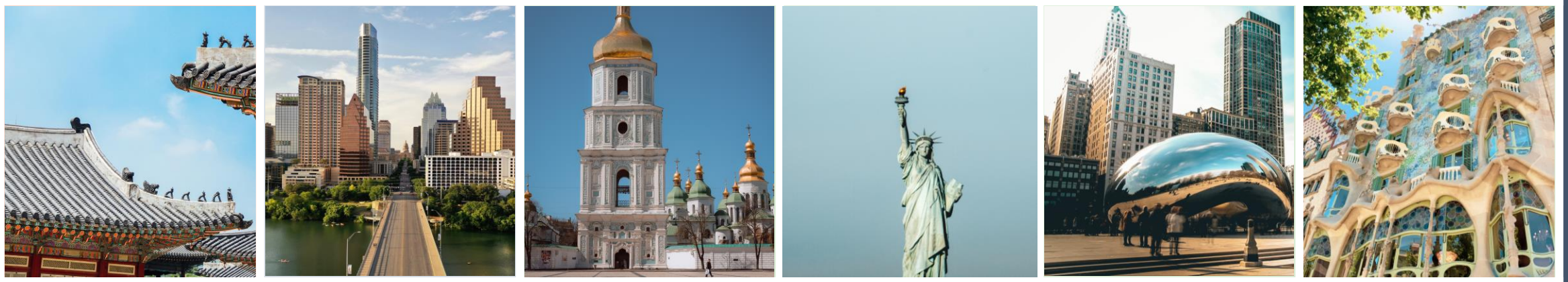


ThoughtLab

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City profiles: Spotlight on urban strategies for the future



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Building a future-ready city

Cities across the globe are preparing for the future

To provide urban leaders with a complete action plan for meeting the challenges ahead, ThoughtLab collaborated with a global coalition of business, government, and academic leaders to conduct a comprehensive benchmarking survey of 200 cities and 2,000 citizens across six world regions: Africa, Asia Pacific, Europe, Latin America, Middle East, and North America.

The resulting study, *Building a Future-Ready City*, shows the importance for cities to have clear visions for the post-pandemic world and action plans for meeting the new needs and expectations of citizens. Leaders should have digital transformation roadmaps for leveraging the latest technologies and data analytics across urban domains. They should take concrete steps to achieve the UN's Sustainable Development Goals (SDGs) around people, planet, and prosperity. And they should build on government, business, and academic partnerships as well as capitalize on new business and funding models.

This report showcases how 16 cities—across regions, sizes, and levels of economic development—are planning ahead to achieve their long-term goals.

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Almaty City, Kazakhstan

A gateway to the future

Almaty is an ancient city dating to the Bronze Age. Since then, it has undergone many economic, cultural, and political shifts, and is now gearing up for what might be its most significant transformation—becoming a preeminent digital hub in Central Asia.

For Almaty City, becoming future-ready hinges on one thing: its people. Citizens are no longer satisfied with the basic government services of the past, according to Bayan Konirbayev, Almaty's chief digital officer. "Our citizens have a more global view and expect the same kind of services available in New York, Chicago, or Seoul."

But the future is not just about what Almaty City can do for its people, it is also about what its people can do for the city. To this end, Almaty's leaders are focusing on another part of their future vision: attracting and keeping the talent the city needs. "We provide the kind of user-friendly environment not available in most countries nearby," says Konirbayev. "That is why a lot of talented people are coming here."

Almaty's attractions include not only its natural beauty, set in the foothills of the Trans-Ili Alatau mountains, but also its 38 universities. They serve some 182,000 students, who make up more than 9% of the city's population of 2 million. Once those students graduate, Almaty seeks to hold onto this talent.

Laying the digital groundwork

With that in mind, Almaty has devised a future-ready city plan out to 2050, with phased short-term goals by 2025 and medium-term goals for 2030. It seeks to make Almaty a highly livable, smart city with a trendy cosmopolitan atmosphere, modern services, and attractive natural environment. The city is implementing the plan in phases, starting with a major digital transformation.

Konirbayev explains that the city is implementing its digital vision on a three-layer foundation: digital infrastructure, data, and services. The **infrastructure layer** includes mobile towers and stations, fiber optics, data processing centers, and IoT sensors installed throughout the city. For example, the city has tripled the number of cell phone stations in the last two years, in cooperation with the four telecoms operators providing services.

The **data layer** includes a unified data governance and data exchange platform and warehouse. Through its data exchange platform and advanced data management system, Almaty has brought together a wide variety of previously siloed data from different government departments, such as social services, education, healthcare, and housing. "It has become our single source of truth," says Konirbayev. This part of the data warehouse includes personalized data on citizens available only to the city government.

There is also a public side to the data warehouse that includes non-personalized datasets—an innovation that can serve as a model for other municipalities. Almaty has created five central databases in cooperation with the private sector that gather demographic information stripped of personal identifiers.

These databases include a range of information, such as data on spending and borrowing patterns from banks and credit card providers; infrastructure usage data from utilities; and housing data from landlords and real estate firms. The private sector gains access to it on a barter basis—to get data, they must also provide it.

The result is a continuously growing bank of data available to public and private entities to improve city services, infrastructure, and commercial decisions.



Almaty City, Kazakhstan

A gateway to the future

Proactive citizen services

Both the non-personalized and personalized data bases fuel the city's **service layer**, which now includes both mobile and desktop applications for citizens to gain access to services. For example, the city provided more than 11 million health-related services online in 2021 vs. only 100,000 similar services offline. Some 97% of the city's services—such as reserving a school place for a child or getting water service—are now available online, although there are provisions for those who prefer to go to a physical location. “The service layer is just the beginning,” says Konirbayev. “After that, we want to focus on proactive services.”

The idea of proactive services is very much in line with Almaty's focus on making the city comfortable, livable, and appealing to the region's most talented people. The plan is to anticipate what citizens might need and offer them those services without any action on their part. The city government will be able to do that using its extensive databases combined with AI analytics.

Almaty has already launched two such proactive services. If a household includes a disabled person, the government will automatically include a discount in utility bills, without citizens needing to apply for it. Similarly, the government will automatically send transport discount cards to students, retired people, and people with disabilities who qualify for reduced public transport fares.

“Instead of the citizen asking for something from the government, the government will seek out the citizen, and say, let us help you with this,” says Konirbayev.

Areas of future-readiness where Almaty has made very good progress

Attracting and developing needed talent and skills	Building efficiencies across city processes and resource usage	Building global economic, political, and trade connections	Developing an ecosystem of collaboration
Driving digital transformation and innovation	Driving sustainability and decarbonization	Ensuring citizen safety and health	Using digital technology and data to improve city management

Technologies that will be most important for Almaty to achieve its future-ready plans



AI



Biometrics



Blockchain



Cloud computing



Data management



DEP



Digital twins



Edge computing



Mobile tech/apps



Telematics

Approximate budget that Almaty is planning to spend on technologies to improve digital infrastructure in the next five years

\$61M

Source: ThoughtLab Future-ready cities survey

Austin, Texas

Building the modern infrastructure to support rapid urban growth

Austin has long been known as a cultural center built around the University of Texas. Over the past 10 years, its digital talent pool, social and entertainment scene, and lower cost of living helped make it one of the fastest-growing cities in the US.

Austin's transformation from a college town to a center for high-tech, civic technology, new mobility, and R&D has attracted businesses and residents from across the country. The influx of new residents has accelerated since the pandemic as remote workers looked to find a better lifestyle.

"Decision-makers want Austin to become a next-generation, smart, global city, the best in its league," says Sharmila Mukherjee, executive vice president for planning and development at Capital Metro, the regional transportation agency.

Coping with these profound changes has become essential as Austin rethinks what it needs to become a truly future-ready city. Currently, says Mukherjee, there is a big gap between the digital and physical infrastructure in Austin, a city with a small downtown surrounded by areas with a suburban feel.

"In certain areas Austin has made significant strides—in attracting businesses and creating a knowledge and technology-based economy," she says. However, the city lacks some urban basics—such as sidewalks. "Before we become a smart city, I think we need to have continuous sidewalks and better pedestrian infrastructure along our streets in our urban core and in the neighborhoods," she says.

Transition to multi-modal transport

To remedy its transportation problems, the city has taken some bold steps. It is currently implementing a \$7 billion transit expansion—Project Connect—which was approved by a referendum in November 2020.

With this big strategic mobility plan, Austin is transitioning from a car-dependent approach to a more effective multi-modal transportation system, says Mukherjee. It includes four bus rapid transit routes and two new light rail lines, along with more than four miles of subway tunnels through downtown and South Austin. Project Connect is now reviewing the program for feasible and viable phasing and implementation of the rail lines in light of higher projected construction costs and inflation.

In addition, Cap Metro, in partnership with the City of Austin and the BCycle company, recently took over Austin's bike share program, renamed Metro Bike. It is phasing out older bikes and replacing them with a fully electric bike fleet over the next three years. "It will serve as a first and last mile mobility solution in some areas and expand the network for more equitable distribution of bikes and associated facilities," says Mukherjee.

Open-loop system

Austin is building a full mobility-as-a-service program. Its transit app permits users to pay for bike share, light rail, and bus service as one continuous journey—with an open-loop credit card payment system and fare-capping slated for the future.



Austin, Texas

Building the modern infrastructure to support rapid urban growth

Equitable transit development

To make the transport expansion viable, says Mukherjee, transit customers need to be able to live near stations and have housing choices available for all income levels. The city is looking to build less-expensive, higher-density housing along the major transportation corridors while avoiding displacement.

The city has also set aside \$300 million in anti-displacement funds at its disposal from the Project Connect referendum. However, the effort is facing some regulatory headwinds. Zoning in much of the area is for single-family housing, rather than for apartment buildings and offices.

“There is a huge disconnect between land-use regulations and housing and transportation needs that is felt on the ground,” says Mukherjee. “If Austin is looking to truly be a global and equitable city, land use changes absolutely need to take place so as not to widen the housing and economic divides even further.” Mukherjee is hoping for council approval of the needed land use changes in the first half of 2023.

While waiting for the disposition of the land-use question, Austin’s housing and planning department is buying properties along the transit corridors for affordable housing, targeting areas where low-income

residents are at high risk for displacement. However, in some instances private developers have moved faster than the city, which is hampered by archaic regulations, and the necessity for multi-layered community consultations embedded in the neighborhood level planning process, Mukherjee explains.

Looking to go bigger

The city is poised to think more globally in its planning process—but that is not always easy in Texas, she says, where there is a strong demarcation between urban, suburban, and rural areas. That has made it politically difficult to extend innovations beyond the city limits—including the new transport options—to neighboring areas that also are experiencing ripple effects from tremendous growth in Austin and Central Texas.

“It took tremendous efforts on part of Capital Metro and the City of Austin to get the transport plan to be approved by the voters” she says, “and now it is incumbent upon the city, the transit agency, and the Austin Transit Partnership, the new entity created to build the light rail, to make it happen for all Austinites.”

Austin landscape from its 2023 Strategic Direction plan



963k

population as of
January 2018



1 in 3 homes

speak languages
other than English



+ 100 people

move to Austin daily



16%

of Austinites live
in poverty



7,760

lane miles of
city streets



2,685

miles of sidewalks



250+

miles of bike lanes



829

arts, culture &
heritage organizations

Source: [Austin Strategic Direction 2023](#)

Barcelona, Spain

Racing to net-zero

With sustainability a future-ready imperative, reaching net zero in carbon emissions is a priority for cities around the world. Despite only covering 3% of the earth's surface, cities produce more than 70% of greenhouse [gas emissions](#).

To combat this trend, many cities in the European Union (EU) have set a goal to reach net zero by 2030, supported by an EU-wide initiative known as Cities Mission. Barcelona is one of the cities selected for the program.

Barcelona did not commit to be fully carbon neutral by 2030, but it pledged to accelerate its efforts as much as possible. Barbara Pons, Barcelona's commissioner for the 2030 Agenda, says the COVID-19 pandemic and other trends—such as increasing impact of climate change and concerns over energy supplies given the conflict in Ukraine—has increased the need to speed up.

A holistic approach

Despite being a large city, Barcelona consumes less energy and generates fewer emissions per capita compared to other similar cities. Yet it still has work to do if it wants to reach its goals. Barcelona wants to reduce emissions in a holistic way, in mobility and transportation, in buildings, in the generation and treatment of waste, and in industry.

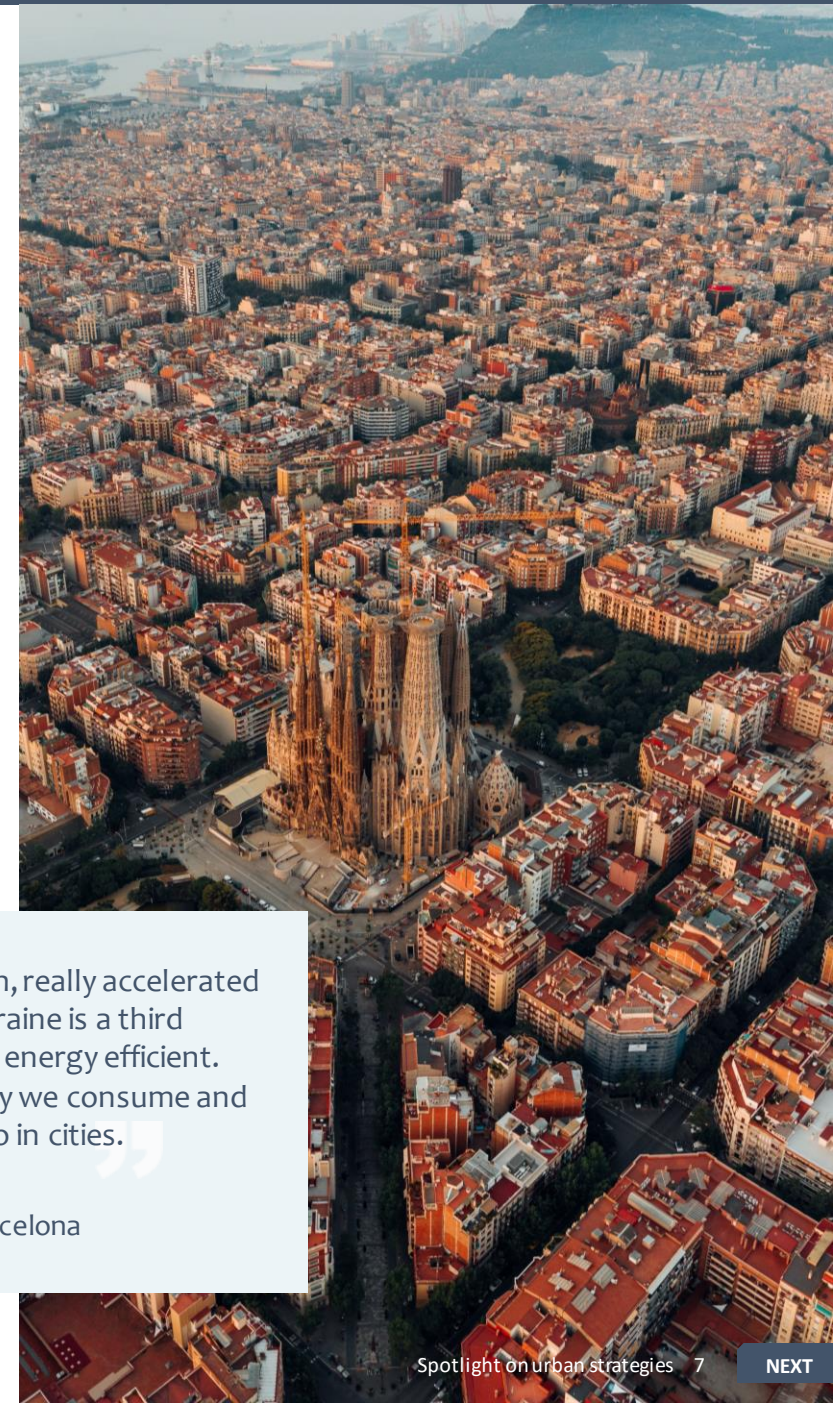
To get closer to net zero, Barcelona is implementing or improving several programs to reduce CO2 emissions. It is prioritizing smart mobility, including expanded use of electric vehicles and development of apps that provide mobility as a service (smart parking, bike sharing, etc.) Reducing transportation speed limits is also key to cutting emissions, not only of CO2, but also of other pollutants. For most of the city, car speed limits will be decreased to 30 kilometers per hour, and only the main arteries of the city will have a higher limit of 50 kilometers per hour.

Another of Barcelona's goals is to make it more difficult and expensive to park in the city. To make the city a low-emission zone, parking spaces are being replaced with bike lanes. Every car is also required to have a mandatory sticker that indicates whether it runs on gasoline or diesel. The city also wants to ban older cars that are more polluting from entering Barcelona during workdays.

COVID-19, along with digital transformation, really accelerated many of the targets we had. The war in Ukraine is a third vector that also highlighted the need to be energy efficient. We have become more aware of the energy we consume and how we can make the transition to net zero in cities.

Barbara Pons

Commissioner for the 2030 Agenda, City of Barcelona



Barcelona, Spain

Racing to net-zero

Addressing climate change and energy efficiency

Being ready for the challenges of the future also means preparing for ongoing climate change. As temperatures rise during the summer months due to global warming, the city is rethinking urban spaces and is developing climate refuges for residents who don't have access to cooler areas during the day.

"Heat waves have become a big problem," says Pons. "We are rethinking our city to offer residents shady places, with access to water and sometimes indoor spaces with air conditioning. We are adapting places like schoolyards to offer climate refuges less than a five-minute walk from every neighborhood in the city."

Increasing the supply of energy-efficient housing is another priority for the city, which has an average building age of 62 years. Only 2% of housing meets the modern energy efficiency requirements implemented by the city. Barcelona currently has funding to renovate around 10,000 housing units per year. With funding from the EU's Cities Mission initiative, officials expect to double or even triple that number of units.

Part of the refurbishing effort includes energy self-production, through installation of affordable solar panels on roofs. Through this initiative, Barcelona hopes to promote "prosumers"—users who produce the electricity that they consume.

"We have a lot of potential for reducing domestic, industrial, and office consumption," says Pons. "Solar panels have the capacity to shift consumers to become prosumers, so we are improving our energy infrastructure."

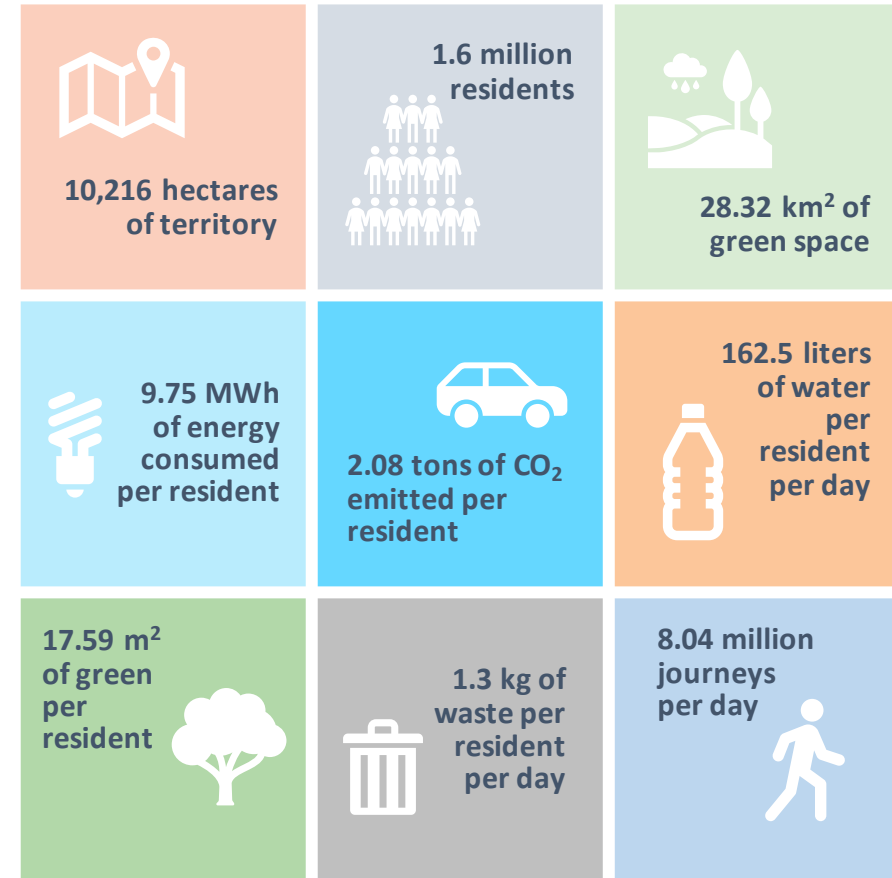
Technology can help

Barcelona is also adopting some advanced technologies to help it with its efforts. To reinvent its use of energy and be able to predict consumption, it is developing a digital twin of the city.

Understanding how the future electricity market will change and develop with the use of solar panels or other technology innovations is essential. With this digital copy, the city can experiment and research without the risk of encountering mistakes along the way. As we rapidly approach 2030, when many European cities have pledged to be carbon neutral, Barcelona wants to meet its climate goals quickly and get things right the first time around.

"Digital twins and simulators will help us understand the impacts of any modifications we make in energy, mobility, or any other infrastructure in the city," says Pons.

Barcelona in numbers from its 2030 Climate plan



Source: [Barcelona 2018-2030 Climate Plan](#)

Bucaramanga, Colombia

How an unplanned city is preparing for the future

Like many others in emerging markets, Bucaramanga is an unplanned city that has evolved organically and rapidly without the benefit of central coordination. The city has expanded on unstable mountainous ground, often threatened by natural disasters like landslides and floods. How does such a city prepare for the future? By harnessing data and technology.

Located on a small plateau of the Andes, Bucaramanga has a sprawling population of around 1.4 million, with a quarter living in remote areas of the city with limited mobility and connectivity. As urban leaders strive to improve the daily life of residents and make Bucaramanga a more resilient, sustainable, and digitally enabled city ready for the future, they are leveraging data and technology to achieve their long-term plans.

“Data is gold for this administration,” says Wilfredo Gomez, digital transformation officer of the City of Bucaramanga. “We have a completely data-focused vision. Our goal is to understand every aspect of a citizen’s life, while respecting their privacy, of course. We want to know whether they have been vaccinated, whether their kids are going to school, whether they are paying taxes, and whether they are using public transportation.”

Tech solutions

Bucaramanga has incorporated all types of data—including geospatial, behavioral, and social media data—along with smart technologies into its future-ready initiatives. The city has invested heavily in security: it has set up over 600 CCTV systems

to provide real-time surveillance and is now installing facial recognition technology to fight crime. In addition, as part of its smart city strategy, Bucaramanga has implemented a remote management system for public lighting, with about 14,000 streetlights covering 10 districts of the city.

The environment is another urban priority. Using IoT sensors, Bucaramanga has optimized trash collection routes and automated waste management, which has helped make streets much cleaner. In five to 10 years, the city plans to utilize AI to find further efficiencies in waste management. It also plans to use AI for predictive modeling to be able to forecast and mitigate natural disasters in future years.

Because of the city’s rocky terrain and unplanned development, mobility is a thorny challenge. Data and technology again offer a solution. The city uses traffic data to reduce congestion and accidents, and it has installed smart traffic lights in seven intersections, with plans to scale this system across the city. In addition, the city has developed shared mobility areas where citizens can access bicycles, e-bikes, and e-scooters for free.

“Our mayor doesn’t want a smart city; he wants smart citizens—people who know how to use technology and value what it can do for them. We want our residents’ quality of life to be improved by technology.”

Wilfredo Gomez

Digital Transformation Officer, City of Bucaramanga



Bucaramanga, Colombia

How an unplanned city is preparing for the future

The future revolves around smart citizens

Transforming urban domains through data and technology is just part of the plan. Bucaramanga’s goal is to ensure that its residents trust and embrace digital technologies and data analytics—and know how to use them to significantly improve their daily lives.

“We want our residents’ quality of life to be improved by technology,” says Gomez. We want them to feel safe when they see surveillance cameras in the streets, and we want them to feel comfortable paying their taxes online.”

The importance of digital knowledge is paramount for the city, which is striving to become an IT talent hub in Colombia. With over 40,000 STEM (science, technology, engineering, and math) students, Bucaramanga is nurturing local talent to achieve that goal.

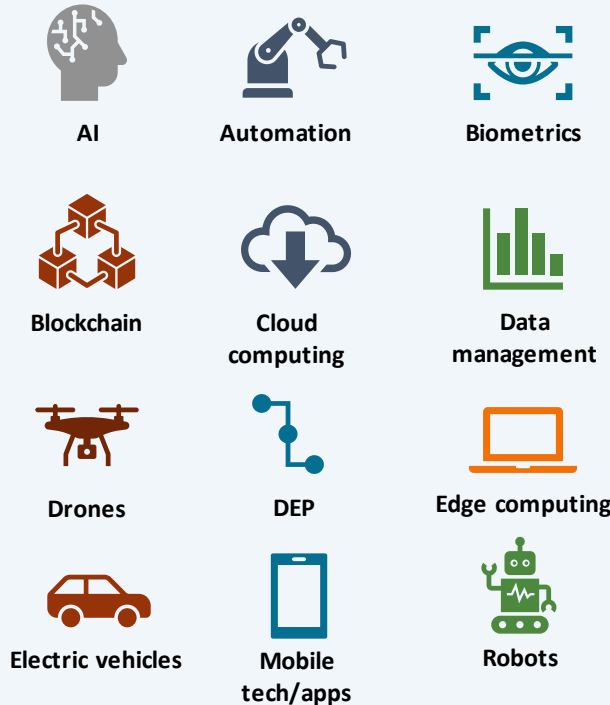
However, retaining that talent is challenging due to nearby competition from larger cities like Bogota or Medellin. Bucaramanga is betting heavily on the rise of remote working to keep talent in the city, where the cost of living is lower.

“The pandemic gave us the possibility to have the best of both worlds. Our plan is to retain and attract talent, who can in turn help develop local startups.”

To encourage citizens’ acceptance of technology, Bucaramanga has put in place multiple “digital points” across the city. These are technology centers that offer residents free computer and internet access, as well as free lessons in computer science, robotics, digital design, English, web platforms, and related skills. Almost 100 free Wi-Fi zones are also spread across the urban center.

“The digital infrastructure that we need to develop our long-term plan is already in place and it has the capacity to scale over the next five to ten years,” says Gomez. “Our focus is on improving our data acquisition and infrastructure. We want to develop our data centers and clouds to ensure the quality and availability of data everywhere. That will be our main goal to become future-ready.”

Technologies that will be most important for Bucaramanga



Areas of future-readiness where Bucaramanga has made good progress

Building trust and transparency	Attracting and developing needed talent and skills
Driving digital transformation and innovation	Empowering communities and citizens to help drive change
Building efficiencies across city processes and resource usage	Adapting to citizen expectations around health, safety, and urban services
Fostering inclusiveness and equity	

Source: ThoughtLab future-ready cities survey

Cary, North Carolina

Pursuing smart initiatives through partnerships

Cary, North Carolina sits just outside the research triangle of Raleigh-Durham-Chapel Hill. With three major universities and a wealth of tech firms operating nearby, Cary is taking advantage of partnerships to support its efforts to become a smart, data-driven city and to achieve the goals laid out in its 2040 Community Plan.

Cary uses partnerships as well as technology and data to optimize city services, drive economic growth, and improve the quality of life for its citizens. “In Cary, in terms of innovation, we are able to take risks, and partner and try things out easier than other municipalities,” said Nicole Raimundo, Cary’s chief information officer. “We have higher expectations because of the makeup of our population, most of whom work in technology, and we have companies like Apple, Google, and Epic Games in our backyard.”

Cary draws on a network of partnerships with entrepreneurs and businesses, from start-ups to larger established companies like Microsoft and SAS. The relationship with SAS, a global analytics firm located in the city, has helped its police force, for example, utilize data and analytics to solve complex crimes. The SAS Visual Investigator system has helped detect criminal networks, accelerate information sharing, and facilitate investigations.

“Bringing in partners that are trying to grow and develop a new business model or a new product is a strategy that works really well for us. We partner to build together, which lowers costs for us and is a win for both.”

Nicole Raimundo, Chief Information Officer, Town of Cary

In 2021, Cary and SAS, together with Semtech, a global supplier of high-performance analog and mixed-signal semiconductors and advanced algorithms, announced a collaboration to build a Center of Excellence focused on technology solutions, including the development of edge-to-cloud IoT solutions. Cary is also collaborating with Cisco to capture and manage data on a single pane of glass for parking, traffic, facility usage, crowd counting, and other use cases.

2040 Plan

Since establishing its first city-wide plan in 1991, “Cary... Growing with a Vision,” Cary has been using such policy documents to guide decisions related to investments and novel initiatives. In 2010, Cary began revising its existing plans, which only covered a few geographic areas, to create a single, comprehensive policy roadmap.

The 2040 Community Plan was adopted in January 2017 and consolidated individual plans across domains like mobility and transportation, preservation, housing, and safety. It covers seven main elements of citizens’ lives: live, work, shop, engage, shape, move, and serve. It was developed using a robust public engagement process. The city sought public input using both traditional and innovative web-based methods to educate and engage the community, including dozens of meetings and workshops.

City leaders employ the plan to inform projects and to set metrics to assess progress. Making data-driven decisions is a priority. The plan guides project proposals, planning for future service needs, and qualifying for grants. It is also used to showcase key initiatives. For instance, after it received requests from citizens to allow the use of eBikes in certain parts of the city, Cary developed an eBike pilot program. “Cary Greenway” provides citizens with over 80 miles of car-free space and helps to promote sustainable outdoor living.



Cary, North Carolina

Pursuing smart initiatives through partnerships

Using data and technology to inform future plans

Cary has set up a “Town Hall,” an experimental campus where it can test smart city initiatives before implementing them on a large scale. Testing new applications on a small scale has allowed the city to capture data and understand how initiatives will work. Building out a test lab in its Town Hall campus also has permitted Cary to involve citizens in the testing and decision-making process and to gain their trust. The city also has a small citizen committee that meets once a month to discuss the topics of technology and communication.

Citizen involvement, data, and partnerships are key to Cary’s plans. The city is expanding this approach by working with nearby towns and cities, particularly on stormwater impacts. In another collaboration with SAS, it has installed water-level sensors to monitor stream activity during storms and to act as an early warning system during flooding—a critical use of technology as climate change generates stronger and more frequent flooding conditions globally. The data Cary collects is shared with its surrounding towns.

Data-sharing and collaborations related to floods have proved to be a “breath-through model” for the future that can help Cary achieve its goals in other areas, such as transportation. “We said, let’s start small, figure it out, get a win, get everyone’s buy in and move forward. And that’s what we did with the floods,” says Raimundo. I think that was a good model for us to move forward with.”

“You have to make sure that you are sharing, engaging, and including everybody so that they know why you’re doing things. At the end of the day, these are people’s taxpayer dollars. They need to know their city is involving them and thinking about their future.”

Nicole Raimundo

Chief Information Officer, Town of Cary

Trends in Cary from its 2040 Community Plan



More seniors

Cary residents over the age of 55 increased from 12% to 18% between 2000 and 2010.



Smaller households

Cary’s average household size and family size decreased between 2000 and 2010.



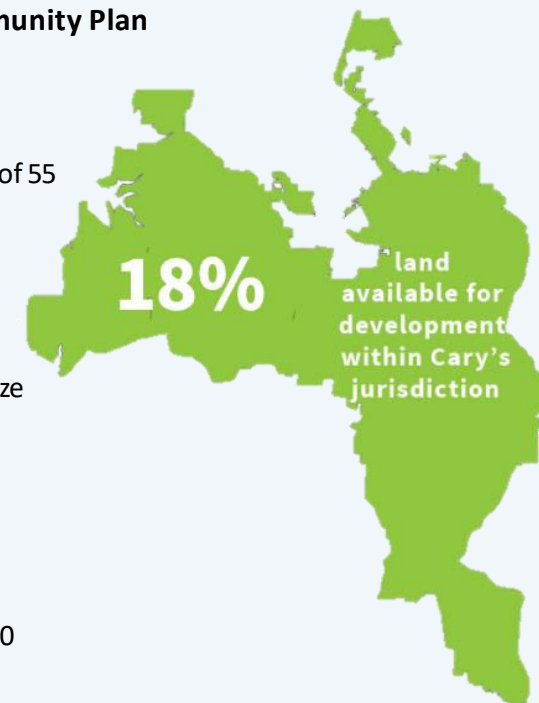
More singles

Unmarried singles in Cary increased from 23.5% in 2000 to 28.6% in 2010.



Fewer millennials

The percentage of millennials in Cary is lower than in North Carolina and the US.



Source: [The Cary 2040 Community Plan](#)

Chengdu, China

Blending technology with nature to meet human needs

Cities around the world are increasingly focused on adding green spaces to promote environmental sustainability and improve their citizens' quality of life. But some cities like Chengdu, China are pushing their ambitions to a higher level by blending technology, economic development, and sustainability.

With its “park city” plan, Chengdu, a city of 20 million located in southwestern China, also wants to become world famous for being a city within a park, instead of building parks within the city.

Chengdu sees its future as a metropolis that considers the natural environment in all aspects of life. Since its launch in 2018, its park city initiative has aimed to sustainably improve Chengdu's urban layout, environmental protection, and industrial development. Rather than simply creating green spaces and parks in an urban setting, Chengdu intends to generate a new type of development model based on a balance between environmental sustainability and economic growth, while improving the living quality of residents.

Fostering a greener economy

To advance towards this goal, in 2019 the Chengdu municipality established the Bureau of Park City Construction and Management to lead planning of the initiative. Already, between parks, gardens, and other protected areas, green zones cover 43.5% of the city.

Yet while urban beautification is certainly a main objective of the park city initiative, another is to foster a greener economy. The plan is designed to strengthen innovation-driven green industries, develop a clean and efficient green resource system, revamp traditional industrial models for rural revitalization, and develop new

business models based on the environment. For example, Chengdu developed the Tianfu Greenway, which spans 4,000 kilometers and is intended to eventually reach over 16,000 kilometers. The city has also advocated for low-carbon lifestyles and has built a green mobility network.

Taking nature to brand-new cities

Chengdu is taking its vision for the future even further by developing a new satellite city. Like many metropolises in China, Chengdu is struggling with an overgrowth of population. To address this, government officials are investing in the creation of new cities, located next to large urban centers, that can welcome millions of people. The Chengdu Future Science and Technology City will be positioned as a hub for innovative international universities and companies to build a world-class sustainable science center.

In February 2021, OMA, an international architectural firm, and Germany-based [GMP](#) Architects were selected as the winners of the Chengdu Future Science and Technology City Masterplan and Design competition. The plan is divided into three stages, with the initial stage expected to be completed in 2025 and full completion slated for 2050. The total area of the future science city is expected to reach 362 square kilometers.

The new city will include five major academic centers: three major universities and two research spaces. Officials are accelerating the promotion of the city's industrial development, and by the end of 2022, they estimate that they will have chalked up 62 projects with a total investment of 123.3 billion yuan.



Chengdu, China

Blending technology with nature to meet human needs

Building around nature

A main goal of the Chengdu Future Science and Technology City is to create a city that doesn't destroy natural spaces but is instead developed around it. The new city will be home to industry and technology centers as well as nature preserves to combine urban spaces with the pastoral beauty of the countryside. Located in a small rural zone near the Tianfu International Airport, Chengdu Future City will rise in the middle of a valley. Fully embodying the concept of a park city, digital plans show most of the buildings surrounded by green areas and rooftops with gardens. Architects also plan to build large park areas throughout the city.

Another important goal is to make the city free of cars, to encourage sustainable mobility and public transportation. All buildings in the initial phase of construction will be accessible by foot within 10 minutes and a network of autonomous vehicles will connect residents to surrounding cities. Indeed, already in Chengdu citizens can ride in AI-enabled [autonomous vehicles and buses](#), ordered via a mobile app.

Other new cities rising

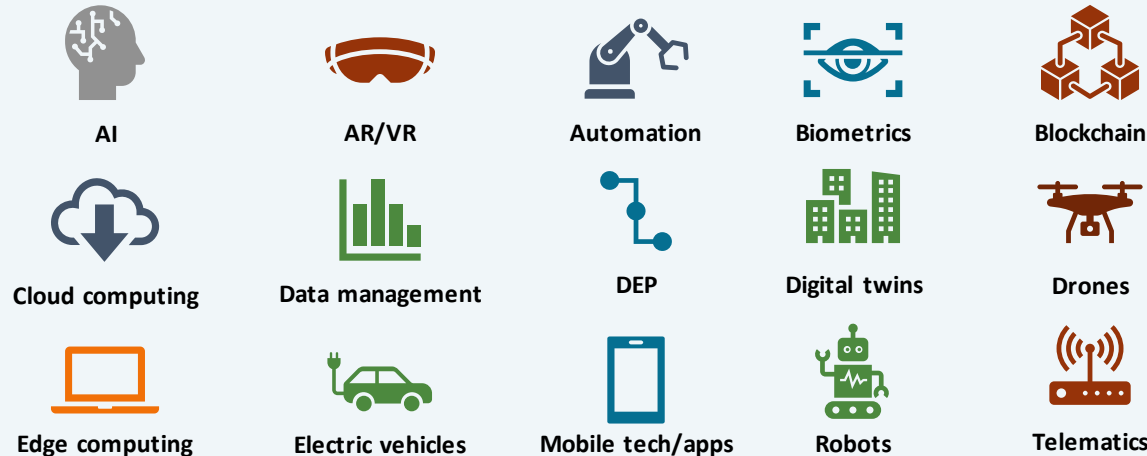
Chengdu Future City is not the first satellite city being developed next to large Chinese urban areas and will certainly not be the last. As the national government projects that over 1 billion people will be living in cities by 2035, China will have to continue to look for solutions to reduce the burden of rapid urbanization.

In 2017, Chinese President Xi Jinping announced the creation of Xiong'an, a 38-square-kilometer area located to the southeast of Beijing. Much like Chengdu, the new city's pillars are economic development, technology, and sustainability. Another example is in the province of Shenzhen, where Net City is being built. Focused on renewable energy, this urban center's energy is entirely supplied by solar panels.

Areas of future-readiness where Chengdu has made good progress

Adapting to citizen expectations around health, safety, and urban services	Building global economic, political, and trade connections	Building infrastructure that is fit for future purpose	Integrating plans across urban domains, departments, and jurisdictions
Driving sustainability and decarbonization	Ensuring citizen safety and health	Ensuring economic and industrial competitiveness	Providing expanded cultural and entertainment opportunities

Technologies that will be most important for Chengdu to achieve its future-ready plans



Source: ThoughtLab Future-ready cities survey

Chicago, Illinois

Making mobility smarter, safer, and more equitable

In June 2021, the Chicago Department of Transportation (CDOT) adopted a new strategic plan designed to revamp the city's streetscape to address longstanding issues of equity. It offers an example of a future-ready approach to infrastructure and mobility—one that is smart, safe, and inclusive.

The opportunity to reimagine the CDOT's strategy arose from the pandemic, economic, and racial justice crises of 2020, which increased receptivity to social change. According to CDOT Commissioner Gia Biagi, the new plan, developed in consultation with a coalition of community and activist groups, helps to move the city forward in tackling fundamental problems of generational poverty and structural inequity.

"In a city like Chicago, where past practices that negatively affected racial minorities are stitched into the landscape of streets and infrastructure, we need to begin unwinding this so we can become a more prosperous, equitable, and inclusive city going forward," says Biagi. "Communities of color in Chicago often have the fewest transportation choices, the longest commutes, the highest concentration of industrial centers and truck traffic in their neighborhoods, and the worst pollution from cars and trucks."

CDOT will look to make improvements in all the areas it oversees, which include Chicago's roadways and bridges, sidewalks, bike lanes, traffic signals and signage, streetlights, the citywide bike share system, and policies focused on complete streets.

Much of the funding for the plan will come from a bond-supported plan for infrastructure investment over five years, passed by the City Council in 2020. Some will come from a \$188 million bond issue earmarked for environmental justice and climate investments.

Micro-mobility in focus

Micro-mobility as a key component CDOT's future vision. Many of its current initiatives center on bikes and bikeways. Since the pandemic began, it has built an extra 125 miles of bike lanes, many protected with concrete barriers. It also has expanded its bike share program, Divvy, to underprivileged neighborhoods, offering significantly discounted memberships to low-income residents. Divvy is one of the largest bike-share programs in the country, and now includes both electric bikes and scooters. Divvy is also the first U.S. bikeshare system to incorporate ebike charging stations according to Biagi.

The environmental bond issue also has enabled the city to give away 5,000 free bikes to qualified low-income recipients. "We have seen a huge response to the program," says Mary Nicol, director of policy at CDOT. "We set a goal of distributing 5,000 bikes over four years, but we received over 19,000 applications in year one. We are looking to partner with bike brands and other companies to figure out how we can reach even more residents and provide them with a low-carbon way to get around the city, access jobs, and meet their basic needs."

Biagi says that 60% of those who applied for a free bike are from areas that experience mobility hardship because of less access to public transportation. A bike may provide the last-mile mobility they need to easily travel to a job. "With partners at a nonprofit think tank, we created an index correlating mobility and economic hardship, and that has become a quantitative criterion for where to invest," she says. "This has become a lens on everything, from which bridge project we're going to do and where we will do additional work on repairs, to making sure our scooter program has an equity component that rebalances the system—every neighborhood in the city is getting scooters, not just downtown."



Chicago, Illinois

Making mobility smarter, safer, and more equitable

New tech supports future vision

CDOT's long-term plans include improving safety for all road users and rebuilding streets, sidewalks, and bus stops to create more walkable, livable neighborhoods. The department is exploring a variety of new technologies. For example, through the Chicago Smart Lighting Program, CDOT has replaced more than 270,000 outdated light fixtures with new energy-efficient LED lights that improve the quality of nighttime visibility throughout the city.

The agency also is piloting smart connected traffic signals that indicate to buses and other vehicles when a pedestrian is in a crosswalk and can control green lights and redirect traffic lanes when needed.

Another major sustainability initiative is expansion of the electric vehicle charging network, particularly in low-income areas. Biagi and Nicol point out that while, currently, most policymakers think of EVs as a technology chiefly within reach of higher-income people, this is changing. "Right now, EVs have been targeted to wealthier people, and the charging stations follow the cars," says Biagi. "We are looking to ensure that we deliver those same opportunities to marginalized parts of our city."

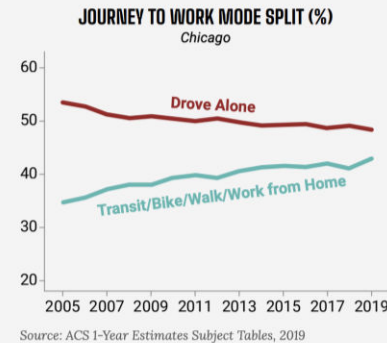
Nicol explains that in some neighborhoods that historically have not had reliable public transit, having a car to get around can be a necessity. "For those trips, we want to incentivize people to transition to electric vehicles where possible." Recent state funding for beneficial electrification, as well as tax incentives, will help.

As part of its EV framework, CDOT is reaching out to stakeholders in these communities to educate people about electric vehicles. It is also piloting curbside charging stations in some areas, working with community groups and the electric utility to find locations and setups most helpful for those living in multi-family dwellings.

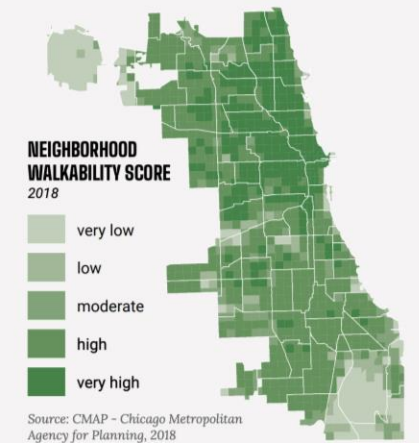
CDOT's vision for the future is one with no "red zones" of mobility hardship, and a wide range of sustainable transportation available to all, says Biagi. But an overarching goal is to make traveling along Chicago's streets and public ways a pleasant experience.

"The question in making these investments is about the tolerance people have for a journey that might be a little slower, but is also safer," Biagi says. "It's all about their conception of time—if you feel like your journey is a positive one, and your destination as a positive place, that changes your perception, and you are willing to tolerate a longer time on that journey."

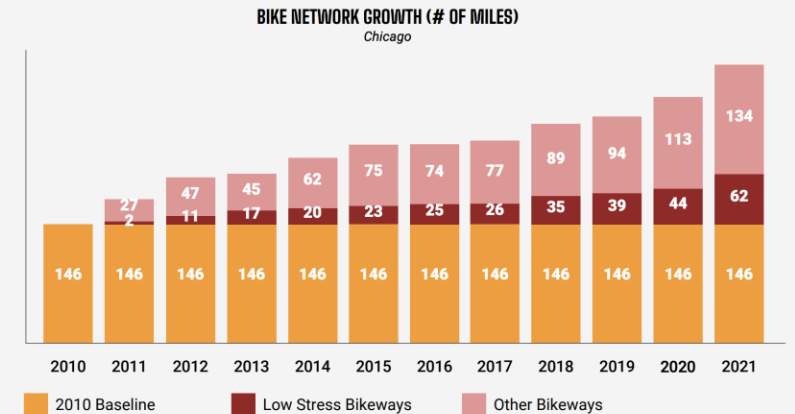
More residents are choosing alternative transportation modes to work.



Chicago's most walkable neighborhoods are on the North side.



Chicago's bicycle infrastructure continues to expand citywide



Source: [Chicago "We Will Chicago" Future plan](#)

Dublin, Ireland

Optimizing its smart city remit

Innovation is challenging for a city when the national government controls many of its urban domains. Dublin, Ireland's capital, sets an example of how a municipality can make good progress toward becoming a future-ready city geared to meeting citizen needs, even without total authority, by working with higher levels of government and optimizing the power it does have.

Ireland's central government retains authority over important domains that municipalities in other countries normally control, including education, health, policing, and many aspects of transportation. Irish cities have chief executives, but not directly elected mayors.

"That makes it much harder to set a big, audacious vision, but there's a lot within our remit that we can do," says Jamie Cudden, manager of the smart city program for the Dublin City Council. Areas Dublin does control include infrastructure such as roads and sidewalks, parking, fire and rescue, streetlights, libraries, social housing, waste and wastewater management, the environment, and hundreds of typical city services.

"There can be a disconnect between national bodies and what citizens think," says Cudden. "We serve as the interface, with a closer ear to the ground, particularly when it comes to areas of social inclusion."

The city has its own plan for "future-proofing" itself. "We look to become a dynamic, sustainable, future-ready city built on inclusive neighborhoods and communities, a strong economy, a vibrant cultural life, and connected growth," says Cudden.

A greener future

Sustainability is a major theme for Dublin, which seeks to meet national and EU goals for a 40% reduction in greenhouse gas emissions by 2030 while it works to improve the city council's energy efficiency by 33%. One

initiative is the retrofitting of social housing to make it more energy efficient. That includes using national funding to offer incentives for installing solar panels and insulation.

Sustainable mobility is another goal. "The pandemic spurred a massive change in mindset regarding making the city more attractive for cycling and led to a huge investment in cycling infrastructure. Many quicker and more temporary deployments stayed sticky, including a significant pedestrianization in the city center," says Cudden. "There's an acknowledgement that the city is a different place post-COVID."

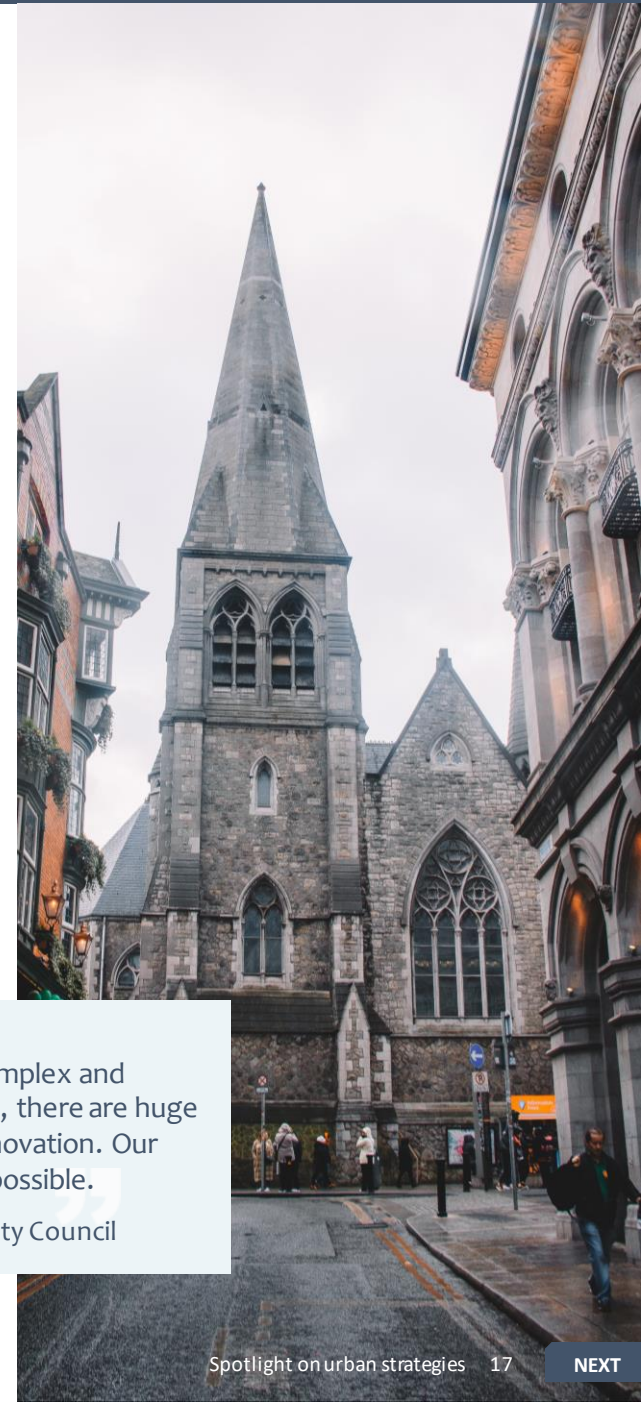
Dublin is starting to see a pickup in shared mobility, such as car clubs and bike-sharing programs, including Dublinbikes, Moby, and Bleeper, says Cudden. The city supports these organizations by allowing licenses to operate on its streets. In addition, it is encouraging development of mobility-as-a-service apps that allow users to make account-based payments for all legs of a multi-modal journey.

The city is also working to expand the number of EV charging stations, in cooperation with other regional authorities. However, Dublin's Georgian architecture and narrow streets makes this challenging. "There's a lot of competition for curbside space, so we are likely to see EV charging in car parks and at petrol stations play a significant transition role," says Cudden.

“

Transforming a city like Dublin could be viewed as complex and challenging, but with the right mindset and approach, there are huge opportunities to leverage smart technologies and innovation. Our program looks to inspire people in the art of what's possible.

Jamie Cudden, Manager, Smart City Program, Dublin City Council



Dublin, Ireland

Optimizing its smart city remit

Harnessing digital technologies

Dublin is embracing the latest technologies and innovative working practices to improve the quality of life for its citizens in the region. With three other councils in the region, Dublin City Council established the Smart Dublin initiative in 2016 that set up four “smart districts” in the city to act as testbeds for new technologies to solve urban problems in partnership with a range of global technology firms, SME’s, academia, public bodies and local communities.

One area where its work has paid off is telecommunications. The sudden upsurge in remote working, online shopping, and digital communication during the pandemic put tremendous pressure on telecom networks. “It showed us the need for much more consolidation and leadership from the city council to support rather than block telecoms investment,” says Cudden.

As a result, the city council set up a new telecoms unit earlier this year as a “one-stop shop” to help speed the roll-out of 5G and high-speed connectivity. “We did a lot of experimentation in our Smart Docklands District from 2017 to build a 5g test-bed and deploy a network of small cells, and realized quickly that it's hard to find poles, power, and fiber that can be easily accessed,” he says.

The telecoms unit provides a single point of contact for the council to get permits and navigate the planning process to put equipment in ducting, on buildings, and on street furniture.

“This is critical for the future of the city and will help us deliver 5G more quickly than other cities in Europe,” Cudden says. The council is working with companies to ensure that disruption is kept to a minimum and that all parts of the community have connectivity.

Cudden notes that the pandemic’s lasting effects are still unclear. One unknown is how hybrid working will affect office space in business districts. Another is the effect of e-commerce on retail shops in the city, whose business has not yet returned to pre-pandemic levels.

Data partnerships

Data is vital for monitoring these trends. The council keeps its finger on the pulse of Dublin’s economic performance—and on its environment—through data partnerships with the private sector. Partners include MasterCard, which provides consumer spending data insights; Standard & Poor’s, which supplies purchasing manager index data; and Google and DPD, which use electric cars and delivery vehicles to collect street-by-street air quality information. Also, the city has developed Dublinked, an innovative non-personal data repository and network freely available to anyone, that includes more than 500 datasets on a wide range of economic, environmental, health, and cultural areas.

Dublin is using this data to support policy decisions and feed into new digital twin technology. It has six different projects in development with multiple industry partners, including piloting the use of digital twins to better manage high-risk sites across the city, for use in emergency response.

Action areas identified in the Dublin City Climate Action Plan



City of Dublin Climate Strategy



Source: [Dublin City Development Plan 2028](#)

Kyiv, Ukraine

Building resilience into future-ready plans

In today's unpredictable world, resilience is essential for urban future readiness. No city today understands this better than Kyiv, Ukraine's capital city. Just recovering from the pandemic, Kyiv is facing even a larger crisis: a fight for survival in the battle with Russia. Kyiv's experience outlines how future-ready digital technologies can help cities stay resilient even during the worst disasters.

Before the war began, Kyiv was already far along in its smart city journey, explains Victoria Itskovych, the city's deputy CIO. The city had been implementing a wide range of smart initiatives across multiple domains, from transportation and education to health and the environment.

Kyiv Digital

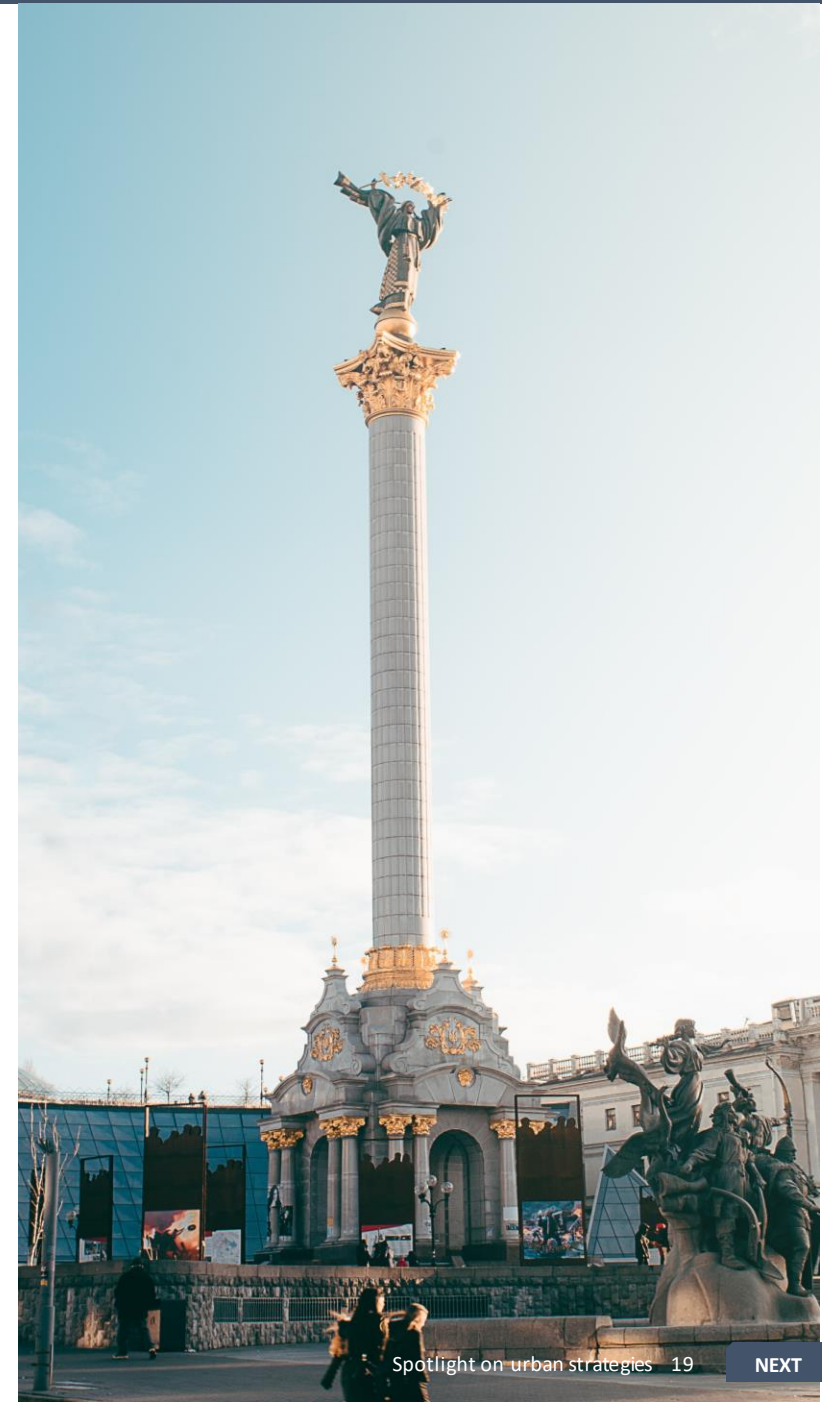
For citizens, perhaps the most visible initiative was the city's smartphone app, Kyiv Digital, which offers access to an array of city services and information. The app has been very popular: so far, 1.8 million people have downloaded it, more than half of Kyiv's 2.9 million inhabitants and 7 in 10 of the city's adults.

In addition to providing access to online city services, the app furnishes information on public transport schedules and arrivals, as well as electronic ticketing. This includes buses, trolleys, and the Kyiv Metro subway system, where you can use either QR-tickets or a travel card stored in the app. Users can top up their travel cards using Apple Pay or Google Pay, or by connecting a Masterpass wallet to save cards for future purchases.

The electronic payment system makes it easier for users of public transportation, which number over one million people a day. It also eliminates corruption, according to Victoria. "It makes sure people's money goes to the municipal budget," she says, rather than having cash payments diverted by bus and trolley drivers.

Kyiv has multi-modal mobility options, including a wide network of electric vehicle charging stations and scooter share. Currently, there are seven different providers of scooters, each with its own app. "Our city app will integrate all seven providers onto one form, so users can see on a map where the nearest scooter is, and the provider," says Itskovych. The city's highly sophisticated smart parking system likewise works through the Kyiv Digital app to track time and handle parking payments, using the phone's location and the car's license plate number.

To accommodate those who don't have payment cards or a bank account, the city offers physical ways to buy transit tickets and pay for parking in special shops. However, Itskovych says, lack of access to smartphones and bank cards is not much of a problem. "On the national level, a lot of government services are now connected to a banking ID, so now everyone has one," she says. Similarly, the government has a program to provide smartphones to older citizens and teach them how to use them.



Kyiv, Ukraine

Building resilience into future-ready plans

The value of data in war time

In a move that proved to be prescient, before the war Kyiv had begun developing a municipal situation center and platform for coordinating municipality owned units, with a system that individual emergency services could use to record incidents and share information with others. “This system became handy for us during the war,” says Victoria Itskovych. Similarly, Kyiv’s citywide network of IoT and sensors and more than 7,000 video surveillance cameras, which provide data for advanced video analytics, are playing a critical role in the war.

When Russia invaded on February 24th, 2022, Itskovych went straight to the city’s data center, where the Kyiv Digital team had been fending off cyberattacks for several days, with help from outside vendors like Cloudflare. “The municipal data center is also the monitoring center for our video surveillance system, which covers the entire city and nearby,” she says, enabling officials to see what was happening and keep law enforcement and the military informed about incursions from soldiers, tanks—and even spies.

The team worked to restore online services while sealing off the data center from further attack. It also began adding functionality to Kyiv Digital, including an early warning for air-raids, which works more quickly and has a wider reach than legacy sirens. As some businesses closed and residents lined up to buy basic goods like food and medicines, the team added a function for business owners to report when they were open and had supplies. The app then plots these on a map.

What lies ahead

Even amid the warfare, Kyiv has not lost sight of its future-ready goals. “One goal for 2025 is to have 60% of administrative services online, with 100% by 2030,” Itskovych notes, which is in line with overall national goals for digital transformation.

Other goals for 2030 include a sustainable, multimodal mobility system using open-loop payments, and a variety of carbon reduction targets. Petro Olenych, chief digital transformation officer for Kyiv, says that one measure under consideration is an addition to the city’s app that will give users information on their carbon footprint when planning a journey by different transportation modes.

Kyiv’s experience holds lessons for other cities. One is that urban leaders’ future-ready plans should include building capabilities to cope with disasters and emergencies into their smart technologies and systems. Real-time communications and information are key to resilience. “We have learned from this that any unrealistic scenario can become realistic, and that you have to take this into account in your disaster recovery planning,” says Itskovych. “But you have to focus on the main things that your citizens need to survive—food, medications, water, power, shelter.”

Petro added that fitting the city’s plans into those for the wider regional or national critical infrastructure is also crucial when considering emergency scenarios. “With that mindset, everything becomes clear—it’s not about profit generation in the first place, it’s about the well-being of citizens and how we can apply technology to help.”

Kyiv City master Plan 2040



Population
3.8 million



Jobs
2.45 million



Housing
28.6 million m²



Metro
17 new stations



Transport
Development of the
high-speed tram network



Bridges
3 new transport
crossings



Infrastructure
New airport, new
large ring road

Source: Kyiv City Master Plan

New York City Housing Authority

Driving a sustainable future

New York City has pledged to reduce greenhouse gas emissions by 40% by 2030 and by over 80% by 2050, as part of its Green New Deal plan for a more sustainable future. The New York City Housing Authority—the largest provider of public housing in North America—is fulfilling this pledge by retrofitting its huge portfolio of housing units, which is no easy task. Its approach can serve as a blueprint for other cities.

Achieving these goals will not be simple for The New York City Housing Authority (NYCHA). Its residential footprint covers over 500,000 tenants in some 335 housing developments, and buildings are the largest source of greenhouse emissions. Under Local Law 97, all buildings that exceed 25,000 square feet must meet new energy efficiency and emissions standards. The city also has banned the use of natural gas for heating and cooling in new buildings.

As a result, NYCHA is pushing hard on several fronts to decarbonize its buildings and convert to beneficial electrification where possible, says Gianluca Galletto, former managing director for technology and innovation partnerships at NYCHA.

“The New York City government plans to decarbonize before the end of the decade—that includes all the buildings that belong to the government, which, if you include NYCHA public housing, goes up to 600 million square feet,” says Galletto. “The only difference is that for public housing the reductions apply to the portfolio on average, not for each single building, so it’s a little more flexible.”

Following a sustainability roadmap

NYCHA is following a Sustainability Agenda that it published in October 2021 that sets out a decarbonization and a climate

mitigation roadmap comprising a variety of solutions. These include rooftop solar panels, which NYCHA is installing on public housing facilities to achieve 30MW of power production. On others, it is putting in small wind turbines for additional power, and green roofs to reduce heating and cooling needs. The agency is also assessing feasibility of installing solar plus storage on two of its buildings.

Another measure is transitioning from fossil fuels to clean, electric-powered systems for heat, hot water, and cooking in housing units. Improvements include electric induction stoves and ovens and high-efficiency heat pumps to provide space heat and hot water. Domestic water and space heating—and cooling—account for 85% of energy needs for New York public housing, explains Galletto. However, while this will reduce emissions from buildings, the full decarbonization effect will depend on New York State converting to carbon-free energy sources for its electricity generation.

Heating and cooling adjustments

NYCHA is also digitizing building heating and cooling systems to better manage distribution. “There are huge quality of life problems because of how old buildings were built,” says Galletto. “One apartment is super-hot in the winter, so they open windows or turn on the air conditioner, while another part of the building is too cold. By changing the architecture of the heat production and distribution, you start to affect the way it is distributed by units.”

This includes installing smart meters and sensors in each apartment. As part of this effort, up to 30,000 families will receive broadband service at a greatly reduced rate, which permits remote management of heating and cooling. “That means no one can put the heat up too high or the air conditioning too low,” he says.



New York City Housing Authority

Driving a sustainable future

Transformative technologies

NYCHA is looking to Scandinavia for ideas for district heating and thermal networks to ensure that heating and cooling can be shared among buildings and that energy is not wasted. Copenhagen and Stockholm have thousands of miles of heat networks, piping that connects underground, Galletto points out. “Buildings can become prosumers of energy because the heat that they don’t use can be used by the building beside you. It’s a little bit like the cloud, or like network storage for different computers, where you can share some of the free hard drive.”

Getting these heat networks and geothermal heating and cooling units built won’t be easy in New York, with its high population density and streets with a huge underground network of pre-existing piping and wiring. But Galletto says NYCHA will draw on new technologies to build on existing piping—and much older district heating using steam that dates from more than 100 years ago.

These technologies include heat exchangers, geothermal capabilities, and heat pumps, which offer a potential for a more than three-fold increase in efficiency and reduction in energy, Galletto says. “With heat pumps, and with the difference in temperature between inside, outside, underground, and above ground, you can also provide cooling,” says Galletto.

In partnership with the New York Power Authority and the New York State Energy Research and Development Authority, NYCHA issued a request for proposal seeking a heat pump that can be installed through a window. The three agencies are currently evaluating six proposals and hope to award a contract in 2022.

He adds that NYCHA is looking to replace all gas boilers over 15 years old—those that are the least energy efficient—with heat pump technology. In other NYCHA developments—10 at present—the plan is to move to geothermal heating and cooling that will replace use of natural gas completely, with a single plant serving up to 10 buildings.

Green infrastructure

Another sustainability initiative being pursued by NYCHA is one to build up green infrastructure, using NYCHA’s 2,500 acres of land. This includes not only green roofs, but also rain gardens with native plants, underground stormwater retention basins, and porous pavement in place of blacktop.

The gardens will serve to beautify the grounds of NYCHA’s housing projects for residents. They will also help to collect stormwater before it enters the already overburdened sewer systems in New York or pollutes waterways. NYCHA is currently designing and constructing such projects at multiple sites across the whole city.

While NYCHA has taken on an enormous project—and must contend with the inefficiencies and repair backlogs caused by many years of previous disinvestment—the effort to meet the decarbonization requirements will be worth it, says Galletto. “It’s a very accelerated timeline, but I think every city should start doing it,” he says.

NYCHA is proving to be ahead of the private sector in this “race” [to save the planet]. Its size is enough to move the markets (like it is doing with window-based heat pumps).



New York and New Jersey Port Authority

How the Port Authority is preparing for the future

The Port Authority of New York and New Jersey oversees much of the most important infrastructure in the New York City area. Its many parts are undergoing a major transformation under the Port Authority's 10-year, \$32 billion capital investment plan, which aims to provide high-quality and modernized facilities.

The plan consists of over 600 projects aimed at improving, expanding, and interconnecting infrastructure assets vital to the current regional transportation portfolio.

The Port Authority's remit includes overseeing five airports—including three of the busiest in the country—as well as a rapid transit system, the largest port on the east coast of the US, four bridges, two tunnels, three bus terminals, and the new World Trade Center complex. According to Benjamin Branham, chief communication officer for the Port Authority, the capital plan for each of the main areas incorporates the goals of sustainability, inclusiveness, and improved customer experience.

Despite delays and setbacks due to the pandemic, which severely interrupted air travel, use of public transport, and cargo shipping, the Authority's renovation, renewal, and construction work, begun in 2017, has moved forward. It will continue through 2026 and beyond.

Plans include repairs and renewals to structures including the George Washington Bridge, the Port Authority Bus Terminal, and the Lincoln Tunnel, and a slew of other major capital projects. Most important are total replacement of the bus terminal, modernization and transformation of John F. Kennedy International Airport, a new AirTrain at LaGuardia Airport and new terminals, redevelopment of Terminal A at Newark Liberty Airport in New Jersey, and extension of the PATH Rail to RailLink station at Newark airport.

Constructing sustainable infrastructure

Sustainability is at the core of the Authority's future-ready plans. It has committed to achieving net zero carbon emissions by 2050 as well as an interim target to reduce emissions under the Port Authority's direct operational control by 50% by 2030. One initiative is to build new solar energy installations on rooftops and parking lots at its airports, ports, and the George Washington Bridge, as well as at the new bus station. The Authority is also constructing a solar energy storage facility generating 12 megawatts of energy, half of which will be a community solar facility for surrounding neighborhoods.

The revamped LaGuardia Airport, where a second new terminal opened in June 2022, provides a model. It has solar paneling on the roof of the parking garage and other buildings, EV charging stations for customers, LED lighting, targets for greenhouse gas emissions, electrification of shuttle busses, ground support equipment and cargo handling vehicles, and plans to accelerate adoption of sustainable aviation fuel.

One of the most important aspects of the Port Authority's vision is ensuring that future-readiness is part of the design and construction of all new and renewed facilities. The new bus terminal, for example, will be able to accommodate 100% electric bus fleets with EV charging built into the gates and garages.

The same is true for changes at LaGuardia Airport. "The terminals were completely outmoded—constructed more than 50 years ago, when things like self-service check-in were never considered," Branham says. "The new terminals have flexibility built in to accommodate future technology changes, such as how passengers go through security or board a plane. Biometrics, for example, may be delivered at scale."



New York and New Jersey Port Authority

How the Port Authority is preparing for the future

Developing and implementing new ideas

Branham says the Port Authority is particularly proud of the innovative way it kept the airport open during construction. “Through engineering ingenuity, we delivered new infrastructure on top of existing infrastructure without losing operational capacity,” he says. “We did it one piece at a time—you might call it the hopscotch approach—building a new part where operations can be transferred while tearing down the old one and raising the new one in its place.”

In fact, the construction started—perhaps counterintuitively—with new parking lots closer to the main highway to free up taxiway space and allow buildings to be built on the old lots. “It’s important to look beyond current limitations and get people to think in new ways and embrace new methods—although that can be very hard,” says Branham.

“You need leadership that gives you the mandate to do things differently, to say, ‘Why is it being done this way? Or why haven’t we thought about this?’ Giving your teams freedom to think in those new ways and take ideas from new sources will enable a lot of projects to move forward that haven’t succeeded before.”

Branham also points to the value of listening to a variety of stakeholders, especially the local community, which was an important element in the LaGuardia redevelopment, and is equally crucial in the agency’s forthcoming revamps of the main midtown bus terminal and John F. Kennedy Airport.

“Having a significant community relations infrastructure at the very outset—as opposed to it being an afterthought—is very important,” he says. This helped to minimize local disruption, as well as to provide contracting and job opportunities locally. “You never know where good ideas may come from,” Branham says, “and you build support and political capital that will be invaluable down the road.”

As Port Authority celebrated its centennial in 2021, many of its facilities were reaching the end of their useful lives. The aging facilities are now in the process of being revamped to accommodate progressively higher volumes and larger vehicles, vessels, and aircraft. The portfolio of renewal projects represents \$8.8 billion (27%) of the total Capital Plan. Some significant projects include:



George Washington Bridge

\$1, 444 million



Lincoln Tunnel Helix Replacement Program

\$1,138 million



Port Wharf and Berth Replacement Program

\$364 million



Port Authority Bus Terminal Interim Improvement Program

\$328 million



Newark Liberty International Airport – AirTrain Newark Interim Repairs

\$300 million



John F. Kennedy International Airport – Runway Rehabilitation

\$228 million

Source: [Port Authority Capital Plan 2017-2026](#)



Orlando, Florida

Building community engagement into future planning

Orlando, Florida has long been a leader in resilience. What also sets it apart is its robust future-ready city strategy, and its unwavering commitment to community engagement and citizen participation. Orlando prioritizes inclusion of residents in the development of its future-ready plans through community meetings, public workshops, and online surveys.

“Stakeholder engagement is the most important thing to do,” says Mike Hess, director of the Future-Ready City Initiative for Orlando. “People think of smart city and jump to technology, but that’s not necessarily what it’s all about. It’s about community engagement, trying to figure out what residents need help with the most.”

The city drafted its Future-Ready City Master Plan right before the COVID-19 pandemic hit, hosting its last community engagement meeting in March 2020. Officials spent months interviewing staff in all city departments, holding focus groups with regional partners, and conducting roundtables and public workshops. City leaders didn’t have a preconceived notion of what their plan should be, but rather relied on stakeholders to guide them. When developing the plan, two of the words that city leaders heard most were equity and resilience, goals that were only amplified by the pandemic.

People come first

“The City of Orlando and this Future-Ready City Master Plan seek to build a human-centered city that prioritizes people and only utilizes technology when it is the best solution to specific challenges,” reads the introduction of [the plan](#), which is organized in two ways. First, it is divided into 11 foundational goals, such as “people first,” “transparent,” “security focused,” and “collaborative.” Second, it comprises seven pillars: connectivity, energy, health and safety,

materials, mobility, placemaking, and water. These pillars focus on the major services that Orlando already provides with an eye to assessing and implementing needed innovations.

The Master Plan Policy Recommendations part of the plan provides a framework for specific strategy development. It includes goals, objectives, and strategies for each of the seven pillar focus areas.

The connectivity pillar is centered on the need to tackle the digital divide and includes strategies to improve the sharing of information with all residents and visitors. Residents were highly impacted by the digital divide during the pandemic. As work, school, shopping, city services, and many other aspects of life moved online, the digital gap became much more apparent. Orlando organized several workshops to reach out to residents and try to better understand their needs.

The city launched a device check-out program, allowing residents to go to any of five community centers to check out a free wireless hotspot if they do not have internet access at home. They are also able to access and to take home free devices like tablets. Thanks to federal funding, Orlando will expand this program to all community centers located in low- to moderate-income communities.

The pandemic amplified the resilience goal and brought attention and extra funding from the federal level, making a much bigger impact than we could have with just city dollars. But it was certainly a challenge, after finishing all that community engagement, having to revisit our plan now that the world feels like a completely different place.

Mike Hess, Director of Future-Ready City Initiative, City of Orlando



Orlando, Florida

Building community engagement into future planning

Another initiative piloted by the city was creation of “[Tables of Connection](#),” outdoor tables that are solar-powered, shaded, and offer residents wi-fi connection and charging stations for their devices. The first tables were set up in two areas where 57% and 33% of residents, respectively, lacked broadband service.

The energy pillar focuses on developing resilient, reliable, and affordable energy for all. The City of Orlando Green Works program and the Orlando Utilities Commission (OUC) offer a variety of energy programs to conserve energy, as well as access to renewable energy sources. As of 2020, 10% of city operations were powered by renewable energy, but the city works on continuous implementation.

Related to the health and safety pillar, the city heard from first responders that they were seeing an increase in calls related to mental health issues that they were not necessarily prepared to address. As a result, the city created a Community Response Team. The police department partnered with a healthcare company to create a call service staffed with trained mental health professionals.

Adapting the plan to new imperatives

As Orlando tries to deal with these new challenges, it continuously relies on the community for guidance and makes engagement more accessible. It utilizes

tools like online surveys and social media to connect with the community, and city leaders travel around districts to give everyone a chance to contribute. Focus-group meetings and even one-on-one interviews are commonly used to connect with residents, all organized by a special city division, the Communications and Neighborhood Relations department.

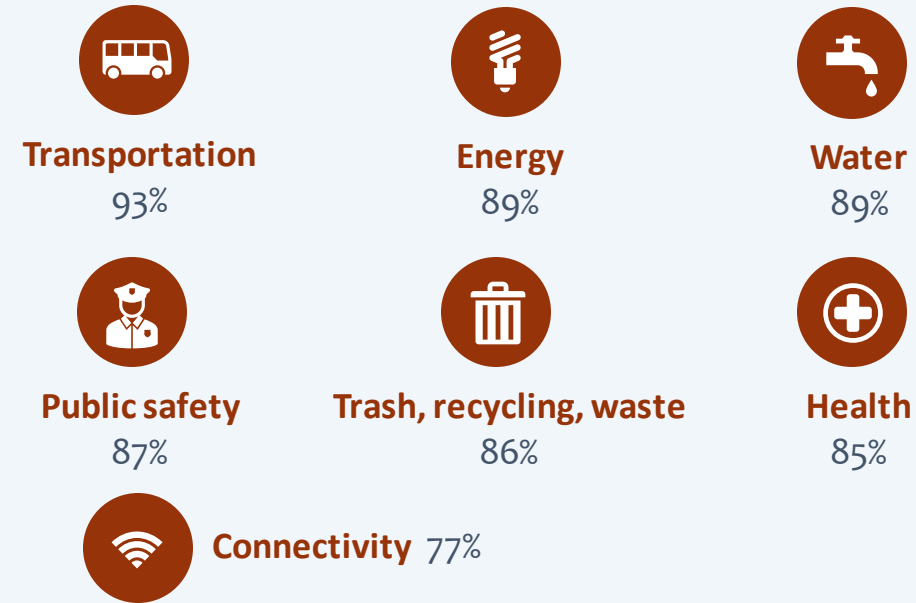
Orlando reopened its community engagement efforts during the pandemic to make sure its master plan was still focusing on the right goals and priorities. The city hosted virtual meeting rooms that residents and city staff could visit at any time to review the plan. Although the plan didn’t change much at its core, some initiatives were added to respond to the new challenges that emerged from the health crisis.

“We use every form of community engagement we can to learn from our residents and help them as best we can,” says Hess. “Our communications and neighborhood relations department knows all the community leaders and all the districts, and they talk to them very personally to create plans to engage citizens. Sometimes that means using social media, sometimes it means having coffee with a neighborhood leader. It’s all about finding all the best different ways to connect.”

Most residents trust the city, but few are familiar with its projects



Focus areas ranked by importance for Orlando residents



Source: 2020 Future-ready survey by City of Orlando

Peachtree Corners, Georgia

Innovation lab of the future

Peachtree Corners, a city of 45,000 in the Atlanta metropolitan area, grew around a technology park set up in 1967 to attract high-tech businesses and harness the skills of graduates from Georgia Institute of Technology and other local universities. Since then, the city has turned the park—and itself—into an innovation hub and vibrant living lab that dreams up and tests smart urban innovations of the future.

“We were sitting on the first technology park ever created in the state of Georgia, where the modem and color printer were developed,” says Brandon Branham, assistant city manager and chief technology officer of Peachtree Corners. “We looked at how we could build off of the tech park’s rich history and continue to create a place that businesses want to be for the energy and synergies that are happening with the ecosystem.”

Test bed for new technology

The innovation hub, Curiosity Lab, includes a 25,000-square-foot corporate innovation space and incubator for tech startups of all types, run in partnership with Georgia Tech. It also offers a facility for testing mobility technology: a “city street of the future” with 5G and fiber optic connectivity, sensors, and connected streetlights and traffic lights that can communicate with each other and connected vehicles. The street is public infrastructure owned and operated by the city, configured to allow autonomous vehicles to operate in the two outside lanes while human drivers use the middle lane.

“There are a number of great closed courses out there—like MCity in Michigan—where companies can test technology in a controlled environment,” says Branham, “but there wasn’t really what we call

the ‘walk’ phase of ‘crawl, walk, run.’” He explains that Curiosity Lab offers more realistic, intermediate testing conditions than a closed course, with hills, trees, and thousands of cars coming in and out daily—an uncontrolled, but nonetheless separate, environment that isn’t in the middle of a large city like New York or Atlanta.

New business model

Peachtree has created a business model around the lab and testing facility for driving innovation in partnership with the private sector—one that other cities can emulate in their own future-ready plans. Companies are permitted to use the street and facilities for testing their technology and applications without additional charge.

Peachtree gets back its investment and maintenance costs through taxes on the economic activity that the companies create, Branham says. Corporate partners include such big names as T-Mobile, Cisco, Bosch, and Georgia Power. In addition, the city is getting the benefit of positioning itself as a high-tech hub, seeing further corporate relocations outside of the Curiosity Lab. Branham points to the recent creation of a \$600 million medical campus by Intuitive Surgical, maker of the DaVinci robot-surgery device, which is adding 1,500 new jobs in the area.

This business model has enabled the city to fund itself without charging property taxes to residents and businesses. This works because the city is a regional job hub for the metropolitan area, having just over 45,000 jobs in Peachtree Corners. “We call ourselves the heart of Silicon Orchard, and that’s really the core of our strategy,” says Branham.



Peachtree Corners, Georgia

Innovation lab of the future

Urban technologies of the future

Like Q's Lab in a James Bond movie, Curiously Lab is continuously churning out inventive ideas for cities of the future. Some of the most notable innovations that companies are both developing and testing include:

- **Autonomous 5G shuttles.** The shuttles, which make multiple stops across the technology park, are equipped with “cellular vehicle-to-everything” technology. Using this technology, shuttles can connect with other vehicles, traffic signals and crosswalks over 5G. To ensure safety, they can stop to avoid an accident with a pedestrian or vehicle.
- **Tele-operated electric scooters.** Using cameras and electronic control units, remote operators can move scooters to meet another customer or a parking location when a rider gets off. “It was pretty cool to see a scooter with nobody on it, driving down the road,” says Branham. Scooter testing led to further developments including a small autonomous mobile store, from which people buy cookies and other treats as it roams around the park.
- **Innovative electric charging solutions.** The park is testing a section of the Technology Parkway with solar panels that can feed battery packs and EV charging stations. The Curiosity Lab is also in discussion with a firm to build a solar canopy over its mobility facility with a wall of expiring batteries from the city's EV fleet to store power.
- **Environmental sensors.** Curiosity Lab is working with partners to test a variety of environmental sensors. These include sensors that detect breaks in water lines and problems with fire hydrants as well as others that detect room occupancy and control temperatures to avoid heating and cooling unused spaces.
- **Smart drone solutions.** Using drones to facilitate cumbersome construction activities, such as tying together rebar before concrete is poured, is one example. Another is a device set atop buildings with a robotic arm to change out drained batteries on drones so they can return to flight.

Peachtree in numbers from its 2040 Comprehensive plan

16.23 m² of
territory



43,500
residents



\$73,000
Average
household
income



Which innovations will revolutionize cities?

As Peachtree Corners CTO and assistant city manager, Branham has a unique vantage point on the future use of smart technologies in cities. Here are some of the technologies that he sees as urban game-changers:

- C-V2X communication between traffic signals and vehicles
- Electric vehicle infrastructure development for providing charging and power grid management
- Smart building infrastructure for improving safety and sustainability
- Autonomous vehicles for public transportation
- Digital connectivity through Wi-Fi and 5G mobile technology to make it all happen

These last will be critical, he says, not only for the future of urban populations and digital literacy, but also to allow cities to manage infrastructure in places they can't easily reach with fiber optics. “It will enable roll-out of connected cameras equipped with AI to process and send back data,” Branham explains.

Perth, Australia

Focusing on livability, sustainability, prosperity – and nightlife

Perth, the capital city of Western Australia and a major hub for resource industries, has been ranked as one of the most livable cities in the world due to the quality of its healthcare, education, infrastructure, culture, and environment, among other factors. But Perth faces an unusual challenge: not enough people live in the city itself, leaving the city center almost deserted in the evening.

To attract more residents and create a more vibrant urban environment, Perth in 2022 launched a 10-year Strategic Community Plan based around three main pillars: making the city **livable** (safe, socially cohesive, inclusive, and activated), **sustainable** (with a healthy environment and social and economic systems in balance), and **prosperous** (successful and thriving).

“Almost all of our strategies have been approved for a 10-year timeframe,” says Daniel High, Alliance Manager of Economic Development at the City of Perth. “We understand intrinsically that a prosperous city needs to be livable and sustainable as well. We have acknowledged that we need to hit those goals by having more people reside within the city.”

While the greater Perth metropolitan area now is home to more than 2 million people, the city itself has just over 30,000 residents. High says the city’s target is to have 50,000 residents by 2030 and 90,000 by 2050. Prior to the pandemic, the population swelled to more than 200,000 in the central business district during the working day.

“We need to transition our small area to be more active day and night outside of that workforce, which is why we want to grow our residential population,” he says. “We would have a more self-sustaining local economy if we had more residents close to our retail core.”

Perth had a particularly strong lockdown during the pandemic, which turned it into a safe place, attracting many expatriates. In 2021, its residential population jumped more than 7%, although in 2022 the rate has slowed to 2% growth. The city has also benefitted from a higher rate of workers returning to offices than other cities—about 70%, says High. “However, work from home is still a powerful trend that we need to consider,” he says.

Enhancing livability

To appeal to new residents as well as commuters and tourists outside of business hours, Perth seeks to develop inclusive, thriving neighborhoods where residents can live, work, and socialize safely. The city is working to fill housing gaps in the central business district with special zoning and incentives for development.

“A big livability goal is around housing projects,” says High. “We also need to build on our residential infrastructure and upgrade our cultural facilities so that we have more recreational areas to offer.”

The city has been promoting adaptive reuse of underutilized buildings for both residential and recreational uses, including revitalization of old theaters—one of which now has a basketball court. High says many of the city’s retail malls occupy heritage buildings, and it is incentivizing developments such as a new theater inside a mall to encourage people to stay there in the evening.

Perth is also improving livability by building its outdoor landscape. An urban forest plan, which will increase green spaces and boost Perth’s tree cover from 16% to 21%, will help make Perth a more comfortable place in the hot summer months for walking and active transport. That will be critical as the city works to expand its network of bike paths and laneways.



Perth, Australia

Focusing on livability, sustainability, prosperity – and nightlife

Dedicated sustainability unit

Increased green space and canopy coverage is part of the second pillar, sustainability. Perth is committed to lowering emissions, harnessing renewable energy, and building a green city. Its climate targets are aligned to those of the state government, aimed at reaching net-zero by 2050.

Perth has created a dedicated sustainability unit to oversee implementation of smart building technology in the city’s own facilities. The unit will also oversee incentive schemes both for retrofitting older structures and setting standards for new construction. In addition, the city is partnering with leading companies based there —particularly mining giants BHP and Rio Tinto—in testing new sustainability technologies, which it then plans to roll out more widely.

A recent smart irrigation project covering 106 city parks resulted in a 30% to 50% savings in water and a reduction in electricity use for pumps. High also cites smart lighting projects around new housing and recreational developments—such as a new sports complex opened four years ago—that are contributing to a reduction in power usage. Other pilot projects slated for wider roll-out include solar roofs on city car parks with battery storage to supply newly added electric vehicle charging stations.

High sees the city’s long-term goal of growing the urban population as a contributor to a greener region. “Having more people reside in the city has huge sustainability benefits, particularly for reducing the need for transportation,” he says. “The greater Perth region has a

terrible urban sprawl, where many people spend a lot of money on fuel to go to jobs in the city.”

Building prosperity

Livability and sustainability are crucial for Perth’s third pillar, prosperity. While already home to more than 1,000 companies, including many energy and resources startups, Perth is looking to attract more by offering support for cooperative research centers, startup incubators specializing in technologies such as artificial intelligence and, particularly, green hydrogen technology.


That is especially relevant for Perth since it is a center for the mining industry, which sees green hydrogen as a more practical alternative than electrification for decarbonizing its heavy equipment and vehicles in remote areas. High sees considerable potential for demonstration projects such as a hydrogen refueling station on city-owned property. “It would give visibility to these types of options for larger, heavy vehicles,” he says.


Also, a recent agreement with the state and federal governments, the Perth City Deal, will bring in over \$1.5 billion in funding for housing and other projects, resulting in thousands of new jobs. The plan includes relocation of several universities, which will draw in about 15,000 more students, a central part of creating a knowledge economy and expanding the resident base. However, High explains, livability is crucial to making the plan work. “The key is not just attracting talent, but retaining it, by making the city a fun place to be, and creating experiences,” says High.


Areas of future-readiness where Perth has made very good progress


Adapting to citizen expectations around health, safety, urban services	Attracting and developing needed talent and skills	Building efficiencies across city processes and resource usage
Building trust and transparency	Developing an ecosystem of collaboration	Ensuring citizen safety and health
Fostering inclusiveness and equity	Building infrastructure that is fit for future purpose	


Technologies that will be most important for Perth to achieve its future-ready plans


 AI


 Automation


 Biometrics


 Cloud computing


 DEP

 EV

 Data management

 Digital twins

 Drones

 Edge computing

Source: ThoughtLab Future-ready cities survey

Seoul, South Korea

Reimagining a city in the metaverse

Imagine a city where citizens can live, work, and socialize without leaving their homes—where they can interact with city staff without waiting in line, participate in town meetings and engage in community activities. That is what the metaverse may mean for cities—and Seoul is investing \$29 million to make it happen.

At the end of 2021, as the world still battled the coronavirus pandemic, large events and festivities such as New Year's celebrations were still restricted or completely avoided. But instead of canceling its famous annual bell-ringing ceremony on New Year's Eve at Bosingak Pavilion, the Seoul Metropolitan Government welcomed partygoers to a private metaverse platform, where virtual avatars were able to mingle, watch performances, and celebrate the new year from their devices. Over 16,000 residents participated in the virtual festivities.

The metaverse is an immersive virtual-reality space, accessible through the internet, where users—called avatars—can interact with each other and with the virtual world around them. The success of several pilot initiatives has encouraged the city of Seoul to create its own public platform, Metaverse Seoul, a virtual space accessible to everyone in the world, designed as a digital twin or replica of the city.

“Metaverse Seoul is a virtual counterpart of our city. It allows people to experience Seoul anywhere, at any time, as long as they have devices,” says In Dong Cho, first vice mayor of Seoul Metropolitan Government. “The metaverse will enable people to interact without the limitations of time and space. It is a technology that can fulfill citizens' needs by allowing an

experience of creative content and services that are unimaginable in the reality.”

Metaverse Seoul will be implemented in stages over a period of five years, from 2022 to 2026. At present, stage one is scheduled to launch by the end of 2022. It is being funded with the city's own budget, although certain services related to the tourism sector are partly funded by the national budget.

A virtual world of endless possibilities

In the metaverse, citizens from all over the world will be able to discover Seoul and socialize. They will have the opportunity to form social relationships through various activities like gaming and cultural events, and to communicate via online chats, voice chats, and video calls. Metaverse users themselves will be able to build their own virtual space and create and share their content.

But Seoul, with an eye to how the metaverse can transform its relationship with its citizens, is taking it one step further by linking it to the city's administrative information system and giving the public access to various city services. For instance, citizens will be able to apply for civic documents and acquire information on topics such as the local tax system.

Companies will also benefit. They will have the possibility to promote their businesses in various ways and carry out investment consultations at the Metaverse Seoul Fintech Lab, a business assistance entity completely funded by the Seoul Metropolitan Government, to offer customized support to fintech start-ups.



Seoul, South Korea

Reimagining a city in the metaverse

Using advanced technologies to drive metaverse development

Seoul has been able to push the metaverse project forward thanks to its already strong endowment of smart-city infrastructure and services. For example, 5G is densely installed across the city and most citizens are familiar with the digital world, with 93.2% using the internet.

Seoul also is partnering with technology providers and other private firms to achieve its future vision for the city. Metaverse Seoul is drawing on advanced technologies, for instance using 3D modelling to create virtual spaces and digital avatars; AI and big data to proactively analyze citizens' need and provide tailored services; the cloud to process and store massive amounts of data; and even NFT and blockchain technology to connect ownership in the virtual and real worlds and to prevent data forgery.

Benefits for the city

Expanding the public services available to citizens via the metaverse will increase efficiency and reduce costs for the city. Without the limitations of time and space, Metaverse Seoul will also help maintain city services in times of crisis, like the global pandemic, and ensure the efficiency and continuity of the city's administration.

The metaverse can contribute to urban development and problem-solving in other ways as well. "The metaverse space, as a digital twin, allows us to proactively diagnose urban issues and possibly develop solutions. This helps reduce costs that may be otherwise required for diagnosis and unexpected accidents and ensure the safety of our citizens," says In Dong Cho.

In addition, the virtual space will be used as a new communication channel to promote tourism and increase sales for local businesses.

As the city government gets ready to launch the first stage of this initiative by the end of 2022, it expects to face challenges along the way. Metaverse creators cannot leave users without support, which generates the need for platform moderation. Protecting users' identities is another challenge, as accounts can be hacked, and identities stolen. Creators must also ensure data privacy as this new universe reveals locations, merchandise information, and other forms of user data.

Despite these challenges, the city is excited to be a front-runner in using this type of technology, which it believes will be a model for other cities globally to follow.

Technologies that are crucial in the development of Metaverse Seoul



AI

AI is used to monitor servers for improved cybersecurity and for smarter responses.



AR/VR

Users can onboard the metaverse servers using VR glasses to create a real virtual experience.



Blockchain

Bosonac is needed to support non-fungible tokens, smart contracts, cryptocurrency, and virtual real estate.



Edge computing

Takes care of the faster data transmission. It allows users to enjoy fast computing without having to set up an entire hardware infrastructure.



Digital twins

Digital twin technology brings realism into the virtual world by creating exact replicas of reality.



IoT

The metaverse uses wireless on a large scale and IoT sensors are needed to pair up all sorts of devices (VR sets, speakers, phones, computers, etc.)

The metaverse is a new challenge for us and we will surely come upon many trials and errors. However, if we share our experiences in designing and building the metaverse with one another, we will be able to reduce such trials and errors and fast-forward to the day when everyone enjoys the benefits of future technology. We look forward to working together with other cities in producing great synergy.

In Dong Cho

First Vice Mayor, Seoul Metropolitan Government

Toyota City, Japan

Reinventing mobility for an ageing society

Toyota City, located in Aichi Prefecture, Japan, changed its name from Koromo in 1959 to reflect the importance of its main employer, Toyota Motors Corp. Since then, the city has grown in population to almost half a million. With one out of six residents expected to be over 75 by 2030, the city is rethinking mobility and other services for an aging citizenry.

Toyota City has received recognition from Japan's government as an "EcoModel City" and "SDGs Future City," reflecting its environmental and energy-related achievements. For years, the city has aimed to create a comfortable, low-carbon lifestyle for its citizens. Since it adopted the 2030 Agenda, sustainable urban development has become a cornerstone of the city's policies.

The Japanese baby boom generation, born from 1947 to 1949, moved to Toyota City in large numbers to take up employment with automotive companies. They will reach the age of 75 by around 2025. Concerned about this "super-aging society," Toyota City has launched initiatives to promote better living conditions and mobility for its older citizens.

To ensure that its residents, particularly the elderly, have access to sustainable mobility, Toyota City is betting heavily on new technological advances and the development of CASE alternatives (**C**onnected, **A**utomated, **S**hared and **E**lectric).

Connected and shared

For instance, the city's Tasukeai (mutual help) Project provides health monitoring, mobility support, and outing services for the elderly. The city is also conducting an on-demand grocery delivery experiment using ultra-compact battery electric vehicles. A 5-km radius around Toyota City Station in the city center is the defined delivery target area, and a smartphone

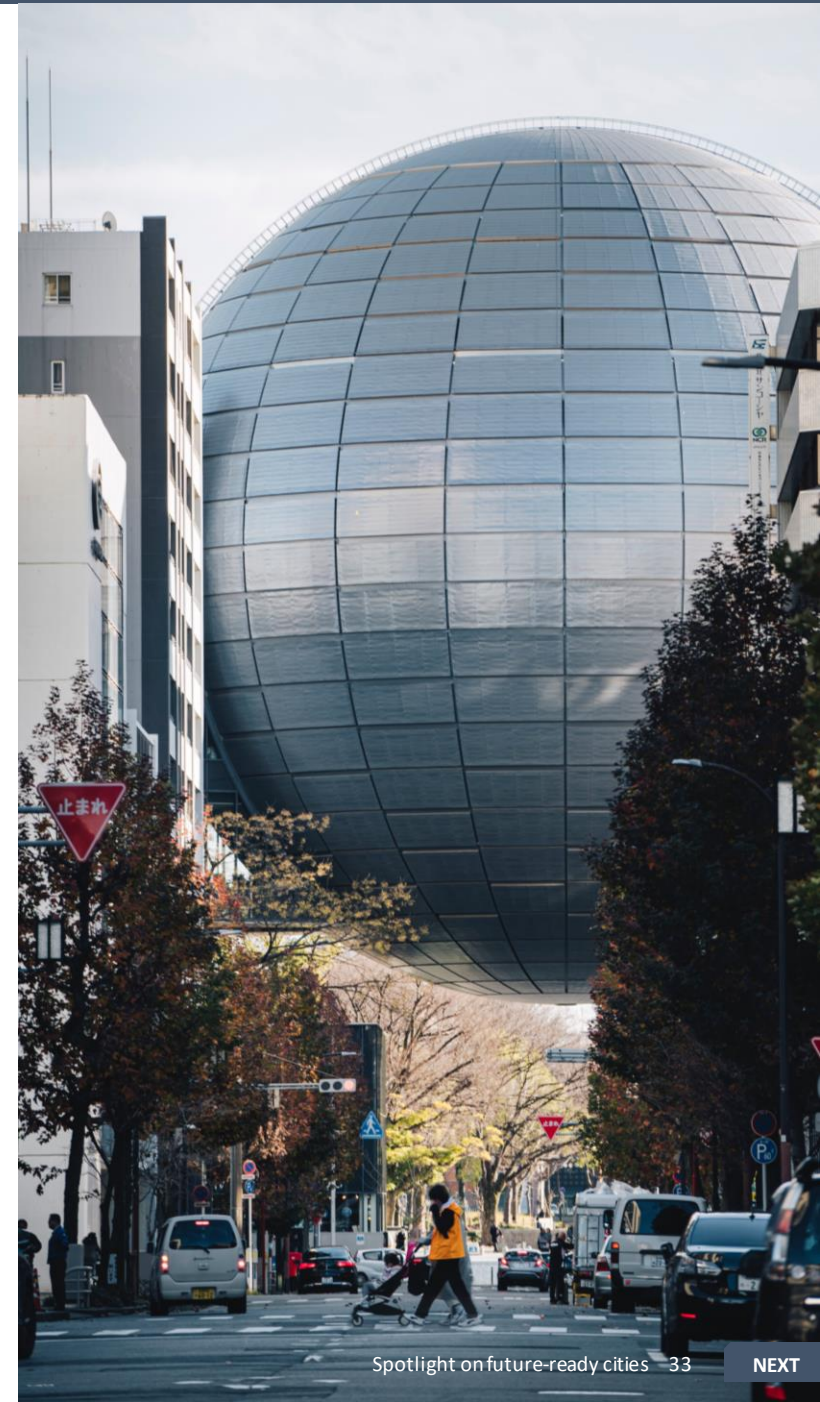
application is used to centrally manage everything from store selection, ordering, and order receipt to payment and delivery. The number of registered members has reached more than 4,000. This delivery service has been particularly useful during the pandemic and will remain a great help to the aging population post-pandemic.

The LIFE Project supports the elderly and others to travel out of their homes by themselves. At its center is the modification of ultra-compact mobility vehicles (COMS) to specifications suitable for driving in rural villages and for daily transportation. These shared vehicles are converted to low-speed driving specifically for elderly citizens. This initiative improves their quality of life and extends their healthy life expectancy by promoting outings, especially in depopulated areas.

Automated and electric

Through public-private partnerships, Toyota City is supporting the testing of driving support software that contributes to traffic safety and facilitates automated driving. It is working to create more advanced automated driving services in the future that will enable all citizens to move safely.

The city is also promoting next-generation vehicles equipped with external power supply functions. These environmentally friendly vehicles can serve as a power source in times of emergency. The city uses them for daily transport but, if necessary, can take them to places that need electricity during blackouts. The city offers a monetary subsidy to citizens who want to purchase one of these next-generation vehicles and asks them to cooperate in times of emergency by taking their cars to locations that lack electricity.



Toyota City, Japan

Reinventing mobility for an ageing society

Leaving no one behind

Underlying these mobility initiatives is Toyota City's pledge to "leave no one behind," the main goal of the city's strategic agenda. In addition to mobility, the city provides administrative services in the spirit of equality to citizens who are generally perceived as vulnerable groups, regardless of age, gender, disability, race, economic, or other status.

To deliver on its pledge, Toyota City brings together all its stakeholders, including citizens, private companies, and other organizations, to develop and help achieve the city's sustainable goals. This includes mechanisms to ensure that the views of all citizens are reflected in the city government's policies.

The E-Monitor System, for example, allows anyone who registers to express their opinions directly to the Toyota City administration. When major policy decisions are made by the administration, such as its sectoral plans, it offers a standard process to receive public comments.

Toyota Corp's new living lab

Toyota Motor Corp. is promoting the creation of the Toyota Woven City, a brand-new, fully autonomous community designed as a living laboratory, specifically to test out new technology like self-driving vehicles. Not to be confused with Toyota City, Toyota Woven City will be built on the 700,000-sq.-meter site of a former Toyota plant near Mount Fuji, a two-hour drive outside of Tokyo. The project has been in development since February 2021. Its Phase 1 opening will be from 2024 to 2025, and it will include the necessary infrastructure for its first residents.

Woven City will have three types of streets: one for automated mobility, another for pedestrians, and a third for both pedestrians

and personal mobility. Underground, there will be a fourth pathway specifically for the movement of goods, where the city's logistics network will also be installed.

While Woven City only has 360 initial residents, the future population is forecast to reach 2,000. The city's fully connected ecosystem is powered by clean energy sources like solar energy and hydrogen fuel cells. A fleet of Toyota's self-driving electric vehicles, called e-Palettes, will be used for transportation, deliveries, and mobile retail throughout the city.

The city aims to test new technologies like automated driving, artificial intelligence, and robotics in a real-world environment.



ThoughtLab

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