

Milton Keynes Building on a Culture of Innovation Evidence Paper

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1. Introduction

Context

The Milton Keynes Futures Commission report presents a compelling vision for how MK could look in 2050:

“Having long been a leading low carbon city, in 2050 Milton Keynes shows how every city can contribute to global carbon reduction targets. Many eco-companies have relocated to be near like-minded others, as well as firms seeking the prestige of being based in the most environmentally sustainable city in Europe”

To realise this vision, MK will need to significantly reduce carbon emissions over the coming decades. MK is already engaged in many successful initiatives around low and zero carbon development, some of which are now being replicated in other cities. The city also has a history of pioneering innovation around sustainable design and construction, the spirit of which should be embraced moving forward. Furthermore, the forthcoming Plan:MK sets out strategic and stretching objectives around energy and climate change mitigation, up to the year 2031.

This challenge needs to be considered within the context of anticipated growth of the city’s population, and the need to accommodate more people as it increases. Milton Keynes Council (MKC) projects that the population of MK will increase from 267,000 people in 2016 to 309,000 people in 2026 (a 16% increase). The MK Futures Commission set out a vision for the city and its surroundings to grow to at least 400,000 by 2050.

To reach Zero Carbon by 2050 will mean all growth must be carbon neutral and will require an extensive investment in renewable technologies and retrofit of existing communities. MK will need to build on its culture of innovation and develop mechanisms that will stimulate the deployment of emerging technology.

Aims and Approach

The ambition of this paper is to share understanding of low carbon policy and associated initiatives in Milton Keynes, to review best practice around low and zero carbon development, identify emerging trends which will impact MK’s long term strategy to achieve zero carbon by 2050 and to make recommendations for how MKC can effectively enable the transition to a healthy, thriving and sustainable future.

Useful Projects were commissioned to prepare an evidence paper to explore how Milton Keynes can build on its culture of innovation in design and sustainability to deliver sustainable development and meet its ambitious target of becoming a near zero carbon city by 2050. To do this we have drawn on our own experience of working in this area and carried out background research and stakeholder engagement, both within MKC as well as with local

businesses. We used this to frame a workshop between different parts of MKC and external stakeholders, to help explore the strengths and weaknesses of current schemes, identify what could be learned from best practice elsewhere, and, in the context of future trends, explore how policies and workstreams can be better aligned to effectively enable a more sustainable city.

The workshop took place on 4th July 2017 and was attended by 17 participants (10 officers from MKC, 2 representatives from local business, and 3 industry experts on low and zero carbon development, in addition to the 2 facilitators from Useful Projects). The full list of attendees is included in the appendix. The appendix also reproduces the workshop agenda and slides as well as a full list of comments, grouped by thematic area.

This paper sets out:

- Background context including an overview of current policy and key trends that may influence future policy direction
- Key considerations for MK for future policy

2. Context

Setting a clear target for Zero Carbon

As well as legal commitments to reduce carbon emissions, in line with the UK Government Climate Change Act, there is widespread consensus that business as usual will not achieve this aim. A compelling business case is also emerging for cities to move towards zero carbon. Many existing cities are taking leadership around zero carbon as illustrated in Figure 1. They see the opportunities in providing a resilient energy supply, unlocking business opportunities and advantages associated with being 'early movers' in this arena and to provide affordable and securing heat and energy for their citizens. There are also wider health and wellbeing benefits associated with low carbon living, especially around active transport and improved air quality from reduced emissions. Many of these can be facilitated via smart technologies.

Setting and communicating a vision for a Zero Carbon City is core to driving delivery and engaging partners to do so.

In the context of MK it is important to engage the current citizens in this transition. As the city has been successful to date, there may be a sense among residents that there is no need to change and an associated reluctance or resistance to embracing innovative ways of living. At the same time, sustainable development and associated improvements in quality of life will be a key attractor for new residents and businesses seeking to locate in MK.

City	Target
London (GLA)	Achieve an overall reduction in London's carbon dioxide emissions of 60 per cent (below 1990 levels) by 2025
	Zero carbon (regulated emissions) for new residential buildings from 2016 and new non-domestic buildings from 2019.
Vancouver	Target for zero emissions from all new buildings by 2030
Pennsylvania	Project for all affordable housing in be designed and constructed to a 'Net Zero Energy Capable' standard by 2030
California	Zero Net Energy for Residential Buildings by 2020 and Zero Net Energy for Commercial Buildings by 2030
Seattle City	Goal to be carbon neutral by 2050
Portland	Achieve zero net carbon new buildings by 2030, reduce total energy use of building built before 2010 by 25% by 2030, supply 50% of all energy used in buildings from renewable resources by 2030
Old Oak Common and Park Royal	UK's largest current development site. Target to achieve zero carbon development in line with GLA energy hierarchy, but with greater expectations on energy demand reduction measures (e.g. passive design)

Figure 1: Examples of other cities' zero carbon targets

In defining how Zero Carbon should be measured, there was a consensus that emissions from buildings, both regulated and unregulated emissions (Figure 2), and transport should be included. It was agreed that embodied or indirect emissions associated with materials and waste should not be included due to the complexity of monitoring at the city scale at this stage.

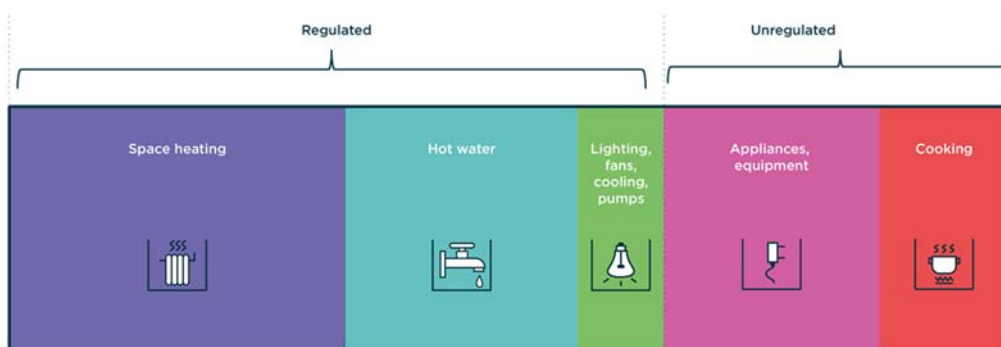
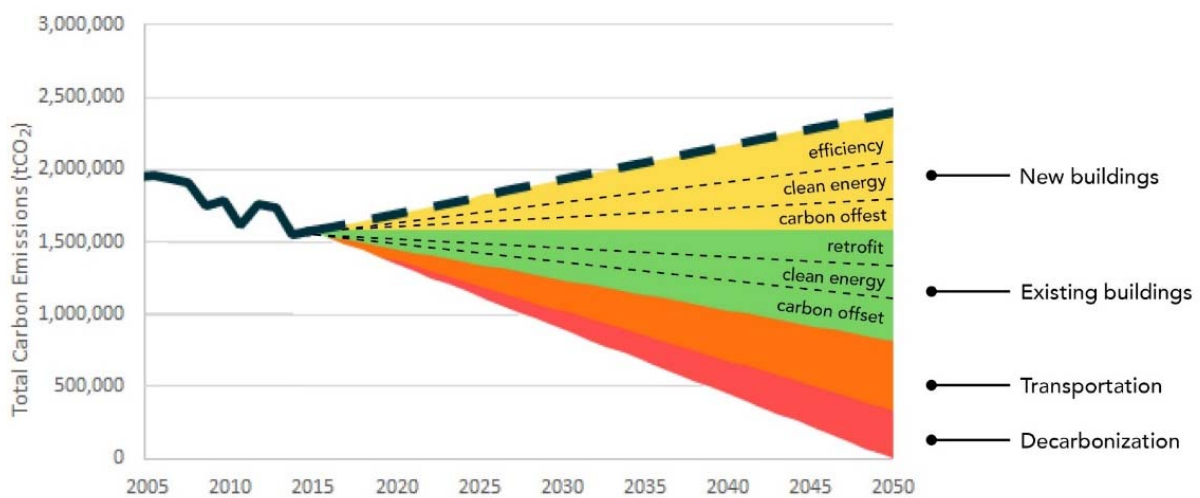


Figure 2: Regulated and unregulated carbon emissions from buildings

Scale of the challenge for MK

MK's carbon emissions have been falling, with per capita emissions reducing by 38% between 2005 and 2015, though they are still slightly above average figures for SE England. The Council is on track to meet their 2020 carbon emission reduction target of 40%. However, the challenge to reach zero carbon remains stretching. Figure 3 illustrates the scale of reduction required, within the context of anticipated population growth. It demonstrates the need for multiple approaches, including zero carbon growth, energy retrofit of existing buildings, a shift away from fossil fuel transportation and the decarbonisation of the grid.



Projections based on 'balance' (high efficiency and high renewables) scenario from Milton Keynes Energy Mapping Project (Centre for Sustainable Energy, Nov 2012)

Figure 3: Illustrative carbon emission reduction pathways (unverified)

Review of Existing Policies

In many aspects MK sustainable development policy has been held up as an exemplar and have been adopted by other local government authorities. Figure 4 sets out the range of policy and initiatives that are currently in place and against different types of emissions sources.

Particular successes include Planning Policy D4 (Sustainable Construction) and the Imagine MK 2050 Strategy. Models for collaboration with the private sector have also been developed, such as the Community Action Platform for Energy (CAPE).

However, there are also some challenges around the continued ability of policy to instigate change. The need to speed up the planning process and the incremental strengthening of Part L of the building regulations around energy efficiency requirements means that Policy D4 is coming towards the end of its useful life and there appears to be little appetite to extend it over the long term.

	CO2 impact area	Policies and strategies							Current initiatives				
		D4	Plan MK	Low Carbon Action Plan	Imagine MK 2050	District Heating	MK Smart / Data Hub	CAPE / Smartklub	Electric Bus Trial	LED Lighting Schools and	MK Waste Recovery	Transport Systems	Boiler Cashback
Own	Municipal buildings	✓	✓	✓		✓							
	Non-municipal buildings	✓	✓	✓		✓			✓				
	Residential buildings	✓	✓	✓		✓		✓					✓
	Public lighting								✓				
	Municipal fleet			✓									
	Public transport		✓						✓			✓	
Share	Retrofit and regeneration partnerships with housing association	✓	✓	✓									✓
	Community energy infrastructure	✓	✓	✓		✓		✓		✓			
	Carbon offset fund	✓	✓	✓									
Influence	Private sector new buildings	✓	✓			✓							✓
	Private sector regeneration / retrofit	✓	✓			✓							✓
	Private and commercial transport											✓	
	Private energy infrastructure		✓				✓	✓		✓			
	Citizen engagement / behaviour change			✓			✓	✓					

Figure 4: Milton Keynes Policy Map against emissions sources which are directly controlled by the council (owned), over which the council has some control (shared) and sources which the council can influence.

Plan:MK

The draft Plan:MK sets out requirements around energy performance and carbon emissions in new construction. As well as achieving whole life carbon neutrality, including the use of a carbon offset fund, Plan:MK sets individual on-site targets. Workshop participants agreed that the requirement for a 19% reduction in carbon emissions over current building regulations was a stretching and credible target.

Plan:MK also requires developers to calculate indoor air quality and overheating risk as well as undertake post occupancy evaluation monitoring of actual energy performance, were strong policies. These are strong policies and were seen as innovative and important component of Plan: MK. However, MK will need to consider how outcomes are evaluated against the design intent. In particular, the policy only requires developers to model regulated loads. MK may wish to include a requirement to also model unregulated (e.g. plug-in) loads to provide a comparator for measured data in use.

The policy also includes a 20% reduction in CO₂ emissions through onsite renewable generation / micro-generation. This may not necessarily lead to the most cost and carbon-effective solutions and outcomes. Future iterations of Plan:MK may wish to consider setting an overall target to allow developers to plan the most effective way of delivering this.

Plan:MK also includes support for retrofit schemes; however, it was recognised in the workshop that these are much more challenging to deliver, particularly on buildings that are in private ownership. In setting strong targets there is a risk that developers may choose to build elsewhere, therefore decreasing investment in MK. However, there is an opportunity for MK to demonstrate leadership, and align their policy with that other city's councils with whom the UKGBC are working to transition to zero carbon.

Vision for a Zero Carbon MK

The Imagine MK 2050 Strategy presents a clear and compelling vision of how MK could be a '*near zero carbon city with a high quality of life for all by 2050*'. Building on this vision, and the Milton Keynes Energy Mapping Report, we have prepared a scenario of how different areas of the city could be transformed to facilitate zero carbon living. Although it is difficult to predict exactly how a zero-carbon city will be achieved, we do know that the energy market is shifting towards a more dynamic, on demand and smart grid. Some of the key characteristics and likely technologies to be deployed are presented in Figure 5. Of course, the technology environment is changing rapidly, and delivery mechanisms will need to be able to accommodate this changing landscape.

Area	Zero Carbon Strategies
Central MK	<ul style="list-style-type: none"> • District heating + cooling • Photovoltaics (PV) • Battery storage • Integrated infrastructure (electric vehicles) and energy storage
Regeneration Areas (existing housing)	<ul style="list-style-type: none"> • Deep fabric retrofits • PV + solar hot water • Battery storage • Heat pumps (centralised / decentralised) • 50/60 – 100 dwellings per hectare (DPH) density required to support district energy
Expansion Areas (new housing)	<ul style="list-style-type: none"> • New ‘eco’ communities (including most of the above) • Passivhaus or equivalent • 100+ DPH density required to support district energy¹ • Electric bus network • Cycling infrastructure • Walkable neighbourhoods
Hinterland / Productive Use of Land	<ul style="list-style-type: none"> • Food production • Energy generation (e.g. biomass, large scale PV) • Biodiversity
Circular Economy Hub	<ul style="list-style-type: none"> • Existing 6MW Waste Recovery Park at Old Wolverton (including anaerobic digestion + gasification) • Industrial symbiosis • Circular economy platform
Zero Carbon Transport	<ul style="list-style-type: none"> • Promoting active travel • Public transport options • Integrated mobility • Links to the Oxford Cambridge Corridor

Figure 5: Possible features of a zero carbon Milton Keynes

Emerging Trends

The approach to zero carbon will need to be flexible and take advantage of the following key trends.

Decarbonisation of the Grid

The UK electricity grid has been decarbonising, as it shifts from coal to ‘cleaner’ sources of fuel and generates more energy from renewables. This trend is likely to continue, as shown

¹ A higher density is required for district heating to be viable for new dwellings, as these are generally more efficient and have a lower heat demand.

in Figure 6, below. In this situation, technologies that use grid electricity as their energy source, for example heat pumps, will have a greater potential to reduce carbon emissions than those that rely on gas, such as gas fired Combined Heat and Power.

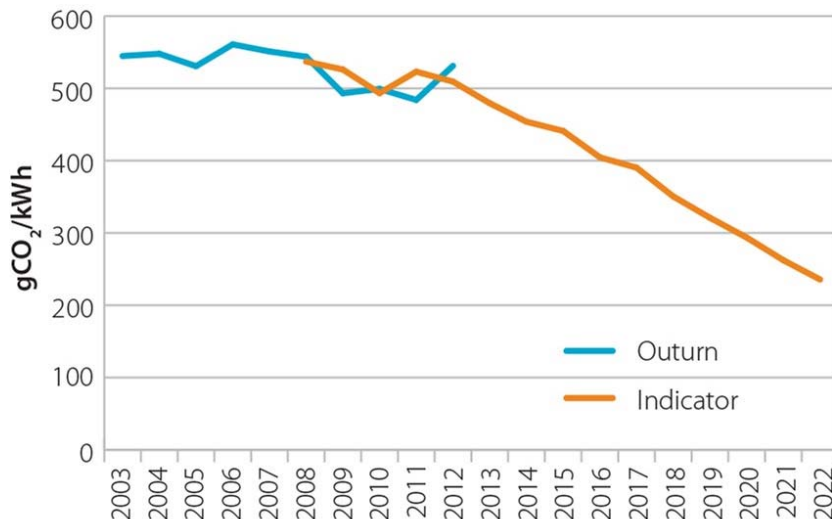


Figure 6: Projected carbon intensity of grid electricity (based on Committee on Climate Change data)

Decentralisation and distributed energy networks

Decentralised energy refers to energy that is generated off the main grid, including micro-renewables, heating and cooling. Decentralised energy is seen as an efficient way to meet demand, whilst improving energy security and sustainability for example by minimising transition losses and capturing waste heat from power generation for heating of buildings.

As more electricity is created off-grid, cities require dynamic grids that can adapt to greater variations in supply and demand. Building localised smart grids with energy storage can help cities better respond to their demands, smooth the supply from renewable power generation, such as solar and wind, and reinforce overall grid resilience. The Ofgem report 'Upgrading Our Energy System: Smart Systems and Flexibility Plan' launched in July 2017, further promotes the role of local dynamic grids as part of the Government's Industrial Strategy and as a way of work enabling the energy system transition.

Residents of Furzton, MK are taking part in Western Power Distribution's LV (Low Voltage) Connect and Manage project. This is an innovative research programme focusing on trialing a smart solution for the connection of domestic PV panels with energy storage, and fast chargers for electric vehicles as a means of managing low carbon technology connections to the grid whilst network reinforcement takes place.

The relationship between decentralised systems and the long-term strategy for the National Grid and gas networks needs to be considered. For example, any wide spread use of heat pumps will need to be considered alongside the capacity of the Grid and its ability to meet

peak heat demands. In the short to medium term at least, gas networks may still be required, whilst the grid is adapted to cope with the possibility of an electric future.

Costs of renewable and low carbon technologies

The shift towards distributed networks has in part been enabled by the falling costs of renewable and low carbon technologies:

- 90% reduction in cost of PV from 1990-2015
- 80% reduction in cost of electrical storage from 2010-2016
- 85% reduction in cost of heat pumps from 1985-2008

Improved business cases have enabled these technologies to be deployed at greater capacities.

Furthermore, the U-value of 'standard' double glazing has improved from ~1.8Wm²k to 1.4Wm²k, and triple glazing, which was virtually unavailable 10 years ago is now readily available and with falling costs.

Disruptive innovation

The shift to a dynamic grid is also being enabled by a suite of disruptive technologies and integration between them. McKinsey have identified 12 key technologies which will have trillion-dollar impact on our economy, four of which are associated with enabling low carbon energy generation (Figure 6). Battery storage, the 'Internet of Things' and 'Autonomous and near-autonomous vehicles' will change the way in which energy is supplied and used.

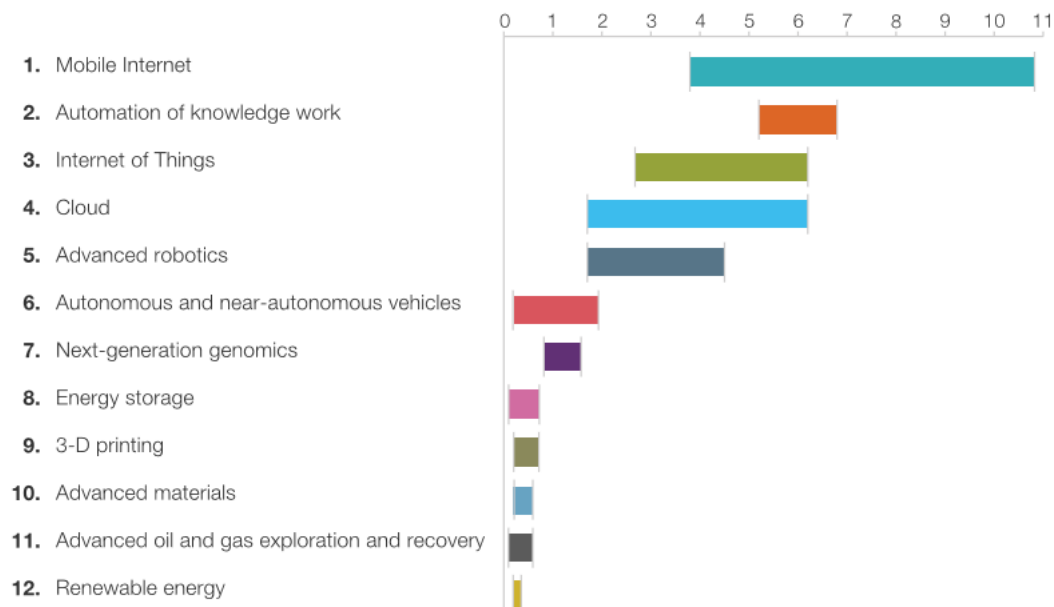


Figure 6: Estimate potential economic impact of technologies in 2020 (\$trillion, annual), Source: McKinsey Global Institute

New governance models

Particularly in the context of reduced reliance on central government funding, cities are looking for new ways of delivering sustainable development. These include collaborative and place based governance models, Community Land Trusts, Community Interest Companies, Partnerships with universities and the private sector. These offer ways to build consensus with MK stakeholders, offer alternative investment models and help grow local supply chains to deliver sustainable growth. A few innovative projects are referenced below:

- **The EcoDistricts Protocol for Collaborative Governance**
 - Encourages multiple partners to work together to achieve sustainability and resource efficiency goals at a district scale
 - Enables collaborative governance, public-private partnership and demonstration projects (e.g. Lloyd EcoDistrict, Portland), and stimulates new business development
 - <https://ecodistricts.org/get-started/the-ecodistricts-protocol/>
- **Stretham and Wilburton Community Land Trust**
 - A community-led, design and development of 75 new homes (market sale and affordable rent) with East Cambridgeshire District Council.
 - Policy support was provided in the local plan, with funding from the Design Council (CABE)
 - The Trust acquires land and maintains ownership of it permanently. With prospective homeowners, it enters into a long-term, renewable lease instead of a traditional sale. When the homeowner sells, the family earns only a portion of the increased property value. The remainder is kept by the trust, preserving the affordability for future families
 - <http://community-wealth.org/strategies/panel/clts/index.html>
- **Robin Hood Energy**
 - Not for profit energy company set up by Nottingham City Council.
 - First local authority-owned energy company
 - Mission to tackle fuel poverty and offers special tariff for local residents.
 - <https://robinhoodenergy.co.uk/about/local-energy/>
- **Aberdeen Heat & Power Co Ltd**
 - A not for profit company set up by Aberdeen City Council in 2002 to develop and operate district heating and Combined Heat & Power schemes in their area
 - Supplies low carbon and affordable heat to over 2000 homes (flat rate) and 15 public buildings (metered).
 - <http://www.aberdeenheatandpower.co.uk/>
- **The Engine Shed, Bristol**
 - A partnership between the city, university and private sector for innovation in digital technology

- A hub and co-working space for entrepreneurs, business leaders, academics, students and corporates
- Part of the 'Bristol is Open' experimental digital network
- <http://www.engine-shed.co.uk/>

Agile planning

Technology is also changing the way we plan cities and buildings. Virtual reality, Big Data, collaborative planning tools provide ways of improving the communication of development proposals and visualising the benefits. This technological innovation is predicted to enable more agile and responsive planning processes. Reference initiatives:

- **The City Observatory**
 - An information portal hosted by the University of Strathclyde Institute for Future Cities which collects, manages and interprets data relating to the urban environment
 - Datasets relate to the themes of transport, health, energy, crime and community
 - The City Observatory is also a physical space in Glasgow, which can be hired as a high-tech digital visualisation and analysis facility
 - <http://ifuturecities.com/projects/the-city-observatory/>
- **San Francisco Open Data (Data SF)**
 - Online platform for exploring datasets from the City and County of San Francisco
 - DataSF has a mission to transform the way the City works through use of data, to improve quality of life and work for residents, workers and visitors
 - Data categories include economy and community, transportation, energy and environment, housing and buildings and city infrastructure
 - <https://datasf.org/opendata/>
- **Bristol is Open**
 - A collaboration between the University of Bristol and Bristol City Council to research and develop initiatives around smart cities and the Internet of Things
 - Funded by local, national and European governments, as well as academic and private sector funding
 - Deploys small sensors, smart phones and GPS devices to collect information about city life, including energy, air quality and traffic flows
 - <http://www.bristolisopen.com/overview/>
- **Commonplace**
 - A digital platform for community engagement and a tool for consulting with and understanding the needs of local residents and businesses
 - Can be used to help communities plan and co-design their neighbourhoods
 - <http://www.commonplace.is/>

- **Future of Planning**
 - a programme exploring how digital innovation, urban data, and user-centred design can improve the UK planning system
 - Presents a comprehensive resource of case studies documenting state of the art innovations in digital planning, from around the world
 - <http://futurecities.catapult.org.uk/project/future-of-planning/>

3. Considerations for the Council

In addition to the policies set out in Plan:MK, the council may wish to explore alternative long-term mechanisms for carbon emission reduction and sustainable growth goals. These include mechanisms to share commitments with the private sector and other organisations, as well as to engage the community in behaviour change initiatives. The following sets out 7 key policy suggestions based on the outcomes of the workshop.

1. Building a Consensus and a Clear Definition for a Zero Carbon City

There is clearly an appetite within the council to deliver a zero-carbon city by 2050 which is reflected already in current policy, specifically Imagine MK 2050. Setting this target is also consistent with best practice in cities in the UK, and more globally. We suggest that MKC sets out clear vision for a zero carbon MK, to include the wider case for transitioning to zero carbon (opportunities and benefits). This vision will be owned by the council and should be communicated clearly to all stakeholders.

We recommend that the city defines more clearly what this means in practice to include:

- The impact of growth on total carbon emissions
- The description of emissions sources, specifically scopes 1 and 2², and
- The roles different parties will need to play using a version of the 'own, share and influence' model.

In doing so, MKC will need to clearly articulate the business case for striving towards a zero-carbon city including the potential for:

- Greater resilience in a changing energy climate
- Greater influence over costs of energy and management of fuel poverty
- Creating value through new businesses and employment opportunities
- Opportunities for returns on investment in local energy schemes

² Scope 1 refers to carbon emissions that arise directly from sources controlled by the city, e.g. from fuels used in boilers or the vehicles that people drive. Scope 2 refers to emissions generated through purchasing electricity for and by people living, working and visiting the city (Scope 3 emissions are a consequence of the activities of the city but occur from sources not owned or controlled by it. This includes emissions associated with waste, water, construction materials, and procurement / purchase of products).

Building a community of practice and broad support will be key to building the momentum required to deliver a near zero carbon city. Demonstrating how value can be created through new revenue streams, and the local community benefits, will create the draw to build political and public support. These opportunities are described in more detail below.

2. The Role of Planning Policy

Historically, planning policy has been used effectively to drive better energy performance of new buildings. In the medium term, policy should continue to pursue energy efficient housing and buildings whilst recognising that complying with building regulations is becoming increasingly challenging.

The greater emphasis on ensuring buildings perform as intended will require appropriate quality assurance throughout construction and commissioning. It will be important to ensure that the commitment to post occupancy evaluation is undertaken in practice, but it is not clear what measures the council can take if actual performance does not live up to design predictions. This kind of work also provides feedback to MKC on whether their policies are delivering the anticipated carbon savings, as well as giving the whole industry insight as to policy effectiveness.

Policies to extend existing low carbon networks will help existing buildings to improve their carbon performance. However, policy itself is unlikely to deliver the transformation required to deliver a near zero carbon city by 2050, and we have suggested complementary approaches below.

3. The Leadership Role of MK Council

MKC should continue to ensure that planning policy is implemented in practice. However, participants of the workshop felt that there was a far greater role the council could play. It was recognised that cities that organise themselves are better placed to attract investment. In this context, the council could take a role as an enabler, promoter, and consensus builder to create the right conditions for investment in low carbon futures. MKC itself needs to be an exemplar in its portfolio of buildings, policies and strategies to encourage this to happen.

It was also felt that the council is trusted by residents of MK and local business communities. This will help in relation to trust issues around use of data to better identify opportunities. MKC should also consider how this position could be used to leverage investment into locally owned energy infrastructure. Forms of collaborative governance offer ways in which the council can partner with business, community groups and the supply chain to deliver low carbon programmes.

MK:Smart was highlighted as a good example of where the council had demonstrated leadership around making data available which is now facilitating businesses in identifying investment opportunities for renewable energy solutions. The council should also lead by example, demonstrating pioneering and best practice in its own developments. There are also opportunities to showcase and celebrate good practice by others.

4. The MK Energy Company

Through the workshop, the group felt strongly that the establishment of a local energy company would be the best delivery vehicle for achieving a zero-carbon MK. The company could be wholly owned by the council, perhaps with some shares available for local business and the community. The company should be tasked with creating investable schemes which offer good returns, carbon reduction and social value (e.g. fuel poverty reduction, better energy services, employment opportunities). By establishing the purpose of the company to deliver clear outcomes, the Energy Company will be able to adapt to the emergence of new technology and changing external environment. This must be accompanied by a flexible procurement approach to bringing forward new approaches.

There is a huge current opportunity in the context of liquid capital and the company would be well positioned to leverage finance from central government, particularly following the industrial strategy announcement. Start-up funding could be sought through developer agreements but should be self-sustaining in the long term and deliver returns on investment.

5. MK Zero Carbon Enterprise

Building on MK's history of innovation, there is an opportunity to develop and nurture the supply chains which will be required to deliver MK's zero carbon vision. This could encompass building local skills in the operation and delivery of innovative technologies and growing organisations that are likely to develop new products and services. This should also extend to bringing forward smaller more innovative building contractors.

MKC should consider working with the South East Midlands (SEM) LEP, third sector organisations and the future MK:U to establish a prospectus and a framework that will foster the emergence of these types of organisations. Concepts like the Engine Shed in Bristol provide a good reference in this context. A similar scheme could be used to build a hub of expertise and incubate businesses working within Milton Keynes on the low carbon agenda. By working with SEM LEP, this offers ways of fostering collaboration across a wider geographical area and with other local authorities.

MK should also consider developing an industry festival around this work, with pilots and test beds, but also inviting people to create demonstrator projects and allowing temporary relaxation of planning regulations, as Rotterdam did for their architecture festival.

6. Mobility

Mobility is a cross-cutting theme across all the working papers and perhaps the most challenging. MK is a relatively compact city with the asset of the green grid. Participants at the workshop felt that a stronger culture of sustainable and active travel could be achieved with the right incentives. This could include investments to improve the connectivity of the Redways, provision of supporting infrastructure and working with community groups to promote walking and cycling culture.

In the medium to long term promote shared mobility services, electric vehicles and other solutions to shift away from fossil fuel based transport. Bold moves will be required to reduce

citizens' dependence on car use. Prototyping solutions through car free days, investigating different carpark pricing mechanisms and investing in shared mobility services were all highlighted as ways of shifting cultural norms. Workshop participants highlighted that existing city centre parking was a major barrier to development. It was recognised that autonomous vehicles will have a significant role to play but could not be seen as the panacea to MKs carbon and increasing congestion issues.

7. Urban form

The urban form of MK, based on a grid of wide roads, pavements and reservations, lends itself to a range of infrastructure retrofits and upgrades with minimum disruption for existing buildings and services and without compromising green space. New urban environments, as well as adaptations and infill projects, should be planned to reduce carbon intensity. Developments should consider the impact of microclimate and orientation on energy demand, overheating risk and other health and wellbeing factors.

A certain level of density is required to support low carbon infrastructure, particularly district energy systems, which require at least 100 dwellings per hectare to make them viable for new buildings given energy efficiency standards. Shared mobility systems also depend on a critical number of users to be commercially viable. Workshop participants raised concern that current policy on densification would be too low to meet policy targets. Selective intensification and transport oriented development principles should be embedded into growth plans. This will support the viability of new infrastructure investment but also support social infrastructure provision.

There may be future opportunities to release car parking spaces for development or community facilities.

4. Conclusion

This evidence paper has explored how Milton Keynes can build on its culture of innovation in design and sustainability to deliver sustainable development and meet its ambitious target of becoming a near zero carbon city by 2050. In the workshop, we presented the findings of our background research and stakeholder engagement. This generated a wide ranging discussion which we have captured in detail within the appendix. We have synthesised this to present MKC 7 key policy recommendations to support the transition to a zero-carbon city.

The grid and urban form of MK puts the city in a strong position to exploit these opportunities and adopt innovative solutions. Furthermore, building a culture around sustainable development and healthy lifestyles will be a key to attracting new residents and investors into MK.

5. Appendix

Workshop Attendees

Name	Organisation	Role
Fiona Robinson	Milton Keynes Council	MK Futures 2050 Programme Manager
Geoff Snelson	Milton Keynes Council	Director of Strategy and Futures
Luke Gledhill	Milton Keynes Council	Planning Officer
Joanne Spurrell	Milton Keynes Council	Planning Officer
Grant Gibson	Milton Keynes Council	Design and Project Manager
Ishwer Gohil	Milton Keynes Council	Strategic Transport Policy & Planning Manager
David Gleeson	Milton Keynes Council	Regeneration Programme Director
Neil Allen	Milton Keynes Council	Head of Regulatory Services
Jonathan Robinson	Milton Keynes Council	Senior Planning Obligations Officer
Ballard Christine	Milton Keynes Council	Project Manager
Sandra Hayes	National Energy Foundation	Sustainability Consultant
David Morgan	SmartKlub	CEO
Daniel Raymond	Expedition Engineering	Associate
Judith Sykes	Useful Projects	Director
Dan Epstein	Useful Projects	Consultant Director of Sustainability
Adam Mactavish	Currie & Brown	Director
Carrie Behar	Useful Projects	Senior Sustainability Consultant

Agenda

Time	Content	Notes
09:45	Arrival	- Tea, coffee, biscuits
10:00	Welcome and introductions	- Introductions - Aim and agenda
10:15 – 10:50		
10:15	Presentation	- Challenge of 2050 (MK & National) - Scale of Energy Challenge - Scenario for Zero Carbon MK - Role of MK Council
10:25	Group discussion	- Do we agree with definition of zero carbon? - How does MK balance the pursuit of carbon reductions, whilst protecting those in fuel poverty? - Is the scope correct?
10:50	Feedback	- Representative from each breakout group to feedback key discussion points
11:00 – 12:00		
11:00	Presentation	- Context of MK as an innovator - MK Energy Policy and Strategy - MK Energy Initiatives
11:15	Group discussion	- Are there any overlaps or gaps in policy? - What has been successful and where should the council focus efforts? - Any specific comments on Plan:MK?
11:50	Feedback	- Representative from each breakout group to feedback key discussion points
12:00 – 13:05		
12:00	Presentation	- Policy Overview - Innovative Governance Models - Technology Innovations and Disruptors - Innovation Parks / Prototypes - Practical Installations

12:20	Group discussion	<ul style="list-style-type: none"> - Is there anything that would get in the way of adopting new approaches? - How can the city be flexible to and manage these changes? - What else can the city take from this?
12:55	Feedback	<ul style="list-style-type: none"> - Representative from each breakout group to feedback key discussion points
13:05 – 13:35	Lunch Break	<ul style="list-style-type: none"> - Delegates to bring packed lunch
13:35 – 14:20		
13:35	Presentation	<ul style="list-style-type: none"> - What you have told us about some of the potential barriers - What we see as potential enablers
13:45	Group discussion	<ul style="list-style-type: none"> - Any additional barriers or opportunities? - How can these barriers be overcome? - What delivery mechanisms could be used to take advantage of the opportunities?
14:15	Feedback	<ul style="list-style-type: none"> - Representative from each breakout group to feedback key discussion points
14:20 – 15:00		
14:20	Round table discussion	<ul style="list-style-type: none"> - Key emergent recommendations

Comments by workshop theme

Topic	Comment
<p>Definition of zero carbon by 2050</p>	<ul style="list-style-type: none"> • How can the Council influence unregulated loads? Need to consider behavioural aspects. • Existing boiler cashback through offset fund – could this be extended to unregulated emissions? • Use of schemes similar to current boiler fund to replace old inefficient white goods, with A+ rated appliances. • Need to consider what happens to these existing appliances – circular economy thinking. The effect large scale replacement has on embodied carbon. • There is a disconnect between how we plan and what happens • Challenge around the high-level aspiration vs. delivery mechanism • Plan to remove D4, to speed up development (in line with NPPF), and to rely on building regulations (in line with ‘allowable solutions’ and NPPG) -risk of policy vacuum • Need to be looking at the city as a whole to find the best opportunities • The pressure is on the application stage – aspiration to speed up planning process • Some misunderstanding around carbon offset fund – it’s part of S106, not CIL. • Question around why MK is going for zero carbon? Is it just a moral argument? Or is there a business case? Need to set out the arguments clearly, e.g. energy security, better operating environment, resilience, economic edge. • Issue of who pays vs. who benefits? • Embodied carbon is hard to influence and may slow down development. Sense that if MKC get the other bits right (e.g. efficiency) they will attract best practice developers and carbon will take care of itself. • What are priorities for planning? Maybe they should be fabric and energy demand, rather than mandating generation. • It’s a ‘big picture system’ and therefore long-term thinking needed. • Deal with energy at a district level so that if it’s cleaner can continue to use more without carbon penalty. • Could the grid corridors be re-identified to hold localised energy infrastructure? • What can be done to support a move towards electricity? • How much electricity can be developed locally?

	<ul style="list-style-type: none"> • Again, consider embodied carbon of renewable technologies against the carbon it saves. • A move to flexible working while meaning transport based emissions are reduced with more people working from home. These workers are now using more heat/ energy in their inefficient homes throughout the day. • Improve walkability of the city – currently work and home locations are far from each other. • Requires a city-wide approach. •
<p>Policy Success</p>	<ul style="list-style-type: none"> • MK wide commitment to zero carbon that industry and residents sign up to. Defines individuals' role in contributing to achieving city-wide goals. • Some contradictions within planning. For example, obligation to grow economy but reduce congestion. These issues need to be addressed at a strategic level. Public transport and cycling not developed to support these aims. • Appears to be several initiatives around the infrastructure for electric cars but also need policy/grants to promote use – need to encourage purchase/lease of electric cars. Consider car share for electric cars. • What does our future society look like and how does policy support this now? • There is a disconnect between policy aspiration and what happens • Policy not driving investment in energy service and clean tech (more defensive) • Developers only comply with minimum requirements • There are 'battles' with developers around viability - some negotiation needed • Land is the big issue • MK prioritise affordable housing over carbon • Policy gaps include the energy performance gap and transport • PRS (private rented sector) applications – planning condition to 'consider feasibility' around energy - e.g. not that strong • In the end, it comes down to cost • Sense that MK are not always leading by example • Current policy is seen to be driving up costs (e.g. D4) – could they be reframed to find 'win-win' situations? • Strategy needs to be positive and proactive

- Carbon offset fund has been successfully used for insulation, and they have looked at appliance scrapping schemes. Now moving to bigger projects, e.g. PVs on roofs. Idea around promoting 'spend to save' as currently process is a bit short term.
- Success of carbon offset is a good example. Though now Building Regulations have caught up.
- May be more challenging in future to deliver 19% improvement in onsite energy performance as Building Regulations get more challenging.
- Another success is the street lamp LED upgrade.
- Boundary/scope around projects and budget often narrow
- MK is currently reactive, not proactive
- Don't want to be seen to be spending more money than necessary, even if long term costs are higher
- Policy needs to make it easier to pursue a different path.
- Lots going on – is it being reported, measured?
 - UK's best infrastructure for electric car parking is in MK. MK achieved this by influencing – didn't spend much.
 - Take up of electric cars going up
 - 2nd biggest cycle hire scheme outside of London (though challenge around cycling infrastructure- the unique segregated cycle ways not used, needs to be made easier to change behaviour).
- Council's role as 'trusted broker'
- Opportunities to promote modular and prefabricated construction.
- Example of Woking Council, who own Thameswey, (who also operate the MK Heat network) working with Private Sector – policy and investment strategies.
- Opportunity for MKC to lead in terms of projects they're doing – 'spend to save'
- Lead by example – but payback in the private sector.
- Idea of 'Sustainable Behaviour Charter'
- Drive behaviour change through co-ownership of resources, crowd-funding
- Sharing economy vs. owning economy
 - How could council accommodate this?
 - Driverless / shared vehicles?

	<ul style="list-style-type: none"> ○ Service economy ● Cities that organise themselves are better placed to attract investment ● Plan:MK targets – allow for “community” energy offer planning compliant ● Should council own more e.g. community energy infrastructure? ● Council has trust – good opportunity to set up energy company – community and personal ● The more MKC own the greater their sphere of influence. Risk reward appetite ● Safety is limiting walkable neighbourhoods ● Strategic case? – How does all this link with city goals?
<p>Opportunities</p>	<ul style="list-style-type: none"> ● Role of LA – MKC could be more than just service providers ● LA as ‘opportunity engine’ rather than ‘service provider’ ● MKC are driving change and leading development with the 6 big projects (e.g. Renaissance MK) ● Bridge for the public-private gap, to send a strong message ‘We are open for business’ ● Business is ready to invest – but is the mechanism there to help them deliver? ● Agile – need to learn from private and 3rd sector ● Digitally literate – not technologists forcing this on the community ● Challenges around ‘living streets’ project - people are so pushed for time they are finding it hard to engage ● Current low density could get in the way of achieving policy targets - policy needs to increase density ● People are set in their ways –typical concerns are how much will it cost? How will it affect me? ● Need 40-50dw/h to support public transport. People are scared of the number – but if you show them what best practice looks like they are okay with it. ● Role of modular construction – flexibility, custom/self-build ● Parking: need 2 cars per 2-bed flat, revenue in city centre only £2/day. Policies contradict each other. Interesting that the parking provision is in the public highway- this is unusual and a major barrier to development of land. 10x the parking provision of any other LA of a similar size! ● Dominance of car use – scale of car parking in the city ● Leads to very low density due to space requirements

	<ul style="list-style-type: none"> • Currently 2 parking spaces per 2 bed flat. Consider alternative use of space • Aspiration to move to mass transit but for this to be financially viable, high density is needed • Plan:MK currently not talking about delivery of high density • Can local policy be used to promote sustainable transport and reduce car use – for example putting up parking charges? • Opportunities for modular construction • Cooperative self-builds – could the council set aside sites to promote this • Lower council tax for ‘greener homes’ • Council to think of itself as a delivery partner to bring forward innovation • Limited appetite in development team for innovate. Different culture needed. LA’s don’t necessarily have the entrepreneurship skills. • Could Imagine MK2050 be rephrased as a 2 page vision and strategic plan? • Identify points where services are ending – these could offer moments to intercept / disrupt BAU. • Perception in parts of MKC that sustainability costs, rather than adding value and saving money. • Current low-density impacts mass transit viability • Current low-density limits growth potential • Could there be a policy to support custom build? • Shareholder / stakeholder models to encourage participation. • Political support can ebb and flow – uncertainty about political priorities • Idea for ‘Test Bed MK’ to incubate innovative and emergent smaller organisations and grow them (with MK:U). • If city doubles in size what is the impact on transport? How to create more viable transport solutions? • GRID is an asset. Opportunities around integrated infrastructure •
<p>Enablers and barriers</p>	<ul style="list-style-type: none"> • What is the effect on MK’s neighbours – are they neighbours or competitors? • Use of flexible procurement model • Who is the private sector? Social impact partner – but be careful who you partner with...

- Showcase best practice by making use of existing land to challenge the market, lead by example and demonstrate innovation.
- Resistance to change – make sure you take everyone with you
- Role of the council – Moderator? Smother? Enabler? Promoter? Mediator? Builder?
- How can MK be a ‘smart’ council? Understand what risks it is prepared to accept.
- Opportunities around demonstrator / catalyst projects – which can be revolutionary but don’t appear too threatening at face value!
- Council as arbitrator / broker – need to provide a coherent vision
- There are big opportunities – they’re good at framing the ‘what’ but what about the ‘how’?
- People have a certain mindset / expectation of the city: green, cars, big houses
- What does MK offer? Education & Jobs
- Idea to host a big festival, e.g. ‘Glastonbury’ to demonstrate how the city could feel if it was full of people
- Could the Parks Trust model be used as a template for other parts of the city? Or LEP?
- SmartKlub working with BEIS, who want to work at LEP level. SmartKlub prefer the City level (Birmingham LEP includes Coventry)
- Boundaries – how do you work with adjacent LAs?
- LEP for current area not working.
- What about Mayoral model?
- The market and low land values are a barrier
- Mindsets – habit, custom and practice – how to change?
- Opportunity to widen the stakeholder group to include private sector.
- Timing of public transport and infrastructure – barrier
- New areas present opportunities for new ways of living – no existing residents with engrained habits. Could be an opportunity to introduce some density and act as an example.
- Moving from least risk to greatest opportunity.

- There's a perception of not enough parking and more congestion.
- How to make density attractive
- Who are the private sector?
- Set up a community 'energy' utility company.
- ESCOs can be more than just supplier
- Transport could be community (not for profit) model, public and commercial, or 'on demand'.
- How to make the most of technological advances?
- Could MK replicate the Parks Trust model?
- MK is still growing, providing opportunity to reshape policy
- Use of collaborative delivery model – form a series of trusts to tackle key sustainability themes
- Reach out to wider neighbours – central government, local, community scales
- Little pull for low carbon transport – the city lends itself to the car, however as innovation in movement – clean vehicles, autonomous vehicles, electric bikes, dockless bikes and new bike share services, Uber type services etc. become a reality this may well change and the appetite for a shift away from multiple car ownership may change but this will take time. the lack of good public transport and perceived distances etc. are currently considerable barriers.