

Milton Keynes Energy Prospectus

15 December 2020



milton keynes council



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**Foreword by Councillor Jenny Wilson-Marklew,
Cabinet Member for Climate Action and Sustainability**

I'm sure I'm not alone in thinking that Milton Keynes is a pretty special place to have grown up. On its redways I learnt to ride a bike, in its woods I found my deep and enduring love of nature and through its balancing lakes saw the genius of its architects in joining natural mechanisms with a highly planned and considered built environment. It is through this experience, being a child of a place like Milton Keynes, that I find myself writing the foreword to this ambitious document, through which we will lay out our plans to make Milton Keynes carbon neutral by 2030.

We now find ourselves facing new challenges. The spectre of climate change is beginning to seep into our lives - it is no longer a concept or something that happens to people in distant lands. The scientific community has reached a level of consensus rarely seen around the dangers of a rising global temperature and it's causes. It becomes incumbent upon all of us to take responsibility and play our part in limiting climate change's impact and preserving our home, our country and our planet for future generations. Within this document, we provide the background and context within which we are operating.

That said, it's not an easy thing to tackle - if it was, we'd have done it by now. It requires vast amounts of investment and changes to the way we live our lives. For many, this change is beyond their reach. When it is a struggle to get out of the door in the morning to get the kids to school on time, there often isn't the capacity to change the journey so that it can be done using a bus. When the struggle is being able to get food on the table, as it currently is for far too many, making considered choices about where that food has come from simply isn't an option. The burden cannot simply fall on individuals. There must be strong leadership coming from elsewhere.

Milton Keynes Council believes that it has an important role to play in delivering changes that will push us towards Carbon neutrality through investment, innovation, and strong leadership. This document sets out our plan. Through it, we articulate what we're doing and what we plan to do. It also highlights the invaluable role the Task and Finish Group have played. This document will be updated in six months' time to reflect their findings and recommendations.

This action plan is bold and ambitious. Its' purpose is to crystallise the depth and breadth of commitment we have made to reaching carbon zero. But more than that, it is a document of hope; the hope that we can play our part in making our world a better place for future generations.

Purpose of this Prospectus

Background

Milton Keynes Council (MKC) is embarking on an ambitious plan to execute the commitments made by its leadership to achieve net zero by 2030. In pursuit of this plan, MKC are taking a proactive position working across council service functions and with the people and businesses of Milton Keynes. MKC will facilitate progress but not just be a facilitator. The intent is for MKC to play a central co-ordinating role in decarbonising Milton Keynes and leading the way to net zero.

This prospectus sets out the opportunities as currently identified, current strategic partners and key stakeholders with an open invitation for others to engage with the MK Energy and Carbon Hub to open discussions on investment and innovation opportunities to stimulate the post Covid green recovery.

The Sustainability Strategy 2019-2050 sets out the ambition of MKC and its net zero ambition, to become the world's greenest city.

The Sustainability Strategy Action Plan outlines the scale of the challenge and the interventions required to reduce carbon emissions to zero for the council's own operations. Clean growth in the city is paramount to achieving net zero goals for the Borough itself.

This prospectus has been prepared with the following aims:

- To present the opportunities identified within the City for investment in low carbon infrastructure
- Identify priority projects for accelerated delivery
- Provide an overview of the role of the MK Energy and Carbon Hub in accelerating investment and delivery of clean growth and stimulating the local green economy, and Covid-19 recovery
- To support the objective in Strategy for 2050 and Plan:MK (the current local plan) to mitigate the Borough's impact on climate change and reduce CO2 emissions by promoting community energy networks and strategic renewable energy developments
- To support the delivery of the Strategy for 2050 and make Milton Keynes a leading green city

The facilitation and delivery of the opportunities and projects within this prospectus will be via the MK Energy and Carbon Hub, a unit to be initially hosted by MKC, with the aim of becoming self-financing and perhaps a separate entity. This prospectus outlines the role and purpose of this Hub.

With this prospectus MKC are declaring that Milton Keynes is open for net zero development and investment.

Overview of Local Area

Milton Keynes has been the fastest growing city in the UK over the past three decades. With a population of approx. 270,000 and growth anticipated to accommodate around 410,000 people in the borough by 2050, ensuring that all future development is sustainable is key to mitigating the impact of growth on the city and surrounding areas and the utilisation of natural resources.

Milton Keynes is unique in that its very layout means high quality green spaces (parks, lakes, woodlands and rivers) are close to every home. This green and blue infrastructure supports a higher degree of air quality and mitigates flood risk whilst reducing the carbon footprint of the city through the abundance of trees.

Our city is a special place. Everywhere, rich, peaceful landscapes surround our homes. Our networks of parks and lakes are gifts which keep on giving. Our city centre is one of the nation's most popular places to go shopping. We can easily travel around the city by car and our Redways provide traffic-free routes for walkers, cyclists and e-scooters. Being a good place to do business has made Milton Keynes the fastest growing city in the country.

Since the early 1950s, this part of North Buckinghamshire has been popular with families moving from London. Pioneers moved to a Bigger, Better, Brighter Bletchley and then to Milton Keynes: City of Trees. We have thrived by welcoming newcomers from all parts of the world and our diversity is an immense strength. Now, much of our growth comes from our children, and their children, building their families here. But today, not everyone shares in this prosperity. It can be difficult for some residents to get around our city or to access a good job. Too many of our young people live in poverty and do not gain the skills that they need to make their way in life.

By 2050, some 410,000 people will live in Milton Keynes borough, part of a Greater Milton Keynes of around half a million. Our Strategy for 2050 starts with some big promises to the residents of Milton Keynes today and in the decades to come. We will strengthen those things that make Milton Keynes special and deal with our weaknesses. This Strategy is for everyone, but especially our children and young people who are the future of our great city.

Milton Keynes Strategy for 2050

The structure of the city was designed for innovation and to retain the flexibility to adapt over time. On our individual estates, sites were reserved to provide space for future community facilities. At a city scale space was provided alongside grid roads to allow for road-widening or the introduction of mass rapid transport system, as proposed in the

Milton Keynes Strategy for 2050. This foresight on the part of the original city planners means that Milton Keynes is ready to accommodate the acceleration of clean growth activity.

Achievements, Assets and Enablers

In Milton Keynes the drive towards low carbon and sustainability has always been at the forefront of design and development.

Over the years Milton Keynes has established itself as a leader for innovation in low energy buildings. In 1986 the Energy World Exhibition was opened, showcasing energy efficient housing and denoting a significant milestone for progressing design and construction of low-energy housing. In 2005 Oakgrove School became the first secondary school to be built to the highest national environmental assessment method standard at the time, BREEAM “excellent”. The school incorporates high standards of energy-efficiency and low environmental impact, including one of the biggest ground source heat pump installations in Europe.

Striving for a low carbon city has meant that reducing the environmental impact of buildings and transport in Milton Keynes has never been an afterthought. In 1972 the first house in the UK incorporating active solar heating as well as solar heated hot water was established in Milton Keynes. It was one of the few projects exploring alternative energy sources to oil. In 2008 Mercedes-Benz installed a wind turbine and industrial units in Bletchley began receiving supply of electricity from their own wind turbines. In the centre of Milton Keynes is the **CMK heat network**. This was established in 2007 and provides heat to The Hub, Vizion and The Pinnacle in the centre of the town as well as power via private wire and to the grid. We have led the way on carbon offsetting policies.

Over the years Milton Keynes has undertaken and co-ordinated research on sustainable energy technologies, and in 1986 the Open University opened the Energy and Environment Research Unit (EERU). In 1992 the city became the first to offer curb side recycling, and in 1993 it constructed the UK’s first purpose-built Materials Recycling Facility (MRF). Today, in the North West of Milton Keynes lies the **Wolverton Resource Campus (WRC)**. This houses the energy from waste facility that processes 132,000 tonnes of municipal waste per year and generates up to 7MW of electricity. The site has been set up to provide energy for the nearby Materials Recovery Facility (MRF) and other local power demand.

Our innovation continues today with autonomous delivery robots – a scheme that was invaluable to many residents during the 2020 lockdown – and trials of driverless vehicles.

Innovations such as these, throughout the years, are what encourage Milton Keynes to pursue further developments to ensure they will be carbon neutral by 2030. The achievements to date lay a strong foundation for future low carbon development. This prospectus sets out the platform from which Milton Keynes can actively and profitably pursue its net zero ambitions and contribute to the UK Government targets set by the Climate Change Act. Milton Keynes has the opportunity to deliver on net zero ahead of the government target of 2050.

Milton Keynes Council has recently established a strategic partnership with **Engie** for the delivery of the **Re:fit** programme across the council estate. This will accelerate low carbon retrofits for existing building stock owned by the council – residential, commercial or industrial.

In parallel, to facilitate and accelerate investment and delivery of a programme of energy projects across Milton Keynes, the creation of **'The MK Energy and Carbon Hub'** is underway. This will be an MKC led business unit that is designed to ensure the transition to carbon neutrality is possible through a combination of functions that enable rapid low carbon development.

Future Clean Growth Potential

Milton Keynes presents a unique opportunity to deploy localised energy schemes that can supply the needs of heat, power and low carbon transportation, ensuring that all citizens and businesses have the opportunity to benefit from the ambitious net zero plans being put forward by MKC.

Central Milton Keynes (CMK) will be key to accelerating clean growth come forward and to understand which types of facilities and activities we might want to encourage in which places. Through our Renaissance:CMK project we are working with Milton Keynes Development Partnership (MKDP) to create a new framework for growth and investment in CMK.

The potential for the existing heat network to extend its reach to the Milton Keynes University Hospital (MKUH) presents further opportunities to accelerate the delivery of low carbon heat to serve the hospital campus, soon to be extended with a new children's and maternity unit. The hospital campus is flanked by estates to be included in the regeneration programme, with the potential for energy centres to be at the core of a programme of retrofit upgrades.

The MK Waste Recovery Park (MKWRP) to the north west already generates significant power that is either used locally or sold through the grid connection to the grid. The heat output of the MKWRP is not currently utilised, so presents a further opportunity for local integration through for example, the piping of waste heat to the estates within the regeneration programme, connecting to the CMK heat network or providing heat to other local businesses. There is a significant amount of available land adjacent to the MKWRP which could allow for the intensification of energy generation locally.

To the East of the city is Magna Park – a significant business and distribution hub that provides access to the M1 and across the country. Here lies a further opportunity for the development of localised energy solutions to support demand. Working together to secure the supply to the occupiers of Magna Park could be a significant step in underwriting the required investment to build infrastructure.

Figure 1 depicts the above opportunities.

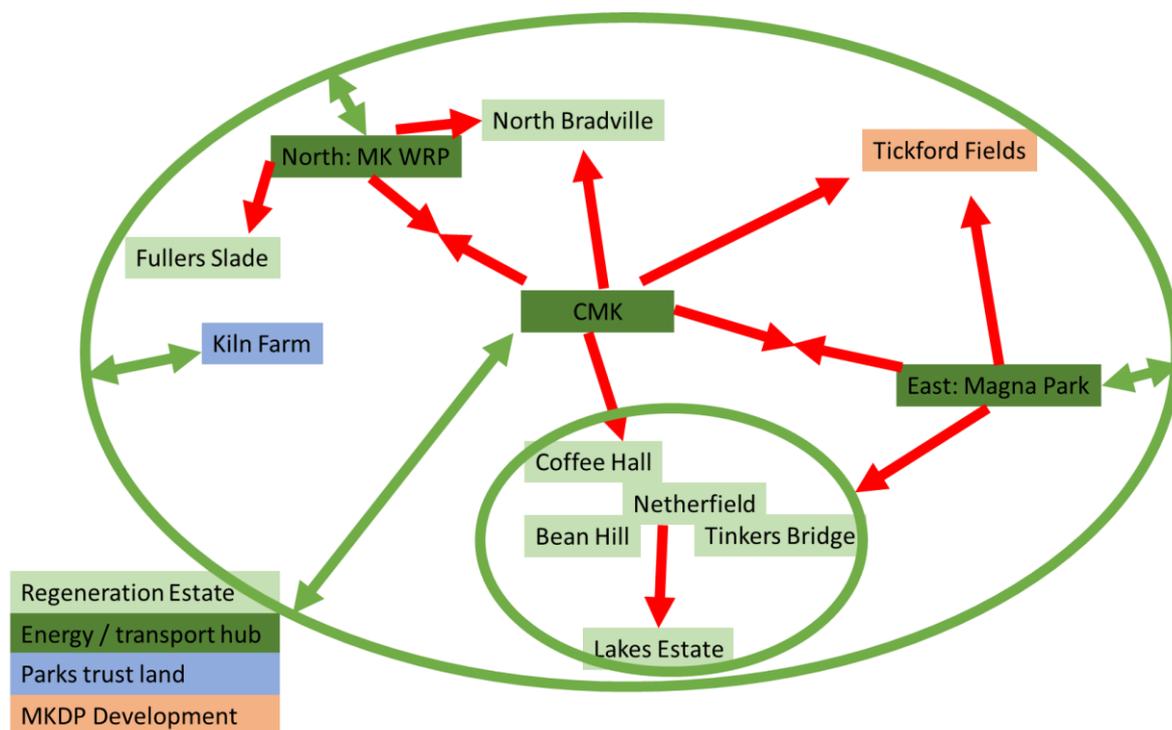


Figure 1 (draft visual)

The council's regeneration programme is focused on making positive and long-lasting differences for people and families in Milton Keynes, and there are at least five upcoming regeneration schemes that will develop over the coming years. Further to this there is the new development in planning at Tickford Fields as well as MKC's ambition to set up a housing development company.

The Milton Keynes Strategy for 2050 highlights the importance of long-term planning for growth, which includes making available the infrastructure and services such as transport, health, social care, schools, shops, leisure, sports and cultural facilities that are essential for existing and new communities. By planning this upfront we can make the case for investments that will serve us well into the future, rather than reacting as pressures arise.

Bringing together a common framework for delivery of heat and power, aligned with infrastructure for low carbon mass rapid transportation, is necessary and provides the opportunity for net zero at inception. The MK Energy and Carbon Hub will work very closely with strategic partners to ensure net zero is at the heart of all investment in the council's assets.

Potential Financial and Investment Opportunity

Developing energy and infrastructure projects is complex and requires a systematic commercial approach in order to achieve the best outcomes. The diagram below illustrates that under MKC leadership there is potential for the MK Energy and Carbon Hub to develop projects from inception through to delivery with potential exit points along the way. A core function of the Hub will be to optimise the balance between risk and return to a manageable level for the Council across its portfolio on energy projects. For some projects it may be appropriate to seek a full or partial exit at a particular stage, whereas others may be acquired part way through the development process or developed through to operation.

By retaining a portfolio-based view of all activities, the Hub will deliver a highly performant suite of interventions which will accelerate the drive towards net zero whilst delivering solid returns. This enables the broadest set of positive outcomes possible to all stakeholders including the council, residents and local businesses. Figure 2 below demonstrates how this could be achieved.

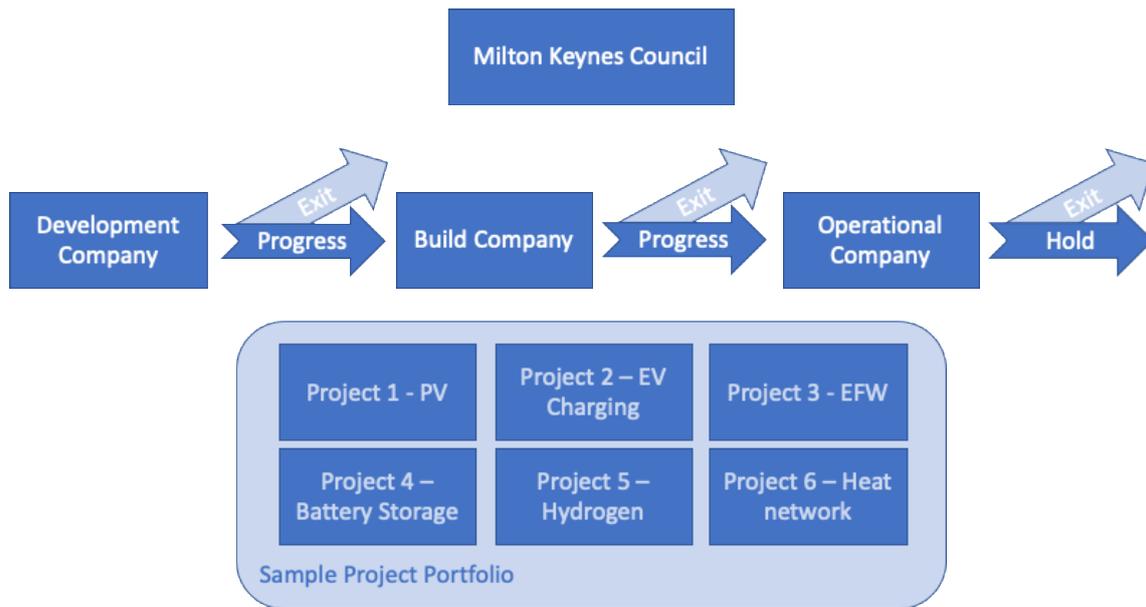


Figure 2 – Project development stages

Enabling Delivery

Project Enabler – MK Energy and Carbon Hub

To facilitate and accelerate investment and delivery of a programme of energy projects across Milton Keynes, the creation of an Energy and Carbon Hub (Hub) for Milton Keynes is underway. This will be an MKC led business unit that is designed to ensure the transition to carbon neutrality is possible through a combination of functions that enable rapid low carbon development.

Governance of the Hub will be led by MKC and to accelerate delivery of the first suite of projects will be set up as an internal function with a clear commercial remit. In time it is likely that the unit may be run as a separate company, and to prepare for that a Shadow Board will be put in place to provide oversight of the programme, alongside a steering committee to support the development of investment ready projects. The Hub will have the overview of opportunities across the city for low carbon investment with key strategic relationships in place to support dialogue with investors and developers who share the ambition for Milton Keynes to become the first net zero city.

The functions of the Hub are shown in Figure 3.

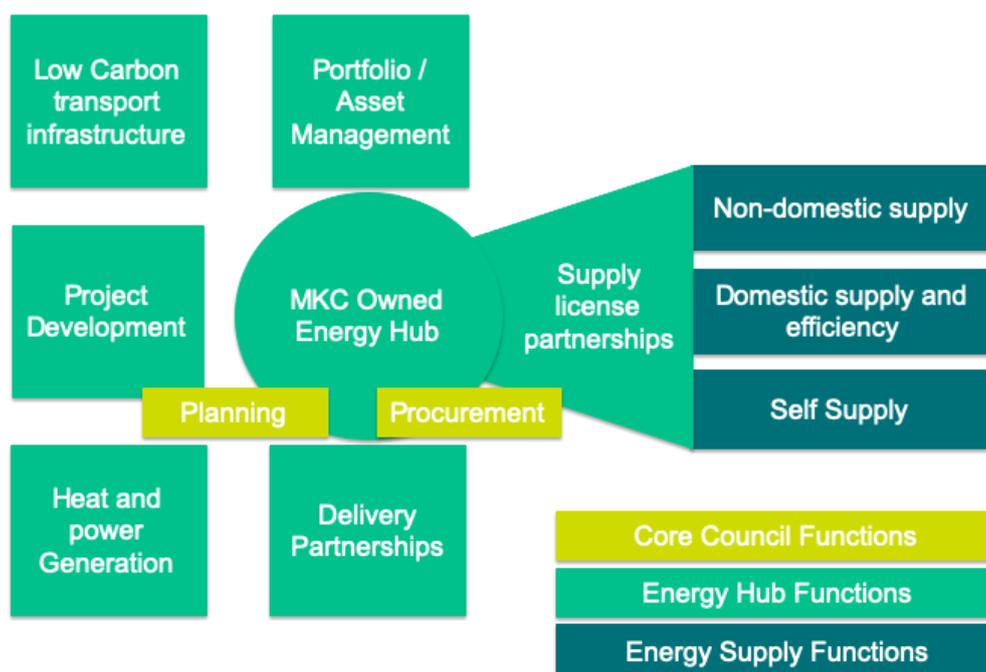


Figure 3 – MK Energy and Carbon Hub functions

The Hub will be an enabler at its core. By being central to the carbon neutral transition and through proactive and positive engagement with the market the Hub will provide **Assurance** to the market by helping to mitigate planning, development and operational risk. It can provide **Stability** through access to market and commercial agreements for the offtake of energy. It will provide a **Framework for Engagement** with all types of energy user. Any generated **Surplus** will be used for MKC improved service provision – including action on fuel poverty and air quality. It will **Deliver** net zero for Milton Keynes.

The MK Energy and Carbon Hub will work hand in hand with our service functions to accelerate development. Within three to five years the Hub will be targeted to become self-funding whilst creating employment and reducing emissions.

Functions of the MK Energy and Carbon Hub

The Hub, upon set up, would be tasked with developing and delivering the net zero ambitions of the council, bringing together a package of deliverable and executable projects that fit within the overall ambition - to help MK become the greenest city in the world. The respective functions will include:

Programme leadership – defining and developing an overall executable masterplan. This function will ensure alignment between policy and delivery, retaining focus on the target of net zero and the interventions possible to achieve that goal. In a phased approach, development is likely to be focused initially on MKC owned assets using Re:fit, with a view to expansion to working with local landowners, occupiers, industrial users and beyond MKC boundaries.

Project Development – this is the process of developing ready to build, investible projects and will include initial feasibility studies to ascertain commercial viability of projects. Once viability has been confirmed, this function will ensure that all required aspects of a project are secure and deliverable – including (but not limited to) ground assessments, planning and environmental permitting, grid studies and connections, risk assessments, offtake agreements, feedstock agreements.

Once all aspects of a project are secure it can be traded to realise uplift in value, built out as a going concern council asset or developed in partnership with development partners. Such decisions will be technology, asset and risk based to ensure a balanced portfolio.

Delivery Partnerships – in line with the objectives of the project development function it will be critical to be able to access the market quickly and seamlessly. An important function will be the management of delivery partnerships which will span the land and professional services landscape.

Land – the Hub will actively seek direct and active relationships with local landowners and developers to ensure the flow of land to underpin the ambitions of MKC and the Hub. This may be in the form of securing land for development from local landowners or could equally be the letting of land under option or lease to developers seeking to develop net zero based projects.

Professional Services – there will be a variety of services required for projects depending upon the technology as well as the inputs and outputs of the projects. It is expected that this function will recruit, maintain and manage a range of suppliers of required services that will be called upon as needed through the development process. As a guide, the services to be supplied will include (but may not be limited to):

- Planning
- Environmental permitting
- Land condition
- Grid consultancy
- Specialist legal services
- Design
- Engineering
- Feedstock supply
- Energy brokerage
- Technology suppliers
- Waste contractors
- Engineer, Procure, Construct (EPC) contractors
- Operations and Maintenance contractors

Through careful management, the professional services function will minimise risk on projects through ensuring swift and accurate execution of project development delivered by experienced teams of specialists. Whilst the list above does not cover all potential services requirements the discipline and governance instilled in the delivery management function will enable the Hub to bring new contractors on board quickly as required.

Programme leadership, project development and links to the Council operations will be provided by a core team within the Council of 2FTE, drawing in specialist expertise for each project as the programme develops, identifying funding and financing opportunities for project development and delivery. As the portfolio of projects and renewable assets grows, and revenue streams increase, the Hub will aim to expand to further accelerate investment and develop longer term energy infrastructure projects. The core team supported by the steering committee will be the gateway for low carbon investors to engage with the Hub and MKC to collaborate on the net zero ambition.

We plan to continue to invest in the Hub through 21/22, reducing this through 22/23, with an ambition for it to deliver a surplus in 23/24.

Strategic Partners & Stakeholders

The Hub will utilise the existing strategic partnerships that are in place with the council to deliver on this ambitious programme and seek to forge new partnerships that will complement the ongoing work and support the acceleration of investment and delivery of additional opportunities.

Local Partnerships

Local Partnerships are providing support to MKC across a range of activity related to climate response, including the delivery of the Re:fit programme, the development of the Supplementary Planning Document for Sustainable Construction policy SC1 of Plan:MK and the creation of the MK Energy and Carbon Hub.

Local Partnerships is a joint venture between the Local Government Association, HM Treasury and the Welsh Government and provide an interface between central government policy and local delivery.

Its principal responsibility is to deliver expert support to the public sector, helping make best use of limited resources as demand for services continues to rise. Local Partnerships co-own the Re:fit Energy Performance Contract framework with the Greater London Authority, and are working with a number of councils across England to respond to the climate emergency.

Engie & Re:fit

MKC are partnered with Engie, to deliver a wide ranging programme of energy projects across the council estate via a Re:fit Energy Performance Contract (EPC).

This programme will deliver a programme of works across multiple phases, beginning with corporate council properties with schools, sheltered housing, council owned housing and land assets for renewable energy projects to follow in subsequent phases.

The Re:fit programme has a performance guarantee attached to it, ensuring that the forecast energy and carbon savings are delivered and accelerating the progress to net zero. Engie's role as MKC's Re:fit Service Provider and strategic partner makes the most of the breadth of expertise that they will bring to Milton Keynes, and a major role in delivering the interventions required to reach net zero emissions by 2030.

Western Power Distribution

Western Power Distribution is the company responsible for electricity distribution in the Midlands, South West and Wales. The opportunities within this Prospectus will require connections to the existing grid and early engagement between the Hub and the district network operator (DNO) will facilitate the development and delivery of larger scale projects, where there is limited grid capacity available.

The Parks Trust

The Parks Trust is an independent charity that cares for over 6,000 acres of parkland and green space in Milton Keynes. This includes the river valleys, ancient woodlands, lakesides, parks and landscaped areas alongside the main roads that represent 25% of the city. The Trust leases land from MKC on a 999-year lease and grows its asset portfolio as the city grows and new green space is created and acquired. The Parks Trust will be a key stakeholder for the development of projects and delivery of net zero across the city.

Milton Keynes Development Partnership

Milton Keynes Development Partnership LLP (MKDP) is owned by Milton Keynes Council. It facilitates Milton Keynes' continued growth and economic success by promoting the development of its land assets to deliver economic and social value from its 70+ sites in line with the Council's Plan and Plan:MK. The MKDP estate comprises around 265 developable acres.

Its role is to develop and grow stakeholder relationships with investors, developers, occupiers and others to provide a fair playing field conducive to conducting professional property business.

MKDP is operated by a specialist team who report to MKDP's board and Milton Keynes Council.

Mears

Mears work in partnership with MKC to deliver repairs and maintenance, capital investment programmes and asset management related services to their c.11,500 social housing stock within the City and surrounding areas. The partnership delivers a stock investment

programme; ensures statutory compliance; delivers core maintenance, void and adaptation services and provides a joined up, forward thinking approach to all aspects of the housing stock

Project Development

A number of opportunities across the city have been identified, in addition to the ongoing Re:fit programme and additional sites which are generally clustered in three locations, and summarised in Figure 4.

	Wolverton Resource Campus	Central Milton Keynes	Magna Park	Regeneration and estate renewal	Homes and house building	Schools
Heat	Fuller Slade Local heat Connection to Centre	Connect to hubs Domestic heat	Industrial offtake Local domestic opp'ty	Connect to hubs Domestic heat	Connect to hubs Domestic heat Improve insulation	Connect to heat network Swimming pools – heat sink
Power	Local Private wire Domestic supply Intensify generation	Integrated generation Localised private wire Offtake	Industrial offtake Localised private wire	Small scale energy centres - fuelled by SRF from MKWRP or waste from other sources	Immersive and interaction experience for residents	Solar PV / battery storage
Low Carbon Transportation	Linking to MK Fleet RCV's EV / H2 support	Hub for city centre low carbon vehicles EV / H2 distribution	EV / H2 support at scale Drive the market	Opportunity to develop an energy system that balances generation against demand through the day and night	Minimise infrastructure required by incorporating all needs within the development	Local hubs

Figure 4 – initial opportunity clusters

The opportunities currently identified that are additional to the programme of work to be delivered by Re:fit and Engie are set out in Table 2, followed by detail as to how these are clustered around the Wolverton Resource Campus, CMK and reaching out to the regeneration areas surrounding Milton Keynes University Hospital and the Magna Park distribution hub. The existing and new school estate and new residential development across the eastern and western expansion areas delivering approximately 60,000 new homes, between now and 2050, will contribute to the carbon neutrality target with low and zero carbon placemaking.

Project	Opportunity	Type	Potential Capacity (MW)	Council/MK Energy & Carbon Hub Role	Fuel Poverty/Resilience	Decarbonisation	Climate Emergency
Wolverton Resource Campus	Energy from Waste	Power	6700	Operation		x	x
	Heat offtake	Heat	22000	Opportunity	x	x	x
	Anaerobic Digester	CHP	1200	Opportunity		x	x
	Battery storage	Power	5000	Opportunity			x
	Solar PV	Power	15000	Opportunity		x	x
	Materials Recycling Facility (MRF)	Private Wire	1000	Opportunity		x	x
	Refuse Collection Vehicle (RCV)	Private Wire		Opportunity		x	X
CMK	New Development	Power Transport	tbc	Opportunity			
	CMK Heat Network Expansion	Heat Power	tbc	Operation	x	x	x
	Heat supply	Heat	6400	Facilitator / Owner / Offtaker	x	x	X
Magna Park	Trigeneration	Power	tbc	Opportunity			
		Heat	tbc	Opportunity	x	x	x
		Coolth	tbc	Opportunity			
	Low Carbon Fuels	Heat	6400	Opportunity	x	x	X

Project	Opportunity	Type	Potential Capacity (MW)	Council Role	Fuel Poverty/Resilience	Decarbonisation	Climate Emergency
Regeneration Estates	Micro - energy	Power Heat	tbc	Opportunity	x	x	x
	Solar PV	Power	tbc	Opportunity	x	x	x
	Heat network	Heat	tbc	Opportunity	x	x	X
Development: Tickford Fields	Low carbon homes	Efficiency	tbc	Opportunity	x	x	x
	Digital City	Smart	tbc	Opportunity	x	x	x
	Energy system	Heat Power	tbc	Opportunity	x	x	x
	Transportation	Low carbon	tbc	Opportunity		x	x
Council Homes (11,500 existing homes)	Rooftop solar	Power	tbc	Operation / Opportunity	x	x	x
	Heat networks	Heat	tbc	Opportunity	x	x	x
	Tariff's	Supply	tbc	Opportunity	x		
	Net Zero Housebuilding	Efficiency	tbc	Opportunity	x	x	x
Schools	Solar PV	Power	tbc	Operation / Opportunity		x	x
	Energy Centres	Power Heat	tbc	Opportunity		x	x
	Net Zero	Efficiency	tbc	Opportunity		x	x
Low carbon Fleet (Buses, Fleet, RCV, HGV)	Refuelling stations	Multi-vector	tbc	Opportunity		x	x
	Hydrogen	Power	tbc	Opportunity		x	x
	Electric Vehicles	Power	tbc	Opportunity		x	x

North West: Wolverton Resource Campus

The Wolverton Resource Campus is a core focus for low carbon energy, at the centre of which is the Milton Keynes Waste Recovery Park (MKWRP), which is an energy from waste plant processing 132,000 tonnes of municipal waste per year and capable of generating 7MW of electricity. Nearby is a Materials Recovery Facility (MRF) as well as the siting for the waste fleet. The campus itself is near to Wolverton and the main North / South National Rail route. It is proposed that a direct private wire connection is made between the MKWRP to the MRF and the adjacent Environmental Services Depot to power the recycling facility and potentially a low/zero emissions fleet. The private wire network would utilise approximately 1MW of power from MKWRP maximising the potential of the waste to energy facility and overcoming any export constraints as the MKWRP is optimised.

Opportunities:

Heat – The residual heat of the plant at the Air Cooled Condenser is about 22 MWth, but this is steam at low pressure and only 40C of temperature so very little potential for heating. A turbine bleed to extract heat at better conditions could be considered but this would result in a corresponding reduction to the electricity produced at the plant. This would need to be contractually accounted for with Amey, the operator of the Energy from Waste plant. There is the potential to connect this heat to the nearby development at Fuller Slade for district heating. A connection to the heat network in CMK could also be possible.

Power – Private wire to Network Rail. This could be an ideal export for the electricity from the MKWRP which could yield increased revenues for MKC as well as reducing the cost of power for Network Rail. However, connecting at nearby Wolverton is not possible without constructing a new transformer which for the level of power to be supplied is not viable. The nearest potential connection is at Leighton Buzzard which is too far away to be viable. However, should the potential offtake be increased the economics for building a new substation at Wolverton could be improved. Viability of such a scheme would need to be tested.

Renewable power – There are two main opportunities here with rooftop solar PV for the building facilities on MKWRP and to utilise adjacent land owned by MKC but leased to the Parks Trust on a long-term lease arrangement. There is a proposal to install 200-250kWp of solar capacity at MKWRP in 2021. There are up to 20 hectares which may be available which could house 10-15MW of ground mounted solar and the land could also be considered as potential for wind generation development. Good practice would be to develop such generation facilities in conjunction with battery storage with the output used locally where possible via private wire.

Refuse Deriver Fuel – A potential output of MKWRP is Refuse Derived Fuel (RDF). The bulk, 90,000 tonnes per year, of the RDF is processed on site in an Advanced Thermal Treatment process. There is a potential to accept more waste inputs into MKWRP with a view to producing RDF for exporting

to be a feedstock for localised generation – perhaps on the regeneration estates or new developments across MK supporting a move towards a circular economy.

Transportation / Fleet – Also adjacent to the MKWRP is the Environmental Services depot which operates a fleet of refuse collection vehicles (RCV) and the Arriva bus depot. There is potential for the conversion of these vehicles to electric with the power output from the MKWRP and solar facilities to dramatically reduce the cost of refuelling.

Summary – There is a clear opportunity to build on the current energy facilities in place at the MKWRP to both utilise what is generated currently more efficiently through the use of private wire export and making use of the waste heat as a feedstock for district heating networks. Further to this there is an opportunity to intensify renewable energy generation through the development of solar and wind schemes.

Central Milton Keynes

Low carbon development within CMK will support the aims of the Renaissance:CMK to create an even stronger and more successful city centre that is fit for the challenges of the mid-21st century. Through investment in new employment, residential, retail and leisure opportunities, drawing on the benefits that could be created by a new city centre university, and (re)developing vacant or underused buildings and land, Renaissance:CMK will help to create a prosperous city centre and capitalise on our position at the heart of the Oxford-Cambridge Arc.

The existing heat network in CMK, with the energy centre located behind the CBX complex can present opportunities for the expansion of this network and development for low carbon heat. This includes meeting future heat demand for major development within the city centre.

Opportunities:

CMK District Heat Network – the existing district heat system in CMK is the first place to look to expand and decarbonise energy. Future development in CMK could look to connect to the CMK heat network, adding demand capacity and heat generation capacity and enabling the network itself to grow. By taking such an approach, this could enable the expansion of a CMK heat network hub with future major developments as anchor loads. There may be potential that the heat network could also be extended to the WRP to the North West, Magna Park to the East, the MKUH campus and the regeneration schemes across the city.

Power – Future developments will have significant demand for power so there is likely to be a viable business case for power generation as a component of the development. This may be in the form of an energy centre and almost certainly could benefit from solar PV cladding or rooftop arrays to deliver low carbon power. The energy centre could also be set up as a processing site for SRF from MKWRP generating power and heat for the development and the heat network.

Summary – City centre developments provide unique opportunities from an energy perspective to really drive towards low carbon. By taking a strategic approach it will be possible to deliver a commercially viable low carbon energy system that can support the centre of Milton Keynes as well as exporting to other parts of the City. This alongside the MKWRP can stand as the cornerstone for the net zero ambitions of the council.

East: Magna Park

Magna Park, to the East of Milton Keynes, is a significant logistics and distribution hub. Occupiers at Magna Park are significant users of heat, power, coolth and transport fuel. Consequently, Magna Park is a source of significant emissions for Milton Keynes and therefore becomes a target for low carbon development. At the time of writing there is limited renewable generation on site so there is an opportunity to work with the owners and occupiers of Magna Park as potential offtakers for localised generation.

Opportunities:

Solar PV – with many hectares of roof space this provides a perfect location for rooftop solar. Based on the potential roof space across Magna Park, there could be the potential for 20+ MW of rooftop solar PV to be built in partnership with the owners and occupiers providing low cost, low carbon power.

Tri-generation – with the significant demand for heat, power and coolth there is the opportunity to develop a local energy station and distribution networks for each energy vector, improving the efficiency of the depots on site, reducing costs and lowering the carbon footprint. The feedstock for this could be the Solid Recovered Fuel generated at WRC.

Low carbon transportation fuels – with such demand for transportation fuel locally, there is a natural market for the shift to low carbon fuels – hydrogen, electricity, biodiesel and compressed natural gas. It may be possible to construct the planned biomethane refuelling station adjacent to an energy station to harness low carbon power as the fuel to generate / store / distribute low carbon transportation fuel.

Summary – as such a large occupier and source of demand, Magna Park has the potential to in effect underwrite the energy generation ambitions of MK. With significant and increasing pressure on decarbonisation the owner and occupiers of the park will be ideal partners to develop long term net zero strategies alongside.

Regeneration and Estate Renewal

Across Milton Keynes there are seven identified regeneration estates including Fullers Slade and Serpentine Court.

The Community Led Regeneration and Estate renewal Strategy 2020 will plan and build suitably designed homes and neighbourhoods that reduce carbon consumption, air and noise pollution level and prevent energy and water wastage. For new developments, green energy generation schemes will be included, for example at Serpentine Court there is an energy centre proposed as part of the design. Given these estates are mixed use there is an ideal opportunity to develop an energy system that balances generation against demand through the day and night.

Opportunities:

Micro energy – development of small-scale energy centres to generate heat and power for the local regeneration developments. This could be fuelled by RDF from MKWRP or waste from other sources.

Solar PV – a standard for all development in MK should include a ‘solar where possible’ provision. Thus, where possible through the regeneration sites solar PV on rooftops should be an expectation.

Heat – further to the micro-generation opportunity highlighted, seek to connect localised district heating to the main MK clusters – MKWRP, CMK and Magna Park where possible. Where it is not possible to develop a heat network, ground and air source heat pump technology are to be deployed. Given the multi-use nature of the developments, taking a balanced and integrated view of the energy vectors should be a standard consideration, ensuring that retail, education and business energy demands are balanced against residential demand.

Homes and Housebuilding

Any new development in Milton Keynes will be subject to the same low carbon policy requirements of Plan:MK. The default in all cases is net zero.

The council owns some 11,500 homes and aspire to set up a commercial house builder to grow the council stock and housing capability. This is a significant stock and presents an opportunity to develop modular and “wrap around” solutions that can be retrofitted to homes to reduce carbon footprint, drive and support the transition to net zero. MKDP are developing a Local Housing Company , and alongside the continued house building programme in the eastern and western expansion areas there is a substantial opportunity for Milton Keynes to lead the way with low carbon place making.

As an example, Tickford Fields will generate 928 residential units in a mixed-use development, which opens an opportunity to design the energy system from beneath the ground up with the grandest ambitions for low carbon heat, power and transportation. There is opportunity for ground mount PV to serve the development.

Opportunities:

Low carbon homes – deploy the latest building material and technology to minimise the energy impact of homes to be built on the estate. This can minimise the need even for localised generation schemes through building generation and storage and high-quality insulation.

Walk up areas – minimise the infrastructure required for transportation by incorporating all needs within the development. Where external travel is required, institute low carbon vehicle sharing schemes or home delivery.

Digital City – deploy digital technologies to maximise efficiency opportunities and create a truly smart city including energy as service and real time matching of energy supply and demand. Leverage such achievement to expand out into the rest of the city.

Solar PV – wherever a home has a roof that is not shaded or has plans for development the default position will be to install solar PV, potentially with a battery storage solution to balance and reduce energy bills. This is a simple and proven method to lower the carbon footprint of homes.

Heat – for existing homes, look to improve the insulation deployed on them and aim to connect into district heating networks. For new homes, seek to insulate to the highest standards and use technology to drive efficiency.

Digital – create an immersive and interactive experience for residents such that they can participate in the energy system, see how their actions can save them money and reduce their carbon footprint.

Schools Infrastructure

Milton Keynes is home to more than 120 schools, each of which stands at the centre of the local community providing education and some ancillary services. The energy demand of schools is of course focused on times of operation during term time and much activity has focused in recent years on efficiency related interventions. Across the UK, many schools have invested in solar rooftop systems and some benefit from modern building standards as part of the Building Schools for the Future programme in the mid - late 2000's.

Given the location of most schools are central to communities, there is the potential for them to also play a role within the energy system for both supply and demand. It is recommended that a modular systems-based approach is taken to drive energy interventions that will unlock new generation and aim to match demand to supply in local areas.

Opportunities:

Solar PV – rooftop solar is an obvious starting point for schools that have not already benefited from such interventions. A standardised modular approach to this for the schools of Milton Keynes should enable low cost delivery of systems and low carbon energy to schools. In many cases, this should be considered alongside battery storage to maximise the potential of solar power within the school and allow for grid balancing – particularly not in term time.

Heat – schools have a significant demand for heat during the winter and so where possible should be connected to heat networks. Where schools have swimming pools, these can be a very suitable heat sink – saving heating costs using waste heat and providing a source of heat at times of high demand.

Energy Centres – where space allows, schools can be ideal situations for the development of communal energy generation, both providing heat and power internally to the school and externally to heat and power networks.

Efficiency – along with any energy scheme there should be a focus on efficiency and minimising any wasted heat or power. These can be driven through a mixture of hard and soft interventions – focusing on the upgrade of equipment to the latest efficient standards whilst also driving communication programmes to the teachers and pupils advising and educating on how to minimise

energy use. Experience suggests that such programmes have a positive knock on effect as children take the messages home and question energy related actions in the household.

Summary – schools can be a focal point for local communities and may benefit from a modular approach to delivering efficient energy systems. From a geographic perspective they can be ideally situated to act as local hubs – within new developments, regenerations schemes as well as existing conurbations. There are opportunities for investment in existing schools utilising the Re:fit energy performance contract with Engie.

Low carbon transport and fleet

In terms of emissions a significant proportion is generated from transportation which almost by definition carries pollution to all corners of towns and cities. There is a concerted drive from Central Government to increase the adoption of low carbon vehicles with the electric car leading the way. Further to this, active travel is also being driven as a direct response to the Coronavirus pandemic.

The original 1970 Plan for Milton Keynes created the grid road network with the flexibility and space for a fixed-track public transport system. Through long-term planning a modern version of this in the form of a Mass Rapid Transit (MRT) network can be delivered. This would be a public transport system with frequent services to and from our key destinations, capable of carrying many passengers at times of peak demand with competitive ticket prices. New electric-powered vehicles, similar to a tram in functionality and quality, can run on road surfaces rather than expensive, fixed rail infrastructure, and in future will be driverless.

From a fleet perspective, MK is examining the options for a shift of bus and RCV's across to low carbon vehicles. This as an initiative could be expanded to all municipal fleet across the city as well as working in partnership with other public and private entities to encourage adoption. As adoption rises, there will be pressure on MKC to provide sufficient infrastructure to support it. This will be in terms of the street charging furniture, depot charging infrastructure and the reinforcements required for the local grid to withstand a potential uplift in demand.

Opportunities:

Refuelling stations – provision of multi-vector low carbon refuelling stations for the main transport hubs could help to release any resistance to a transition to low carbon. Such refuelling hubs could be powered by locally generated renewable energy (and as such provide an advantageous offtake opportunity) and provide fuel for electric, hydrogen, biodiesel, compressed or liquid natural gas vehicles.

Hydrogen – hydrogen is seen as a potential answer as a fuel for long distance HGV transportation and citywide bus services. Whilst the market remains fairly new, there is an opportunity to create a local hydrogen market for larger vehicle refuelling, thus underpinning any investment in infrastructure.

Electric Vehicles – these are leading the way in the low carbon transportation sector and require significant infrastructure to reduce range anxiety and issues of queuing for charging. MKC have led the way in recent years with the installation of charging infrastructure which can be built upon, enhanced and developed for the fleet of the future. In the knowledge that a major shift to EV's is coming, the opportunity is for MKC to get ahead of the game and install additional infrastructure. Working closely with EVCP suppliers there may be the opportunity for revenue share or renewable offtake to drive a positive commercial model for the council.

Conclusion

This prospectus sets out the carbon neutral ambitions for Milton Keynes and the delivery mechanism for developing a broad yet deliverable pipeline of low and zero carbon opportunities across sector and stretching across the city. This pipeline will of course flex as new initiatives, technologies and innovations are introduced to the market.

The Energy and Carbon Hub will be an agile unit, resourced to be fleet of foot to identify and deliver worthwhile opportunities as they arise, and to quickly discount activity that could take up valuable resource for little gain on the pathway to carbon neutrality.

The steering committee will support the direction of activity, and an invitation to landowners and investors is extended to engage with the Hub.