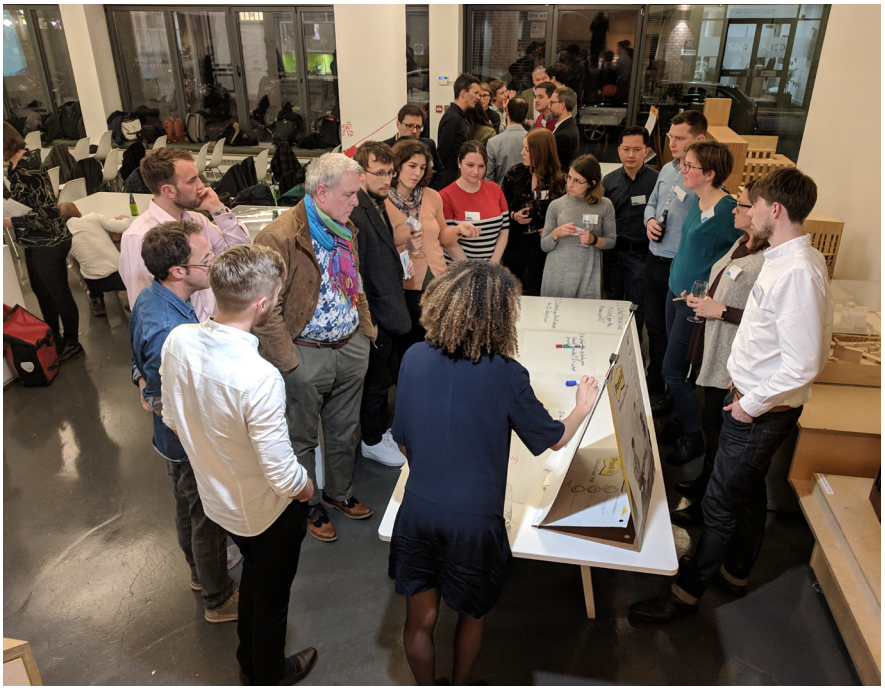
CONSULTATION ON

A DEFINITION FOR NET ZERO CARBON BUILDINGS IN THE UK

FOR UKGBC

LONDON ENERGY TRANSFORMATION INITIATIVE




Carbon Intensity (gCO2/KWh)
Framework


Agenda

LETI consultation on a Definition for Net Zero Carbon buildings in the UK for UKGBC

The London Energy Transformation Initiative (LETI) believe that in order to meet our climate change targets all new buildings need to operate at net zero carbon by 2030 with all buildings operating at net zero carbon by 2050. In order to achieve this, radical change is needed within the construction industry. In order for the above statement to be implemented, a robust definition of what net zero carbon means for buildings in the UK needs to be developed. LETI therefore welcomes the development of a Net Zero Carbon buildings definition by the UKGBC.

LETI is a voluntary network of built environment professionals, including architects, developers, engineers and sustainability professionals. This network has been utilised to build consensus of what needs to be included in a Net Zero definition and framework to ensure that it is robust enough to ensure our climate change targets are met.

LETI has received feedback from 140 built environment professionals from 78 organisations through an online survey and through a workshop. The findings are summarised below:

Key Priorities

- **There must be a fabric energy efficiency standard built into the Net Zero Carbon definition**
- **The Net Zero Carbon framework must set kWh/m² requirement for each key building type (e.g. residential, primary school, etc.)**
- **All energy uses, not just Regulated Energy, should be included in the Net Zero Carbon definition**

Additional Priorities

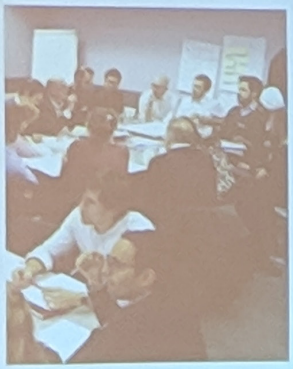
- **There is strong support for a two-tiered definition of Zero Carbon (Operational and Whole Life)**
- **Grid storage losses need to be taken into account in a Zero Carbon framework**
- **A Net Zero Carbon building must be fossil fuel free**
- **There should be a limit to how much carbon buildings can offset**
- **Demand response is essential for Net Zero carbon buildings and thus should be included in the definition.**

More info on the London Energy Transformation Initiative (LETI)

The London Energy Transformation Initiative has been established to support the transition of the capital's built environment to net zero carbon, providing guidance that can be applied to the rest to the UK. We do this by:

- engaging with stakeholders to develop a robust and rapid energy reduction approach, producing effective solutions to the energy trilemma of security, sustainability, and affordability;
- working with authorities to create practicable policy alterations to ensure the regulatory system is fit for purpose, placing verified performance at its core;
- encouraging and enabling collaboration between built environment professionals
- providing technical advice to support exemplar developments, enabling pioneers who aspire to go beyond the current regulatory framework

Agenda



- Introduction to LETI and the objectives for 2019
- Setting the Scene – Zero Carbon Intro and Sli-do
- Part 1 (1820 to 1910)
  - LETI Zero Carbon Framework
  - Zero Carbon Modelling Results
  - Questions/Voting/Group Discussions/Results
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  - Getting it Right
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- Finishing up - Final Question / Results / Q&A

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Net Zero Carbon Workshop – 11 March 2019

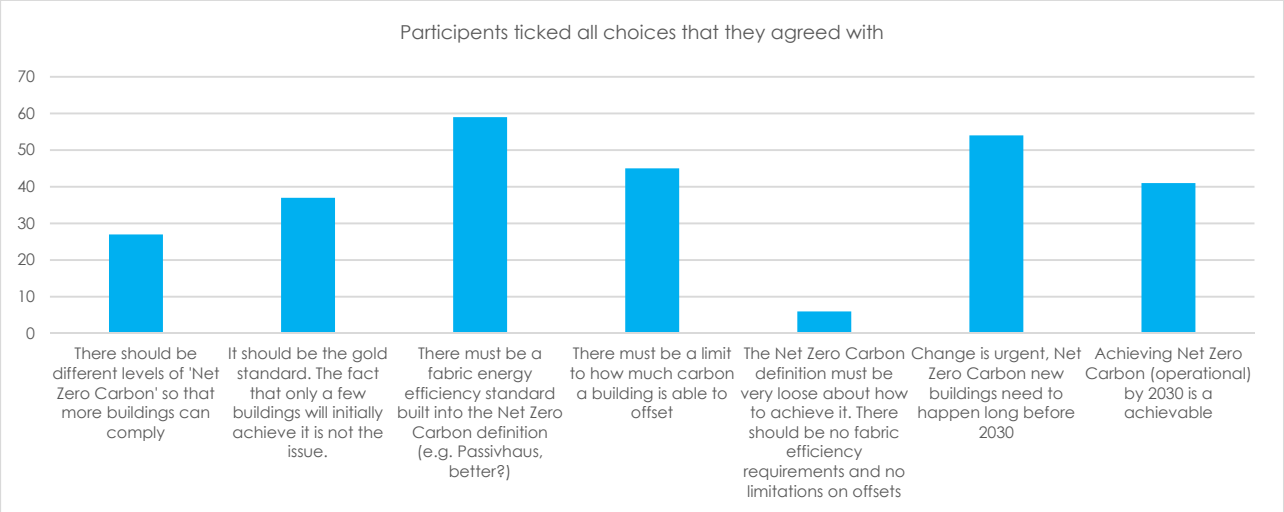
What we did

LETI hosted a Net Zero Carbon workshop from 1800 – 2000 on 11th March 2019. The aims of the event were:

- To inform attendees of LETI's work on defining Zero Carbon to date
- To gain feedback and ideas from attendees in order to ratify the work done so far and inform future work

What were the key outputs?

- **80%** supported a two-tier definition of Zero Carbon (Operational and Whole Life inc Embodied)
- **97%** believed that continued grid decarbonisation should be part of a Zero Carbon strategy
- **90%** believed that storage losses need to be taken into account in a Zero Carbon framework
- **88%** believed that there must be a fabric energy efficiency standard built into the Net Zero Carbon definition. There was strong support for an emphasis on fabric efficiency above all other measures/strategies
- There is general dissatisfaction with the current Part L methodology of measuring energy consumption and support for a move to a kWh/m².year target for different building typologies. **85%** thought that Net Zero Carbon framework must set kWh/m² requirement for each key building type (e.g. residential, primary school, etc.)
- **72%** felt that you should only be able to achieve Zero Carbon if no fossil fuels were being used on site
- **76%** felt that on-site renewables should take precedence over off-site
- **92%** of attendees thought that Demand Response was either vital or very important to achieving Zero Carbon
- **55%** thought that zero carbon should be the gold standard (even if that only a few buildings will initially achieve it)
- **67%** thought there must be a limit to how much carbon a building is able to offset
- Finally, **61%** of attendees thought that Zero Carbon buildings were achievable by 2030



LETI members' voices on Net Zero Carbon

Results of our online survey – March 2019

The London Energy Transformation Initiative is an open network of built environment professionals that are working together to put London on the path to a zero carbon future. The voluntary group is made up of developers, engineers, housing associations, architects, planners, academics, sustainability professionals, contractors and facilities managers.

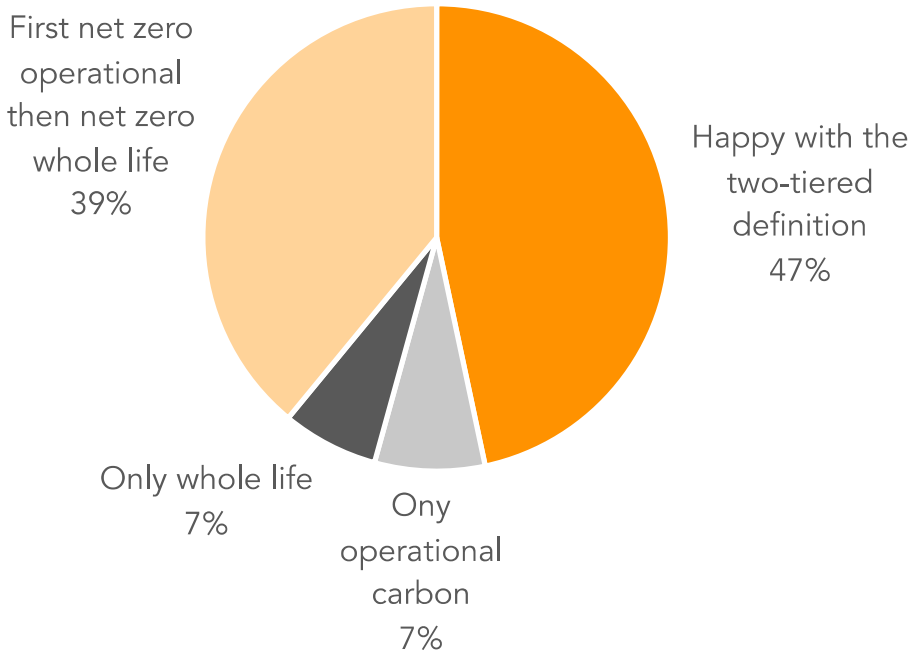
LETI was established to work collaboratively and propose evidence-based recommendations. In order to complement and contribute to the UKGBC consultation on the definition of Net Zero Carbon, we have sent a survey focusing on new buildings to our members.

We received **114** responses, which is amazing. The results are summarised on the following pages.

Two-tier definition

A majority of LETI members (86%) agree with a two-tier definition with 'Net Zero Operational' a key and more urgent requirement.

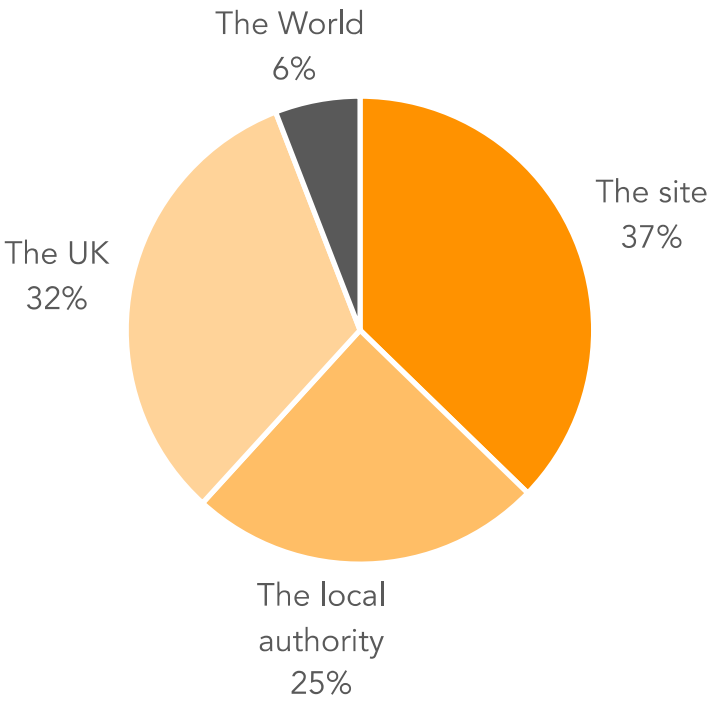
Only 14% of LETI members want a single-tier definition.



I agree that both operational and whole life carbon should be included in the net zero definition and I agree with the two-tiered approach	46.15%	48
I think net zero should only include operational carbon	7.69%	8
I think net zero should only mean net zero whole life carbon (there should not be an option for only operational net zero)	6.73%	7
I think net zero should only mean net zero whole life carbon but let's phase it: we should start with net zero operational and then become net zero whole life	39.42%	41

What should be the boundary for the carbon balance?

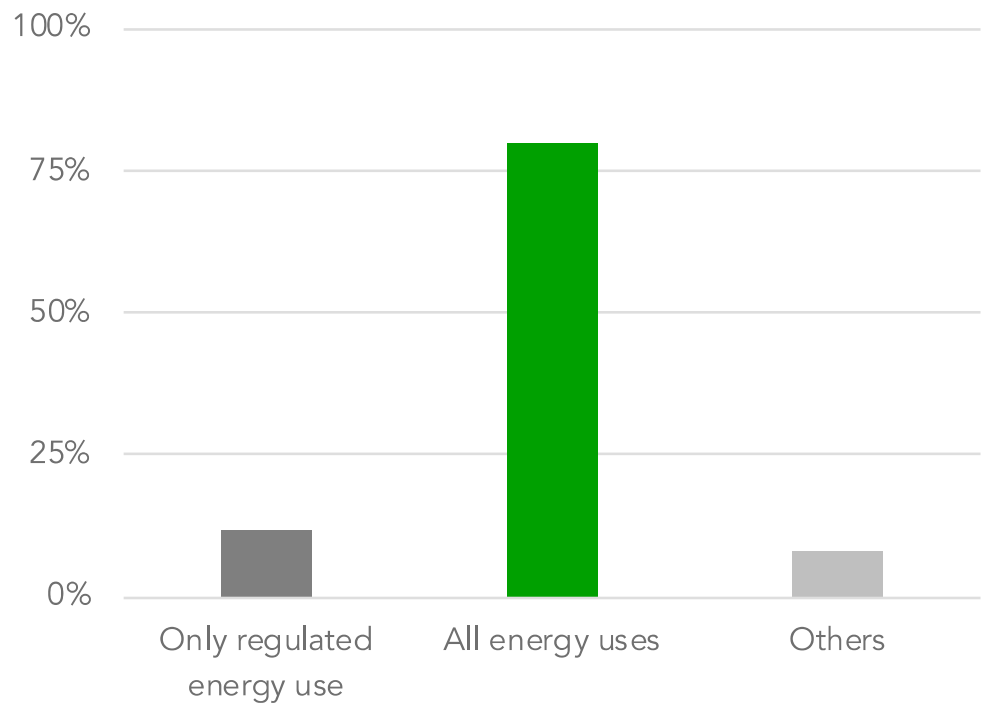
There is no consensus on this issue.



The site - The building should achieve a balance of zero emissions over a year with on-site measures only. I know that all buildings may not be able to achieve it, but it should be the gold standard: a '1.5 degrees C compliant building'	37.62%	38
The local authority - The building should be able to offset residual emissions locally. I think it is important that additional carbon saving projects are being delivered locally and that local authorities become responsible for developing their own zero carbon roadmap.	24.75%	25
The UK - The building should be able to offset residual emissions (e.g. additional renewable energy, carbon offset fund) anywhere in the UK. National renewable and offset schemes would help to reduce the country's emissions more cost-effectively and would still comply with the commitments of the Paris agreement and the current 'national carbon budgets' approach.	31.68%	32
The World - The building should be able to offset residual emissions (e.g. additional renewable energy, carbon offset fund) anywhere in the world. Carbon emissions in the atmosphere have no borders, why should we?	5.94%	6

Regulated energy vs total energy uses

80% of our members think that the Net Zero Carbon definition should cover all energy uses, not just regulated energy.



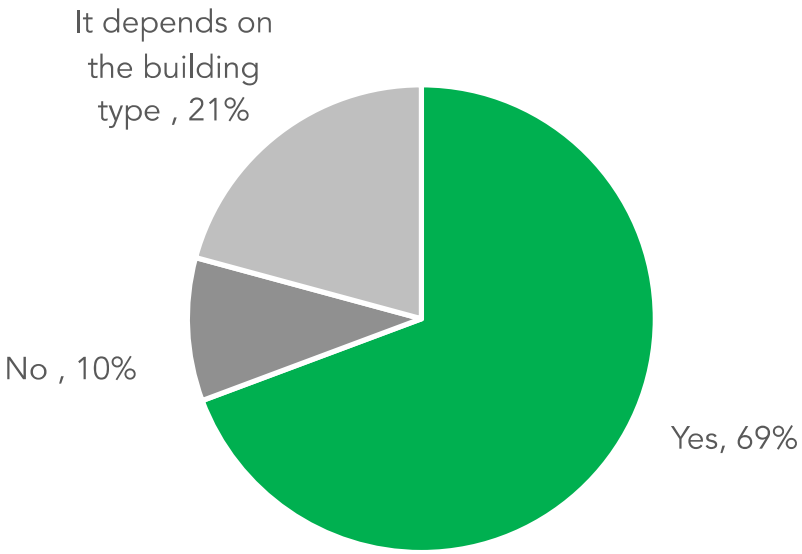
Net Zero Carbon hierarchy and fabric efficiency

LETI members think that the hierarchy is necessary but not sufficient.

62% of respondents would like the thresholds more clearly defined.

It is a good approach as we need both priorities and flexibility	40.00%	40
It is too flexible, the Net Zero Carbon standard should not enable offsets	31.00%	31
It is far too flexible, the Net Zero Carbon standard should not enable off-site renewables or offsets	12.00%	12
The priorities need to be more strongly defined (e.g. by thresholds) to avoid the definition from being abused, e.g. only a very energy efficient building should be able to achieve the Net Zero Carbon Building standard	62.00%	62

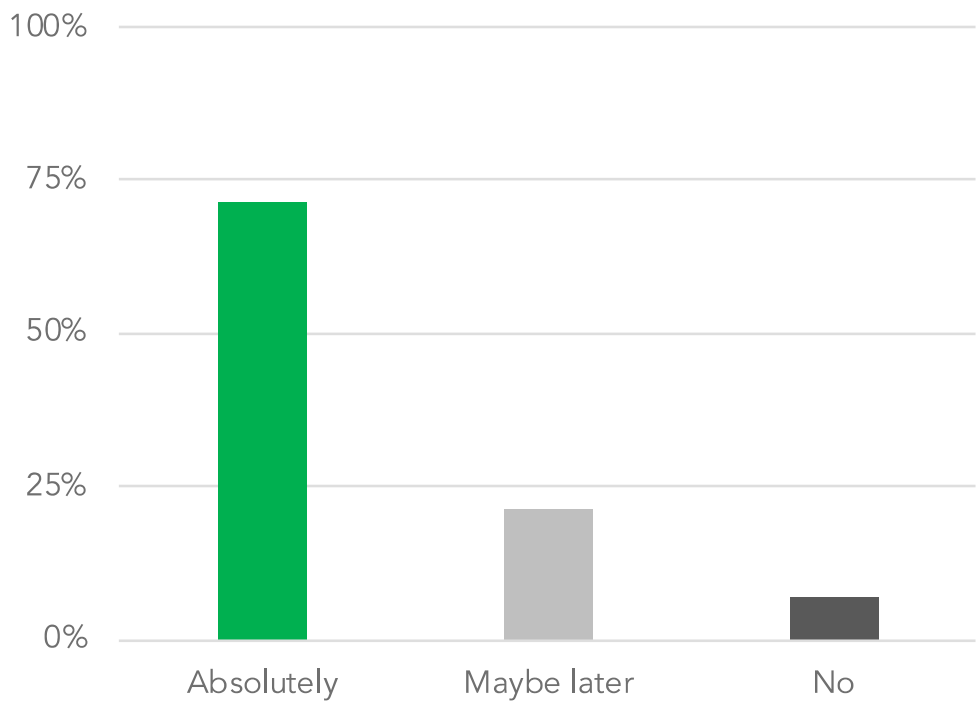
90% of respondents think a specific fabric energy efficiency requirement should be introduced, at least for some building types.



Yes - a building should be able to achieve the Net Zero Carbon standard only if it has adopted a fabric first approach	70.00%	70
No - fabric energy efficiency should be encouraged but not mandated	10.00%	10
It depends - Some building types (e.g. residential) should have a fabric energy efficiency requirement but not all	20.00%	20

Maximum energy use (kWh/m²)

A majority of LETI members (72%) think a specific energy use target should be set by building type as part of the Net Zero Carbon standard.



Absolutely - we now know that it is not only about carbon. Setting kWh/m2 levels to achieve is a good way to ensure we are driving energy use down	72.00%	72
Maybe later - we really need to do this but we do not have the data to enable us to do it right now. Let's work on it though.	22.00%	22
No - Net zero carbon should be about carbon only.	7.00%	7

Renewable energy

There is no consensus on this issue on whether there should be minimum renewable energy requirements as part of the Net Zero Carbon standard

It is essential that Net Zero Carbon buildings have to comply with a minimum renewable energy requirement (e.g. m2 PVs / m2 building footprint)	22.00%	22
It does not matter, even buildings with no PVs at all should be able to achieve Net Zero Carbon	33.00%	33
It matters but we should not create a specific requirement	36.00%	36
Off-site renewables and offsets should only be allowed when roof-mounted PVs have been maximised / are not adequate	41.00%	41

Fossil fuels

Less than 2% think that the use of fossil fuels in a Net Zero Carbon building is acceptable, while 26% think that it matters but that it should not be a condition for achieving Net Zero Carbon.

More than 70% think that the use of fossil fuels on site (e.g. oil, gas) is not compatible with Net Zero Carbon.

Integration with the electricity grid

73% think that the Dynamic Demand Response is essential and that new Net Zero Carbon buildings should be encouraged / mandated to be 'smart grid ready.

58% of them think that Net Zero Carbon buildings should be encouraged / mandated to reduce their peak electrical demand.

Workshop agenda

Time	Activity
1800	LETI Introduction
1815	Zero Carbon Introduction
Part 1	
1820	The LETI Zero Carbon Framework
1835	Modelling Results
1845	Part 1 Questions (Sli-do)
1850	Table discussions
1905	Results
Part 2	
1910	Demand Response
1915	Getting it Right
1920	Future Gazing
1925	Part 2 Questions (Sli-do)
1930	Table Discussions
1945	Results
Closing Session	
1955	Q&A and Discussion
2010	Close

Abridged presentation slides

Net zero carbon workshop

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MAYOR OF LONDON

THE LONDON PLAN

- **Be Seen –** Energy Use Disclosure
- Calculation of **unregulated energy consumption**
- Referable scheme to **calculate whole life-cycle carbon emissions**
- The recognition that that Building Regulations **use outdated carbon emission** factors
- **A Zero Carbon Plan** for all developments
- The **heating hierarchy** – zero emission and secondary source top
- Inclusion of **demand management, minimising peaks and avoiding high energy bills for occupants**

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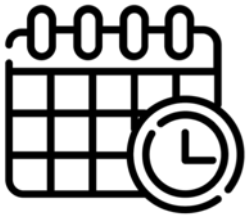

9 months!

LETI to publish technical guidance

10% of all Designed new buildings are Zero Carbon

2020

2019

100% of all built new buildings are Zero Carbon

2030

20% NZ by 2021

40% NZ by 2022

60% NZ by 2023

80% NZ by 2024

2025

100% of all Designed new buildings are Zero Carbon

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- **Net Zero Carbon**
- **Embodied Carbon and Whole Life Carbon**
- **Calculation Methodologies - Building Regulations - Part L**
- **Be Seen- Data Disclosure**
- **The Future of Heating**
- **Demand Response and Energy Storage (DRES)**
- **LETI Declaration**

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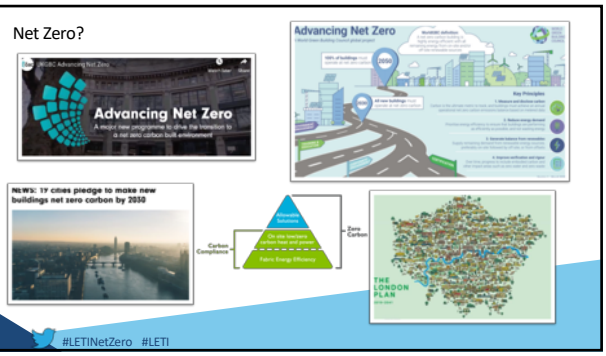
Net Zero?



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UK GBC

Task Group Supporters

BBP Better Buildings Partnership · BPF British Property Federation · BSRIA · CIBSE · Good Homes Alliance · London Energy Transformation Initiative · Passivhaus Trust · REA · Revo · RIBA Architecture.com · RICS · Solar Trade Association · Sustainable Energy Association

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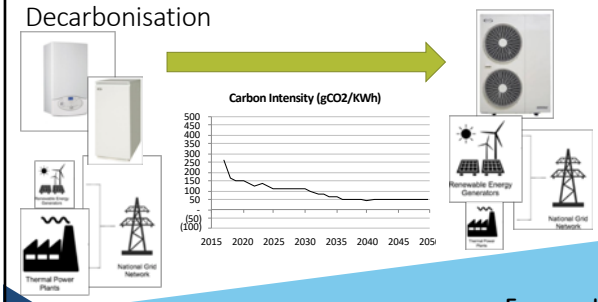
Decarbonisation



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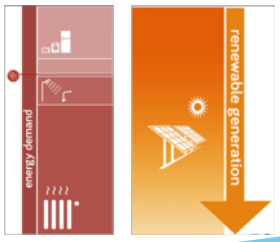
Framework

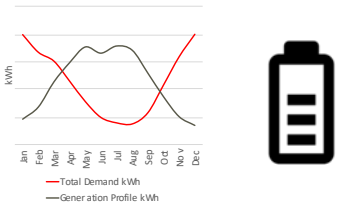
Energy Categories



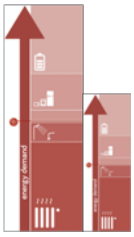
Demand at the meter is made up of :
- Heating/Cooling load
- Hot Water demand
- Lighting
- Aux Electricity (Pumps and Fans)
- Unregulated (Plug Loads)

Zero Carbon
- Demand = Generation?

Seasonality = Storage



Higher Demand Effects



High Demand equals:
- More Storage required (£££)
- More storage losses (%%)
- Increased grid capacity (££)
- Higher Peak Load (£)
- More renewables (£££)

- Unachievable???

Reducing Demand

How to reduce	- Fabric Efficiency - Low Carbon Heat - Closing the Performance Gap	- Design Efficiency - Low Carbon Heat	- Efficient Design	- Minimise overall demand - Demand Management
LETI Workstream(s)	- Low Carbon Heat - Be Seen - Methodologies - Benchmarks	- Low Carbon Heat - Be seen	- Benchmarks - Be seen	- Demand Management

'Zero Carbon Ready'

Zero Carbon Definitions and Levels

Net Operational Zero Carbon:

A building which is Net Operational Zero Carbon is one which produces or procures sufficient carbon-free renewable energy to fully offset the annual carbon emissions associated with the operational use of the building.

Zero Carbon Levels:

Level 1 – Regulated Energy Offset
Level 2 – Regulated and Unregulated Energy Offset
Level 3 – Regulated, Unregulated and Storage Losses Offset

Level e – Embodied Energy Offset (e.g. Level 1e)

Modelling

Modelling Setup: What have we done so far?

- 1 Building Type
- 3 Form Factors
- 4 Specifications
- 3 Heat Supply Systems
- 4 Carbon Scenarios
- 3 Benchmark Years
- 4 Levels of Compliance

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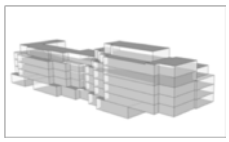
Modelling

Modelling Setup: 1 Building Type

Medium Density Residential Apartment Block in London

68 Homes and Communal Areas

Treated Floor Area - 5,000sqm



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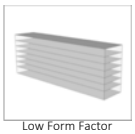
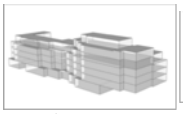
Modelling

Modelling Setup: 3 Form Factors



Low Form Factor



Medium Form Factor

High Form Factor

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Modelling

Modelling Setup: 4 Specifications

London Plan – Current London Plan Compliance

London Plan Plus – Emerging London Plan Compliance

Pragmatist – Similar to Passivhaus Level

Optimist – Going Further than Passivhaus

					London Plan	London Plan Plus	Pragmatist	Optimist
Fabric	Floor	Main	U-Values	W/m2K	0.12	0.11	0.10	0.08
	Wall	Main			0.18	0.15	0.13	0.10
	Roof	Main			0.15	0.13	0.10	0.08
	Window	Glazing			1.35	1.15	0.85	0.70
		Frame			1.20	1.00	1.00	1.00
		Glazing	g-factor		0.50	0.50	0.50	0.50
	Thermal Bridging	Frame	Installation W	W/mK	0.04	0.04	0.04	0.04
		Overall	Y-Value	W/m2K	0.1	0.1	0.07	0.04
Ventilation	MVHR		Efficiency	%	85%	85%	90%	90%
		Consumption	Electrical Power	Wh/m3	0.55	0.55	0.35	0.35
	Ducting	Distance to Unit	Length	m	10.00	10.00	2.00	2.00
		Insulation	Thickness	m	0.025	0.025	0.025	0.025
	Infiltration		Air Change Rate	ACH	3.0	3.0	1.0	0.5

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Modelling

Modelling Setup: 3 Heat Supply Systems

Communal Gas Boilers

Individual Direct Electric

Communal Heat Pumps

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Modelling

Modelling Setup: 4 Carbon Scenarios & 3 Benchmark Years

National Grid – Future Energy Scenarios

Scenario	2017	2030	2050
Community Renewables	266g	77g	32g
Two Degrees	266g	48g	20g
Steady Progression	266g	117g	50g
Consumer Evolution	266g	146g	72g

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Modelling

Modelling Setup: 4 Levels of Compliance

Zero Carbon Level 1 – Regulated Carbon

Zero Carbon Level 2 – Total Carbon

Zero Carbon Level 3 – Total Carbon including Storage Losses

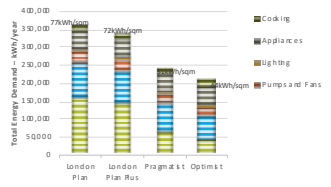
Zero Carbon Level 3e – Total Carbon including Storage Losses and Embodied Carbon

Modelling Setup: A Few Assumptions

- Basic approach to PHPP assessment used
- Thermal bridging losses – ψ-value conversion
- Simplified approach to storage losses (PER) – estimated factors
- Space for 500sqm of PV Panels on roof generating 200kWh/sqm
- No consideration of overheating to date

Modelling Results: Annual Operational Energy Demand

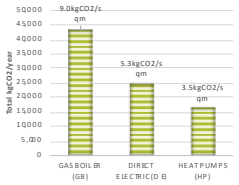
Case Details - *Medium Form Factor*



To Discuss:
- Demand or Consumption?
- Set a kWh/sqm/year limit for various building types?
- Is there value in pushing for Passivhaus and above levels of building fabric?

Modelling Results: Heat Supply Type Impact

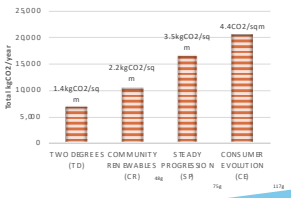
Case Details - *Low Form Factor, Pragmatist, Steady Progression, 2030*



To Discuss:
- Should gas heating be allowed as part of the Net Zero definition?
- Should future decarbonisation of the gas grid also be considered?

Modelling Results: Grid Scenario Impact

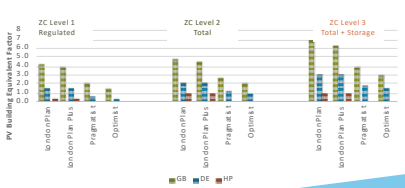
Case Details - *Low Form Factor, Pragmatist, Heat Pumps, 2030*



To Discuss:
- How should we include future grid decarbonisation within the definition?
- Optimistic or pessimistic?

Modelling Results: PV Requirement to Achieve ZC Level

Case Details - *Low Form Factor, Steady Progression, 2030*



To Discuss:
- Are the levels appropriate?
- Should we make it easier or harder to achieve?
- What should the limit be to offsite measures and offsets?

PV Building Equivalent Factor = Number of further PV installations, of an equivalent scale to the assessment building (500sqm of PV panels), required to achieve zero carbon level.

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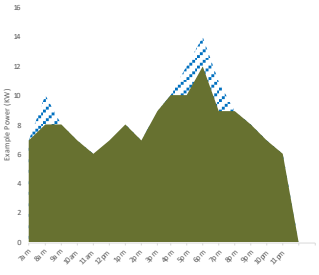
Demand Response and Energy Storage

LETI Workstream

Flexibility

Changing when you use energy during a day by using smart controls and energy storage.



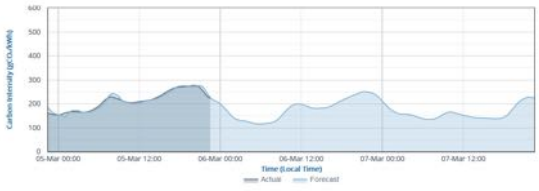
Demand Response

How can this be low carbon?

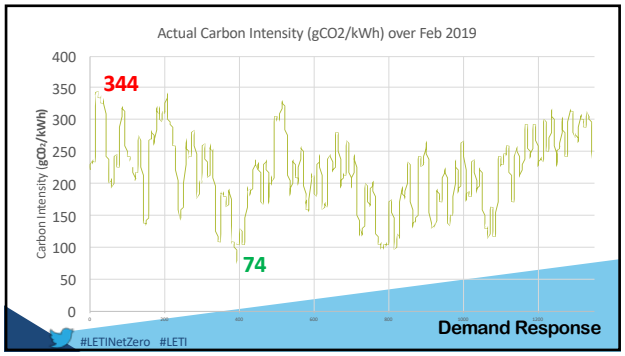
233 gCO_2/kWh is usually wrong

Think "WHEN" = Save Carbon

Demand Response



Demand Response



#	Region	Forecast Carbon Intensity (gCO_2/kWh)	Index
1	South Scotland	81	low
2	North West England	84	low
3	North East England	96	low
4	East England	147	low
5	South West England	188	moderate
6	North Wales and Merseyside	210	moderate
7	North Scotland	226	moderate
8	London	250	moderate
9	South East England	250	moderate
10	South England	284	high
11	Yorkshire	300	high
12	West Midlands	300	high
13	South Wales	300	high
14	East Midlands	383	very high

Carbon Savings

- Carbon Intensity 'Trading' / 'Avoiding'
- Allowing more renewables on the network
- Delaying grid upgrades
- More effective use of on-site generation

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Demand Response

GLA Asked Us

- What does **GOOD FLEXIBILITY** look like?
- How best to assess **FLEXIBILITY** elements?
- What are the '**LEVELS**' of Flexibility

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Demand Response

We're asking you

- What does **GOOD FLEXIBILITY** look like?
- How best to assess **FLEXIBILITY** elements?
- What are the '**LEVELS**' of Flexibility
- How much of a developments peak should be **FLEXIBLE**?
- How should GLA do **ongoing monitoring**?
- *…Design Guides for Flexibility…*

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Demand Response

Getting it Right
Closing the performance gap

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Getting it Right

What is the performance gap?

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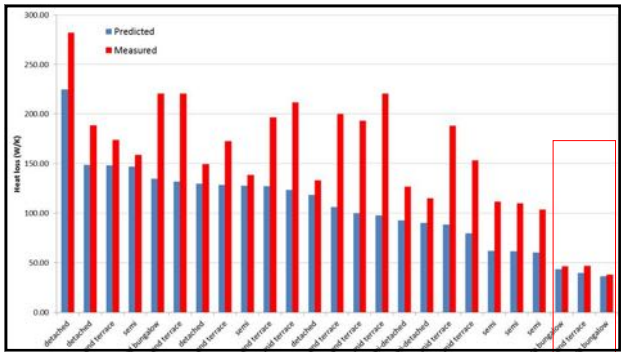
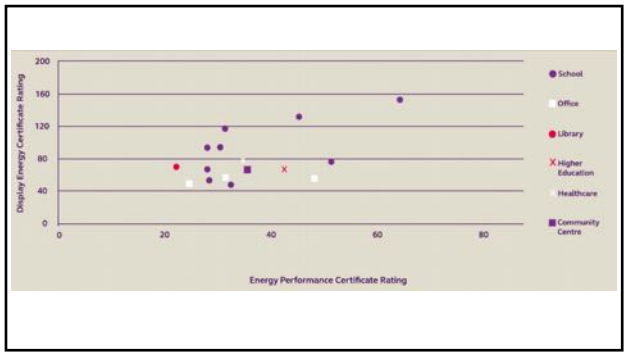
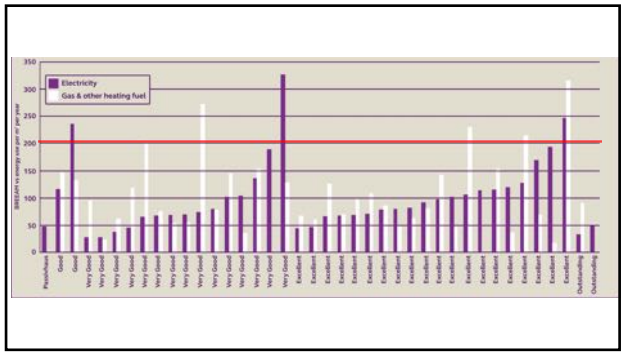
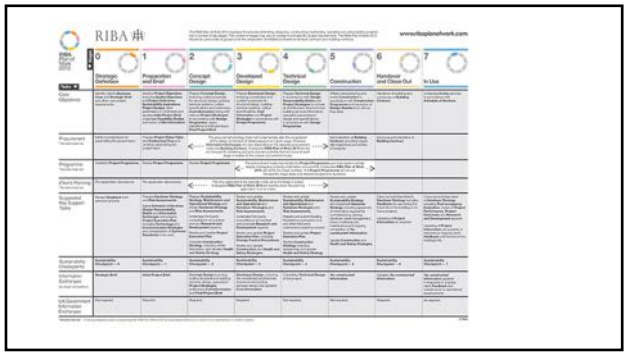
Getting it Right

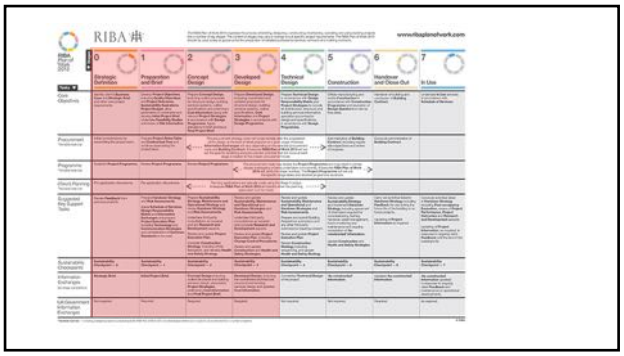


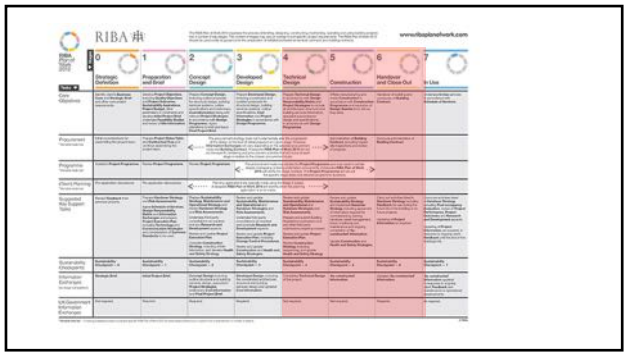


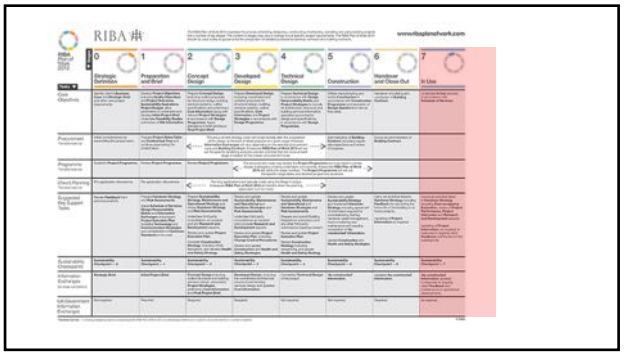


Work so far
Literature review









Incentives
Quality control

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Getting it Right

Our Output

	RIBA Work Stage	Description of key tasks	Sustainability Checkpoints
Preparation	A Appraisal	Identification of client's needs and objectives, business case, sustainability aspirations and possible constraints on development. Preparation of feasibility studies and assessment of options to enable the client to decide whether to proceed.	Strategic sustainability review of client needs and potential sites, including re-use of existing facilities, building components or materials.
	B Design Brief	Development of initial statement of requirements into the Design Brief by or on behalf of the client confirming key requirements and constraints. Identification of procurement method, project and sustainability procedures, building design lifetime, organizational structure and range of consultants and others to be engaged for the project.	Internal environmental conditions and formal sustainability targets stated. Building lifespan and future climate parameters stated. Early stage consultation, surveys or monitoring undertaken as necessary to meet sustainability criteria or assessment procedures. Involvement of design team after Practical Completion defined. Site Waste Management Plan (SWMP) started.
Design	C Concept	Implementation of Design Brief and preparation of additional data. Preparation of Concept Design including outline proposals for structural and environmental strategies and systems, site landscape and ecology, outline specifications, preliminary cost and energy plans. Review of procurement route.	Key design team members appointed. Formal sustainability pre-assessment and identification of key areas of design focus. Deviation from aspirations reported. Initial Part L assessment. Plain English description of internal environmental conditions, seasonal control strategy and systems prepared. Environmental impact of key materials and construction strategy checked. Resilience to future changes in climate considered.
	D Design Development	Development of concept design to include structural and environmental strategies and services systems, site landscape and ecology, updated outline specifications and cost and energy plans. Completion of Project Brief. Application for detailed planning permission.	Full formal sustainability assessment. Interim Part L assessment and design stage carbon/energy declaration (e.g. Carbon Buzz). Design reviewed to identify opportunities to reduce resource use and waste and recorded in SWMP.

Future Gazing – Update

1. What might be different by 2030?
2. How might this affect our modelling? What might we need to make allowances for?
3. What new technologies and working patterns do we anticipate?

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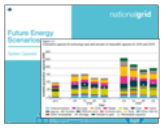
Future Gazing

Future Gazing – Update



How will our renewable generation change?

- National Grid is conservative / doesn't consider transformational models or interface with people
- Change needs to be incremental to allow infrastructure and people to adapt
- Our energy network needs to be technology agnostic for adaptability
- Is it possible for district heating to be renewable?
- How do we plan for disruptive innovation?

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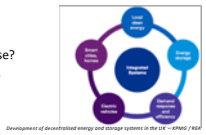
Future Gazing

Future Gazing – Update

How will storage work?

- Less storage required if we can do Demand Side Response effectively
- Should there be conditions for new developments on peak use?
- Smart grids - e.g. fridges/dishwashers come on when there is high supply but low demand on the grid
- Batteries decreasing in cost and size (for home-owners and NGrid)
- What will the role Blockchain be in our energy markets?
- Localised storage - e.g. electric vehicles
- Heat storage as well as electricity storage



Development of decentralised energy and storage systems in the UK – KPMG / RGE

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Future Gazing

Future Gazing – Update

Societal trends / working patterns that might be different in 2030 and beyond:

- Flexible working – Will people use collaborative spaces or will they be using energy at home? Less office space and energy required for travel?
- More flexible lifestyles have the potential to help flatten our energy demand profiles
- How we shop – more making less shipping and consuming?
- An increase in number of electric vehicles
- Warmer homes for an aging population

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Future Gazing

Final Discussion / Q&A

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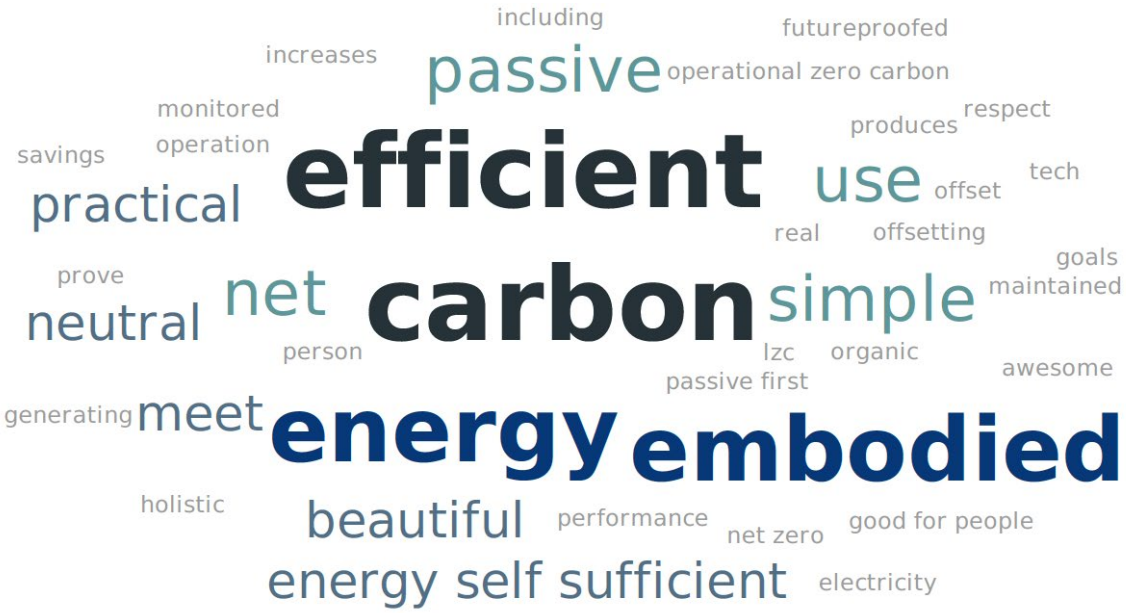
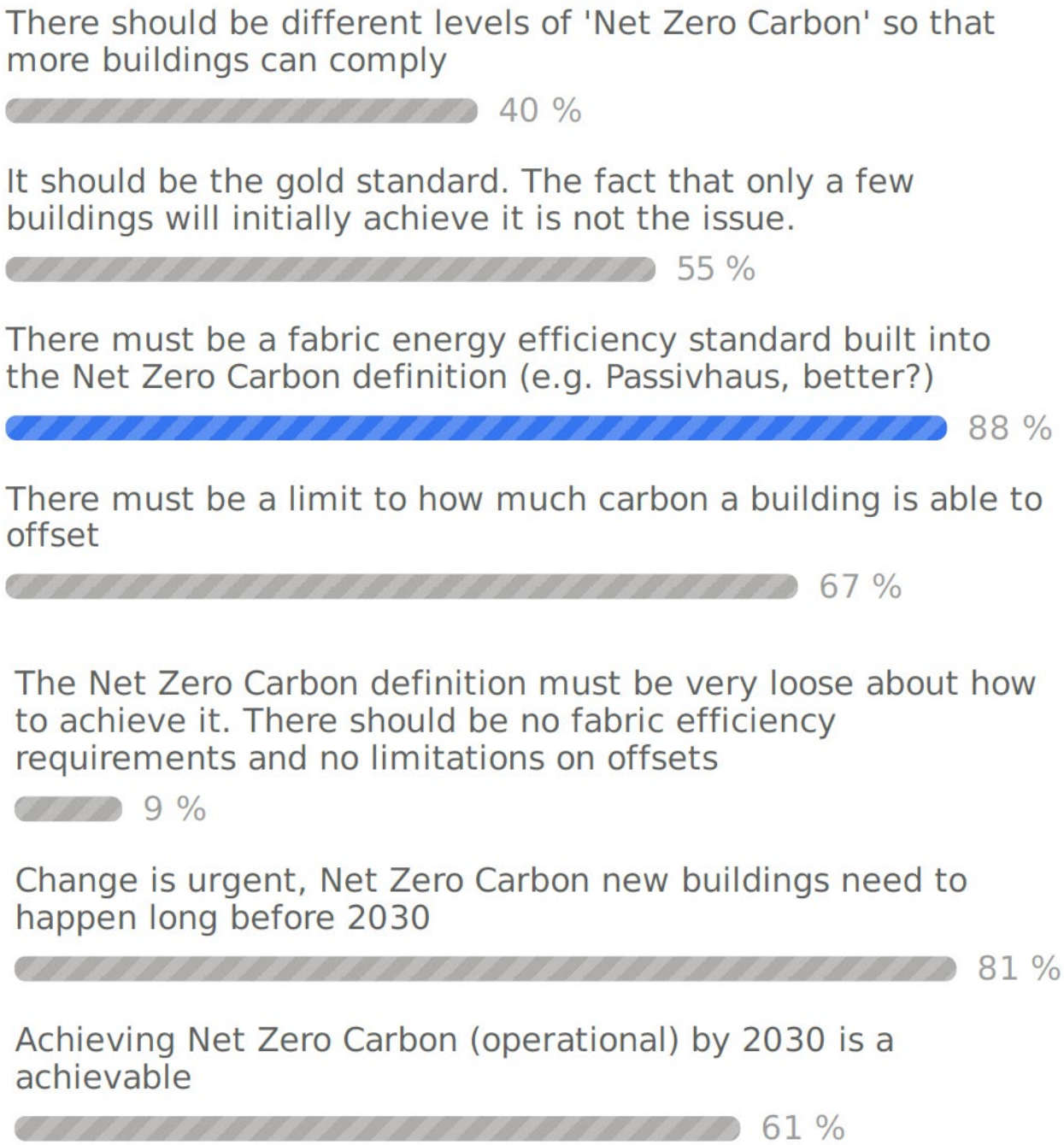
MAX FORDHAM

Detailed workshop poll results

People at the event said a net zero carbon should be:



People at the Event thought:



Part 1 Poll

PART 1 - POLL (1/8)

0 7 0

There seems to be an emerging consensus that a two-tiered definition (Net Zero Carbon Operational and Net Zero Whole Life) is the best way forward. Do you agree?

Yes

80 %

No, Net Zero Carbon should only be about Net Zero Carbon operational

9 %

No, Net Zero Carbon should only be about Net Zero Whole Life

11 %

PART 1 - POLL (2/8)

0 7 0

Do you agree that we should base our strategy on continued grid decarbonisation?

Yes

97 %

No

3 %

PART 1 - POLL (3/8)

0 7 0

Do you think that storage losses need to be included?

Yes, all storage losses (grid and building)

60 %

Yes, but only building level storage losses

29 %

No

4 %

I don't know

7 %

PART 1 - POLL (4/8)

0 7 1

Should the Net Zero Carbon framework set kWh/m2 requirement for each key building type (e.g. resi, primary school, etc.)

Yes

85 %

No

15 %

PART 1 - POLL (5/8)

0 6 9

Should Net Zero Carbon calculations use a carbon factor for electricity which reflects the projected...

3-year average (e.g. 2019-2021)

42 %

20-year average (e.g. 2019-2029)

55 %

50-year average (e.g. 2019-2069)

3 %

PART 1 - POLL (6/8)

0 7 1

Do you think that Net Zero Carbon should only be achievable if there is no use of fossil fuels on-site?

Yes

72 %

No

28 %

PART 1 - POLL (7/8)

0 7 1

Do you think that Net Zero Carbon Operational should...

Be unique, permanent and simple - we just have to hope that more and more buildings will meet it over time

39 %

Have different levels (e.g. Level 1 for regulated only, Level 2 for total energy use, etc.)

61 %

PART 1 - POLL (8/8)

0 7 0

What should have priority to offset residual emissions?

Off-site renewables

19 %

On-site renewables

76 %

Offset payments

6 %

Part 2 Poll

PART 2 - POLL (1/10) 0 7 0

DEMAND RESPONSE - How important is increasing energy flexibility to achieving a Net Zero Carbon future for London?

It is a vital component to achieve Net Zero
61 %

It will be very useful in achieving Net Zero
31 %

It will be somewhat useful in achieving Net Zero
7 %

We can achieve NZC without it
0 %

PART 2 - POLL (2/10) 0 6 9

DEMAND RESPONSE - Have you seen it used in a scheme? (Plans, accepted plans or completed buildings)

Yes, lots of times
1 %

Yes, but only a few times
25 %

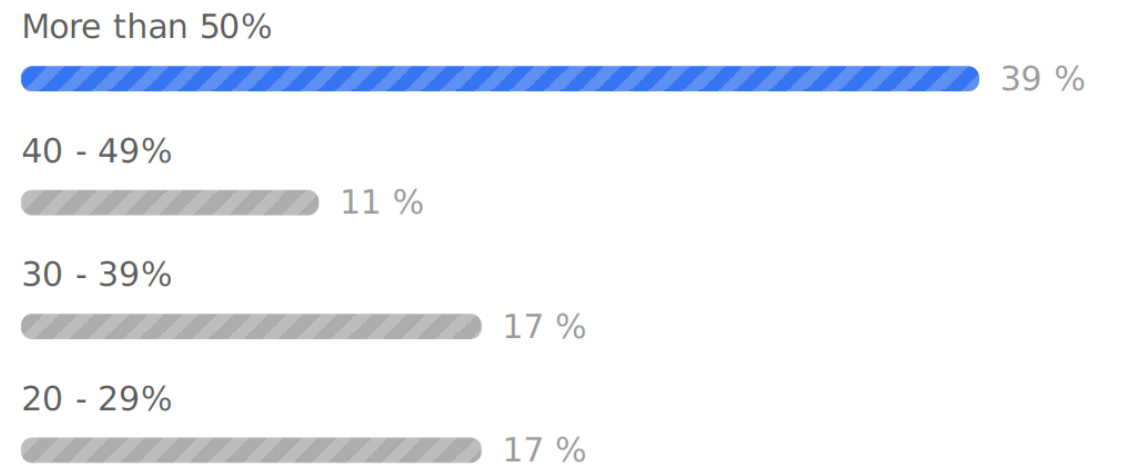
No, I've never seen this happening in practice yet
74 %

PART 2 - POLL (3/10)

0 6 6

DEMAND RESPONSE - What percentage of total peak energy use (kW) in a scheme should be flexible for at least 1 hour? (Note: It is technologically feasible to do 100%)

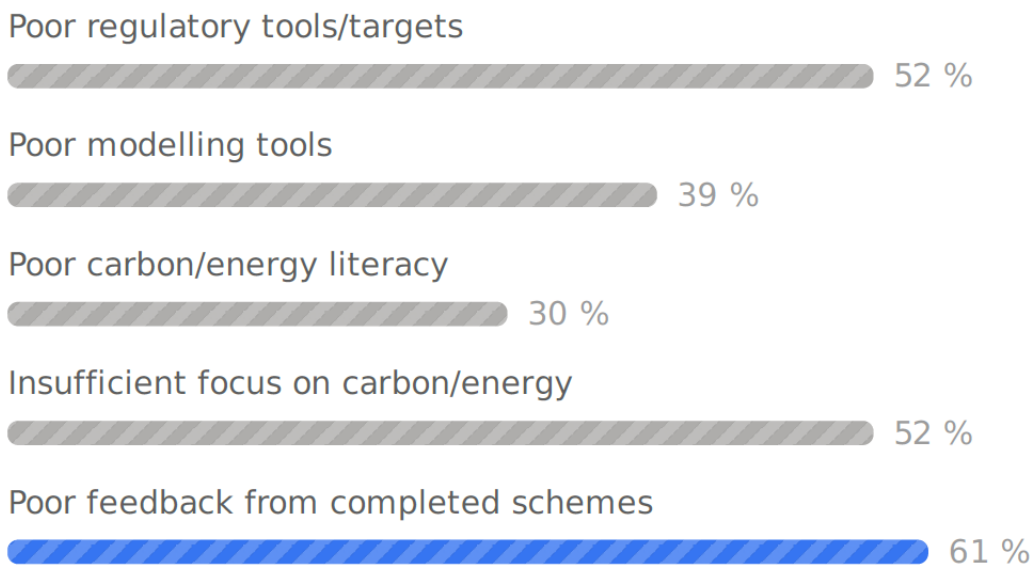
(1/2)



PART 2 - POLL (4/10)

0 7 1

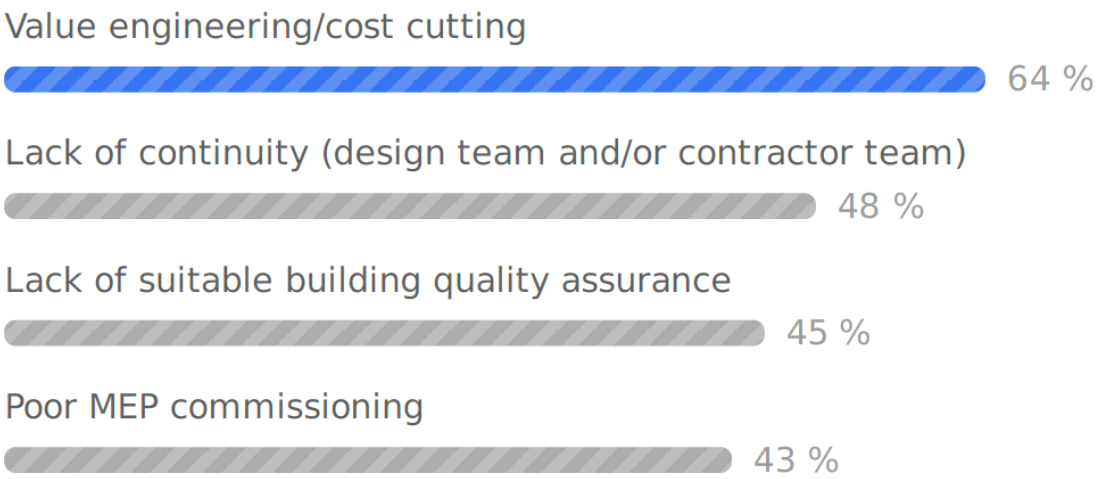
PERFORMANCE GAP - What are its main causes during the early stages of design (Stages 0-3)?



PART 2 - POLL (5/10)

0 6 9

PERFORMANCE GAP - What are its main causes during detailed design, construction and handover (Stages 4-6)?

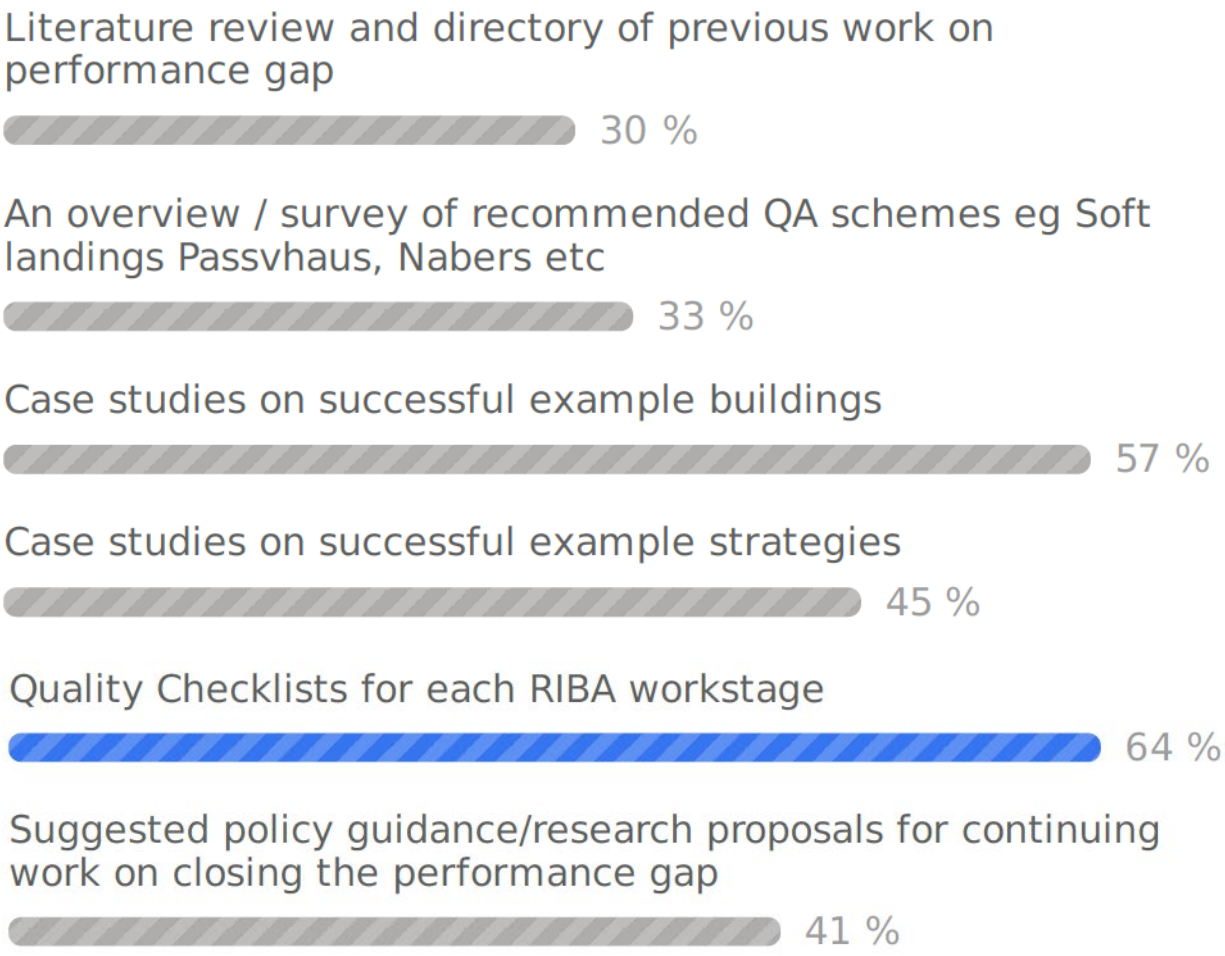


PART 2 - POLL (6/10)

069

GETTING IT RIGHT - What tools or resources would be most useful for us to include in the LETI zero carbon: Getting it right report?

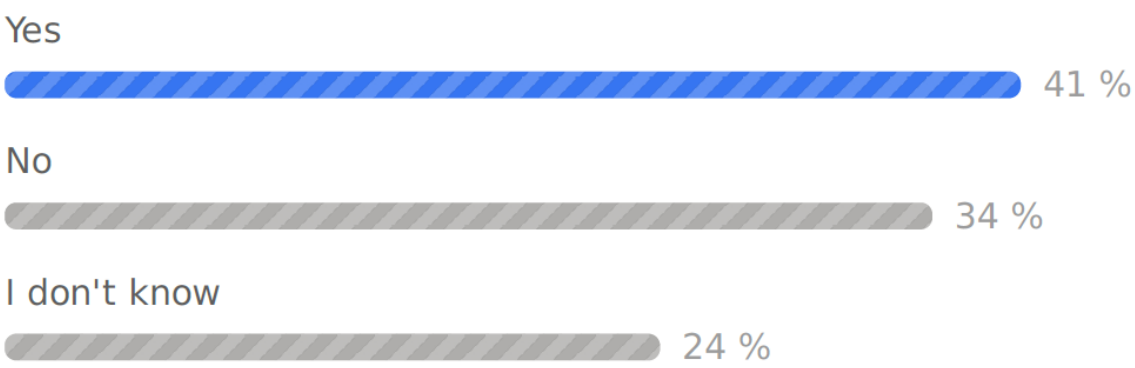
(1/2)



PART 2 - POLL (7/10)

0 7 0

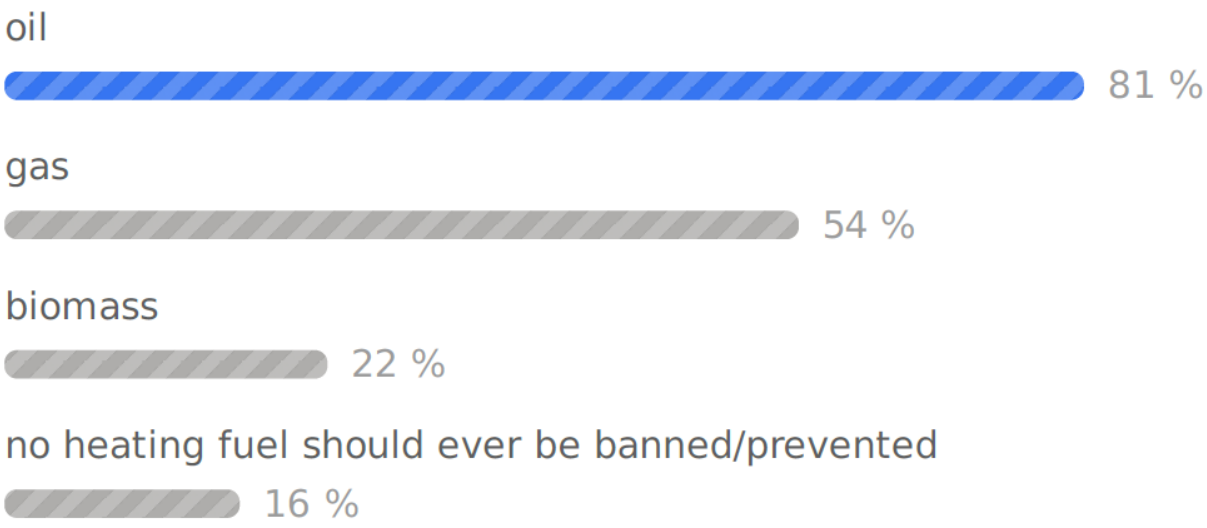
FUTURE GAZING - By 2030, 70% of our electricity supply will be met with renewable generation. Do you agree with this statement?



PART 2 - POLL (8/10)

0 6 8

FUTURE GAZING - By 2030 at the latest, NO new homes should be allowed to be heated by:



PART 2 - POLL (9/10)

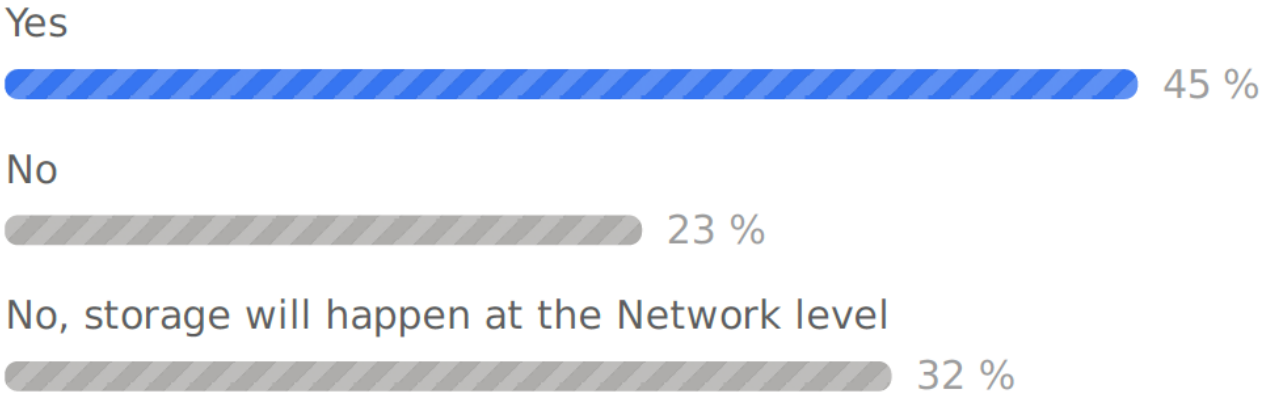
0 7 0

FUTURE GAZING - By 2030, vehicle charging will have become flexible and intelligent so as to allow the grid to cope with 10x as many electric vehicles. Do you agree?

PART 2 - POLL (10/10)

0 6 9

FUTURE GAZING - More than 50% of homes nationally will use battery storage



Detailed comments from survey

You have to have a measurement and display scheme of actual energy use

The way we model building performance must closely align with reality- we can't measure with a faulty tape! This means moving beyond Part L modelling into more realistic approaches- PHPP has been successful, as have other methods.

Air quality in our cities would be greatly improved if more people had electric cars. A barrier to electric cars in cities is a lack of charging points especially for people living in old residential stock, even house owners. Would it be appropriate to use this framework to encourage provision of chargers? This may be muddying the water.

The amount of off-site renewables needed to meet a building's energy demand should be an equitable proportion of the total renewable energy available from the UK's grid.

There is a careful balance between the output and the processes. I think as soon as specific approaches or technologies are mandated, then it becomes a target for influential lobbying (e.g. it's holding back other tech). It should be output driven to encourage alternative approaches. Start with aiming for zero energy consumption for the regulated energy, onsite renewables for the unregulated energy consumption, and then offsite renewables as a last resort. Perhaps a green bank/trust/broker that will invest in sustainable energy for offsetting as a last resort.

The first step to net zero MUST be disclosure and reporting of whole building energy and renewables for ALL buildings on an annual basis.

I believe that the industry/local authorities need to make an effort in designing more dynamic urban areas, where loads/peaks can be shared. Instead of focussing in a building only and try to optimize the use of its services, and investing in the new emerging technologies (smart grids, IoT) that can really help us to reduce emissions faster than just focussing in individual buildings.

All buildings heating system to be low grade (heat pump ready). Cooling system with low grade to be encouraged. Innovation credits to be taken into account.

Using measured metrics are essential component. Design based compliance with no feed back loop has been shown to be not fit for purpose.

Bear in mind the IPCC warning that we have 11 years to steeply decarbonise. That is the aim - not current pledges and budgets.

The net zero carbon hierarchy is a good tool to allow flexibility and retain the responsibility for specific solutions with the project team. However, it needs to sit in some context to make sure it is respected in implementation. At the moment this aspect feels weak and not guarded in any way against cost and other project pressures.

I feel that it is important that in new build sites (or in refurbishment of several buildings in a close area) are seen as a 'unit' or a 'co-operative' where renewable energy is delivered and shared. This would hopefully engender a feeling of shared responsibility - together we are stronger.

PV is a great technology, but unsuitable for all building types. I think we are also being narrow minded, what about solar thermal or other renewable electrical generators?

Embodied carbon is a grand aim, but unpractical in reality. Most manufacturers of building services equipment will have equipment with over 250+ different components from all over the world. Those components will be made of other components, that will be made of other components etc etc. unless it becomes an EU or UK law requirement to report embodied carbon on the good imported into the UK/EU it will not be possible to achieve.

new buildings must also recognise how those people in those buildings are using energy outside of the building - a key example of this is providing adequate cycle storage and washing facilities to encourage people to cycle to the building.

Must mandate fabric first approach to energy efficiency with Passivhaus style kWh/m2/yr targets as well as peak load targets. Also, PVs need to work in conjunction with green infrastructure such as green/brown roofs. Drive for zero carbon must not be at the expense of on-site biodiversity.

Low carbon heat needs to be prioritised, which likely means heat pumps or direct electric (if fabric efficiency is high enough). The CCC has made it clear that heating of buildings needs to be near completely decarbonised.

The survey does address affordability for the users. This has apparently proved to be problematic for some low carbon residential buildings. This should be considered if there is not be a back lash in the future.

There should definitely not be a minimum on renewables because their effectiveness in reducing carbon emissions is very variable and dependent on the carbon intensity of the grid. If the grid becomes much cleaner, we can easily get to the point where PVs are not good at all and, considering their embodied carbon, they could actually become carbon active! The reduction in energy demand through passive strategies has to be the key point for a net zero carbon building.

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