The Climate Crisis – What more can transport planners do to address the climate emergency?

# Positive visions of a low-carbon future: Strategies from successful cities

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## Introduction

On 1st June 2017, the USA announced its intention to withdraw from the Paris Agreement, a 2015 agreement to limit the global average temperature increase to well below 2°C[1]. The following day, New York City Mayor Bill de Blasio signed an executive order affirming the City's commitment to the Agreement[2], showing how cities can address the climate emergency even when national governments fail to act. This is important, as over half the world's population live in cities, which as major centres of population, consumption, buildings and transport, produce 70% of world's greenhouse gas (GHG) emissions[3]. However, given their more immediate relationship with businesses and residents, and generally more nimble governance, cities are also in a position to make effective changes to reduce emissions[4].

Transport is a key part of making these changes to address the climate emergency, as the sector contributes around 30% of UK GHG emissions[5], with these levels remaining static compared to reductions in other sectors. In 2016, over half of UK domestic transport emissions were produced by cars, meaning this mode of transport is responsible for 15% of all domestic emissions[6]. Transport urgently needs to decarbonise, and the solutions lie in public transport, walking and cycling, not just in the uptake of electric vehicles. The transport systems we design and how people use them will change with decarbonisation, and transport planners must inspire, guide and enable this change. Strategies that provide clear paths to action and show that change is happening in a positive direction can be more effective at reducing inaction on climate change[7].

This research paper sets out three case studies that focus on the different stages of positively selling and implementing transformational projects. The stages and their case studies are:

1. **Establishing a vision through public participation**: the development of the Sydney 2050 strategy;
2. **Testing new ideas and measuring progress**: New York City and the use of pilot schemes to transform city streets and public spaces; and
3. **Expanding the positive impacts of change**: Copenhagen and the co-benefits of climate action.

Methods from each case study will be summarised to show what transport planners can do to address the climate emergency.

Cover photo: Green Square Library, Sydney. Source: Good Design Australia
https://good-design.org/

# Sydney, Australia


Image: A newly pedestrianised George Street with light rail. Source: City of Sydney

Public consultation and engagement are part of every major transport project. Transport planners are involved in the development of engagement strategies, the analysis of responses and decisions on how these are incorporated into projects. The City of Sydney conducted wide-reaching and innovative public engagement in the development of the Sustainable Sydney 2030[8] strategy. These methods are being expanded for the engagement currently taking place for the Sydney 2050[9] strategy. This case study explores these strategies and how they can be used by transport planners.

The City of Sydney is the Local Government Authority in central Sydney, with a population of 240,000 people[10]. In 2008, the City published Sustainable Sydney 2030: a long-term vision that set ambitious targets and identified measures to mitigate the effects of climate change. The overall strategy is split into four-year Community Strategic Plans and Delivery Plans, and currently the City is delivering these plans for 2017 to 2021[11]. The City also produces bi-annual reports on its emissions and other environmental metrics. The latest report shows there has been a 21% reduction in GHG emissions between 2006 and 2018[12].

The City's community engagement process has a strong focus on active participation, where the community defines the problems and the solutions[13]. Having the community actively participate in setting goals can mean more effective measures are adopted. For example, in the consultation for Sustainable Sydney 2030, 97% of respondents said they wanted the City to act on climate change. This was a clear mandate for an emissions reduction target and allowed the City to be more ambitious than it may have been otherwise[8]. Of the active participation methods used in developing Sydney 2050, two are of particular interest and can be applied more widely in transport planning.

**Workshops with children and young people**

"Our future Sydney" outlines the methods used by the City to seek the views of children and young people about Sydney in 2050[14]. Today's children and young people will play a key role in the implementation of the 2050 plan, and will experience the greatest impact of climate change. The consultation was developed based on the United Nations Convention on the Rights of the Child[15], the school curriculum and the role of schools as community centres with a diverse range of students. Incorporating the workshops into the curriculum achieved learning outcomes in geography, mathematics, English and economics. Data maps were used to show how people move around the city, how resources are consumed and how the use of space in the city has changed.

> United Nations Convention on the Rights of the Child, Article 12:
>
> Every child has the right to express their views, feelings and wishes in all matters affecting them, and to have their views considered and taken seriously.

The Sydney 2050 general survey was adapted into versions suitable for the age of the participants, and included the following questions:

- What do you hope Sydney will be like in the future?
- What pastimes do you enjoy now and want available to children/young people in the future?
- What excites you about Sydney's future?
- What concerns you about Sydney's future?
- Why should adults listen to the views of children and young people?

Action on climate change was the number one concern across all ages of survey participants. Environmental responsibility, sustainability and green spaces were also priorities, along with safety, fairness and social cohesion. Children and young people want a city where they can walk, cycle or use public transport, and preference for these modes was based on environmental concerns.

The question about why adults should listen to them showed that participants took the consultation seriously and valued being given a voice. For the participants, the issue of climate change is not abstract, and their views about the future are dictated by climate change and the action required to tackle it.


*Workshops with young people. Source: City of Sydney*

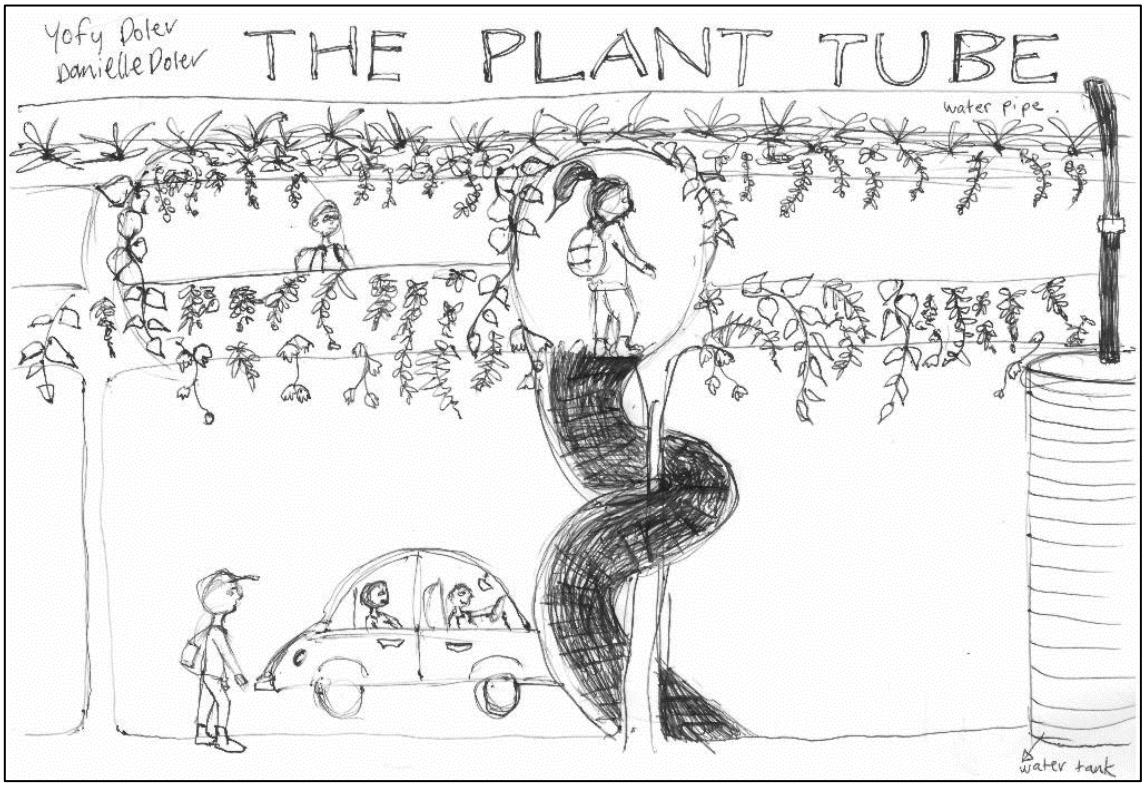
> We may not have as much life experience as you, however we are more nationally and internationally connected than ever and have access to multitudes of information that we didn't have access to before. We are future-orientated and care about our world in a way that is not illusionary or vague, but pressing and important.
>
> Comment from school workshop participant, aged 15

The City used the outcomes of these workshops to inform a Children's Summit[16] and a Youth Summit[17], where representatives from a range of schools were brought together to discuss their priorities and develop a vision[18]. They then presented their ideas to senior members of the City council. One of the ideas pitched to the council by the attendees of the Youth Summit was to reduce car dependence by introducing congestion pricing, cheaper public transport and wider footpaths. In response, the City has committed to listening to and acting on the insights of young people.

**Creative writing workshops**

Stories and narratives can be powerful tools for giving sense to the world, as data and evidence may not always be sufficient to mobilise people to act[19]. As part of the development of Sydney 2050, the City of Sydney collaborated with a local arts studio to deliver creative writing workshops attended by people aged eight to 80 years. A collection of these stories and poems called "I am Sydney" was published and incorporated into the Sydney 2050 consultation[20]. Stories ranged from personal accounts of people's arrival and history in Sydney, to how the city is changing, to what the city could look like in the future. "The Plant Tube" tells a story of children walking to school in a sealed walkway filled with plants that filter pollution from outside, as constant exposure to pollutants has heightened sensitivities and allergic reactions. "All's Changed 'Cept the Sky" describes a grandmother and granddaughter snorkelling in Sydney, where a new coral reef and the ruins of city centre can be seen under the water. These stories allow people to think beyond their daily life and imagine what the future might hold. While these two examples show a future where action was insufficient to avoid extreme air pollution or sea level rises, it is possible for positive stories about the future to normalise low-carbon living and the transition to that lifestyle.

While it is too early in the Sydney 2050 development process to see what influence these stories have had, the use of creativity is being used elsewhere to help the public understand how we will reduce emissions and what our future world will look like. For example, Sweden has appointed a Chief Storyteller as part of Viable Cities, the programme to help nine cities reach net zero by 2030[21].




*Drawing of the plant tube. Source: City of Sydney*

> As my sight adjusts the scene below clears to eye-popping clarity. Brilliant, live coral are everywhere, festooned thickly upon wide, curving concrete. Reds and blues and yellows, fans and clumps and appendages, the sheer fecundity a marvel of regeneration…The concrete ribbon splits in two, re-joins into one, swoops and dips in and around a tunnel, the dark entrance a beaconing maw. Can't help but imagine some frightful sea beast lies await inside, just out of sight. Staring doesn't provoke; nothing emerges but bubbles, the remnants of an ancient air pocket, or a cracked gas pipe that's been bleeding for years. Every time we visit, the tiny bubbles are there, floating up in a steady stream. Soon we're past it, moving east with the tide, the crumbling rooftops too far down to see.
>
> Excerpt from "All's Changed 'Cept the Sky", George Lancaster, I am Sydney

**Applications to transport planning**

Children and young people deeply appreciate transport modes that give them independence, such as walking, cycling and public transport. They will also be the main users of our transport systems in 10, 20 and 30 years' time and have strong views on sustainability and climate change. Because of these reasons, transport planners should ensure the views of children and young people are captured in the public engagement process. This can be done by using the school curriculum as a tool for engagement and learning about cities and transport in the classroom. If this approach were used more widely in the UK, the outcome would be a more inclusive transport system that caters for all ages, regardless of an ability to drive. It would also mean a vision and corresponding objectives are developed that align with the views of the people responsible for implementation in the decades to come.

Creative writing may be a harder element to include in traditional public engagement, but it can provide a valuable insight into how cities and infrastructure influence people's lives. If it is difficult to engage adults with this method, creative writing can be used as part of the strategy to engage with children and seek their views on what the future holds. Using creative writing or other forms of expression can make a compelling case for climate action, and give people an idea of what a low-carbon future will hold.

Engaging children and young people, and getting the community to express their views in a creative manner form part of creating a vision for the future. Regardless of the methods used to create this vision, the following case study will provide an example of how to approach the next step: implementation.

**In the UK**

The consultation for the 2050 Edinburgh City Vision is led by a steering group that includes young people. Children and youth have contributed to the vision by making videos expressing their views.

# New York City, USA


Image: Public space and cycling space on Broadway, New York City. Source: NYC DOT

Changes to the status quo can be difficult to deliver, and by their very nature transformational sustainable transport projects threaten the status quo of private motor vehicle priority. Under Mayor Michael Bloomberg and Transportation Commissioner Janette Sadik-Khan, the Department of Transportation (DOT) in New York City developed methods to rapidly implement pilot schemes to test impacts, demonstrate effectiveness and gain public acceptance. This case study explores these methods and how they can be applied to transport planning.

New York City is the largest city in the USA, with a population of 8.4 million and a geographic reach about 30 times larger than that of the City of Sydney[22]. In 2007, Bloomberg produced PlaNYC, a plan detailing how to sustainably prepare for a million new residents by 2030, while acting on climate change, improving quality of life, and strengthening the economy. To implement the transport aspects of the plan, Sadik-Khan set ambitious goals to increase the mode share of sustainable transport modes, improve the efficiency of public transport, make streets safer, and redistribute space. Even though New York City has the highest rate of public transport ridership in the USA, the idea of reducing space for cars faced opposition. Manhattan is known for traffic, and people were concerned that reducing space for cars would remove the liveliness of the city, worsen congestion and make it difficult for businesses. To overcome concerns, the DOT proposed making temporary changes, where a pilot scheme would be put in place for a few months and a decision made at the end of that period to make the change permanent. There are several elements of the New York City pilot schemes that can be applied to transport projects elsewhere.


*Before and after the reclamation of Delancey Street, New York City for public space. Source: NYC DOT*

**Setting goals**

One of the first things Sadik-Khan did as Commissioner was to set out clear goals and benchmarks. These were:

- Cut annual traffic fatalities by 50%;
- Create programmes to treat streets as public space;
- Double cycling commuting by 2012; and
- Implement a system of rapid bus lines.

As Sadik-Khan says "Goals are important because if you want to change and steer the ship of a big city in a new direction you need to know where you're going and why"[23]. These goals were useful for both determining which schemes to prioritise and for identifying the metrics for success to be measured during the lifespan of the project.

**Quick and simple**

One major benefit of the pilot programmes was they were inexpensive and simple to implement, using materials the DOT had available or were able to obtain easily. In her book "Streetfight", Sadik-Khan describes the revival of the City's transportation network as "…fast, installed in days and weeks using almost do-it-yourself tactics: paint, planters, lights, signs, signals and surplus stone[24]". The benefit of this low cost and simple approach is that pilot projects could be implemented quickly by adapting the space, instead of spending years and millions of dollars designing new spaces. The projects themselves became instruments for the public to understand how space could be redistributed and its impact on the city. This was the case for the pedestrianisation of Times Square, which was initially a six-month pilot project that started with traffic cones and cheap beach chairs, which were later upgraded to planters and dedicated street furniture. Following the success of the trial, the City made the pedestrianisation permanent and a $US55 million upgrade was approved, which was completed in 2017[25].

Another benefit of experimentation is that once the pilot project is in place it is possible to make changes if elements of the scheme do not work as intended or can be improved. For example, a cycle lane was installed next to the kerb along Broadway, with a new public space in the median (see cover photo for New York City). On some sections of Broadway, conflict occurred between people cycling and people accessing the new public space. Along these sections the position of the cycle lane and the public space was reversed so the public space was closer to the kerb. Monitoring how people use the space and interact with each other means the design of the scheme can be fine-tuned to improve the efficient use of space and increase public enjoyment, which makes it more likely to gain public approval over the course of the pilot period.

**Collect data**

To justify making the changes permanent and to make further changes elsewhere, the DOT collected data before and during the pilot period. By collecting data on a broad range of metrics, the DOT showed how these projects improved safety, air quality and economic activity. This evidence provided a powerful counterpoint to objections based on people's perception of safety or congestion, and allowed the DOT to successfully defend against legal challenges to some of the schemes. Data collection for traffic volumes also expanded from counting cars to include bus passengers, cyclists and pedestrians to understand how many people were moving along a given corridor. The following metrics were used in the first major study of the impact of the changes on streets compared to other areas of the City[26]:

- Crashes and injuries for motorists, pedestrians and cyclists;
- Volume of vehicles, bus passengers, cyclists and users of public space;
- Traffic speed (including incidents of speeding and median speed);
- Economic vitality;
- User satisfaction; and
- Environmental and public health benefits.

Across a range of projects, from installing cycle lanes, to creating more public space, to making dedicated bus lanes, the city found that results for these metrics improved after the introduction of the pilot project. For example, after the installation of the protected cycle lane on 9th Avenue, there was a 58% decrease in injuries to all road users and a 49% increase in retail sales. The introduction of the Select Bus Service on Fordham Road in the Bronx, with bus

priority in lanes and at intersections, advance ticket sales and three-door boarding, lead to a 20% increase in bus speeds, a 10% increase in bus ridership and a 71% increase in retail sales at businesses along the bus route.

**Monitor and report wider impacts**

As well as collecting metrics on specific locations to measure the impact of schemes, the City produces comprehensive reports about mobility and GHG emissions. These allow the effectiveness of the overall transport strategy to be monitored and adjusted if necessary. Metrics used in the 2019 Mobility Report[27] include:

- Bus and subway ridership;
- Travel speeds (including citywide bus speeds);
- Citi Bike and taxi trip comparisons (trip time and cost);
- Citywide traffic cordon trends;
- Vehicle registration, including for-hire and taxi vehicles; and
- Travel surveys on trip modes and purposes.

The growth of ride-share companies such as Uber and Lyft increased for-hire vehicle registrations in the City by 23% between 2016 and 2017. This is identified as a contributing factor in the decrease in trip rates in traditional taxis and a levelling out of subway ridership. Being aware of emerging trends can inform future projects such as congestion pricing (which will be introduced in 2021) or other surcharges on for-hire vehicle trips.

New York City produces an inventory of GHG emissions from buildings, transportation and waste, with the most recent being for 2016[28]. This report shows emissions from transport decreased by 6% from 2005 to 2015, but stayed steady between 2015 and 2016. The reduction in transport emissions was due to a reduction in vehicle miles travelled and an increase in fuel efficiency (68% contribution to reductions), more efficient electricity generation (22% contribution), and a decrease in per capita transit use (10% contribution to reductions).

**Applications to transport planning**

A pilot scheme can be used where a transformational change is needed, but there are issues with politics, public perception, or funding. Sadik-Khan emphasises that pilot programmes are not just a way to counter public opposition to a project and avoid a lengthy engagement process. They can also be used where objectives are clear, but the methods to achieve them are not yet known. In these cases, a pilot programme can be used to test different strategies to determine what makes the most efficient use of the space and increases public acceptance of the project. In a UK context, the process of modifying a road to conduct a pilot for up to 18 months can be done using an experimental traffic regulation order, which allows changes to be made during the first six months if needed.

If this approach were used more widely in the UK, transport authorities could approach the redesign of streets and the redistribution of space in a more flexible and innovative manner. This in turn would improve the quality, attractiveness and safety of sustainable transport modes, enabling people to shift away from a reliance on cars.

Any pilot scheme should be accompanied by extensive data collection, starting before any changes to establish a baseline. The data collected should not have a sole focus on traditional transport metrics, as the co-benefits of a given project are useful for gaining broader public acceptance. Taking full advantage of these co-benefits and promoting them as a key part of any project is the focus of the next case study.

**In the UK**

The London Borough of Waltham Forest trialled measures to reallocate road space to public space, including model filters to limit access to buses and cycles.

# Copenhagen, Denmark

Image: Cykelslangen, a dedicated cycling bridge in Copenhagen. Source: Ursula Bach

The appraisal process for transport projects estimates the strategic, economic, social and environmental benefits, but these do not commonly make it into the public eye. In its ambitious strategy for climate action, Copenhagen realised the co-benefits of climate action should form an integral part of the success of emissions reductions programmes. As much as there is a moral imperative to prevent climate change, people want to see benefits in more tangible areas of their lives as well. This case study explores the co-benefits associated with climate action and how they were promoted.

Copenhagen is the capital city of Denmark, with a population of around 800,000 people[29]. The city produced its first climate plan in 2009, where it set a goal to reduce emissions by 20% between 2005 and 2015, and outlined an intention to reach net zero emissions by 2025. After achieving 20% reduction in emissions by 2011, the city produced a new climate plan in 2012 that committed to net zero in 2025 and set out guidelines for how this should be achieved[30]. The strategies and methods are proving effective, with a 38% reduction in GHG emissions from 2005 to 2015, alongside a 16% growth in population and an 18% growth in GDP[31]. The city emphasises the co-benefits of each climate project, some of which are explored below for their applicability to transport planning.

**Hedonistic sustainability**

Many of the co-benefits that Copenhagen includes in its emissions reductions projects can be defined by the concept of hedonistic sustainability. The term was coined by architect Bjarke Ingels, the designer of the new waste-to-energy power plant that incorporates a ski slope and hiking trails on its roof. The idea is that projects are not just good for the environment, but are good for life as well. As Ingels describes it, "Sustainability can't be a moral sacrifice, or a political dilemma or a philanthropic cause, it has to be a design challenge. Hedonistic sustainability teaches you that by thinking about sustainability you're also thinking about a city that's more exciting and fun to live in[32]."

*CopenHill, the skiing and hiking area above an energy-to-waste plant in Copenhagen. Source: Max Mestour*

**Economic benefits**

Copenhagen anticipates that its economy will improve during and after its transition to net zero, due to savings on fuel costs and improvements in health and quality of life[30]. Part of the reason for the economic performance of the climate plan is that initiatives are multipurpose, not just limited to reducing GHG emissions. Alongside its emissions reductions target, Copenhagen has set the following economic targets[33]:

- 5% annual growth in GDP;
- 20,000 new jobs by 2020;
- To be among the top three most liveable cities in the world; and
- Ensure businesses work in an environmentally and socially sustainable manner.

The city acknowledges that economic growth requires attracting business and employees, which in turn relies on being a liveable, creative and sustainable city. Copenhagen sees its investments in cycling infrastructure and public transport as key elements of making an attractive city and supporting a growing economy. They are also exploring innovative land use planning that provides room for businesses of different sizes, industries and life stages to move to or start up in Copenhagen.

**Quality of life**

In 2009, Copenhagen set itself a series of visions and goals for the quality of urban life to be achieved by 2015[34]. The three main goals were:

- 80% of Copenhageners will be satisfied with the opportunities they have for taking part in urban life;
- Pedestrian traffic will have increased by 20% in 2015 compared to 2009; and
- Copenhageners will spend 20% more time in urban space in 2015 compared to 2009.

While metrics like pedestrian traffic and dwell times in public spaces can be easily measured, the city also captured qualitative views by interviewing people around the city. Following the publication of these goals in 2009, the city conducted annual studies they called Public Life Accounts to measure progress. By 2013, all three goals were achieved and the city had added metrics to study how children used the city[35]. This included interviewing children to determine their satisfaction with playground equipment.

These goals show a strong commitment to the idea that the transition to net zero emissions will be accompanied by an increase in the quality of life for Copenhageners without incurring costs. The benefits include lower heating costs due to renewable district heating, a harbour swimming pool following relocation of heavy industry and remediation, and green spaces that also act as rain gardens to capture excess water from heavy rainfall.

**Applications to transport planning**

The co-benefits of transport schemes can extend far beyond the immediate function of moving people from one point to another and improving journey time. As well as contributing to emissions reductions targets, introducing or improving lower carbon transport modes gives people more options when it comes to where they live and work, and makes more efficient use of limited road space. Freeing up this road space can give way to making even more space for sustainable transport modes, or for different purposes to improve urban life, such as parks and plazas.

Copenhagen provides transport planners with an example of how lower carbon solutions can be better across the board than the traditional alternatives. Transport planners can apply this approach to their own work by seeking out or dreaming up low-carbon solutions and their co-benefits and championing these projects. This will require a change in mindset at all levels, from transport planners working on housing developments, to those designing our city and country-wide transport systems, to those developing and influencing policy at the local, regional and national levels.

**In the UK**
Greener Grangetown in Cardiff is a sustainable drainage system project that improved the urban realm, and cycling and walking infrastructure.

## Conclusion

Countries and cities around the world are setting targets to be carbon neutral by 2050. While progress has been made in other sectors to date, transport emissions have remained steady in the UK since 1990, and will continue to rise as a proportion of overall emissions. Effective reduction in transport emissions will require a shift from the private car to sustainable modes of travel: walking, cycling and public transport. This shift relies on changes in how transport projects are prioritised and delivered to enable changes in travel behaviour. One advantage that cities have over countries is that their governance can be more agile and they interact on a more personal basis with their residents.

This paper has explored the approaches used by city governments in Sydney, New York City and Copenhagen to develop a vision, implement transformational projects rapidly and make co-benefits a central part of projects. Strategies and methods from each of these case studies can be applied to a UK transport planning context in the following ways:

- Capture the views of children and young adults as part of the public engagement process, as they are the future users of transport projects and have strong, positive views on climate action. They also appreciate transport modes that give them independence now, such as cycling, walking and public transport;
- Encourage the use of creativity as part of the public engagement process to allow people to imagine a net zero future and work backwards to realise the steps required to get there;
- Once a vision has been developed, set objectives and milestones to define what success will look like and how it will be measured;
- Use pilot programmes to test and demonstrate new ideas to give people the opportunity to experience what a change actually looks like and how the redesigned street functions. Any pilot programme needs to be accompanied by extensive data collection, including a baseline established beforehand. This will show if the objectives of the scheme have been met, and help create a case for permanent change; and
- Consider and communicate the co-benefits of transport projects that will reach further than the street, such as improved air quality, more efficient use of public space, more green spaces and lower trip costs.

Applying these methods to transport planning in the UK would help address the climate emergency. The case studies chosen demonstrate a small subset of innovative and effective steps being taken around the world to make transformational changes to reduce transport emissions. As well as using the methods outlined in this paper, transport planners should find and adapt other methods to their projects.

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**UK Examples**

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