

Visions of Cambridge in 2065

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What is your vision of Cambridge?

The purpose of the “Visions of Cambridge in 2065” project is to imagine possible futures of Cambridge; and to open up the possibility of imagining those futures to a broad cross-section of its citizens. The UK Government Future of Cities project funded and catalysed five other UK cities to produce visions of the future of their city.

This volume is the result of the first phase of the Cambridge case study. It gathers together 24 visions from a wide variety of people who live and work in the city; who were all asked to think about the issues they considered critical to the continued and future success of Cambridge as a city. Phases 2 and 3 consult members of the public and schoolchildren, respectively, in order to bring a wide range of views to bear on the question of the future of Cambridge.

The authors of each vision identified their priorities for where we will live in Cambridge, how we will live and how we should respond to the changes the city will undergo over the next 50 years and some common themes emerged, including:

Where we live. Visions of the future built environment of Cambridge were overwhelmingly green: both verdant and ecological. With improved green spaces and increased agricultural production outside and inside the city, the environmental heritage will be protected and enhanced. Equally, new forms of public and private transport (such as driverless cars) will drive on or near clean streets lined with ecologically sound new and retrofitted buildings in keeping with Cambridge’s rich architectural heritage (which means we will continue living with tourists!). Multicultural neighbourhoods will provide new living landscapes with welcoming environmental and cultural spaces. In 2065, Cambridge will function as a global leader at the same time as playing a critical role locally as a small, attractive and environmental hub surrounded by smaller settlements.

How we live. Cambridge was overwhelmingly seen as a city that will thrive through improved connections, among diverse communities within the city and also further afield. In addition to being more diverse, Cambridge will be a more equal place in which to live and learn. As well as building strong community ties in the immediate vicinity, in 2065 Cambridge will be a world leader in sustainable tourism. It will be a healthy city, growing more of its own food and improving the city’s cyclability. It will be a smarter city, developing and using cleantech and collaborative creative and cultural spaces.

How we respond to the future. Perhaps unsurprisingly, technology was the aspect of Cambridge’s future that was most frequently mentioned in these visions. Innovations in technology were foregrounded, along with innovations in cleantech, agriculture, cultural investments, and entrepreneurship. Governance issues were mentioned several times, particularly with regards to improving localism, participation and equity. Whilst the unpredictability of the future was a recurrent theme, so was the importance of planning for this uncertain future and in laying strong foundations for the city to build on and to continue to go from strength to strength.

In summary, these authors see Cambridge in 2065 as a city that is green and connected - inside and out. Cambridge is seen as both a global leader and local hub, for high-tech innovation, culture and also communities. The very high quality of life associated with the city has been maintained and developed, providing a recreational and cultural match to its continuing intellectual and economic growth.

Above all, Cambridge is viewed as a beautiful city that attracts people from all over the world and whose citizens can live healthy, happy, and equal lives. Maybe that is a vision we can all sign up to?



24 visions of Cambridge in 2065



Lara Allen
Centre for Global Equality

Scientists, social scientists, policy makers, law makers, civil society and student organisations came together to evolve frameworks and mechanisms to facilitate access to the benefits of scientific advances for the bottom billion.



Anne Bailey
Form the Future

Blending learning and work can help to influence the link between family income and attainment in schools; address skills shortages; and enable students to take ownership of their own learning.



Alan Blackwell
Computer Laboratory, University of Cambridge

Cambridge's impressive transition from medieval town to concentrated knowledge economy incubator is fortunate, but not coincidental and is threatened if equity concerns are not addressed.



Julian Bowrey
Bowrey Consultants Ltd.

Many aspects of local governance have remained the same in the past 50 years and more, but change is needed in councils' working cultures, and in the ways they relate to their citizens.



David Cleevely
Centre for Science and Policy

Much of the business growth in 2065 has been based on foundations laid down in 2015 due to spectacular developments in Life Sciences as well as engineering, cleantech, agritech, Information and communications technology (ICT) and software.



Ben Cowell
The East of England National Trust

The Wicken Fen Vision will expand natural space for wildlife and people in Cambridgeshire, and engage local communities and people to develop their sense of ownership.



Douglas Crawford-Brown
Cambridge Cleantech & Retrofit

The effort to deliver on the retrofit and the cleantech revolution will unite the community behind a vision of delivering low carbon lifestyles so Cambridge does its part in ensuring climate change risks are acceptably low, in Cambridge and globally.



Bob Dennison
Stagecoach East

Over the next fifty years, the bus will have evolved to the point that it will be barely recognisable and the biggest advances in design is likely to come with the advent of driverless vehicles and the design of new ways to power them.



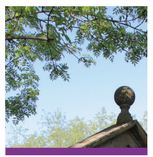
Cambridgeshire County Council

The people of Cambridgeshire will benefit from an integrated transport network which enables efficient and reliable travel between key destinations in support of a thriving local economy.



Rachel Drury
What Next? for the arts group

In 2065, Cambridge remains at the forefront of innovation, and the city has become a worldwide centre for cross-disciplinary research and development resulting in world-leading art and innovation.



Lynsi Hayward-Smith
Cambridgeshire County Council

Our vision in 2015 was to create a locally responsive skills system that would maximise the impact of public investment, forge stronger links between employers and the education system, and drive growth across Greater Cambridge.



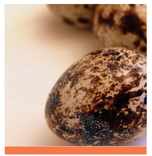
Rachel Jones
Instrata Ltd

By 2065, I will be 95. I will hopefully still be living in my own home with the help of technological innovations developed over the next 50 years.



Peter Landshoff
Christ's College, University of Cambridge

By 2065 there will be much greater awareness of the challenge that the increased number of old people poses for the economy, particularly for health and social services.



Lewis Herbert
Councillor, Leader of Cambridge City Council

The City Council has a clear vision to lead a united city, 'One Cambridge - Fair for All', in which economic dynamism and prosperity are combined with social justice and equality.



Ian Lewis
University of Cambridge

The 'network effect', in which the universities, public and corporate research institutions and local businesses interact with each other, has driven much of Cambridge's success and needs to evolve and develop as the economy grows.



Theresa M. Marteau
Behaviour and Health Research Unit, University of Cambridge

In 2015, the city set out an ambitious 50-year programme to prevent disease by altering environments to change behaviour and to reduce the gap in health between rich and poor by focusing on early intervention.



Anna McIvor
Transition Cambridge

In 2065, Cambridge has become a food-growing city with strong communities that lead the way in developing ever more sustainable ways of living.



Roger Mitchell
Cambridge Conservation Forum
Natural Cambridgeshire

In 2065, Cambridgeshire will have the highest quality of life, championing innovative land management and landscape scale restoration of the natural environment so that nature thrives alongside jobs and housing.



John Miles
Department of Engineering, University of Cambridge

Cambridge will be transformed by high-speed trains that bring people from surrounding villages into transport hubs and the automatic electric vehicles that move them from these hubs around the city in minutes.



Tony Raven
Cambridge Enterprise

Cambridge needs to continue to be an intellectually challenging place with a high quality of life that can attract and retain the world's leading minds in both academia and business.



Claire Ruskin
Cambridge Network Ltd

By 2065, Cambridge ideas are recognised as changing the world and businesses will be looking at new opportunities we can only imagine, having solved many of today's challenges of health and climate.



Jeremy Sanders
University of Cambridge

The University's unique selling point — its USP — will be its convening power, bringing key individuals to Cambridge to experience personal interactions and chemistry, despite the large carbon cost of international travel in an energy-deprived world.



Emma Thornton
Cambridge City Council

The beauty of Cambridge is that whilst it is steeped in history, it is also at the forefront of innovation and scientific and technological discovery. We would continue to safeguard this heritage, but also to innovate.



Jane Wilson
Arts Development UK

The very high quality of life associated with Cambridge and South Cambridgeshire has been maintained and developed, providing a recreational and cultural match to the continuing intellectual and economic growth of the city.





Dr Lara Allen

Director, Centre for Global Equality[1]

In the 2010s, while Cambridge's scientists were inventing materials and processes we now take for granted, a social movement of equal importance was in formation. This movement grew around the increasing acknowledgement that extreme inequality in all its myriad forms is unsustainable.

Assumptions about the desirability of greater equality that are normal in 2065 were in their infancy then. Examples include sufficiency as the driver of levels of income and consumption; fairness in the utilisation of natural resources; the necessity of avoiding waste; and economics in which externalities for people and the planet are factored into all costs and profits.

A number of factors made Cambridge an ideal enabling environment for the emergence of the movement towards greater equality. By 2015, this city was booming as a result of decades of investment in its science and technology entrepreneurial eco-system. Alongside the University's global leadership in scientific research, there was a strong, fast-growing high-tech business environment with particular strengths in bio-tech, digital tech and clean-tech. This provided a model and a culture for the evolution of today's social ecosystem – the mutually supportive web of organisations and individuals working to achieve a new social compact.

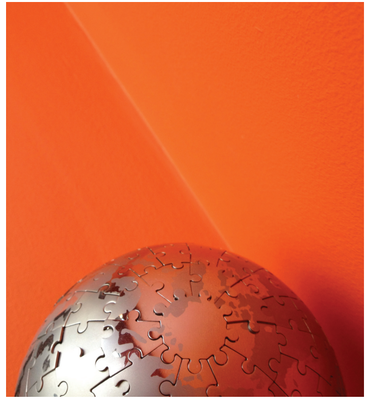
These shifts, along with the plural approaches that evolved as different groups worked in their own ways towards the same goals, were central to the zeitgeist of the era and were happening in many parts of the world at the same time. The 21st century approaches to development that were evolving are now resilient, agile, multi-nodal and emergent, and are undertaken by a myriad of small, innovative, globally-networked, mutually-supporting, often self-funding initiatives.

Cambridge's particular contribution related to the sharing of knowledge, and the benefits from knowledge. Inspired by the lobby against food waste that was gaining traction at the time, a drive to address knowledge waste and knowledge inequality was initiated. Concerned about the potential of new technology to widen the gap between the haves and have-nots, scientists, social scientists, policy makers, law makers, civil society and student organisations came together to evolve frameworks and mechanisms to facilitate access to the benefits of scientific advances for the bottom billion.

"Assumptions about the desirability of equality that are normal in 2065 were in their infancy in 2015."

The early 21st century Cambridge pioneers contributed to understanding and explaining the predicament of the world in 2015, and to starting the evolution of practical, proactive responses to changing the downward spiral towards destruction. While the rich and powerful have clung to their influence and privilege with enduring success, an alternative trail has been blazed. Technological innovations have been rolled out to the benefit of the bottom billion, famines have been prevented, and solar fuels are not exclusively the domain of multinationals.

The movement for greater global equality evolved models now replicated in localised forms in many parts of the world, and Cambridge prevails as a leading node in a network using massive small change to achieve increasing global equality.





Anne Bailey

Director, Form the Future

Despite the constant tinkering of the past quarter century, schools have actually changed little since Victorian times, with the introduction of state education and the effective outsourcing of learning to schools. It's time to re-integrate learning with the community.

Academics are split on how far education should act as preparation for work. While many "aim to provide students with fundamental skills, such as problem-solving, analytical techniques, creative thinking and innovation, so that they are adaptable to new work environments",[1] others see employability as the preserve of the careers service. In Cambridge Form the Future is joining up schools and employers in order to realign aspirations and course choices with where the jobs will be. Is this excessively utilitarian and will classicists become extinct as we teach every child to code? I believe that by interweaving learning with work we can create a richer educational experience.

There are three reasons for blending learning and work:

1. To break the persistent and problematic link between family income and levels of attainment at school.[2] By introducing students to people from a wide range of backgrounds we give them the chance to reset their aspirations.
2. To address skills shortages. Any education system that doesn't consider employers' future skills needs - or the flipside, future career opportunities for students - is preventing sustainable growth.
3. To enable students to take ownership of their learning. What we have lost in the current system where exam results rule is intrinsic motivation.

"Any education system that doesn't consider employers' future skills needs – or the flipside, future career opportunities for students – is preventing sustainable growth."

In his recent book 'Drive', Dan Pink argues what motivates us is autonomy, mastery and purpose.[3] Applied to education it might look like this. Students choose subjects they're interested in (autonomy) as well as some we consider essential; they choose when they feel ready to be assessed; and they take the test. If they fail or believe they could do better, they continue to apply themselves until they achieve their best (mastery). Students know that their efforts will affect their future employment (purpose). It's how we prepare for the driving test. Instead of the pressure for all students to pass an exam on one particular day - and all the stress and teaching time devoted to this one attempt - we switch to personalised learning. So while the study of subject content becomes more self-directed, enabled by technology - with teachers providing individual tuition as needed - the rest of the curriculum is project-based, in partnership with local enterprises, tackling real problems and developing sought-after skills such as teamwork, problem solving and communication.

We've gone too far in outsourcing education to schools and divorcing learning from work. A future education system would reintegrate them: teaching in real contexts; giving students the chance to learn from and with people from different industries; and cultivating the skills, knowledge and experience that will enable them to tackle the as yet unknown challenges in our future cities.

Form the Future is a social enterprise that links schools and businesses so that young people can prepare for future careers. By connecting students with people in the community they wouldn't ordinarily meet, Form the Future inspires the next generation to aim higher, discover new opportunities and get ready for fulfilling and rewarding careers.





Dr Alan Blackwell

Reader in Interdisciplinary Design, Computer Laboratory, University of Cambridge

Many aspects of modern life are now controlled by multinational corporations and online communities rather than national governments. In Cambridge, this future society — with its associated economy — seems more imminent than in many parts of the world.

The technology research community of Cambridge has expanded rapidly in the past 30 years, after a few earlier milestones in the University (the Cavendish Laboratory and the Mathematical Laboratory) and in the local town (Cambridge Scientific Instruments, Cambridge Consultants, and Acorn Computer). Now one of the most prominent European centres of research and development, Cambridge is still a surprisingly small town, with a permanent population of only around 100,000. It has a vigorous commercial environment and international scientific reputation in both digital technologies and biosciences. It is located in a rural region, but with a conveniently compact street plan, with all parts of the city easily accessible by bicycle. In all these aspects, Cambridge seems well placed to become an experimental incubator for a new kind of locally-governed knowledge economy.

Cambridge has made an impressive transition from medieval town to concentrated knowledge economy incubator. It is reasonable to ask, therefore, whether these two aspects of the town (the tourism-friendly chapels and choirs versus the venture-funded technology ghettos) have come together purely by historical accident, or whether there is some kind of useful causal relationship between the two?

My own view is that the current success of Cambridge is fortunate, but not coincidental. The relative underdevelopment of Cambridge through the periods of the industrial revolution and post-WWII regeneration, meant that physical infrastructure remained on a human scale (for pedestrian, horse or bicycle) during a period in which most Western cities were completely reshaped. After the advent of the knowledge economy from the late 1980s, post-industrial economies have acquired a need for high-density knowledge infrastructure, supporting the social and cultural contexts within which informal knowledge exchange can support international scholastic networks. This seems like a new requirement of the 21st century, but the good fortune of Cambridge is that it happens to be the same requirement that the city has evolved to support since medieval times. Modern Cambridge perhaps deserves little credit for recognising the opportunity, since all that has happened is that we failed to demolish these existing strengths, but this is a good time to reflect on what our strengths are, and assess whether they are in any way endangered.

Of course, danger comes with success. As many other cities around the world recognise the unique advantages of Cambridge (our knowledge/area density is around 100 times more concentrated than Silicon Valley) and seek to emulate them. Simultaneously, we must contend with local initiatives that, through lack of understanding these unique advantages, may kill the golden egg-laying goose. A constant threat is the rural County Council that holds authority over Cambridge roads, who often seems to promote short-sighted policies that favour oil-burning traffic over cycling provision. Another is the constraint of centrally-planned school curricula that are insufficiently flexible to accommodate the wealth of talent and innovation that could be deployed in local schools. In fact, most aspects of UK public policy — business, law, welfare — seem very poorly attuned to the needs of a community of the future.

"Cambridge must restore some of its medieval ambitions, but with those royal privileges directed toward the poor and disenfranchised rather than the children of an elite."

In medieval times, Cambridge was largely self-governing, with its own governance, economy and police force. The colleges were granted independent governance by Royal Charter, and were able to pursue academic agendas with relative independence from government. All of this has changed today, with many of these freedoms recently constrained — for example, through the requirement that all Colleges convert their royal charters to registrations with the Charity Commission and the resulting constraints, such as no longer being able to engage directly in politics. These changes come at a time when national governments seem increasingly irrelevant; when knowledge communities are essential centres for building the future; and the future of world business looks rather like William Gibson's cyberspace, playing out between global zaibatsu - industrial and financial business - conglomerates grounded in city-state technopolises.

In response to this situation, I have a proposal that may seem either subversive or ironic — neither is wholly intended. Furthermore, it may seem to be arguing from a position of privilege, and I hesitate to do so as a Cambridge outsider myself. The aspiration to meritocracy always seems to result in entrenched privilege, which cannot be defended. I would not want the opportunity for Cambridge to act as an exemplar also to result in the oppression or disenfranchisement of other communities.

My proposal is therefore that Cambridge must restore some of its medieval ambitions, but with those royal privileges directed toward the poor and disenfranchised rather than the children of an elite. A first step would be a "King's Hedges College" established by Royal Charter, self-governing, but purposely located in one of the poorest and most disrupted segments of the city. The membership of this college should be elected from among the existing leaders of the community, in order to broaden participation in the knowledge economy. King's Hedges — along with Abbey College, Romsey Town College and others — should admit undergraduates, but not in the current manner that concentrates the essence of the upper middle class through Eton and Rugby. Instead, these colleges (and the University as a whole) might admit only one student from any school. Aspirational parents could move around the country, joining communities where they can make a difference in return for opportunities for their children.

The result would still be a technocracy — I believe that this is unavoidable in the 21st century. But it would be an equitable and fair one, once again bringing the reflective capacity of scholarship to public life, and doing so in a way that cannot be damaged by those in government or business who are unwilling or unable to understand the changing times as they defend their own inherited privilege.



"Cambridge has made an impressive transition from medieval town to concentrated knowledge economy incubator."



Julian Bowrey

Bowrey Consultants Ltd.

I started working at the County Council in January 1990. Since then Cambridge has changed a great deal: it's bigger, busier, more cosmopolitan and, if anything, even more renowned. The governance of Cambridge has also changed. The County Council was reorganised in 1996: both City and County Councils have changed their political management structures, both have lost responsibility for some functions, and (especially since 2011) have less money to spend.

But it would be fair to say that our local governance has changed less over the last 25 years than the city itself: if you look back 50 years to 1965 you'll see that both County and City Councils are in the same buildings, the same councillor and officer distinction exists (although Aldermen, a feature of local government since Anglo-Saxon times, have disappeared), and the issues discussed at Council are pretty similar.



17%

increase in the population of the city between 2013 and 2036

This continuity of local public administration is because it will always be needed and, in reality, the alternatives are pretty limited. The different levels of local neighbourhood, city and county/sub-region, region and nation must all be catered for. And although there is a move to city Mayors and fewer councillors, there will remain democratically elected councillors representing our interests. Those elected representatives will be similar to those today, and fifty years ago, because local politics will always appeal to a minority of society.

"When my grandchildren visit the 101st Cambridge Folk Festival in 2065 they will find elected institutions representing the interests of the city and its surroundings with locally elected councillors at their heart."

The formal structures of public administration always lag behind the times, and are always imperfect because local administrative lines on the map cannot seamlessly overlay the real world complexities of how places function. In my time — thanks to rail electrification — Ely has become far more connected to Cambridge and Cambridge to London, not to mention what the internet has done to our sense of community! However you can't constantly fiddle with local boundaries to align them with these changes: our administrative processes are too slow, it's enormously distracting, and ultimately it just moves an inevitable set of geographic and organisational boundary problems elsewhere. I'm sure it won't stop government trying, but judging by the administrative changes since 1965, we might foresee one bout of legislative-driven change to boundaries and structures alongside the current round of closer working resulting from the Cambridge City Deal. And it will still look pretty similar!

Another conclusion from this lookback is that most reorganisations over the last fifty years have resulted in powers and responsibilities being taken away from local authorities. The latest phase of local government reform (the Localism Act 2012 and City Deals) plus the all-party agreement on the need for some form of devolution suggest that might be changing.

I think the more profound change will come from the ways councils relate to their citizens and other interests in the localities and their working cultures. I'll focus on three facets of this change:

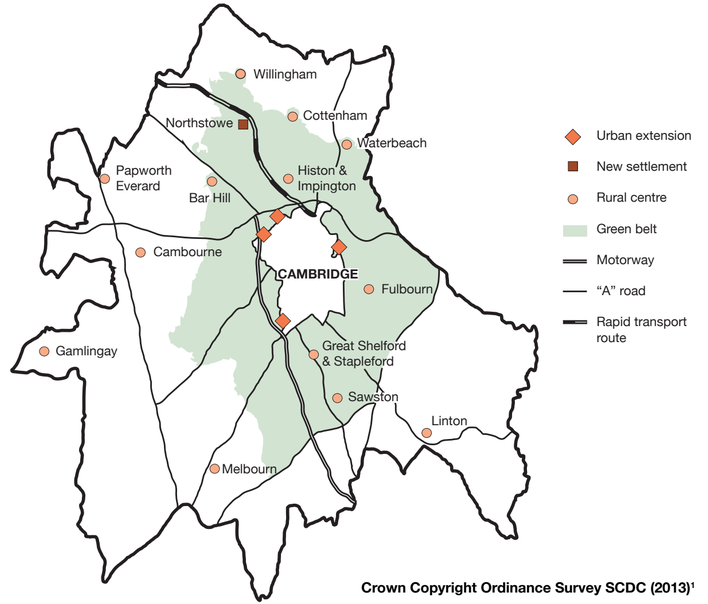
Facilitating partnerships and brokerage will become even more central to local governance. This means representing the interests of the local community to the outside world, and creating local coalitions to drive change, and helping reconcile different interests in the community. This will involve working effectively with the diverse range of interests within the city; using the democratic mandate to act as honest broker. The ability to facilitate effective partnerships and create structures to manage the different interests in the city will be key skills for councillors and officers. These soft leadership skills will be vital whatever the outcome of the current debate about austerity and the diminished role for state institutions (leaving in 2000). In 2065 they will have long been core skills for council members alongside either commissioning and operational management skills.

Cambridge will be a far smarter city in 2065. This is not to cast aspersions on the talents of the current population, but local public administrations must be at the heart of a smart community embracing digital and other emergent technologies to support economic growth and conviviality. That will include city systems to manage traffic and energy use, using the city as a test bed for innovative new data driven businesses and, most importantly and using technology to empower local citizens, including giving them the knowledge to hold their local public institutions to account. The decisions we are making now as we invest in new homes, roads and other infrastructure will significantly influence whether we achieve that vision. And if I were about to graduate in computer science from a local university would working for a local authority be my first choice? We need to attract strong digital and technology capacity into our councils.

"Profound change will come from the ways councils relate to their citizens and other interests in the localities and their working cultures."

Strategic planning. Current live planning issues in Northstowe, Waterbeach, Alconbury and North West Cambridge will determine the future liveability and prosperity of the city in 2065, just as decisions made in the 1970s about the Green Belt and necklace villages shape the city today. For planners and developers, 2065 is not so far away. Any successful city must have the capacity to create a shared vision for the future and plan strategically to achieve that.

In conclusion, I believe, and fervently hope, that when my grandchildren visit the 101st Cambridge Folk Festival in 2065 they will find elected institutions representing the interests of the city and its surroundings with locally elected councillors at their heart. City residents will feel their interests are well represented locally, nationally and internationally, and their local institutions help a vibrant, talented (and occasionally fractious) population to live and prosper together. Building on the work of its predecessors our council(s) will have the skills necessary to create a vision of and plan for a successful future, in close partnership with its residents, universities, business and other interests, and it will already be thinking about the world in 2105.



Crown Copyright Ordinance Survey SCDC (2013)[1]



Dr David Cleevely

Entrepreneur
International Telecoms Expert
Founding Director, Cambridge Centre for Science and Policy

Cambridge has changed dramatically in the 50 years leading up to 2065. Just as Silicon Valley grew between 1960 and 2010, so Cambridge has grown a mature network of businesses and enterprises that rival the best in the world.

The 2065 statistics provide a good first picture: a population now well over 600,000 in a metro area of over 1 million people, and a GDP almost 8 times that of 50 years ago - more than twice the growth experienced by other towns and cities in the UK. In my vision, the 150th $1bn company has been crowned (in 2015 there were just 14). More telling is that there are more than 16 home-grown $10bn companies and a second recently made it to $100bn.

Much of the business growth has been based on foundations laid down between 2015 and 2065, from which four notable developments have occurred.
The first, and most spectacular, development has been in the Life Sciences — the changes in personalised medicine, diagnostics and disease prevention enabled by computing and sensor technology began to boom in the late 2020s. 100,000 people are now employed in Life Sciences, medtech and medical ICT, and Cambridge is one of the 3 leading global centres. But Life Sciences still only constitutes 20% of Cambridge employment (up from 14% in 2015). The strength of the growth of Cambridge has stemmed from a broad base of technologies. Other sectors — such as engineering, cleantech, agritech, ICT, and software — have been transformed with the growth of the Internet of Things and Big Data.

The second development has been partnerships with other UK clusters (such as automotive in Northampton and aerospace in Stevenage) which means that in 2065, Cambridge is leading the UK in a number of critical areas of technology such as robotics and energy systems. Links to London with its media, design, fashion and finance sectors have produced two-way exchanges to the advantage of both (though Cambridge sometimes feels more like a part of London than a separate city).

Thirdly the emergence of smart cities has produced a double win for Cambridge in 2065. Early pilot trials through the 2020s meant that Cambridge rapidly developed innovative technology. This has helped propel a new export-led boom as well as enabling the City to accommodate growth.

Finally, pressure to keep up with change and technology as well as a better understanding of how people learn has also transformed the education sector. Although Cambridge University has only doubled in size, Anglia Ruskin University (ARU) is now 5 times as big as it was in 2015. With the growth of Massive Open Online Courses (MOOCs) - after a false start before 2020 - education from Cambridge and many other established universities has become a huge world business.

14*x $1bn

companies have come from the **Cambridge cluster**

* Abcam, ARM, Autonomy, AVEVA, blinkx, CAT, Chiroscience, CSR, Domino, Ionica, Marshall, Solexa, Virata, Xaar

2*x $10bn

companies have come from the **Cambridge cluster**

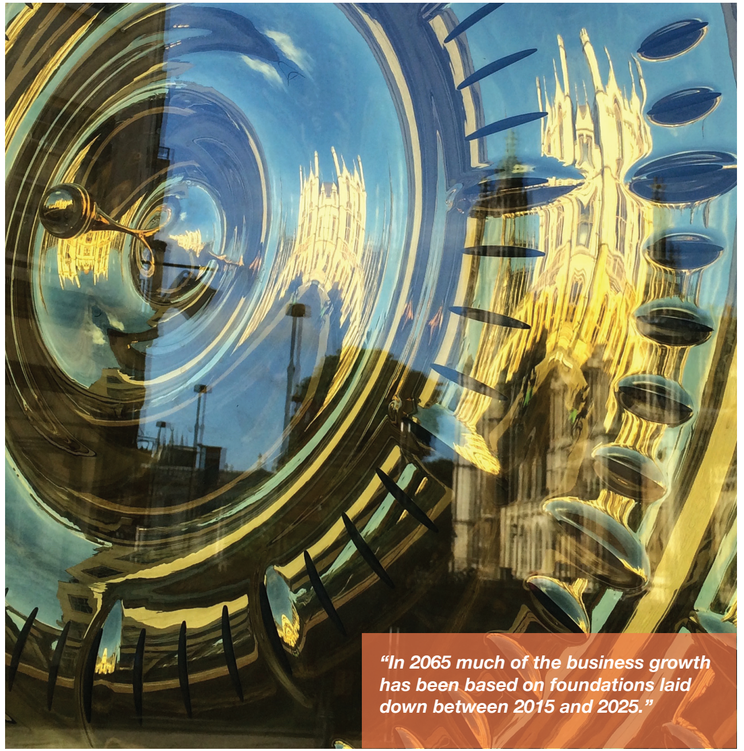
* ARM & Autonomy

In 2065 Cambridge extends to over 20km around Great St Mary's. It has attracted the headquarters of over a dozen multinational companies and is dotted with more than 100 science and business parks, a few of which have more than 10,000 people working onsite. The improvements in transport infrastructure and the emergence of driverless cars in the 2030s have reduced pressure on residential housing and commercial property, but prime locations near transport hubs still command a premium. With train travel to the mega-hub at King's Cross now below 30 minutes, the area around the station in Cambridge is now effectively part of London.

Changing shopping habits plus technology have altered the retail sector — but not as drastically as many had feared. The city centres (such as Trumpington, North West Cambridge, Huntingdon, Newmarket and Ely and the historic heart) are dominated by leisure, and continue to attract consumers and tourists — thanks in part to the efficient underground network. Retail parks and online shopping for more than 50% of purchases mean that outlets for physical goods — other than specialists — have almost all disappeared from high streets.

In 2065, the wealth and expertise generated by the growth of businesses in Cambridge is being recycled — as it was in Silicon Valley. Together with international Venture Capital and Private Equity firms who have set up in Cambridge, enough money has been provided to fuel one of the most extraordinary booms which the UK has seen since the creation of towns like Manchester and Birmingham in the 19th century.

Fortunately, after some hesitation, infrastructure spend has managed to keep pace with — and even anticipate — economic development. Over £10bn has been spent by government on the city and immediate surroundings, not counting the further spend which was necessary to support transport and other infrastructure for the Cambridge hinterland and connections to London, Birmingham, Oxford and the East Coast ports.





"The National Trust looks after a number of significant sites nearby including Wicken Fen, Wimpole and Anglesey Abbey. We are dedicated tothe long-term conservation of these places, but equally interested in making sure Cambridge grows in the right way as a city, respecting its distinctive historic character and ensuring new developments create opportunities for investing in green infrastructure."



Dr Ben Cowell

Regional Director, The East of England National Trust

Wicken Fen is one of the few remaining fragments of fenland wilderness in East Anglia. Its biodiversity is exceptional, but it needs to grow larger in scale to support sustainable populations of its special and rare species.

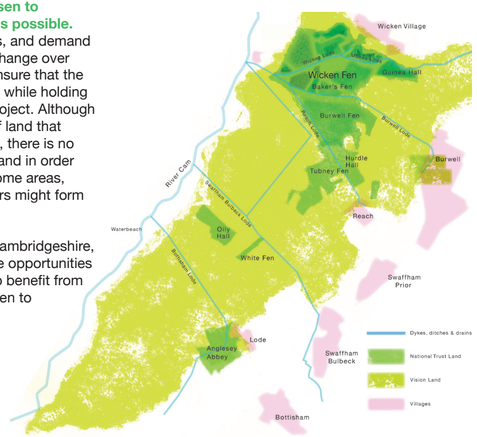
Wicken Fen lies only 15km from the city of Cambridge, which is forecast to grow to a population of over 250,000 by the year 2025. Thus, Wicken is in an area that is experiencing considerable pressure for new housing and other developments. However it is also in a county with very limited biodiversity and few open spaces with public access. In Cambridgeshire there are only 9,239 hectares of habitat notified as Sites of Special Scientific Interest (SSSIs). This represents less than 2.6% of the county's land area. By comparison Cumbria's 159,902 hectares of SSSIs cover less than 23% of that county. The average in England is 6.8%.

"The extensive nature reserve will provide access routes from Cambridge and surrounding towns and villages by foot, cycle, horseback and boat."

The National Trust's Wicken Fen Vision was launched in 1999 with the long-term aim of a massive increase in the reserve's size, expanding southwards towards the edge of Cambridge. The Trust plans to use ecological restoration techniques to create and restore wildlife habitats on a landscape scale, and to provide visitors with new access to nature and green space. The aim is to create a mosaic of wetland habitats: wet grasslands, reed beds, marsh, fen and shallow ponds and ditches, as well as establishing chalk grassland and woodlands where soil and topography dictate.

This 100-year timescale has been chosen to allow as much flexibility of approach as possible. Conservation priorities, farming practices, and demand for access to public open space will all change over time: this very long-term approach will ensure that the Vision can evolve to meet these changes while holding true to the underlying principles of the project. Although the National Trust has identified 53km^2 of land that could form part of the Wicken Fen Vision, there is no necessity for the Trust to acquire all the land in order for the Vision to meet its objectives. In some areas, management agreements with landowners might form a sensible approach.

In addition to promoting biodiversity in Cambridgeshire, a principal aim of the project is to provide opportunities for visitors, tourists and local residents to benefit from access to the Vision area. The Trust is keen to promote sustainable transport, growing in scope with the Vision; and to encourage public transport to, from and within the Vision area. The extensive nature reserve will provide access routes from Cambridge and surrounding towns and villages by foot, cycle, and boat as well as on horseback, and will create recreational opportunities across a unique and developing area of countryside. The Vision area will also provide extensive opportunities for volunteering, education and interpretation. We want to ensure that the National Trust engages with local communities and that local people can develop a sense of ownership of the Vision.



The area covered by the Wicken Fen Vision (National Trust 1999)[1]



Professor Douglas Crawford-Brown

Director, Cambridge Centre for Climate Change Mitigation Research (4CMR)
Member, Programme Oversight Group for Cambridge Retrofit
Supporter, Cambridge Cleantech

Three facts jump out as one looks across the energy, carbon and environmental landscape of Cambridge over the next several decades

1. 80% of the buildings that will be on the ground in 2065 already exist.
2. Energy use in buildings accounts for more than a third of carbon emissions.
3. We occupy some of the least energy efficient buildings in the EU.

By 2065, we will have met the challenges of improving energy efficiency in Cambridge's buildings through extensive retrofitting, and of delivering low carbon energy to those buildings through innovations for cleantech.

Retrofit: It is clear that the buildings of Cambridge in 2065 will have to be greatly improved for energy efficiency compared to today, or we will be pushing green energy into those buildings only to have it come right back out having served no purpose. It is also clear that renewables as a significant source of this green energy – solar and wind especially – will only be viable if energy demand in buildings is reduced and 'levelled' (i.e. with roughly constant demand throughout the day and seasons).

Hence there will be a need for an ambitious programme of energy efficiency retrofits of buildings, to complement new-build standards. With existing technologies and behavioural changes, it will be feasible and cost-effective to reduce energy consumption by 50% in existing homes, offices and stores in 2065, with pay-back periods that are acceptable under many forms of finance. The challenge has been to find building owners willing to take on the necessary finance.

Buildings in Cambridge today contribute about 40% of the carbon footprint of the population, slightly higher than the national average because our transport system encourages low carbon movement such as by bike. Cambridge Retrofit was therefore created to stimulate and enable retrofits throughout all of the categories of buildings in the city — offices, schools, homes, retail stores. It emerged as a national model of how a community can bring about the energy efficiency improvements needed, which in Cambridge would reduce the per capita carbon emissions by 20%. That improvement alone would be a quarter of the way towards the (80%) carbon footprint reductions needed for the city in 2065.

The challenge of Cambridge Retrofit — and indeed of the nation that will follow our lead — will be to create

Cambridge Retrofit

Cambridge Retrofit is not simply a project. It is a network of supply and demand organisations that work together to deliver an ambitious programme of energy efficiency retrofits needed if our building stock of 2065 is to contribute to the national and global targets for reducing the risks of climate change, improving energy security and reducing fuel poverty.



a social network that brings together property owners and occupants, retrofit delivery companies, financiers of retrofits, suppliers of retrofit materials, policy/planning groups, educators and innovators to coordinate their actions so the most cost-effective solutions at the best financial terms will be available for building owners. With approximately 65,000 spaces to retrofit, this will require an unprecedented level of delivery: almost 2000 spaces per year for 35 years. The city's buildings of 2065 will consume a third to half of the energy they do today through a combination of wall, loft and floor insulation, window replacement, draught proofing, high efficiency boilers, white goods, electronics and lighting, and a smart local grid.

Cleantech: Necessary reductions in energy consumption and carbon emissions will be significantly higher — and the costs significantly lower — if cleantech innovations are developed and moved into the market at scale.

The Cambridge area has been home to two large revolutions based on innovation: biomedical and information technologies. We are now into a third revolution, that of innovation for cleantech. Such innovation is essential to meet environmental and energy ambitions for 2065. It will provide a significant part of the economy of the region, which already has 4 times the national average of per capita economic activity in cleantech. It will position the Cambridge area as the place in the world to invest in cleantech innovation, delivering the solutions needed by both developed and developing economies as they move into a lower energy, lower carbon future.

Cambridge Cleantech

Innovation can remain dormant if not given support which allows ideas to grow into viable businesses that can deliver solutions at scale. Cambridge Cleantech provides this support, giving innovators access to services and a market that helps them translate innovations into the solutions required for a large programme in improving the energy efficiency of buildings - as well as a myriad of other environment and energy problems for which cleantech is the answer. Most of the innovations discussed in this vision are already underway in companies involved in Cambridge Cleantech, and will be ready for use in building retrofits over the next decade or two.

"Necessary reductions in energy consumption and carbon emissions will be significantly higher — and the costs significantly lower — if cleantech innovations are developed and moved into the market at scale."

Where are these innovations most pressing?

The buildings of 2065 will require low cost, thin, and paintable interior wall insulation. They will require energy management systems that respond to changes in grid power and the shifting energy demands of occupants throughout the day. They will require smart appliances that keep themselves on only when needed, and that anticipate when they will be called on to deliver services. They will require both heat and power storage to level the load. They will require solar photovoltaics (or PVs) — solar panel electricity systems that capture the sun's energy using photovoltaic cells — built into construction materials such as windows and roof tiles. They will require construction materials with low embodied energy and carbon, so the energy savings from a retrofit are not negated by the high energy and carbon used to produce the retrofit materials in the first place. The list goes on, and innovation is crucial to meeting the needs identified. Cambridge creativity is already at the heart of many of these innovations, and its role as a knowledge-based economy will expand dramatically by 2065.

Moving innovations forward to the scale of application needed for ambitious programmes such as the retrofits of 65,000 buildings in Cambridge is deceptively difficult, and requires community-wide support. Producing the initial ideas is enhanced by the presence of one of the world's leading universities at the heart of the community. But an idea must be given room to grow to the scale required to achieve the ambition. This requires incubator spaces; access by small and medium-sized enterprises (SMEs) to low cost legal, marketing and financial advice; networks that connect these SMEs to the larger firms that will actually deliver the retrofits; support that gives innovators opportunities to prove their ideas in large building estates; and government policies that encourage advanced research, innovation and SME growth.

The Cambridge of 2065 will have innovators and SMEs at the heart of its economy, joining seamlessly into the supply chains of larger firms that have already made the journey to global success. These innovators will make deep energy efficiency improvements in buildings feasible, raising us past the 50% reductions already envisioned by Cambridge Retrofit. The effort to deliver on Cambridge Retrofit and the cleantech revolution will unite the community behind a vision of delivering low carbon lifestyles that ensure Cambridge does its part in ensuring climate change risks are acceptably low in 2065, in Cambridge and globally.

80%

of the buildings that will be on the ground in 2065 already exist.





Cambridgeshire County Council

Economy, Transport and Environment Division

In 2031, the people of Cambridgeshire will benefit from an integrated transport network which enables efficient and reliable travel between key destinations in support of a thriving local economy.

A high quality passenger transport network of rail, guided bus and bus services will enable efficient journeys between Cambridge, Peterborough, the Market towns and district centres in and around Cambridgeshire. This network will prioritise passenger transport on key corridors and link up with community transport connections to access more rural areas. This will be fed by a comprehensive system of long distance cycle/pedestrian routes connecting key destinations.

Rail travel will continue to grow strongly with more frequent, fast and reliable services to London and key destinations from Cambridge: Peterborough, Ely and the market towns. Key employment destinations such as Alconbury and Cambridge Science Park will be served by new stations, providing excellent links to London, the main airports and ports, and onto the UK and European mainland. East-west links will be enhanced through Peterborough and the opportunity for a new east west link between Cambridge and Luton/Bedford (East West rail) could enhance economic growth prospects on a wide arc between Oxford and Cambridge. Good onward connections will ensure that Cambridgeshire's profile as a thriving, attractive and accessible business destination is further enhanced.

Accessibility on the strategic road network will be improved with key barriers and capacity constraints addressed. Bottlenecks on the A10, A14, A47 and A428 will be prioritised for improvements to facilitate growth and continued economic prosperity More car traffic will access rural hubs or Park & Ride sites for efficient, reliable onward travel to key destinations.

"The economy of Cambridgeshire is vital to the national economy, and an effective, sustainable transport network is vital to the economy of Cambridge."

Improved information technology will better inform travel choices and reduce the need to travel. More people will work remotely, accessing more services online and travelling by sustainable alternative methods of travel. This will help sustain and improve quality of life and well-being ensuring that Cambridgeshire continues to be among the top locations to live, work and study.

43%

of people that commute within Cambridge, travel by bike

The Long Term Transport Strategy was developed as part of the Cambridgeshire Local Transport Plan 2011-2031. This strategy identifies the major infrastructure requirements that are needed to address existing problems and capacity constraints on Cambridgeshire's transport network, and the further infrastructure that is required to cater for the transport demand associated with planned growth.

Across the county, major growth is planned in the period to 2031, with over 72,000 new dwellings needed to meet the predicted demand for housing for current and new residents of the area. The economy of the area around Cambridge is dynamic and plays on an international stage. Major transport investment is needed to support growth, maintain the competitive advantage that the clusters of high-tech industries in around the city have over competing clusters around the world, and to maintain the quality of life that draws these industries and their employees to the Cambridge area.

The economy of Cambridgeshire is vital to the national economy, and an effective, sustainable transport network is vital to the economy of Cambridge. This Long Term Transport Strategy has been developed alongside the Local Plans of Cambridgeshire's districts and identifies what we need to ensure that the transport network meets this need.



Bob Dennison

Engineering Director, Stagecoach East

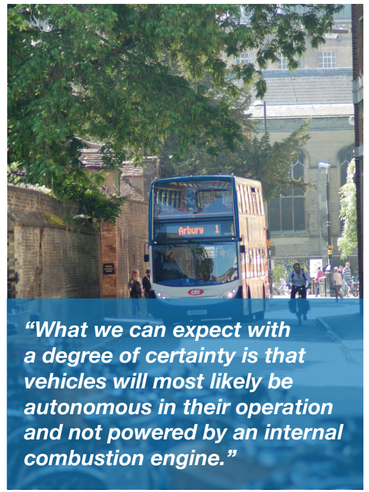
As technology moves on, so does the speed of development. Over the next fifty years, I believe that the bus, as we currently know it, will have evolved to the point that it is barely recognisable compared with what it is today.

It may come as a surprise to many that the concept of the bus, from the Latin "Omnibus" meaning "for all", was originally devised nearly 200 years ago. In the early 1900s, following the invention and development of the internal combustion engine, the motorbus was born and the pace of development increased. The design of what we consider to be modern buses today, dates back to the 1960s, so is itself around 50 years old with the most significant development during this time being the introduction of low-floor step-free boarding within the last 20 years or so. Although these more recent developments have made a significant impact in terms of making buses accessible to people with reduced mobility, the roots of the 50-year-old design are still instantly recognisable. In general there is still a driver at the front responsible for the speed and direction of the vehicle, and an engine at the back to make it move. Only in the last few years have we seen advances in alternative propulsion systems facilitating a move away from the internal combustion engine.

In the future, the single biggest advances in design is likely to come with the advent of driverless vehicles. Not an entirely new concept, driverless vehicles have been around for some time (for example, the light rail infrastructures in airport transit that move passengers between terminals). Mainstream vehicle manufacturers have been working on driverless technology for road-going applications, although clearly such systems are not yet common in the marketplace. It is, however, the control systems in development that are likely to be the precursor to full automation. Although in their infancy, examples of such systems are already operational and are used in conventional vehicles where the guidance system takes care of where the vehicle goes and the driver is responsible only for the acceleration and braking of the vehicle. Various approaches have been taken by developers, but the most common in current use are either based on magnetic or optical guidance systems fitted to an otherwise conventional vehicle. Another related development is variable cruise control which can control acceleration and braking in relation to another vehicle or object in front.

The "bus" of the future combines the technologies which control the direction, acceleration and braking of the vehicle, and links them to other systems such as GPS which enables the vehicle to know its location in real time and relate that to starting and stopping points. In addition to these systems, the vehicle needs to have an awareness of all other road users in order to safely control speed and braking – effectively a collision avoidance system.

The form of the vehicle is a matter for debate; they may take the form of a low occupancy 'pod' or a larger vehicle, more closely resembling the bus as we currently know it. What we can expect with a degree of certainty is that they are most likely to be autonomous in their operation, and not powered by an internal combustion engine.



"What we can expect with a degree of certainty is that vehicles will most likely be autonomous in their operation and not powered by an internal combustion engine."





Rachel Drury

What Next? for the arts group, Cambridge

Innovation thrives in environments that encourage curiosity, challenge people to think differently, and provide space and freedom for experimentation.[1]

These notions sit at the heart of arts and cultural practice so by 2065, to ensure Cambridge remains at the forefront of innovation, the city has become a worldwide centre for cross-disciplinary research and development, resulting in world-leading art and innovation.[2] This meets the growing demand from the city's highly skilled, knowledge intensive workforce[3] for a strong, contemporary cultural offer and improves quality of life which helps to attract and retain a more diverse pool of talent. Demand increases further as people live longer and healthier lives, and have more leisure time due to the efficiencies of technology (nearly everyone works from home and connected devices simplify life).

In the late 2010s, the city made a choice to prioritise quality of life[4] and positively engage with the growth of the city. To build on this, a series of key actions were taken over the next twenty years, resulting in the prosperous, innovation-driven economy of Cambridge.

By 2065:

In response to population growth[5] and increasing demand for housing, new neighbourhoods are developed making the city multi-centred — with each centre having its own distinct local character. Affordable live/work spaces for artists, craftspeople and micro-creative industries create the edgy, independent vibe associated with places like Shoreditch and help to attract and retain younger talent. Citizen-led local schemes support locally-grown produce, skills sharing, and independent shops clustered around new community hives that incorporate the services of libraries, internet cafes and community halls.[6]

The innovation economy of the city makes creativity the most highly valued skill amongst employees. As a result, collaboration and knowledge transfer between the arts/culture and science/technology sectors[7] become common place, creating a new ideas/society centred approach and ethical discourse that leads the city to become a global leader for responsible research and innovation. This discourse leads the city to make better investment decisions, saving millions.

Cambridge declares itself a "Creative Innovation District" and the city's international business sector invests in a cultural investment fund that brings millions of pounds of sustainable funding to transform and sustain the cultural infrastructure and activities of the growing city.[8] The (re)new(ed) facilities and programmes attract world leading artists/shows and provide unique hothousing opportunities for artists/companies to work with Cambridge's scientists and engineers.

The city's infrastructure is strategically conceived to support large-scale public cultural events, by providing access to free, green electricity; an integrated network of speakers; programmable screens and lights; and high speed internet services, all via the physical web.[9] The replacement of cars, buses and taxis with clean, driverless cars decongests the city, opening it up to large scale outdoor events, such as major artist-led installations and performances. Regular festivals in the city centre integrate cultural activity with the more experiential approach to shopping developed in response to the ubiquity of home delivery. Street festivals and outdoor events flourish as, across the city, communities take back the streets and create smaller scale celebrations that enhance community cohesion.

"Cambridge declares itself a 'Creative Innovation District' and the city's international business sector invests in a cultural investment fund that brings millions of pounds of sustainable funding to transform and sustain the cultural infrastructure and activities of the growing city."

World-class education moves beyond the walls of the universities and schools making the whole city an integrated, cross-disciplinary learning environment. Cultural institutions alongside specialist learning sites (real and virtual) and businesses provide learning opportunities at all levels.



Lynsi Hayward-Smith

Head of Adult Learning and Skills, Cambridgeshire County Council

To maximise the potential of Cambridge, our vision in 2015 creates a locally responsive skills system that maximises the impact of public investment; forges stronger links between employers and the education system; and drives growth across Greater Cambridge.

Skills in 2065 are influenced by many factors including:

- the way we communicate (particularly using social media)
- the way we travel and the types of transport we use
- the ageing population
- the automation of manufacture
- the growth in scientific and technical innovation
- the need for self-help skills to keep us healthy
- the ways in which we want to spend our leisure time
- the development of supply chain and systems integration.

Hayball (2010 Urban Design Competition winner) could have been describing the Cambridge of the future in his vision for St Leonard's as a model for the 21st century 'Knowledge City': "By integrating and enriching existing education, health and technology infrastructure into this commercial/residential hub, the project becomes a true community asset, where knowledge and creative capital can meet positively. The public space in this scheme is critical to making a destination; a place where people want to gather, move and interact."

In 2015, there are two skills gaps in Cambridge. Firstly, in general, young people do not have the knowledge and skills to understand what employment opportunities are available nor how to take advantage of them; and they are not prepared for the many different careers they will have. Secondly, there is a gap in the skills required by employers and what is available to them, including high levels of literacy, numeracy and digital literacy. In addition, employers require employees to have the skills to understand and apply learning and the correct attitude and behaviour to secure employment, coupled with the flexibility to be able to learn new skills throughout their lives. It is envisioned that all of these are still relevant in 2065 and readily available.

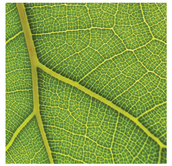
In the future, Cambridge will still be a centre for scientific and technical innovation. There will be a need for highly skilled software developers and meditech innovators who will develop technologies for the remote care of individuals by the medibots that will have replaced home carers and the technologies that predict disease and enable patient choice. There will be people developing and repairing 3D-printing materials to service the new trends in home-produced consumable goods. Additionally, there will be knowledge transfer experts and planners to enable the city to keep pace with the travel and dwelling needs of the community.

The other emerging skills that will be needed in 50 years' time will definitely include the manipulation of big data, work with renewable and sustainable energy sources, and the development of the leisure/virtual gaming world within which we will probably spend much of our non-work time. These skills will also enable us to care remotely for those who have social and health needs.

What skills will build city resilience? It will be the same skills identified in 2015, coupled with those required for flexibility, innovation and fast-paced change that will help make the city resilient.



"The same skills identified in 2015 coupled with those required for flexibility, innovation and fast-paced change will help make the city resilient."



Dr Rachel Jones

Director, Instrata Ltd

By 2065, I will be 95. I will hopefully still be living in my own home with the help of technological innovations developed over the next 50 years.

Developments such as an interactive wall display connect me to family and friends. I attend classes via the display, such as exercise classes and continuous learning courses. I use the display for most of my check ups with my specialist nurse and the elderly care unit at Addenbrooke's Hospital. My vital signs are connected via my mobile to the health system so my condition can be monitored and will trigger alerts. My specialist nurse gives me regular anti-viral jabs as there are more and more flu strains developing.

I fell over a few years ago but instead of replacing my hip, they implanted biomaterials, which reduced the recovery time. I had an exoskeleton to enable me to walk and assist me with exercising, though the physiotherapist was here once a week for months. I had to pay for extra physiotherapy, which I was told would help marginally, but healthcare has become expensive for the government.

Medical science has progressed over the past 50 years. My grandchildren know exactly which diseases they are likely to get and have been prescribed exercise and interventions that slow the progression. For instance, my grandson has cancer but has medication tailored to his individual genetic profile. His partner has a tendency to put on weight has been prescribed a special diet and exercise routine. Their GP is more of a counsellor than a medic.

The obesity epidemic that was foreseen did not occur due to government legislation placing controls on the food industry for sugar, salt and fat.

I have appliances in the kitchen that help me with the heavier tasks that I am finding more difficult, such as loading and unloading the washing machine and unpacking the food delivery.

I try to get out most days, visiting friends nearby or just to walk by the river, which is an area of biodiversity. I know some of the families who live close by, and I am happy to take in their home deliveries. It means I talk to somebody most days.

Transport in the city has changed so you can only walk, cycle or go by public transport. This has resolved the air pollution issues in Cambridge. I book an electric buggy to take me into town to meet friends, go to the cinema and attend concerts.



"Developments such as an interactive wall display connect me to family and friends, and give me access to exercise classes and continuous learning courses."



Professor Peter Landshoff

Christ's College, University of Cambridge

By 2065 there will be much greater awareness of the challenge that the increased number of old people poses for the economy, particularly for health and social services.

In this region, life expectancy at birth has been increasing by more than 5 hours a day. If this rise continues, life expectancy will have reached over 90 years by 2065. Today, 8% of the UK population is over 75 and by 2037 this is projected to rise to 13%. Based on these projections, by 2065 more than one person in five will be over 75.

According to present trends, perhaps a sixth of the over-75s will suffer from dementia. By then there should be an integrated model of dementia care, to overcome the fragmentation within the range of healthcare providers and between the NHS, social care and other agencies. It is now being recognised that the amount of money spent on research into dementia is far too little. In 2015, research funding allocated to this area was £50 million per year. This is less than one tenth the amount spent on cancer, even though the cost to the economy is twice as much. Cambridge is an important centre for this research and is providing new opportunities to involve people with different expertise, and so by 2065 the condition may be less of a problem.

As people get older, their health issues become more complex because they may be living with a multitude of different conditions. Medicine is able progressively to manage more and more conditions but a proper balance will need to be struck between prolonging life and maintaining its quality.

In 2015, three quarters of people aged over 65 have a medical condition. People need from early in life to eat less and more healthily; drink less alcohol; smoke not at all; and take exercise so that they remain as active as possible in later life. The direct cost of mental ill-health, dementias, obesity, physical inactivity, diabetes, loneliness and cardio-vascular disease (including strokes) is already estimated to be £60 billion each year. 40% of people in hospital beds ought not to be there. People are usually happier, and it is much cheaper, if they are not in hospital. There is an urgent need to reduce the burden on the NHS. An important initiative in Cambridgeshire has begun to improve this, by providing better integration of health and social care services for over-65s.

Cambridge is fortunate to have a hospice that provides end-of-life care, often in a patient's home. By 2065 people's condition will be monitored automatically in their homes and as they go about their lives, so that they can be given help when they need it. The technology is already available, though there are serious issues about how to handle the data. Self-management by those with long-term conditions will need to become the norm; this will require research, organisation and investment, cultural change and education.



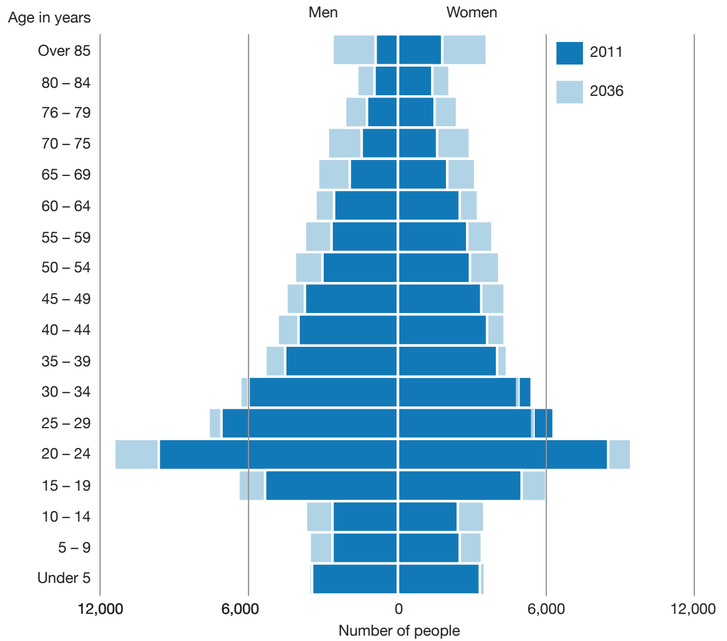
"In this region, life expectancy at birth has been increasing by more than 5 hours a day. If this rise continues, life expectancy will have reached over 90 years by 2065."

The loneliness of older people is a present-day scandal. Currently, half of over-75 year olds live alone, many with television as their main company. This puts an unnecessary burden on the NHS: social isolation is a major determinant of health, and lonely people worry more about their condition, so that they even visit their GP just to have someone to talk to. The old-people's bus pass is a good investment, as it helps to avoid this. It is important to make it easier for people to go out, by ensuring the good design of residential areas, with cafes, seats, green spaces etc. For those who cannot go out, easy-to-use technology will help them to stay in close touch with family members and others. Communities need to be age-friendly and do much more to ensure that nobody who wants help is neglected. The voluntary sector will play a vital role in this change and we need to research the best ways of helping communities develop so they become self-sustainable and less reliant on health and care services.

Getting older people engaged in voluntary activities could provide great benefits. They can also play an important role in helping local facilities to continue that are not commercially viable — pubs, shops, libraries etc. More generally, there is a need to develop new employment models that enable older people to work purposefully and enjoyably. Even if paid work is no longer open to them, they need to think how to contribute to society in other ways.

In 2015 the NHS already faces a crisis, caused partly by the increase in the number of older people and although measures are being taken, they need to be pursued with much more vigour. For example, while more than 90% of older people live in mainstream housing, there is a reluctance among developers to build in simple and cheap measures to make things easier for people when they become frail or disabled. More thought also needs giving to the provision of housing that can accommodate several generations of a family – if they want it.

Population changes in Cambridge city



Cambridgeshire Insight (2013)[1]



The Cambridge Local Plan 2014[1]

The local plan sets out the way that Cambridge City Council will meet the development needs of Cambridge to 2031. Over that time the city will have plans to grow significantly; supporting the nationally important economic contribution the city makes and the factors that are inseparable from that success, seen in the exceptional quality of life and place that Cambridge benefits from. This local plan will manage change in a positive and sympathetic way. It delivers a vision for growth that will secure the priorities for Cambridge. The policies of the plan will set out how we will meet the important development needs that must be accommodated, but also how we will intend to protect this special city's outstanding heritage and environmental assets. The plan will deliver new homes and jobs in a sustainable way, providing affordable housing and an accessible, compact city form where people can have sustainable choices about how they will access work, study, leisure and other services.



Councillor Lewis Herbert

Leader of Cambridge City Council

The City Council's vision for Cambridge is that it will be a compact, dynamic city, located within the high quality landscape setting of the Cambridge Green Belt. The city will draw inspiration from its iconic historic core, heritage assets and structural green corridors, achieving a sense of place in all its parts, with generous, accessible and biodiverse open spaces and well-designed architecture.

Building on the city's reputation for design excellence, Cambridge's new development will be innovative and will promote the use of sustainable modes of transport, helping to support the transition to a more environmentally sustainable and successful low carbon economy. The city will continue to develop as a centre of excellence and world leader in the fields of higher education and research, and will foster the dynamism, prosperity and further expansion of the knowledge-based economy, while retaining the high quality of life and place that underpins that economic success. It will also grow in importance as a sub-regional centre for a wide range of services. Housing provision in the city will be of a high quality and will support the development and enhancement of balanced and mixed communities through provision of a mix of sizes and types of housing, including a high proportion of affordable housing (with 2,000 built by the City Council).

The Council will have a clear vision to lead a united city, 'One Cambridge - Fair for All', in which economic dynamism and prosperity are combined with social justice and equality. It is a vision we will share and develop, working with our citizens and partner organisations.

'One Cambridge — Fair for All'

- A city which believes that the clearest measure of progress is the dignity and wellbeing of its least well-off residents and which prioritises tackling poverty and social exclusion, recognising that greater social and economic equality are the most important pre-conditions for the city's success.
- An international city which celebrates its diversity and actively tackles discrimination on gender, race, nationality, ethnic background, religion, age, disability, gender identity, and sexual orientation.
- A city in which all citizens feel that they are listened to and have the opportunity to influence public decision making, and which values, supports and responds to individual and community initiatives.
- A city where all citizens and organisations appreciate their duties as well as their rights, where people are free to enjoy themselves but also show consideration for others, and where the community works together to reduce harm and nuisance including by education and, where needed, robust enforcement of the law.
- A city where 'town' and 'gown' combine, and where mutual understanding and partnerships are developed through joint working, community initiatives and volunteering.

Cambridge — a great place to live, learn and work

- A city which strives to ensure that all local households can secure a suitable, affordable local home, close to jobs and neighbourhood facilities.
- A city which draws inspiration from its unique qualities and environment and its iconic historic centre, and retains its sense of place across the city through positive planning, generous urban open spaces and well-designed buildings, and by providing quality council services.
- An entrepreneurial city with a thriving local economy, in which businesses are assisted to build on their global and national pre-eminence in learning, discovery and production, and develop a full range of local employment and skills development, while also recognising and delivering on their social responsibilities.
- A city where getting around is primarily by public transport, bike and on foot.

Cambridge — caring for the planet

- A city that takes robust action to tackle the local and global threat of climate change, both internally and in partnership with local organisations and residents, and to minimise its environmental impact by cutting carbon, waste and pollution.

"The City Council has a clear vision to lead a united city, 'One Cambridge - Fair for All', in which economic dynamism and prosperity are combined with social justice and equality."



Ian Lewis

Director of Infrastructure Investment, University of Cambridge

It would be a reasonable objective for the regional economy to grow five-fold in the coming 50 years.

Cambridge is acknowledged as a long-term success story for UK plc, significantly driven in the past few decades by the continuously increasing economic contribution of information technology and the physical and life sciences in which the region excels. Greater Cambridge has the significant advantages of a world-leading University and cultural and economic hub: a large associated pool of highly qualified knowledge workers; a relatively unspoilt mix of urban and rural developments; and good transportation connections, particularly to London.

While the city of Cambridge is densely developed and at risk of congestion, the region has a relatively low population and current development density. This capacity for development, combined with the regional advantages, can be expected to foster continued economic growth for the 50 years considered in this vision, and the state of the region in 2065 will be determined by the way in which this growth has been accommodated. During this period, the engagement of the universities and colleges in the region with local businesses, authorities and populace can be expected to increase, such that the regional economy continues to develop into a more integrated whole.

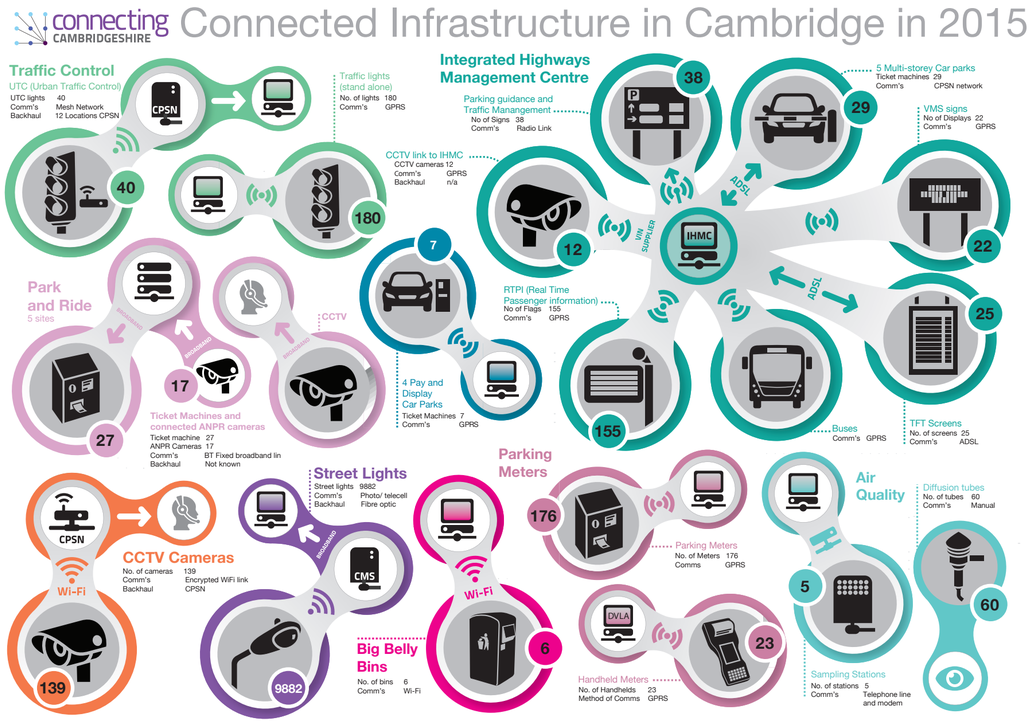
The “network effect” that has driven much of Cambridge’s success, in which university bodies, public and corporate research institutions and advanced local businesses interact, needs to evolve and develop as the economy grows. Today, businesses aspiring to join the vibrant local ecosystem prefer to locate their offices within the city. In 2065, businesses will necessarily be more distributed and this network effect will be equally important, but will need to more effectively encompass the Greater Cambridge region for both physical and virtual connectivity.

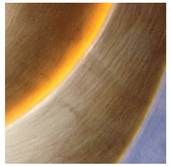
“The ‘network effect’ that has driven much of Cambridge’s success will need to evolve and develop as the economy grows.”

Current transportation arrangements cannot hope to support the increased direct personal interaction in the greatly expanded economy and innovative transportation solutions will be essential. The ability to hold meetings “at a distance”, mitigating the need for travel, will improve but collaborative working in highly equipped laboratories and discussing complex technical issues in regard to specialised experiments or materials will still benefit from face-to-face direct interaction. Smart infrastructure will be required such that traffic can be better managed but also transportation choices can be more informed. So not only will a comprehensive range of digital transportation infrastructure be required, it will necessarily be integrated to provide both an intelligent traffic solution and publicly accessible information in real time that shows where and how traffic is moving.

Nevertheless, the ability to support state-of-the-art remote meetings and collaboration will need to be an area in which Cambridge excels in 2065.

This model will complement face-to-face meetings but not replace them. Office meeting rooms will be equipped with the necessary wall-sized 3D screens, cameras, speakers and microphones. The required space and equipment cost will preclude this technology being common in employees’ homes, although more limited participation from home will be possible and this will also mitigate the expected transportation challenges. For collaboration, communications capacity is currently treated as a limited resource with remote meetings kept short, but in 2065 this capability will be an essential part of the working day. The remote 3D collaboration of 2065 will make significant demands on digital capacity and the successful future Cambridge ecosystem will in part be determined by the locations with that communications capacity.





Professor Theresa M. Marteau

Director, Behaviour and Health Research Unit, Cambridge Institute of Public Health, University of Cambridge

2015: Cambridge is good but could be better.

Known for its University, cycling and Silicon Fen, Cambridge fares pretty well when it comes to health. Like many affluent British cities, its residents tend to live longer and in better health than people from poorer parts of the country.[1]

However, evidence from the University's behavioural scientists, epidemiologists and political economists was creating an ominous picture of the future burden of disease including diabetes, cancer, dementia, heart disease and depression.[2] The good news, though, was that this burden could be reduced if the population were to become more physically active, stopped smoking, drank less and ate better. Cambridge set out an ambitious 50 year programme to meet this challenge. To prevent disease it focused on altering environments to change behaviour.[3] To reduce the gap in health between the rich and the poor it focused on early intervention programmes.[4]

2065: 50 years on, what did Cambridge do, and with what effect?

Healthier, fitter and more prosperous. Cambridge is the first UK city to reverse the rising rates of sedentary behaviour that were predicted at the beginning of the 21st Century.[5]

Pedestrians and cyclists rule Cambridge roads thanks to redesigned road systems. The risk of serious injury on the road has declined dramatically, with none reported in the past 10 years.[6] Solar-powered driverless buses navigate the historic streets, with collective cars transporting those unable to walk or cycle to work, school and college.

This increase in movement has infiltrated homes and offices, with both environments now designed to maximise movement. Gone are the days of sitting for hours on end in meetings: standing and walking meetings are the norm, and desks that allow students and workers to stand at their computers are popular.

The city has an abundance of freely-available beautiful spaces, both outside and inside, where people meet their daily activity goals with the help of prompts from smart devices. These inspiring, creative spaces were reclaimed from the city's redundant car parks and are maintained by an enthusiastic network of local employers happy to donate both funds and time to keep their employees happy and healthy.



1%

of the richest in 2015 own as much as the poorest

50%

Meat-free diets. The widespread availability of cheap, energy dense food[7] and large portion sizes[8] were recognised as two drivers of over-consumption in 2015. Food is now served in sizes more akin to those served a century ago thanks to an initiative led by Addenbrooke's Hospital and the Biomedical Campus, followed by schools across the city. Food outlets throughout the city, controlled through a novel licensing scheme, offer healthier menus. Obesity rates are falling, particularly in children.

A smart Cambridge-led technology now turns pulses into delicious meatless and dairy-free products, packed with health benefits. Animal products no longer feature in diets and the commercial food sector has adapted to meet a major shift in people's preferences for eating less — but better — food, thereby improving both population and planetary health.

Safe "alcohol". The days of waking up groggy with a hangover are over. Advances in neuroscience have led to drinks that mimic the pleasurable effects of alcohol without any of the side effects[9]. The "neuro-drinks" industry contributes significantly to the wealth and health of Cambridge and is set to overtake the alcohol industry. This has been helped by a change in international trade laws to prevent the sale of dangerous products when a safer alternative is available.

Smoke-free city in sight. Only 5% of the population in Cambridge smokes and tobacco is now available only to those with a registered addiction — typically those born before 2015.

How has this been achieved? Tobacco control policies have been very successful, both locally and nationally, through a combination of high and rising taxation, removing cigarettes (now sold in unbranded packets) from point of sale, and banning smoking in all public and private spaces where children are present. Electronic cigarettes proved a passing fad and can now only be seen in museums.

A fairer society? Being born into poverty is associated with poor prospects for health, wealth and happiness.[10,11] Cambridge invested heavily in early intervention programmes, based on neuro-scientific evidence to avoid the damaging effects on developing brains associated with poverty and to capitalise on the brain's ability to change. In 2065 inequality remains the global challenge that it was in 2015 given an absence of national and international fiscal reforms to corporation, inheritance and other taxes that are needed to shift wealth from the richest 1% that still own as much as the poorest 50%.[12, 13, 14]

Cambridge continues as Europe's largest technology cluster, protecting it against rising unemployment in the surrounding area. However, the full benefit of programmes targeting inequality has been muted even within the Cambridge bubble.

Martin Rees now rules the world as a cryopreserved enlightened despot prepared to meet the many Promethean challenges — including inequality — that democracy did not.[15]



"In 2065 inequality remains the global challenge that it was in 2015 given an absence of national and international fiscal reforms to corporation, inheritance and other taxes that are needed to shift wealth from the richest 1% that still own as much as the poorest 50%."



Dr Anna McIvor

Member, Transition Cambridge

In 2065, Cambridge has become a food-growing city with salad, vegetables and fruit growing on all available walls, roofs and gardens.

Fruit and nut trees line the roads, and most households now keep chickens or even goats. Relatively little food needs to be imported, and East Anglia has become 85% self-sufficient for food. This became necessary as the price of imported food rose due to the impacts of climate change on many food producing regions as well as soaring oil prices which increased transport and production costs. Organic food production methods have become the norm, as they use less energy and are therefore cheaper (pesticides and fertilizers were also made from oil, so they became very expensive).

All new houses in Cambridge are now built to the highest Passivhaus standards[1], well-insulated from both heat and cold and requiring little energy to heat or cool even during the climate extremes which have become more common. All remaining older houses have been retrofitted to a similar standard.

Agriculture and energy generation now go hand in hand, and wind turbines can be seen in all directions heading out from Cambridge, with crops growing around their bases. After the problem of energy storage was solved in the early 2020s (by a Nobel prize-winning group working in the Cambridge Engineering Department), energy rationing was no longer necessary. However, the system of carbon credits remains, ensuring the equitable distribution of energy and discouraging unnecessary long-distance travel.

The excellent public transport network within Cambridge has reduced the need for personal car ownership, and most people are members of car clubs. Driverless electric cars have also reduced dangers on the roads (their active avoidance technology means that road collisions are extremely rare). Cycling is by far the most popular form of transport, with its health and fitness benefits. Cycling is also the most popular sport in the area, with many people taking part in the biennial East of England Cycle Championships.

Strong communities have formed throughout the city, with a wide range of community activities and celebrations taking place throughout the year. Community hubs can now be found on most streets, and these provide a community space as well as communal facilities and services, such as healthcare, childcare, activities for young people and a place for the elderly to get together. Within these hubs, communal kitchens, laundry facilities and workshops provide a sociable space for people to do their everyday tasks, as well as reducing the need for individual ownership of many items and appliances. These spaces facilitate communication and skill-sharing between generations, and laughter and music can often be heard coming from within them. The community hubs also take part in various arts festivals, including the annual Cambridge Carnival with its famous parade.

In 2065 Cambridge remains an enjoyable place to live, with strong communities that lead the way in developing ever more sustainable ways of living.



"In 2065, agriculture and energy generation go hand in hand."



Dr Roger Mitchell

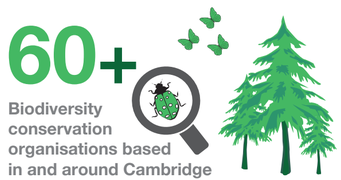
Cambridge Conservation Forum
Natural Cambridgeshire

Natural Cambridgeshire is the Local Nature Partnership (LNP) for Cambridgeshire and Peterborough.

The Government, in its 2011 Natural Environment White Paper, committed to set up Local Nature Partnerships to bring about improvements in their local natural environments. Following consultation with stakeholders, the Cambridgeshire Local Nature Partnership Board was established in 2012. Since then, the Board has been developing its role, resulting in its vision:

"A Cambridgeshire that has the highest quality of life because we place nature at the heart of our agenda. A Cambridgeshire which appreciates that to prosper people need a high quality environment in which nature thrives alongside jobs and housing."

If Natural Cambridgeshire's vision is applied to the city of Cambridge, then it sees the city in the context of the surrounding landscape and its essential relationship with this environment, and therefore seeks to ensure that the following attributes are in place:



Living landscapes: through ambitious programmes of habitat and species recovery, wider land stewardship and the safeguarding of existing wildlife sites, Cambridgeshire will be an exemplar for the landscape-scale restoration of the natural environment.

Local food and farming: building on our status as one of the leading food-producing parts of the country, we will promote initiatives that foster the very best land stewardship, producing food for local and national markets and connecting farmers, communities and the farmed environment. We will champion innovative land management, building on good farming practice and recognising the critical relationship between agriculture and Cambridgeshire's natural assets.

Better places to live: Cambridgeshire will have as its foundation thriving and healthy places to live: high-quality housing that will be alive with green space and wildlife, accessible (financially and physically) to all, and that will provide clean air and water.

Sustainable jobs: whether through tourism, land management, or scientific research such as biotechnology, putting nature at the heart of our enterprise agenda will create fulfilling forms of employment for the long-term.

Healthy communities: the Cambridgeshire to which we aspire will have healthy communities in healthy environments. We will pioneer initiatives to ensure that green spaces and access to nature help people to enjoy and appreciate the nature around them, leading to healthier and happier lives.

Reconnected heritage, culture and leisure: whether walking, cycling or riding through a network of long-distance paths, visiting a country park, or enjoying heritage, art and culture linked to wildlife, nature will be at the heart of how we spend our leisure time in the countryside.

"In 2065, Cambridgeshire will be an exemplar for the landscape-scale restoration of the natural environment, championing innovative land management and creating healthy places to live."

All of this will be underpinned by the promotion of nature throughout the education and skills agenda, encouraging people to value nature: for its own sake and for its role in enhancing our lives.

The delivery of this vision will also support efforts to adapt to and mitigate the impact of climate change. We believe that if we achieve all of this, Cambridge will be a better place to live in, work in and visit, as well as becoming an exemplar for sustainable living.



Professor John Miles

ARUP/Royal Academy of Engineering Research Professor in Transitional Energy Strategies, Department of Engineering, University of Cambridge

It was barely light and slightly chilly as he crossed the short distance from his car to the cigar-shaped 'Bullet' and stepped into the soft warm glow of the long, thin cabin.

It was already half full and he found his way quickly to an empty seat and sat down. As he buckled up into the comfortable airline-style seat, a returning Bullet glided quietly into the adjacent bay and the other passengers coming up behind from their cars made their way towards the newly arrived vehicle. At one departure every three minutes, no one ever had to worry about missing the service.

Although he had ridden the Bullet many times before, the powerful acceleration and the low hum of the electric motors still gave him a thrill as the vehicle rapidly picked up speed on the smooth, purpose-built, trackway. The journey from the Park-and-Ride on the A428 near Papworth Everard to the University's busy West Site on the Madingley Road took only three and a half minutes as the vehicle sped at 120mph along the elegant, overhead viaduct which curved gracefully across the fields in the early morning half-light. As he travelled, he reflected on how easy it was to make the commute from his home in one of the outlying villages. Years ago, the last 8 miles from the A428 roundabout had apparently taken 45 minutes or more as commuters crawled along the Madingley Road between 6:30 and 9:00 each morning. And it had been the same going home in the evening — strangulation of the city and its aspirations had seemed inevitable in those days.

The Bullet cruised to a halt at the West Site interchange and he stepped out. The big site spread out before him, with buildings stretching to all four corners. The high level of site development had been made possible by the massive improvements to transport access which had been brought about by the Bullet.

He looked at his smartphone; it had automatically hailed his autopod and was showing the vehicle ID. He glanced around the wide-open apron area and found the driverless, two-seater electric vehicle waiting nearby. He strolled towards it and waved his smartphone casually at the windscreen; the autopod recognised his booking and opened its door silently. He stepped in and sat back comfortably. The pod was warm and it took off automatically in the direction of his office, effortlessly navigating the final mile of his journey at 12 mph alongside the early morning build-up of pedestrians and cyclists who also travelled to work along the wide landscaped pathways which criss-crossed the site. By the time he reached the main door of his building and stepped out of the autopod, he had checked his e-mails, caught the headlines, and summoned the lift.

The Bullets and autopods had transformed Cambridge. Three high-speed Bullet links came in from well outside the city; his one from the west, plus another from the east to the Marshall's Site, and the third from the south to the Addenbrooke's Site. This, plus the triangulation of Bullet links between the three sites meant that movements to, and between, the sites could be accomplished in a matter of minutes no matter which direction you approached from. Once on each site, travellers could use the local autopods to arrive at the door of their destination with ease, despite the vast size of each campus.

These transport links meant that the enormous economic growth which had occurred in Cambridge between the 2020's and the 2060's had been easily contained within the three campuses and had not been allowed to spoil the old city. This, plus the convenience



Strong transport links connect the city to surrounding villages in a 'network of nodes'.

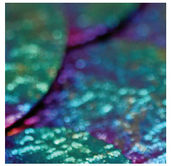
of travel from the surrounding towns and villages, had meant that the catchment area of the city had expanded enormously and an economic explosion had taken place. Global giants in bio-sciences, software, pharmaceuticals, finance, and high-tech engineering had poured into The Fen, and a flood of new start-ups had spun out of the University. Together, they had created the world's largest and most successful techno-cluster outside The Valley, putting even London's Shoreditch, Hackney, and Olympic Park successes into the shade.

"Thousands of commuter and visitor vehicles no longer entered the city, and the peak-time traffic crushes had been removed altogether."

And, best of all, movements within the traditional city-centre area bounded loosely by the three campus sites had become startlingly easy. Thousands of commuter and visitor vehicles per day no longer entered the city, and the peak-time traffic crushes had been removed altogether. As a result, within central Cambridge, bicycles jostled with pedestrians, autopods, buses and cars in a manner that seemed to have been a Cambridge tradition for ever — except these days the traffic moved reasonably smoothly over the course of a day, rather than being caught in what felt like perpetual grid-lock.

And all of this, he reflected, had been achieved without any draconian fines, car movement restrictions, or excessive parking charges imposed from above. Rather, it had all happened because the Bullets and autopods had simply made it more attractive for commuters, visitors, and residents alike to use them in preference to using their cars.





Dr Tony Raven

Chief Executive, Cambridge Enterprise

In 2060, Cambridge will have celebrated the 100th anniversary of what is known as the Cambridge Phenomenon which converted the city from a top university in a rural market town into one of the world's top entrepreneurial clusters.

Fourteen billion-dollar companies and another 1500 high tech companies have been created in and around the city that are together turning over more than £13bn a year. It's where The Cloud and the chips that power the world's smartphones and tablets were developed, where six of the ten top-selling drugs in the world originated and where new research breakthroughs are creating world-changing opportunities every day.

"We know that the world will change in ways we cannot begin to imagine."

In 1960 no one could have foreseen the dramatic change to come, or the technologies that would drive it. Just 15 years ago we couldn't foresee the impact that the Internet, social media and genetics would have today on our daily lives. And so also today we cannot envisage how technologies and opportunities will change our lives in the next 50 years.

What we do know is that the world will change in ways we cannot begin to imagine. And that to retain Cambridge's leading position in that change we must retain the attributes that have served it so well to date: a place that is receptive to new thinking and agile and flexible in responding to it; a safe and supportive place to do risky things; and above all intellectually challenging, with a high quality of life that can attract and retain the world's leading minds in both academia and business. Retain those and the rest, whatever they turn out to be, will follow.



"Cambridge needs to continue to be an intellectually challenging place with a high quality of life that can attract and retain the world's leading minds in both academia and business."



Claire Ruskin

Chief Executive, Cambridge Network Ltd

"Cambridge ideas are recognised as changing the world and the city is known as the most imaginative place to learn and to create, stretching people to achieve the best work of their lives."

Cambridge businesses have developed in a phenomenal way between 1965 and 2015, but by 2065 changes in and around Cambridge have accelerated even more extraordinarily.

By 2065, Cambridge has stayed at the leading edge of invention and innovation. It has created recognition and leadership for the world by welcoming the most inspiring to come to the city to co-create. Cambridge has thriving entrepreneur communities creating ideas and start-up businesses; the most successful of these are routinely scaled up to create widespread opportunity. Those that are sustainable locally stay in the region. Cambridge ideas are recognised as changing the world and Cambridge is known as the most imaginative place to learn and to create, stretching people to achieve the best work of their lives.

Because the character and beauty of Cambridge is acknowledged as accelerating quality innovation, it is therefore saved before high-rise buildings and over-congestion can turn people away. Cambridge leaders are careful to preserve historic parts of the city and re-develop major zones for optimal living and working.

Cambridge stays apparently small and special as a place to live; a green belt between the centre and the necklace of businesses around the outside provides space to regenerate. Natural corridors allow pleasant walking or cycling above ground and enterprises are still perfecting the invisibility screens that allow rapid transit for goods and longer journeys by interactive transmission. People still want to work in groups in 2065, and face to face meetings are the norm for creative sessions, backed up by auto-electronic assistants for mundane tasks. Locations and routes have been planned to optimise the way Cambridge residents and visitors can live and work, not at the fastest pace, but at the most enjoyable productive pace. In reality, Greater Cambridgeshire now houses many more people than it used to, but it does not feel crowded or congested and the local 'public houses' have brought together all types of people, young and old, for a much more socially inclusive life than in the early part of the 21st century.

Cambridge is welcoming to learners and workers, and stays small by encouraging visitors to stay for a few years and then go back to their home territory to continue to do business remotely with Cambridge. Families send next generations to repeat the exciting experience they had in the city. Cambridge is a smart city of course, with the highest quality, joined up access to all the information that could be needed. The Understanding of Things is another world-changing technology that Cambridge led in by building the sensors, communication devices and big data analysis that have made the difference.

The Schools and Universities of Cambridge have combined to stay at the top, with life-students matched to the roles they play in a working life marked by flexible phasing. Recognising a total working lifetime of up to ninety years now, with healthy lifetimes greatly extended, individuals choose to work in phases to suit their life choices: sabbaticals, re-training and re-deployment are commonplace. Ambition and hard work still drive, but so many health conditions have been eradicated that people can give peak performance without loss between working phases. The chasm between private and public sector approaches has been reduced as people work in both, and unemployment is rare as people understand the impact of purpose on their happiness.

The nature of business in Cambridge has moved on. Fusion has resolved the energy crisis that looked certain in the 2020s, and Cambridge clean-tech development has been recognised for being at the forefront of this technical salvation. Healthcare has changed beyond recognition from the age of obesity and chronic illness. There is still considerable progress being made in curing Intolerance, but Maintenance of Peak Kindness and Productivity has been effective for twenty years. Prevention of illness is well advanced, and acceptance that random biological errors will always occur makes humanity more forgiving. Agricultural technology, also unlocked by Cambridge collaboration, has meant that the world can now produce 80% more food than it did 50 years ago and no-one need be hungry.

Space travel is expensive and the queues seem longer every day, but then Time Travellers continue to love auto-punting on the River Cam between meetings.



Professor Jeremy K. M. Sanders

Pro-Vice-Chancellor for Institutional Affairs, University of Cambridge

A perspective on the University of Cambridge

By 2065, the paperless office will finally have arrived. All current and past information will be accessed digitally via voice recognition, and the keyboard will have been consigned to the museum. Even the rarest, and certainly the most fragile, documents will be instantly available in digital form, and only the most privileged researchers will ever get to touch and smell the real thing. Access to the book stacks in the University Library will be extremely restricted. Walls will be communications screens enabling world-wide holographic 3D video conferencing, and we'll probably all have implanted chips instead of phones.

11,000+

people employed directly by the University

The University of Cambridge will still have a residential component, allowing some individuals to taste the traditional experience, but the bulk of teaching and education will be delivered remotely: the "lecturers" may well be as remote from Cambridge as the audience. But research and scholarship will still play a major role at the elite Cambridge level.

"The University of Cambridge will still have a residential component, allowing some individuals to taste the traditional experience, but the bulk of teaching and education will be delivered remotely."

Top people from around the world will still want to gather together to meet and discuss their research and ideas. The University's unique selling point — its USP — will be its convening power, bringing key individuals to Cambridge to experience personal interactions and chemistry despite the large carbon cost of international travel in an energy-deprived world. At every level, from undergraduate via graduate student, postdoc and sabbatical professor to top executive and world leader, Cambridge will be one of the key venues to come and be seen, and to rub shoulders with the global intellectual elite. If it sounds like an exclusive conference venue, then that may be about right.

18,500+

students at the University of Cambridge

In addition to the intellectuals and leaders, the University will employ cleaners, catering and other service staff, many of them living in affordable housing owned and provided by the university.

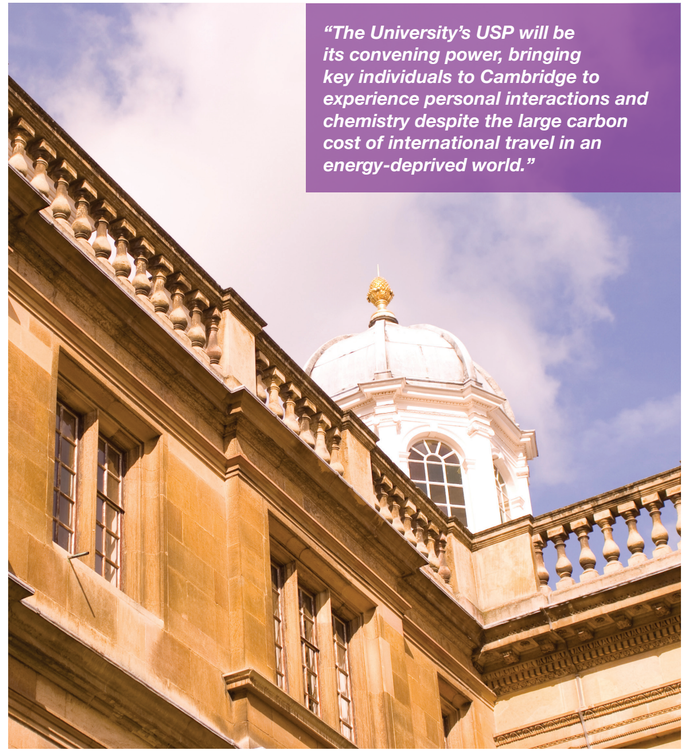
Scientific, technological and medical research will still need laboratories for the ultimate experimental tests, but computational prediction will be the main mode of exploration in Cambridge. Exploration in the field will be dominated by remote controlled machines capable of operating unsupervised in hostile environments: within the body, under water, in deserts or forests, in space. But the conception, interpretation and dissemination will still happen in Cambridge, with even more international groups than today. And the boundaries between University and private sector exploitation businesses will have dissolved.

A perspective on the CIty

In 2065, the University of Cambridge will continue to be the global attractor for international research and development companies and will spin out more local companies than in the early-21st century.

Cambridge residents will be a highly-educated group of people, including many who commute to London, living within the 2015 city boundaries or in the innermost necklace villages accessible by electric bike and personal autonomous vehicles. They will enjoy world-class shopping, culture and restaurants, and access to the intellectual riches of the University. North West Cambridge (and possibly) similar developments will have matured into exciting local centres that are attractive for families and visitors alike. Building height restrictions will have been dramatically scaled back, so the great medieval core will be surrounded near the 2015 city boundaries by apartment blocks of 10 storeys or more in order to satisfy demand. Only public transport and small autonomous or service vehicles will have access to the core. All vehicles will be electric and driverless. Shortage of water will be a major constraint on growth and behaviour, with recycling even of foul water becoming commonplace.

The polarisation already visible in 2015 between an intellectual and financial leadership and workers who provide manual services will continue to grow. Service workers will mainly live further out, commuting into Cambridge via fast mass transit from hubs such as Wisbech, Alconbury or Haverhill, although many of the University's lowest-paid staff will be living nearby in affordable housing that it owns. They will be providing service to the intellectuals and leaders in business and the University, and also servicing the world-wide tourist trade who come to look at the traditional colleges as living history. However, most of the technicians, secretaries, accountants, taxi and bus drivers and other mid-level support staff will have gone, replaced by machines with artificial intelligence at levels we can barely begin to predict.



"The University's USP will be its convening power, bringing key individuals to Cambridge to experience personal interactions and chemistry despite the large carbon cost of international travel in an energy-deprived world."



Emma Thornton

Head, Tourism and City Centre Management
Cambridge City Council

Technology
Looking ahead to the future, we would like to think that Cambridge will be ahead of the game in terms of using cutting edge technology to enhance visitor experiences. The beauty of Cambridge is that whilst it is steeped in history, it is also at the forefront of innovation and scientific and technological discovery and we would seek to continue to safeguard, but also to innovate.

Augmented reality
Whilst we appreciate that augmented reality is something that we will already see coming on stream, particularly in a specific museum or attraction, as the technology becomes further refined there seems to be significant potential to explore this further in a city like Cambridge. We could give people a glimpse behind some of the colleges and other great buildings, and into the past as they walk around the historic city, in a single augmented reality offer. This could be video content that overlays the real images being captured via a mobile device, rather than just layering of static content. This would need to be enabled by superfast wifi connectivity via a boosted up version of the current wifi network and/or enhanced mobile data provision.

Safeguarding heritage
Our vision for Cambridge in 2065 is that it would continue to be recognised as one of the premier historic cities in the UK with its distinctive built heritage well conserved. In addition to the college buildings this would also include its rich traditions of church, civic, industrial and domestic architecture.

Cambridge would have received World Heritage Site status, in recognition of the beauty and integrity of its urban fabric and its importance as an international seat of learning, research and innovation. Cambridge's green spaces would be in good heart, and would have expanded in order to allow greater access outside of the city – in particular in relation to the National Trust's vision of a green corridor connecting Cambridge with Wicken Fen to the north-east.

Value not volume
There would be much greater recognition for Cambridge as a short-break destination with improved awareness of the rich proposition in the "Beyond Cambridge" area both in terms of recreation and arts and culture. There would be world class attractions around Cambridge showcasing the important history and heritage of the region and a stunning rural hinterland which we need to better promote and connect our visitors to in order to encourage them to stay longer, as we will encourage a culture of "Slow Tourism". Through this we would increase the value of the visitor economy to the "Cambridge and Beyond" area whilst respecting the local environment and its protection.

Connectivity
Through significant improvements in both the road transport network and public transport we will be able to better connect the "Cambridge and Beyond" tourism offer. Creating personalised tours on the day could provide visitors with push video content to their mobile devices at key locations to encourage them to step inside a building or order transport to a new location (e.g. Newmarket to experience the world's best racing). This will only succeed if key transport routes are well connected and relatively free flowing, and connected into an app that always presents the user with the best possible options e.g. train/bus versus car.

"Cambridge would have received World Heritage Site status, in recognition of the beauty and integrity of its urban fabric and its importance as an international seat of learning, research and innovation."





Jane Wilson

Chair, Arts Development UK

The challenge of looking forward 50 years in a city which recently celebrated the 800th anniversary of the University of Cambridge is an interesting one, as 50 years is not a particularly long time set against the long arc of the city so far.

Speculating on arts, recreation and culture 50 years into the future has almost the opposite problem: creativity, by its very nature, means that the exact form they will take should be to a large extent unknowable. However, what we do know is that they will, in whatever shape, be a crucial part of that future.

So, what we can usefully consider are changes in the ways in which people are able to take part in cultural activity, and how we can plan and manage for that change. In particular the argument I am going to make is that we need to actively plan, rather than relying of the work of previous centuries.

In 2065 some things are just the same as now: people still want to come together, and not just virtually, for significant civic and cultural moments. Digital forms of transmission and distribution and the virtual cultural experiences they support are ubiquitous, and the city's cultural value is now internationally accessible, but that has not replaced a very human desire to gather together in real time and physical space.

Much about the historic city centre has not changed. Buildings which have been here for hundreds of years are still standing, and many have the same uses as in 2015. The museums, venues, and open spaces, which were unique in their scope for a city of the size of Cambridge in 2015, are still present. City centre green spaces continue to provide a balance of events and recreational space for residents and visitors. Advances in technologies around work and transport have released the city centre from the constant in and out flow of cars and created more space for significant shared cultural experiences, returning to a more social and communal use of the city streetscape. However, by 2065 the historic core, which was already stretched in 2015, is no longer able to provide sufficient cultural space for the whole city.

"Advances in technologies around work and transport, have released the city centre from the constant in and out flow of cars and created more space for significant shared cultural experiences, returning to a more social and communal use of the city streetscape."

A strong collaborative approach to planning over the 50 years between 2015 and 2065, has meant that Cambridge, rather than following the model of those cities which simply added ring after ring of housing around an ever more pressurised civic core, took a very different approach to growth.

The tradition of urban green space and high quality architecture has been expanded outwards, providing multiple locations with high quality outdoor and indoor civic spaces. The quality of arts and recreational activity experienced in the historic centre is matched or surpassed. Venues with the scale and infrastructure appropriate for the expanded city have been planned into the growth, including large scale green spaces able to hold city wide gatherings, with excellent public transport, cycling and walking links.

So, rather than recreating yet another overstretched once beautiful city centre surrounded by suburbia, Cambridge took the opportunity to breathe outwards, taking its remarkable and ancient urban green landscape with it. The very high quality of life associated with Cambridge and South Cambridgeshire has been maintained and developed, providing a recreational and cultural match to the continuing intellectual and economic growth of the city.



And finally, in 2065...

Cambridge needs to continue to be a place that is above all an intellectually challenging, with a high quality of life that can attract and retain the world's leading minds in both academia and business.

Any education system that doesn't consider employers' future skills needs or, the flipside, future career opportunities for students is preventing sustainable growth.

Cambridge must restore some of its medieval ambitions, but with those royal privileges directed toward the poor and disenfranchised rather than children of an elite.

When my grandchildren visit the 101st Cambridge Folk Festival they will find elected institutions representing the interests of the city and its surroundings with locally elected councillors at their heart.

Ideas must be given room to grow to the scale required to achieve their ambition.

What we can expect with a degree of certainty is that vehicles will most likely be autonomous in their operation and not powered by an internal combustion engine.

The University's USP will be its convening power, bringing key individuals to Cambridge to experience personal interactions and chemistry despite the large carbon cost of international travel in an energy-deprived world.

Thousands of commuter and visitor vehicles no longer entered the city, and the peak-time traffic crushes had been removed altogether.

Cambridge ideas are recognised as changing the world and the city is known as the most imaginative place to learn and to create, stretching people to achieve the best work of their lives.

Profound change will come from the ways councils relate to their citizens and ot her interests in the localities and their working cultures.

The 'network effect' that has driven much of Cambridge's success will need to evolve and develop as the economy grows.

Inequality remains the global challenge that it was in 2015 given an absence of national and international fiscal reforms to corporation, inheritance and other taxes that are needed to shift wealth from the richest 1% that still own as much as the poorest 50%.

The University of Cambridge will still have a residential component, allowing some individuals to taste the traditional experience, but the bulk of teaching and education will be delivered remotely.

The extensive nature reserve will provide access routes from Cambridge and surrounding towns and villages by foot, cycle, on horseback and by boat and will create recreational opportunities across a unique and developing area of countryside.

We know that the world will change in ways we cannot begin to imagine.

The same skills identified in 2015 coupled with those required for flexibility, innovation and fast-paced change will help make the city resilient.

Advances in technologies around work and transport, have released the city centre from the constant in and out flow of cars and created more space for significant shared cultural experiences, returning to a more social and communal use of the city streetscape.

In this region, life expectancy at birth has been increasing by more than 5 hours a day. If this rise continues, life expectancy will have reached over 90 years.

Developments such as an interactive wall display would connect me to family and friends, and give me access to exercise classes and continuous learning courses.

Cambridgeshire will be an exemplar for the landscape-scale restoration of the natural environment, championing innovative land management and creating healthy places to live.

Much of the business growth has been based on foundations laid down in 2015.

Necessary reductions in energy consumption and carbon emissions will be significantly higher — and the costs significantly lower — if cleantech innovations are developed and moved into the market at scale.

The City Council has a clear vision to lead a united city, 'One Cambridge - Fair for All', in which economic dynamism and prosperity are combined with social justice and equality.

Assumptions about the desirability of equality that are normal today were in their infancy in 2065.

Scientific, technological and medical research will still need laboratories for the ultimate experimental tests, but computational prediction will be the main mode of exploration in Cambridge.

The economy of Cambridgeshire is vital to the national economy, and an effective, sustainable transport network is vital to the economy of Cambridge.

Agriculture and energy generation go hand in hand.

Cambridge would have received World Heritage Site status, in recognition of the beauty and integrity of its urban fabric and its importance as an international seat of learning, research and innovation.

Cambridge declares itself a 'Creative Innovation District' and the city's international business sector invests in a cultural investment fund that brings millions of pounds of sustainable funding to transform and sustain the cultural infrastructure and activities of the growing city.

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1. See Passivhaus for more information: http://www.passivhaus.org.uk/standard.jsp?id=122.

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Please note the views expressed in this report do not represent the policy of any local or national government, organisation or institution.

Visions of Cambridge in 2065

In October 2013, Professor Sir Mark Walport chaired the first Foresight Future Cities Regional Workshop in Cambridge. The discussions during that meeting inspired a consortium of people from across the city to come together to work on the 'Visions of Cambridge in 2065' project. This is one of six local city projects co-funded by the Foresight Future of Cities project in the Government Office for Science. Each project is developing its own methods for visioning possible futures of its city.

'Visions of Cambridge in 2065' seeks to open up the possibility of imagining the future of Cambridge to a broad cross-section of its citizens; eliciting visions of what the city could look like in 2065, and to map diverse projections for its future.

This volume represents the first phase of the project, bringing together visions from city and county-level policymakers, researchers and people who work for companies, local organisations and networks. The second phase of the project will include perspectives from the people who live and work in the city.

This project was co-led by the Cambridge Forum for Sustainability and the Environment and the Centre for Science and Policy (CSaP).

The Cambridge Forum for Sustainability and the Environment is a Forum in the University of Cambridge that aims to stimulate cross- disciplinary conversations about some of the great sustainability challenges the world faces in the future, and the research pathways which will help to prepare for and address those challenges.

The Centre for Science and Policy promotes engagement between academic research and government in order to improve the use of evidence in public policy, and support academics in the public policy dimensions of their research.

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