustainability literacy with younger clients/ school age but it is the older generation still making a lot of the decisions.

- Capital cost for technological solutions
- High density – Does tower blocks have to be the only approach? There have been many bad examples in the past and a lot of research has been done to understand what went wrong and what the social sustainability opportunities are to do better.
- Tower blocks do not allow individuals to control interactions with their neighbours.
- Cyclists would like to keep their bikes near to their home entrance – this is currently not supported by planning, and prevented due to maintenance/fire concerns. (Also note difficulty for families if child falls asleep on bike and bike must be parked in the basement). The norm should be challenged.
- Social / biodiversity impacts are less quantifiable and so they often lose out to issues such as energy that may have stronger or just better understood policies. Roof strategies are an example. A design may spend weeks balancing social space / landscape / energy but then be thrown aside to meet an energy target.
- Maintenance concerns prevent some of the features that enhance community / social fabric and sense of ownership through territorialisation
- Flexibility – buildings are not actually often designed for flexibility or to really be adaptable
- Masterplans often are not able to design for the long term. Concern that designers design for today rather than 30 years' time.. Particularly true when it comes to thermal comfort. Climate change adaptation is not being taken seriously enough at all.
- Full opportunities for free play not currently being realised because designers are not thinking about all spaces as opportunities for play or prioritising car free routes to play spaces

Key Priorities

- Bring community into development early to be part of the design and establish opportunities for longer term ownership (energy, landscape, transport, social)
- Set up community group registry to enable already established groups to put themselves forward to engage. Provide capacity building skills to help community groups fully engage in planning
- Clarify benefits of doing better-- what are the values of social benefits? Communicate these clearly to all

Short term recommendations/actions

- Training/ educating sales people to communicate sustainability features clearly in new properties
- Support communities to take ownership of energy projects
- Set up a list/ register of community groups who are interested in engaging with developers and planners. Provide capacity building skills to help community groups fully engage in planning. London Heat Map has been very successful example of making information available at early stages. This model could be replicated in other areas.

- Community client/ brief development
- Research / clarify benefits of designing / doing better- how do we value social benefit
- For example there are opportunities to use the communal areas of apartment blocks to provide a place to play, to territorialise your space (provide dwellers a sense of individualism), provide a social space, provide storage space, and support recycling. This is often dismissed by developers due to maintenance

Long term recommendations/actions

- Investigate opportunities to encourage/require longer term involvement by developer – need to be responsible for long-term performance not just meeting building regulations. Better hand over procedures?
- Support Community Land Trusts
- Set up local community groups/ energy management group
- Electrification of trains (include diesel rail) – air quality

Other comments

- Should we be aiming for 'net zero' or not? Is it more efficient to generate electricity elsewhere where there is more value for money and use valuable space for social space? Should there be a split between how we consider thermal and electrical renewable technologies?
- We need to consider how we build in flexibility to accommodate future needs of the community.

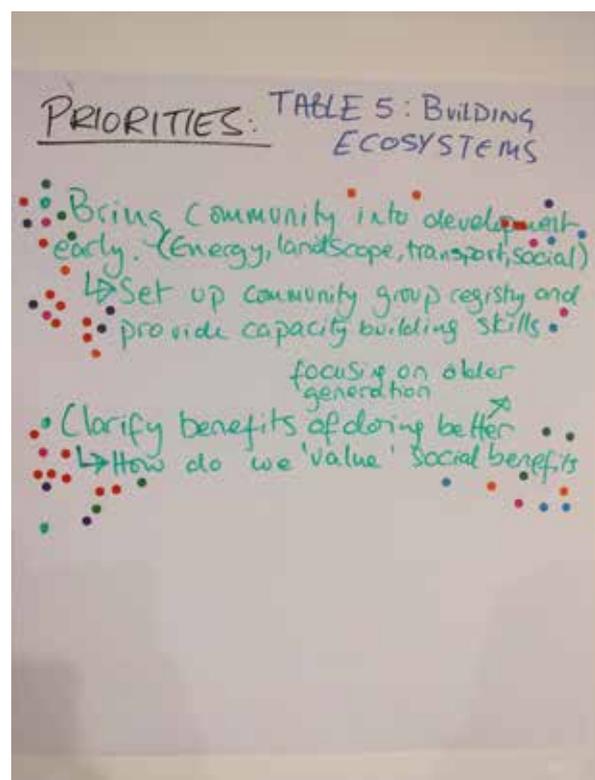


Table 7 – Capacity Building and Engagement

[Click here to watch the video of the summary presentation](#)



Introduction to the theme

The transition to a zero emissions capital cannot be delivered by policy or incentives alone. Success will come down to people – as policy makers, as stakeholders, as clients, as designers, builders, operators and occupants of buildings. This table explored what skills gaps might exist and how best we might go about filling them. The need for cross-sector collaboration and consumer education emerged as key priorities.



Participants

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Emma Georgitsi - Mott Macdonald

Mandhir Sidhu - BLD Lighting & Displays

Mohamad Tabatabaee - Battle McCarthy

Ron Hollis - Taylor & Stapleton Engineering

Ruth Moulton - StART

Issues/ Barriers

Skills gap

- Do people setting policy have skills to set policy? Are they responding to the barriers effectively from an educated platform? How could we assist to better inform?
- Do clients have a clear enough understanding to set their own briefs and focus in on the key development quality issues.
- Skill and resource gap in local authority leads to erratic and pedantic application of varying policies.
- Clients will spend money on health and safety training but not energy or maintenance
- Client care and education critical – must show them the way with tangible benefits. It's not about green buildings but buildings that work hard for the occupants and buildings people want to occupy (enhancing value).
- Why should someone be interested in clean energy, water, clean air? Is it a big enough priority for people yet? Positive change needs to be more robustly enforced
- Curb insatiable appetite for energy – fridges, TVs, do with less – must tackle the plug loads
- Change the argument as to why building retrofit improvements should be made – Staff retention etc.

Cost

- Industry very capital cost focused. How can changes be made to promote sustainable buildings. We can design efficient system but costs are higher (or are we thinking the wrong way). QS' often add a premium to jobs that are briefed to be sustainable. Is this justified?
- Need policy to leverage and incentivise, e.g. give end user tax relief- a focus needs to be placed on spend money upfront for a better building
- Would a fine be too small a percentage for a large company for them to worry about? Difficult mechanism to make work. Target the worst offenders more robustly. Worst 20% create 80% of the problem?
- CLT people want affordable homes but also low bills. Technology needs to be affordable, resilient and reliable
- Currently energy is a small part of a buildings cost. Saving 50% of energy is not a big operational impact when compared to people cost. How can building owners be made

interested – better environments high lettings? In future where energy is used is important should we for example set m2 usage targets.

Current context

- Buildings must work better in their context, buildings that overheat and are not resilient are prevalent in London
- Metering is a fashion statement or BREEAM compliance mechanism rather than being used well and more importantly for building optimisation. Should we be forced to comply and begin regulating?
- Tick box solutions strip people of intellectual responsibility
- Buildings have become more complex in short period of time using systems and complex technology to achieve 'savings'. Philosophy needs to change

Technical

- Performance focus- target led- net zero grid, not compliance led.
- Should not just look at energy but also water/embodied energy in water/cleaning surfaces/storm water
- Must consider the energy associated with other resources such as water. How is it cleaned for example, this is energy intensive
- Reduce unnecessary use of drinking water and avoid mixing run-off with sewage
- Don't tie building to one fuel service or central system solution, not just building but quality of general environment should be measured. Currently most district pipe networks are undersized for more efficient temperature operation due to the capital investment in the infrastructure required
- Air quality is critical but who is responsible for it and how can it be more effectively managed. Areas that have poor air quality need more filters in the HVAC systems this increases resistance and therefore energy use
- CHP is easy because it is known. Solutions should not have to be compared to CHP – Willmott Dixons electric cities report was highlighted as a view of the future
- Materials we construct built environment from are as important as the energy use itself however life cycle carbon is not often taken seriously.

Process

- Professional bodies must be encouraged to collaborate more openly to provide a coordinated front – Who sets the agenda and the skills gap needs, who is looking to the future to define what impacts the policy changes will have. Should the targets be set and then the industry left to re-tool?
- The traditional process of the architect starting first and then the building physics added later (plus engineering) must be reversed. A true consideration of environment/micro climate key
- Performance based contracts should be considered

Collaboration and transparency issues

- Historically the industry and owners like to keep knowledge close to chest as suspicious of critique. Openness must be encouraged so that research and trends can enhance outcomes
- Requires total team engagement early and a change of mind set. How can this be encouraged when developers are under risk pressure at planning stage and are trying to achieve planning outcomes with minimum effort. Team members need to be less siloed and work together

Key Priorities

Skills gap

- Best practice cross discipline sharing forum with open source information that promotes collaboration and dissemination of innovation that allows learning
- User feedback loops to be more prominent - trip advisor for housing/offices – what are the best buildings to work in – let people educate people on what good buildings are
- Defining what the training needs are? (based on research and knowledge collection)
- Collaboration (policy, brief, design, operate) is key
- Local Authority, resource, training and capacity to be improved
- Genuine cross discipline built environment courses are critical
- Define the future need–A futures forum group that actual influences direction

Other

- Financial Incentives- tackle split incentives, lifecycle mechanism
- Performing based- energy targets – People re-educated in the way they think and design. Open design philosophy to achieve targets rather than unrealistic tick box compliance
- Standard data platform-leverage BBD, Every building, straight to utility co, simpler
- CRC- New cost transfer- behaviour change, league tables, tweak what worked and improve. Real continuous improvement loops. Policy must be linked in here to keep up quicker. Too much reliance on one big solution or idea
- Disclosure of energy data and Audit and improvements are necessary
- Enforced minimum operational standards are needed
- Funding needs to be provided for delivery enforcement and regulation

Short term recommendations/actions

- Get professional bodies to collaborate- events and seminars
- Bring a trainer and train all engineers in London as a company
- Look at syllabus in schools and higher education. Role for CIBSE, RIBA, RICS and others need to be clearer. Should CIBSE require training (should CIBSE be involved in this)
- Create professionals who can respond to next challenge
- Ease of building services fuel switching and upgrading easier
- Solutions should not have to be approved against CHP
- Schools use school buildings in teaching curriculum- air quality
- Traditional process architect study joined by engineer and ME Engineer. Architects effectively reduce windows/change overheating.
- Promote more robust collaborative planning applications that have a wider sustainability design foundation

Long term recommendations/actions

- Adaptability is clearly key

Table 8 – Lifecycle Carbon

Click here to watch the video of the summary presentation



Introduction to the theme

As the operational energy footprint of buildings both new and existing continues to fall the relative impact of other sources of carbon emissions within our buildings increase in relative importance. Taking a whole-life approach to carbon – across its lifecycle requires us to look more closely at both the embodied impacts of materials used in construction, but also their durability and impacts at the end of their useful life. Metrics in this sector are available but yet to be widely embraced within the UK buildings sector.



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Victoria Burrows - World Green Buildings Council

Issues/ Barriers

- Lack of data on actual carbon use of products – we do not yet really know whether embodied or operational carbon are the most significant at the moment in new buildings.
- Lack of awareness of life cycle carbon issues.
- Lack of knowledge of what qualitatively the best product/construction method.
- Lack of reliable methodology to evaluate life cycle carbon.
- Multiple Databases existing and they are regionally sensitive and lack transparency.
- Databases and methodologies are very academic, with different sets of data to compare similar products e.g. PAS 2050.
- Existing requirements and “benchmarking” such as Green Guide and Environmental Product Declaration could be useful but the green guide method is opaque and very debate, and the EPDs are not widely used.
- Need simple and faster methods of assessment.

Key Priorities

Methodology

- Provide better guidance/ data set for embodied carbon factors and energy in use
- Standardise the calculation methods for embodied carbon and energy usage.
- Encourage transparency with manufacturers reporting actual embodied carbon of their products.
- Turn "academic" calculations and research into reliable design basis.
- Focus on areas of construction that comprise the greatest embodied carbon (80/20 rule)

Policy

- Set Targets for building to limit life cycle carbon
- Develop Metrics

Life of Buildings

- Planning to encourage building with high space and function flexibility (e.g. floor-to-ceiling height is key for this)
- Planning to encourage building that generate much "Value" (economy, environment, public space, living space)

Short term recommendations/actions

- **Key recommendation:** GLA to adopt a data and methodology and guidance for embodied carbon
- Policy- encourage innovation
- Simple guidelines
- Two routes
- In the very stage for the GLA could introduce a requirement that embodied carbon has to be declared, even if there is no target: this would encourage teams to look into it, help them prepare for an actual target when it is introduced in the future, and help the GLA identify the most used methodologies, knowledge gaps etc.
- Planning to encourage possible change of use (100 yr buildings): Residential unit can become office and vice-versa
- Need to focus on where 80% of the life cycle carbon is with simple planning applications process to permit big decisions early.
- Need GLA to adopt a standard methodology for life cycle evaluations.
- Better implementation of policy on operational carbon, including a requirement to monitor and report energy in use.
- Many policies indirectly support low embodied carbon, but not robustly and without clear targets. We should make more of them
- We should also make better use of existing data (e.g. BREEAM database of projects, which includes materials used, recycled aggregates and cement replacement, energy and water usage during construction, and construction waste : these are all markers of embodied carbon)

- We don't necessarily need more policy but clearer policy
- Policy also needs to be able to encourage innovation

Long term recommendations/actions

- Adaptable responsive policy on life cycle carbon.
- The embodied carbon database and methodologies can and should evolve in the future with assistance of universities and manufacturers.
- Need to generate demand/ interest from clients and help them decide e.g. demolition and new build vs refurbishment

Short term recommendations/actions

- Policy to reduce life cycle carbon (probably keeping targets for operational and embodied carbon separate in the first instance) with 2 routes to compliance, both routes feeding into each other-
- Simple methodology for smaller projects or design teams.
- Innovation for capable design teams who could propose alternative methods
- GLA to adopt a dataset & methodology for Life Cycle Carbon evaluation
- Planning to encourage flexible buildings that have 100 year life and allow changes of use.
- Stronger policy for the reduction of waste in refurbishment.

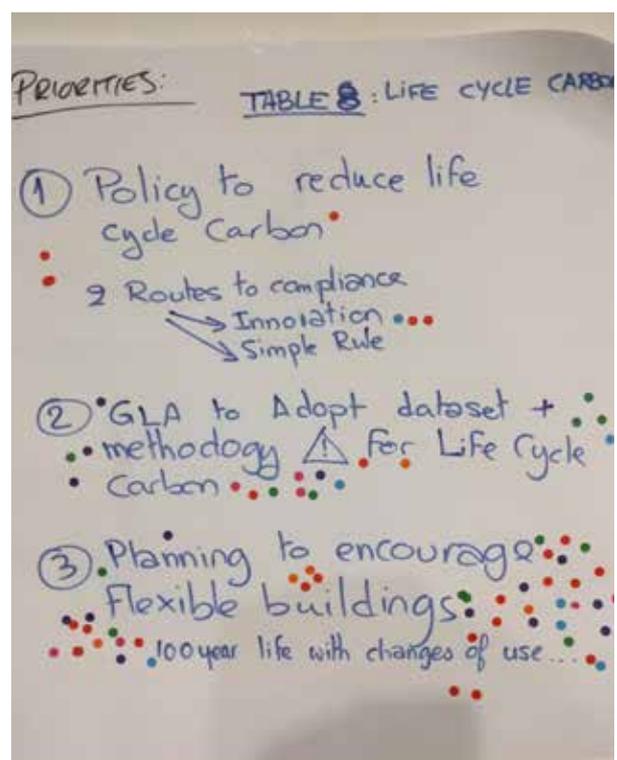


Table 9 – Resilience

Click here to watch the video of the summary presentation



Introduction to the theme

Resilience is the ability of the built environment and communities to effectively respond to natural or man-made hazards and to bounce back after these shocks. Resilient design and planning addresses how buildings can respond to weather events such as storms, floods or heat waves, acts of terrorism, or interruptions to the transportation, energy, water and communications infrastructure upon which we depend.

Within the context of Energy Policy resiliency tends to focus on issues of overheating risk, but can equally apply to loss of power in winter. Finding out what design strategies increase resiliency requires better follow-up on how existing and recently designed buildings are performing.



Participants

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Note keeper: Stephen Kent - CBRE

Andrew Waddelove - Tyrens UK

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Clare Newport - Elementa Consulting

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Nicole Steed - Workman

Ruth Shilston - RWDI

Issues/ Barriers

In relation to resilience the following key issues were identified from the workshop:

Key Issue: Overheating

Overheating is a major problem for the built environment, particularly within new buildings, which are not being designed to account for future projections of climate change scenarios.

This is having an effect upon the health of the occupants, particularly those who are more vulnerable and leading to costly additions such as comfort cooling, affecting the carbon intensity and sustainability credentials of the building.

Legislation is too reactive, forcing designers to improve build quality/ air tightness to achieve compliance with Building Regulations Part L and to contribute towards London Plan Policy, whilst not being required to sufficiently account for the overheating risks that are produced as a consequence.

Furthermore, although London Plan policies refer to CIBSES TM52, there are no specific requirements to account for projected climate change scenarios

within building designs. This is leading to a lack of measurement & verification within the industry and a lack of confirmation that the buildings being built today can sufficiently meet the future climate conditions that will occur during the building's lifecycle.

Future projections for overheating/flooding should form part of the submitted proposals.

Key Issue: Adaptability

Adaptability and flexibility within buildings contributes to resilience. Whether this accounts for change of use, changing climatic conditions or changing fuel source, the more adaptable a building, the more likely it is to withstand disturbance throughout its lifecycle.

The design of buildings needs to be flexible to take account of future uses. This is not an aspect that is covered within current legislation and is not supported by Local Planning Authorities due to the potential risk of illegally building houses within an office building or vice versa.

Buildings also need to take account of the ability to adapt to future climate change scenarios. The life of buildings is such that climate change is real, and a naturally ventilated building now may require mechanical ventilation in 40 years. How does the design allow for adaptation?

Key Issue: The Performance Gap: Energy Illiteracy & Post Occupancy Evaluation

Resilient design strategies include optimising building performance based on future climatic conditions rather than past data, as well as ensuring buildings are operated as intended and well maintained.

The performance gap was highlighted as a major roadblock to achieving these resilient outcomes. Buildings are firstly modelled using unrepresentative NCM data, which sets an unrealistic benchmark of performance. Buildings are then being occupied and managed by people who do not understand how to effectively operate and manage the often complex systems that have been installed within the buildings.

Furthermore, legislation does not require Post Occupancy Analysis and building data is not always accessible, which results in buildings that do not reflect the intended operation and performance. Resilience is therefore reduced as these buildings and the wider utility grid are less likely to withstand disturbance, whether climatic or systemic, and there is no avenue for local authorities to rectify this.

There are also missing incentives to encourage tenants to engage with energy performance issues. Energy is often included in the service charge and there are no tangible benefits available to incentivise energy awareness.

Key Priorities

Short term recommendations/actions

“Sticks & Carrots” to enforce and entice people to focus on future climate.

An assessment of overheating and future climate change scenarios needs to be explicitly requested within future legislation. This will encourage designers to account for overheating risks and building adaptability within their designs, leading to more resilient buildings

in the future.

The need for accessible analysis is clear. An online platform to standardise analysis of future climate impacts may be an option.

Measurement & Verification

Greater research is needed to improve the accuracy of predictive design modelling and improve the real time performance of buildings in responding to projected climate change scenarios. Building performance data needs to be open source, to encourage research, investigation and exploration by the industry as well as institutions.

Post Occupancy Evaluation also needs to be brought into legislation to influence the sustainable operation of buildings and capture data upon the real time performance of buildings.

Incentives need to be provided to encourage occupants and building users to care about operating buildings within a sustainable manner.

Long term recommendations/actions

User Education

Ongoing user education needs to be encouraged to ensure that buildings continue to be operated effectively during the building's lifecycle. This education needs to permeate through generations of building operators and users, so that it doesn't stop with the first tenant. Legislation needs to empower buildings users to pursue building issues if the building is not performing as intended.

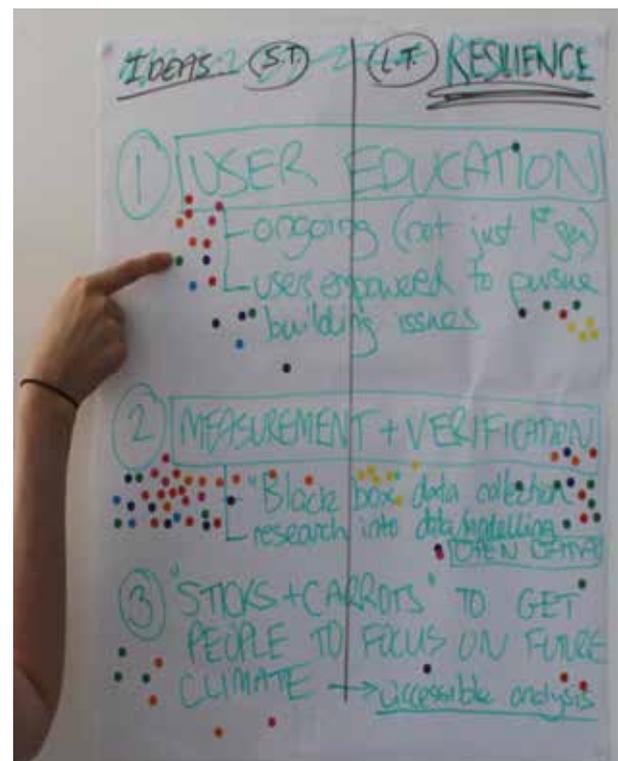


Table 10 – Open Table

Click here to watch the video of the summary presentation



Introduction to the theme

In advance of the workshop 9 themes had been identified that we believed would provide a home for all of the key areas of interest and influence around fixing London's Energy Policy. However at these events it is useful to have table that can accommodate other ideas, that do not fit into the prescribed categories.



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Facilitator: Ben Galuza - Elementa Consulting

Note Keeper: Nuno Correia - XCO2 Energy

Anthony Carroll - Como Interiors

Clare Murray - Levitt Bernstein Associates

Martin Hunt - Forum for the future

Nikolai Almeida - Darling Associates

Stephen Gallacher - WSP

Syed Ahmed - Energy for London

Tom Dollard - Pollard Thomas & Edwards

Victoria Lockhart - International Well Building Institute

Issues/ Barriers

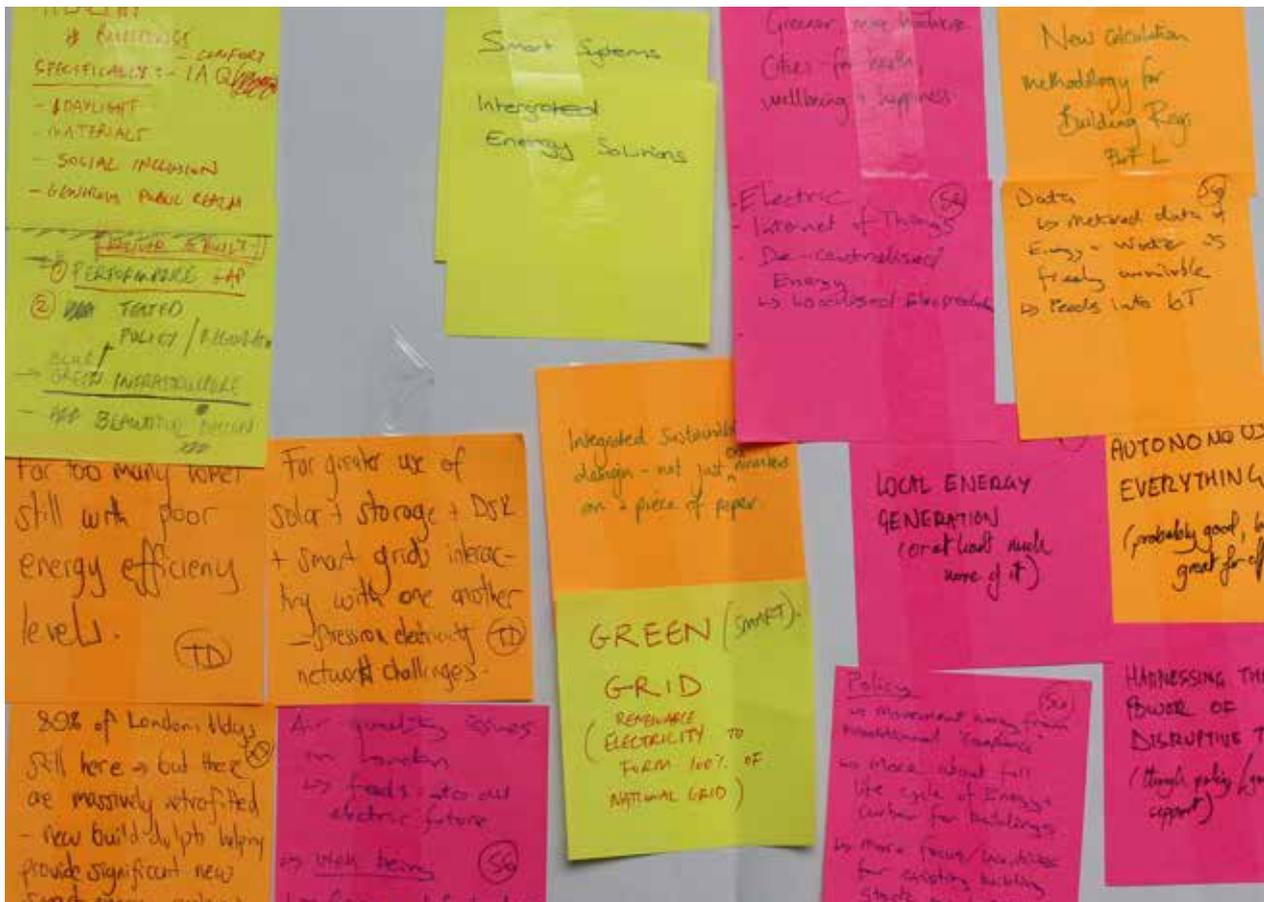
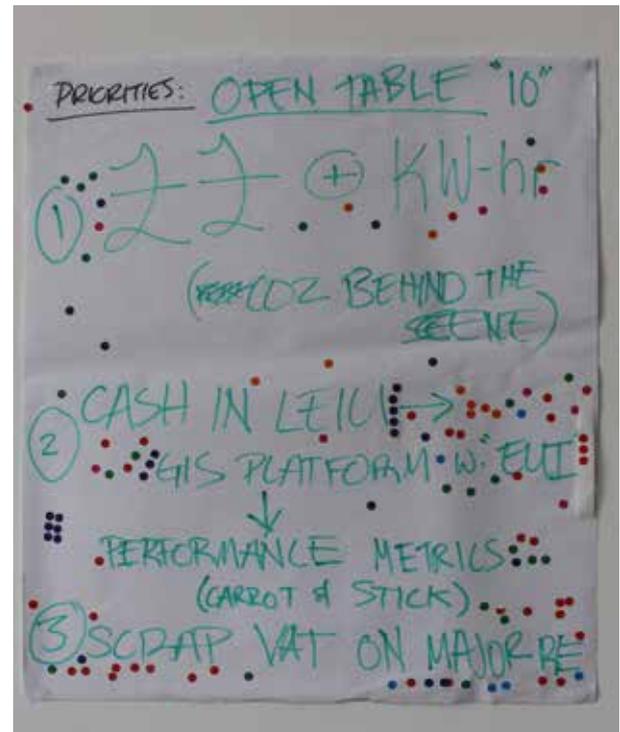
- Lack of energy literacy and common knowledge on concepts and metrics around energy performance
- Local authorities lacking resources – could do with training and technical guidance
- Information not being disseminated across industry and to public
- Entrenched interests and lobby groups in construction industry are both a barrier to change and a major driver for deregulation
- Penalties not strong enough
- Market not diverse – home buyers don't have a choice
- Fuel poverty is an issue and might be exacerbated by a move to all-electrical systems
- Current infrastructure to require update should a shift to all-electrical occur at current energy demand levels
- Design stage tools are not fit for purpose
- Design is often compliance-led, rather than performance-led
- Detailed handover, commissioning, aftercare and post-occupancy evaluation are still not common practice

Key Priorities

1. Focus on Energy and Cost metrics rather than CO₂. These are better understood by the public and are not subject to as much fluctuation as CO₂ (carbon factors);
2. Establish an online platform to disclose operational energy performance data. This could be funded by carbon offset payments (cash in lieu) currently made to local authorities. Moreover, cash in lieu should be connected to actual performance and not design stage estimates;
3. Accelerate retrofit of existing building stock by scrapping VAT on any major refurbishment initiatives.

Recommendations

- Energy storage
- Demand side management/response
- Training and guidance to be provided to local authorities on implications of energy policy implementation
- Promote collaboration between planners, designers and policy makers
- Set up an instrument whereby rents for commercial buildings are linked to actual energy/environmental performance
- Carry out post-occupancy evaluation in newly completed buildings



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