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EVENT REPORT:

# ZERO CARBON FUTURES SYMPOSIUM

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Carbon  
Neutral  
Cambridge

**On 21 May 2019 Carbon Neutral Cambridge<sup>1</sup> organised the Zero Carbon Futures Symposium in partnership with the Greater Cambridge Shared Planning Service, South Cambridgeshire District Council and Cambridge City Council. The event was supported by the University of Cambridge's Centre for the Study of Existential Risk and local businesses. 51% of the 57 expert participants and speakers were council officers or councillors. Other participants included representative from universities, the built environment sector, local charities and community groups.**

The overarching aim of the one day symposium was to help accelerate the local transition to Net Zero Carbon by informing policy development for the new Greater Cambridge Local Plan. It addressed questions such as the powers (both statutory and soft power) that are available to Councils, and the examples that would support the use of those powers. The primary focus of the day was on new build housing and energy, as these are matters where the City and District Councils have most influence.

Climate change matters both globally and locally. With a projected sea level rise of 1.5m by 2100, and much of Cambridgeshire lying at below this level, unchecked climate change will have very significant impacts in our region.

This event report summarises the key findings and recommendations, aiming to inform both the Greater Cambridge Local Plan, and to assist councils, councillors and community groups in other parts of the UK in accelerating their paths to Net Zero.

All of the speakers' presentations and the various reports resulting from the day are available from the Carbon Neutral Cambridge website<sup>2</sup>



CENTRE FOR THE STUDY OF  
**EXISTENTIAL RISK**



South  
Cambridgeshire  
District Council



## INTRODUCTION

**Note that this report shares the views and ideas of the expert participants but this does not necessarily imply endorsement by either Carbon Neutral Cambridge or our partners. While care has been taken, we can accept no liability for any errors or omissions.**

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# SPEAKERS AT ZERO CARBON FUTURES SYMPOSIUM

Stephen Kelly, Greater Cambridge Shared Planning Service  
Tommy Harris (age 16)  
Owen Bellamy, The Committee on Climate Change  
Emma Davies, Greater Cambridge Shared Planning Service  
Richard Twinn, UK Green Building Council  
Gwyn Jones, Norwich City Council  
Andy Gouldson, Leeds Climate Commission  
Dave Lomax, Waugh Thistleton  
Miles Messenger, Bouygues UK  
Hugh Ellis, Town and Country Planning Association  
Cllr Rosy Moore, Cambridge City Council  
Cllr Pippa Heylings, South Cambridgeshire District Council

All presentations are available to download here:

<https://carbonneutralcambridge.org/events/zero-carbon-futures/>

## KEY FINDINGS AND RECOMMENDATIONS

- 1 Every Local Plan in England has to have a carbon reduction trajectory in line with the Climate Act. Although to date most councils have ignored this, they're unlikely to be able to get away with it in future.
- 2 To be amongst the leaders, Greater Cambridge's Local Plan should follow London and Reading's examples in setting a Net Zero Carbon standard for all major residential developments, ie requiring on-site carbon emissions to be 35% lower than specified in Building Regulations Part L (2013) with all remaining emissions offset by use of off-site renewables or payments into a local Carbon Offset fund.
- 3 The average new home uses 40% more energy than required by Building Regulations. It would help reduce this "performance gap" if major residential developments were required to use an approved independent assured performance service, such as NEF's APP<sup>3</sup>, or Bioregional's BEPIT<sup>4</sup> to ensure the quality of design and construction.
- 4 The ultra low energy Passivhaus standard typically reduces the energy use of a new home to 10% of that specified by Building Regulations. Evidence submitted to the Committee on Climate Change suggests that this will cost no more than £4500 for a semi-detached home, including the cost of low carbon heating.
- 5 To encourage high standards of energy efficiency, Councils should require all new buildings to complete airtightness test, with an allowable permeability of no more than 3m<sup>3</sup>/m<sup>2</sup> at 50pa.
- 6 Financial viability is no excuse for failure to meet the required standards of carbon reduction. With care in design and construction very low carbon homes can be built for modest additional cost.
- 7 In law, the price paid for land is no reason for non-compliance with local planning policies.
- 8 Councils should consider requiring embedded carbon calculations<sup>5</sup> to encourage the use of timber in place of concrete and steel in buildings and lock away carbon.
- 9 A local Green Bond could be a useful way to attract local and institutional capital for investment throughout the Combined Authority region, to reduce both carbon emissions and inequality
- 10 Councils, community organisations and building professionals should demand improvements to Building Regulations Part L in the forthcoming government consultation and call for the restoration of powers to local planning authorities to allow the acceleration of decarbonisation.

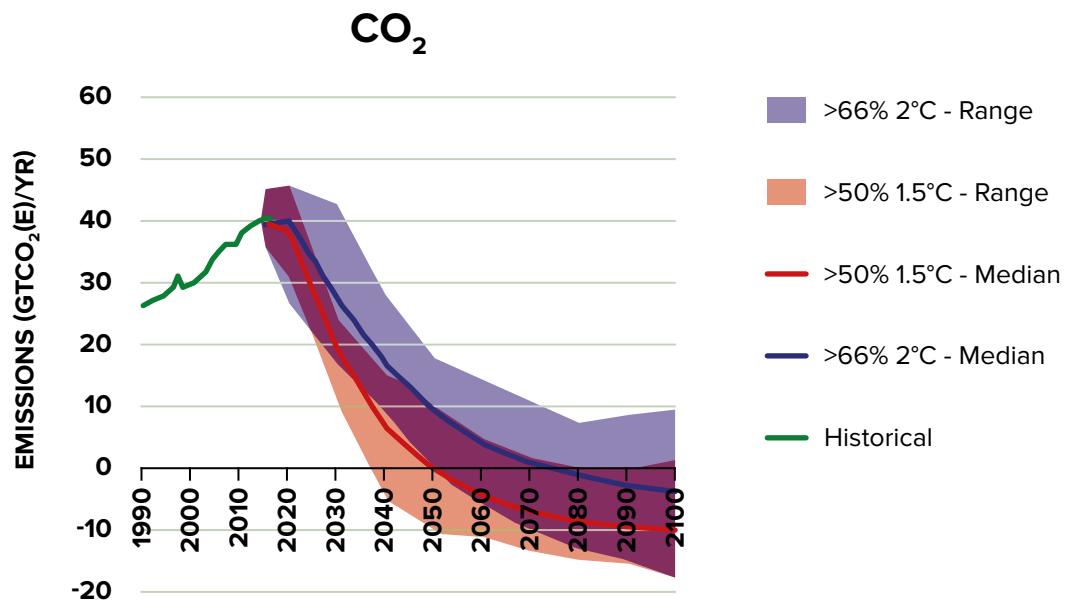
# 1. POLICY OVERVIEW

## NATIONAL CLIMATE POLICY

Three weeks before the Symposium, the Committee on Climate Change (CCC) advised the UK Government to update the Climate Act by setting a target to cut greenhouse emissions to Net Zero by 2050 in order to avert catastrophic climate change and improve people's lives<sup>6</sup>. This became law on 27 June 2019.

Owen Bellamy, a senior CCC analyst outlined the key messages of the report, summarising their advice as "*start now and tackle everything*".

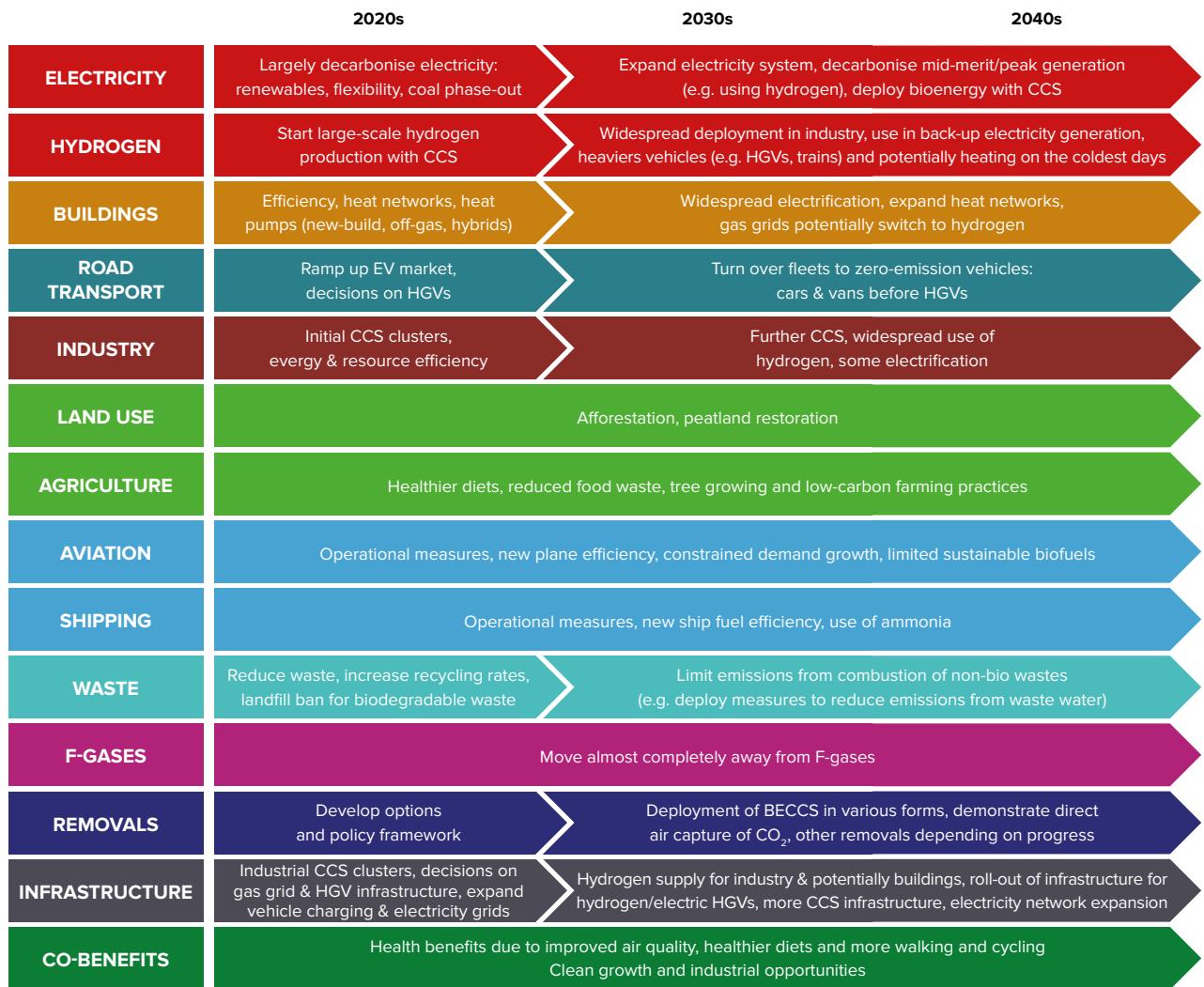
When challenged by a participant, who pointed out that science, safety and global equity required the UK to reach net zero earlier than the global target date of 2050, he emphasized that the CCC had taken care to recommend a "*credible*" target. Although it required immediate action and rapid changes in all areas of the economy, the CCC's view was that it could be achieved with known technologies at a cost that was "*small and manageable*".



The Committee on Climate Change's graph shows the required change in global emissions.

Achieving the target will require, he said, a supply of low-carbon electricity (which will need to quadruple by 2050), efficient buildings and low-carbon heating (required throughout the UK's building stock), electric vehicles (which should be the only option from 2035 or earlier), developing carbon capture and storage technology (which is a necessity not an option), low-carbon hydrogen, stopping biodegradable waste going to landfill, phasing-out potent fluorinated gases, increasing tree planting, and measures to reduce emissions on farms.

Rapid cost reductions in essential technologies such as offshore wind and batteries for electric vehicles mean that the overall costs of the transition to a net-zero economy are manageable at an annual cost of up to 1-2% of GDP to 2050, but they must be fairly distributed, said Bellamy. They must also be perceived as such by workers and energy bill payers.



*The Committee on Climate Change: how net zero can be delivered in the UK*

## GREATER CAMBRIDGE POLICY

Greater Cambridge is being required to provide 33,500 new homes by 2031<sup>7</sup>, with potentially a million new homes envisaged in the “Oxford Cambridge Arc”. As the Government’s Clean Growth Strategy<sup>8</sup> has a mission to at least halve the energy use of new buildings by 2030 it is clear that these must be built to very much higher standards of energy efficiency than at present.

One of the aims of the forthcoming Greater Cambridge Local Plan is to support the delivery of net zero carbon and requiring higher energy efficiency will be a key part of this.

**In his presentation, Richard Twinn of the UK Green Building Council (UKGBC) first outlined their recently launched, industry led framework definition for net zero carbon buildings<sup>9</sup>, before discussing the scope for using a Local Plan to decarbonise new housing.**

The UKGBC Net Zero Carbon Buildings framework has the primary focus of setting in place a path to achieve net zero carbon buildings in both construction and operation (ie in-use energy consumption), whilst beginning to provide direction for addressing whole life carbon in the industry.

The framework has 2 initial targets: firstly that by 2030 all new buildings should be net zero carbon in operation, and secondly that by 2050 all existing buildings should be net zero carbon in operation. There's work in progress to integrate the embedded carbon in construction into the framework too. Twinn pointed out that it's hard to get to net zero today, so we should get started now and tighten standards over time.

Twinn emphasised the importance of prioritising energy efficiency in buildings before addressing other measures, such as the provision of renewable energy. This is sometimes referred to as the fabric first principle. He highlighted the WorldGBC definition that states a zero-carbon building "*is highly energy efficient with all remaining energy from on-site and/or off-site renewable sources*". Over time, progress should also include embedded carbon and other impact areas such as zero water and zero waste.

He added public disclosure and verification were important factors: "*If you want to call yourself a net zero carbon building you need to demonstrate how you have done it*".

UKGBC has published a useful guide to help local authorities – The Policy Playbook: Driving Sustainability in New Homes: a resource for local authorities<sup>10</sup>.

## THE ROLE OF THE LOCAL PLAN

The Local Plan has a crucial role in reducing emissions to meet national carbon budgets.

From 2007 the 'Planning Policy Statement 1 Supplement on Climate Change'<sup>11</sup> and from 2010 the 'Code for Sustainable Homes'<sup>12</sup> explicitly encouraged and empowered councils to set higher energy performance standards than the minimum required by Building Regulations. However, these powers were stripped away in 2015, and there was a period of confusion about what was permitted. Twinn clarified the current position, as outlined in the revised Planning Policy Guidance on Climate Change<sup>13</sup>, updated in March 2019.

For non-housing developments, Local Planning Authorities are not restricted or limited in setting energy performance standards above the building regulations, but for housing the situation is more complicated.

In London, which is an oddity, said Twinn, because it is exempt from the limits affecting other councils, they have set their own Zero Carbon standard for housing. This is 35% lower carbon emissions than required by building regulations, of which 10% has to be achieved via energy efficiency. Measures such as off-site renewables and optionally paying into a fund are used to offset any remaining carbon emissions to get to a nominal Zero Carbon.

For councils outside London, it has been clarified that local planning authorities can, indeed, set energy performance standards for ‘new housing or the adaptation of buildings to provide dwellings’ that are better than the building regulations, up to the equivalent of Level 4 of the former Code for Sustainable Homes. This level represents a 19% reduction in carbon emissions compared to the requirements of Building Regulations Part L (2013)

Many local authorities, including Cambridge City Council have chosen to restrict themselves to this 19% limit, but some councils are going further on the basis there is no legislation explicitly stopping them from doing so. Hugh Ellis, Policy Director of the Town and Country Planning Association also pointed out that “*Government never actually implemented the deregulation of the energy efficiency regulations, so we've got wriggle room in law*”.

Milton Keynes requires carbon emissions to be 19% better than building regulations, with a further 20% improvement through the provision of on-site renewable energy.

In Reading, the emerging plan<sup>14</sup> follows London’s lead in specifying that Major Developments should be Zero Carbon, defining this as including at least a 35% reduction in Carbon emissions in comparison to Building Regulations Part L (2013) then using other measures such as off-site renewables and the option of paying into a fund to offset any remaining carbon emissions. Reading’s plan comes for examination shortly<sup>15</sup>, and its progress is being watched with great interest to see if the government dares challenge these targets.

Oxford City Council Local Plan 2036<sup>16</sup> states, “There is a strong precedent for local authorities taking a lead on emissions reductions in new homes” and specifies a 40% reduction, increasing to 50% from 2026. In discussion it was pointed out that although it is good to include an ambitious and escalating target, if the required on-site carbon reductions are too high it can drive dysfunctional behaviour such as Photovoltaic (PV) solar panels being installed on North facing roofs.

This is a fast-moving field, with the direction of travel very firmly towards Local Authorities demanding increased energy efficiency in new developments.

In subsequent discussions with Carbon Neutral Cambridge about an appropriately ambitious target for the Greater Cambridge Local Plan, Twinn recommended that

*"to show leadership, Greater Cambridge should follow Reading in pushing for 35% plus offsets up to 100% for major developments. It's worth noting that Bristol plan to propose the same for all developments (in line with London) shortly so there would be another test case there as well."*

The ultra low energy Passivhaus standard (see discussion below) could be accepted as an alternative to the 35% improvement, with no requirement for further offset.

## A GREATER CAMBRIDGE CARBON OFFSET FUND?

Emma Davies Senior Sustainability Officer (Design and Construction) at Cambridge City Council and member of the Greater Cambridge Shared Planning Service wondered about the role for a local offset fund. Could Cambridge set up a carbon offset fund, she asked. And then use some of that money to retrofit the existing housing stock where achieving carbon savings can be more challenging than in new build. This new source of funding might be particularly valuable for retrofitting council owned properties. Upgrades such as improving insulation and air tightness, improving doors and window and installing more efficient energy and heating systems could generate significant further carbon saving, reduce fuel poverty and improve the health and wellbeing of tenants.

In London carbon offset funds have for a while provided a useful source of funds for carbon reduction projects across London and momentum is building. In October 2018, the Greater London Authority issued guidance<sup>17</sup> for London's local planning authorities on establishing carbon offset funds – This could form part of a template for other regions.

The GLA made clear the aim of their Zero Carbon Standard was to achieve significant carbon reductions on site and to get as close to zero carbon as possible. Only then should offsetting be considered.

## PASSIVHAUS

Achieving the national and local targets of reaching net Zero Carbon by 2050, means that many new homes will need to do substantially better than halving the energy use of new homes by 2030 (the Clean Growth target).

One way of achieving this is by encouraging use of the ultra low energy Passivhaus standard, which typically reduces energy use of a new home to just 10% of that required by Building Regulations part L. The standard is gaining increasing recognition and support across Europe for new build (with the equivalent enerPHit standard for retrofits) and campaigners are lobbying governments for a pledge that in future all buildings be signed off as Passivhaus-equivalent or Passivhaus-compliant.

A Passivhaus is designed to use no, or very little energy in operation, because it is mostly heated by solar gain and the residual heat from occupants and household appliances. It achieves this by using high levels of insulation, triple glazing and very high levels of air tightness. It will always include a way of recovering heat from the stale air that is being extracted from the house (typically Mechanical Ventilation and Heat Recovery)

Designers pay very careful attention to passive means of avoiding overheating. For example by using deciduous trees to shade windows in summer but allow solar gain in winter, or by using external blinds and screens. Although a Passivhaus will often include on-site PV, this is not a requirement, because it is a “*fabric first*” standard (ie focussing on energy efficiency).

Gwyn Jones, growth and development manager at Norwich City Council briefed the Symposium on the city’s experience of developing the UK’s largest mixed tenure Passivhaus development. This is Rayne Park, with 172 homes, of which 112 are Passivhaus, due for completion in Autumn 2020.

She said that “*the best way to educate people who are not familiar with Passivhaus is to take them to visit another Passivhaus development and talk to the tenants - we took them to Hastoe Housing*” One aspect at the outset said Jones, was the planning policy focus on energy generation, rather than energy efficiency. But she emphasised that ultimately “*what persuaded the council to take Passivhaus forward was less to do with the environmental side, but more the social.*”

She said:

“*We think there will be at least a 70% reduction in heating costs, and this is important when it comes to addressing fuel poverty for those in council houses. The experience of Hastoe Housing Association was that they had NO rent arrears from any of their tenants as people were more able to pay their rent as a result of lower energy bills.*”

Other benefits for tenants were better air quality, fewer allergies, better sleep, and less noise. Notably 85.7% of the tenants of Broadland Growth's scheme at Carrowbreck Meadow said they would now either prefer to live in a Passivhaus or would only move if it was into another Passivhaus. There are also economic benefits in upskilling the local workforce and giving opportunities for local businesses, for example in supplying the high specification triple glazed windows.

Jones said evidence and feedback to date shows that their Passivhaus homes are performing as expected. This lack of a performance gap is important, because the average new home is likely to use 40% more energy than predicted. (It's clearly important to take measures to reduce this shocking performance gap in ordinary new homes).

In her opinion, Passivhaus will be the only way to achieve truly Zero Carbon homes.

However, to be able to require this in future, councils need to have the planning powers restored to them that were stripped away in 2015. As one participant said "*We want to have Planning Policy Statement 1 supplement on Climate Change reinstated*".

## CARBON NEGATIVE CONSTRUCTION

Carbon Sequestration will be essential to achieve net zero carbon emissions, and one way of doing this is to encourage greater use of wood in construction. This is because trees absorb carbon as they grow, then, when the timber becomes part of the building, the carbon is locked up for the life of the building.

There are various timber based, modern methods of construction, and these are becoming increasingly popular because of their potential for minimising disruption and cost, particularly given the national shortage of both bricks and bricklayers. Precision off-site manufacture means it's easier and cheaper to reliably achieve high standards of air tightness and energy efficiency.

David Lomax, senior associate at architects Waugh Thistleton outlined their experience with engineered Cross Laminated Timber (CLT). This can often replace steel and concrete in buildings up to 9 stories high. Waugh Thistleton designed Dalston Works in London, at the time the world's largest CLT building.

Lomax shared their estimate that, if using CLT construction, each home in a block of flats would lock up 20 Tonnes of carbon, thus allowing it to be carbon negative in construction. In contrast, if a similar block of flats was constructed with the normal concrete and steel, each home would be responsible for the emission of 20 Tonnes of Carbon, even before the first occupant moved in. This is because both concrete and steel have much higher embedded carbon emissions than timber.

This is important for achieving net zero, because as Twinn had said, ultimately, net zero should include taking into account the carbon impacts from the whole lifecycle of a building, from construction to demolition waste and disposal. One industry participant suggested that, in order to encourage this, embedded carbon calculations should be required on Major Developments.

## FINANCIAL VIABILITY

A critical question of course, is how much extra does this high performance cost? What is the evidence that low carbon housing developments can be both financially viable and “affordable.” The cost of development is always a difficult question to answer, in part because of commercial confidentiality, and in part because of uncertainty about the level of risk premium.

Participants shared their experience. There was a general feeling that the 19% uplift on current building regulations part L was a sweet-spot with a fabric first approach costing maybe just £2-3K extra for a traditionally built terraced house, and £5-6K extra for a detached. This would probably at least halve bills: in part because there is typically no performance gap between the predicted and as built performance.

Passivhaus is currently significantly more expensive, with participants estimating the additional cost currently at around 15-20% in comparison to a home built to current Building regs part L. However in large part this is due to contractor inexperience, the cost of rectifying mistakes (for example one participant described an inexperienced contractor casually drilling a hole through the air tight membrane which subsequently failed the air tightness test) and the resulting risk premium. One participant estimated that the additional cost might ultimately be as little as 10-15%. Another pointed out that evidence<sup>19</sup> submitted to the Committee on Climate change by AECOM states that Passivhaus level standards and air source heatpumps become cost-effective for most house types by 2025 at an estimated cost increase of just £4500 for semi-detached house. When one considers that the average lifetime of a new house is 60-100 years, this cost is more than offset by the saving in operational energy costs. Additional non-financial benefits are better climate resilience and health and wellbeing outcomes for the occupants.

In a followup discussion, Russel Tame, MD of Bioregional Homes, a subsidiary of Bioregional, the global sustainability group, emphasised the cost saving advantages of using Modern Methods of Construction (MMC) with off-site precision made timber based construction, in place of traditional construction using brick, steel and concrete. He emphasised that they had found that by using MMC, together with good training and supervision of contractors, Bioregional’s partners were building ‘passivhaus-equivalent’ Zero Carbon homes at no additional cost. One example is their work with Cherwell and South Oxfordshire council on the development of 6000 homes at the Zero Carbon Village in Bicester.

Interestingly, it was reported that Berkeley Homes are planning that all their homes will be built net-zero-ready by 2020. The details are still unclear, but it will probably include tight fabric standards and high output radiators or underfloor heating to make it easy to switch over heating systems (eg from gas boilers to air source heat pumps) at a later date.

## LAND PRICE

Carbon Neutral Cambridge's chair, Anne Miller asked:

*"How do we deal with financial viability? One can set nice standards, and the developers say it's not financially viable so we don't have to meet minimum space standards, we don't have to meet energy efficiency standards, we don't have to meet affordable housing standards. How do we tackle it? Is it just that councils should be bolder, or does that mean they just get enormous legal bills?"*

Hugh Ellis, head of policy at the Town and Country Planning Association said the new viability test in the latest NPPF report and the accompanying guidance gives us some wriggle room. He said:

*"I am confident that this viability issue is beginning to ease. The difficulty is how fast are we catching up? You look at the guidance, it says price paid for land is not a reason for non-compliance with local planning policies<sup>20</sup>. That is an important tool that we have got to renegotiate, but it's not taken us all the way, the critical document will be the RICS guidance and that's still been fought over, and it's a political fight, between those people who support local government and those people who support landowners.*

*But I do think we've got some options now but let's be clear that the stronger the local plan, and the absolutely no blinking that you need on this issue is critical. If you paid too much for the land that's your problem, that's what the government says"*

Richard Twinn said:

*"We need to be setting clarity for the development industry. If you set requirements far enough in advance and I would argue 2025 is far enough in advance, then that provides certainty and the costs will get absorbed when developers are thinking about buying new land. Equally, that will help drive costs down and help to drive demand locally for things like triple glazing"*

## AN UPGRADE TO BUILDING REGULATIONS PART L?

Government is reviewing Building Regulations part L with the expected aim of halving the energy use of new homes by 2030. They will be undertaking a consultation in the autumn<sup>21</sup>.

An upgrade would help reduce costs nationally. As one participant said

*"I think the costs will come down if more schemes developed, so we should be pushing to do more. I agree with what was said earlier - that private housebuilders aren't going to be doing this voluntarily, it needs to be legislated, and the only way to achieve this is through national policy standards."*

Emma Davies of the Greater Cambridge Shared Planning Service emphasised that carbon reduction and energy also needed to be addressed in planning, not just in Building Regulations. She said

*"I think it's a fundamental aspect of building design, it needs to be led by an architectural approach, otherwise you miss opportunities to design out unwanted energy use. You have to look at it holistically, which you don't get through building regulations. So I would really like to see a greater role for planning in being able to set target reduction targets for new development."*

A participant commented on the experience in Scotland, where regulated carbon emissions for new homes were reduced in 2015, so they are now 23% lower than in England. Despite the warnings from the industry, the number of private housing starts has been completely unaffected<sup>22</sup>.

## QUALITY OF LIFE

Ellis added an important point, saying that one of the problems today was that "we are not educating people about the enormous positives and possibilities that you can generate through planning". He said too often the message was that ideas were not affordable, and so not possible.

*"Unless we can all collectively say – as we did with the New Towns -that the solution to climate change is also about a better way to live, we are never going to get there. It can't just be about the technicalities and the science, important though that is -it has to be about a different narrative."*

## THE LEGAL DUTY

Ellis of the TCPA advised the audience not to see the Local Plan as simply a requirement, but to see it as an opportunity

*“to draw the climate agenda powerfully into relation with other agendas, particularly things like transport. Effective planning depends on very strong local authorities and public authorities in general taking action.”*

He flagged a number of core planning principles which make clear that *“mitigating and adapting to climate change”* is a core planning objective. Importantly, he pointed out that for a Local Plan to be valid the 2019 National Planning Policy Framework (NPPF) states<sup>23</sup> that *“every local plan in England has to have a carbon reduction trajectory in line with the Climate Act”*

He commented that to date, this duty has been largely ignored, so *“about 80% of the Local Plans are not compliant with the basic duties described now”*. However, the increasing attention that is being paid to this, means that councils won’t be able to get away with ignoring it for much longer.

He said:

*“To be in conformity with the NPPF, local plans should reflect this principle ensuring that planning policy clearly and comprehensively deals with climate change mitigation and adaptation. Planning authorities will need a clear grasp of their carbon profile, and their policy should support radical reductions in carbon dioxide emissions – essential if the UK is to meet its national and international obligations”*

He commented to the Planning Officers present. *“This means you have a legal mandate to be difficult and to move things forward”*

**As Davies said earlier in the day. “It’s not all about planning... How do we work with our partners across the built-environment sector and across academia and industry?”**

Professor Andy Gouldson, chair of the independent Leeds Climate Commission shared their experience in establishing a local climate commission to build these partnerships, bringing together key organisations and actors from business, councils, the university and other third sector bodies.

The aim of the Leeds Climate Commission is to develop a decarbonisation roadmap, outline the economic case for climate action in Leeds, and help Leeds “*to make a positive choice*” on issues relating to energy, carbon, weather and climate. It also acts as a forum where organisations can exchange ideas, research findings, information and best practice on carbon reduction and climate resilience.

The commission found the most effective decarbonisation measures for Leeds were linked to insulation, heating and cooling in retail buildings. Their action plan would create 4,200 extra years of employment for the city and save £277 million a year by 2030, while cutting household energy bills by £81 million. Transport costs are also cut by £150 million by tapping into opportunities offered by electric vehicles (EVs).

They are also developing a green bond to attract institutional and private capital to fund green initiatives across the city. The aim is to give councils access to cheaper money, while giving a 2.5% return to investors who will also have the bonus of knowing that their money is funding specific local projects. This is being designed as “open source” so that other regions can use it too. It was commented that, given the income inequalities in the Cambridgeshire and Peterborough Combined Authority area, this could be a useful idea locally, allowing investors from wealthier areas to support green and carbon saving projects in poorer areas.

The Leeds decarbonisation roadmap, shows that carbon emissions are now 48% down on 1990 carbon levels with about half of that stemming from decarbonisation of grid electricity. To reach net zero by 2050, about half of the remaining gap can be done by things that “*are cost effective now, a no brainer*”. The next 16% are things where “*we know what to do, but it’s not currently economic*”. The remaining 40% will require innovation.

These innovation measures include switching the heating network to decarbonised hydrogen (one of their partners is Northern Gas Networks) working with the largest energy consumers to deliver significant improvements, accelerating roll out of district heating and electric vehicles, retrofitting domestic, public and commercial buildings and ensuring that all new buildings are carbon neutral, as well as promoting ambitious levels of walking and cycling.

**Both the city of Cambridge and South Cambridgeshire already use planning conditions to require electric vehicle charging in new developments. But as Emma Davies of the Greater Cambridge Shared Planning Service said, added infrastructure was needed to support net zero carbon. “Our electricity grid here and across the UK is already at capacity”. She believed there was a role for planning in looking at new forms of infrastructure as part of new developments, such as “smart grids and smart energy systems”.**

Miles Messenger, head of energy performance contracting at Bouygues Energies & Services UK focused on how local authorities can lead the transition to zero carbon through investing in energy saving and renewable energy.

*“It’s about making strategic investments to turn capital into revenue through energy saving and renewable energy projects. Put another way: how you can invest in your own assets to deliver major climate efficiency savings?”*

He said the built environment accounted for about 40% of the UKs greenhouse gases. Half of those were directly or indirectly associated with buildings.

*“Modern construction techniques allow us to build net zero carbon buildings, but it is predicted that around 80% of buildings that will exist in 2050 are already built. So a major focus needs to be on retrofit and efficiency, as well as new build developments.”*

It is clear that energy investment is good business, so Councils do not necessarily need to invest themselves (although the financial returns are higher if they do). Messenger pointed out that conventional energy retrofit, “could generate energy savings of between 15% and 50% via primary energy reduction, achieved within the economic constraints of a typical invest-to-save programme”. And with energy prices rising so sharply, those financial savings were going to rise as well, he said. This gives a payback period on capital investment was between 5 and 15 years, on a project with a lifespan of 10 and 20 years. This yields an internal rate of return of between 6% and 10%. However, in order to achieve net zero carbon through retrofit, building owners would need to be prepared to make longer-term investments and make bigger changes.

Bouygues had delivered a number of projects in Cambridgeshire. For instance, a schools and academies energy efficiency programme requiring an £8 million investment had been delivered at no extra cost to the schools and was, in fact, making a net saving year-on-year. At the same time, it was estimated there would be a 37,500 Tonnes CO<sub>2</sub> emissions saving over the 15-year project life; and about 7,250,000kWh/annum saved. Preparatory work on the project at

South Cambridgeshire Hall in Cambourne was demonstrating that even a modern, energy efficient building could be improved via a combination of renewable energy and energy efficiency measures, together with integrated EV charging facilities.

Elsewhere in Cambridgeshire, Messenger flagged a project in St Ives, where the company proposes to transform the park and ride site into a renewable energy generation hub.

*"This combines EV chargers with solar PV, battery storage and smart-grid controls; we are offsetting the demands placed on the grid from electrification of transport by generating the electricity locally". "We are also using this combination of technologies in a way that will have a positive impact on the local energy network. We hope St Ives could move from being a pilot to being a template for park & ride sites across the UK."*

Messenger highlighted two other challenges:

*"One of the biggest limiting factors at the moment is our inability to buy and sell energy locally. Peer-to-peer trading would open up a huge market for delivering deep carbon savings across communities".*

This is working well in Bouygues' projects in France, for example bringing together 2000 homes and 50 businesses in Paris, but in the UK the regulatory framework is a major barrier.

Secondly there was the landlord issue.

*"Landlords might own buildings but typically, they are not responsible for energy costs, consumption or carbon emissions. Tenants however are often responsible but can't make changes to the building because they don't own it. We need to find a model that incentivises investment in commercial building energy retrofit."*

One model to address this problem is the successful Low Carbon Workplace Fund established by the Carbon Trust with partners Columbia Threadneedle and Stanhope. The fund buys buildings and retrofits them to become modern, efficient offices with low energy costs and improved employee well-being and productivity. The fund has grown to seven buildings totalling 274,000 square feet and is valued at about £260m.

## 5. CONCLUDING REMARKS

**It is increasingly clear that achieving carbon neutrality, or “net zero carbon” is urgent and challenging, but also that it is possible and brings many benefits.**

As Carbon Neutral Cambridge, we have a vision of Greater Cambridge that is a leading force in the UK’s decarbonisation. That is healthier, less unequal, less stressful, with more trees, more green spaces, better homes and better quality of life for ALL.

We know that it is not going to be easy to decarbonise at the pace and comprehensiveness that is required. But Cambridge has a huge wealth of capability if we can bring it together. We are calling for our universities, local councils, key businesses, NGOs and land owners to work together to make it happen, ideally through the formation of a well-resourced local Climate Commission.

It is clear to us that although Government has disgracefully stripped away some of the key planning powers our councils need to accelerate decarbonisation, our Councils have more power than they have used to date to accelerate progress towards net zero.

We call on the Greater Cambridge Planning Service to embed decarbonisation in the heart of the new Local Plan. In particular, given the longevity of new homes, it should follow London’s example and Reading’s emerging Local Plan in setting a Zero Carbon standard for all new homes in Major Developments. This should require homes to be 35% lower carbon than specified in Building Regulations, then use offsite renewables and pay into a council run carbon offset fund for all remaining carbon emissions.

Every Local Plan in England has a legal duty to have a carbon reduction trajectory that is *“in line”* with the Climate Act. We call on our councils to do their duty and develop an exemplar Local Plan that will clearly comply.

Increasingly, experienced contractors, the declining cost of components and innovations, such as Modern Methods of Construction, the Passivhaus standard and Assured Performance Services enable very low carbon homes to be built at little extra cost. As these low carbon homes improve health while reducing fuel poverty and rent arrears, we would like to see our councils actively promoting them and helping create a thriving network of experienced local businesses to do the work.

The local Growth agenda is often criticised and could easily make things worse: decarbonisation must be put at the top of the agenda and the investment be used to reconfigure our infrastructure and improve housing, so that it’s fit for our zero carbon future.

**ANNE MILLER**

Chair, Carbon Neutral Cambridge

## REFERENCES

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