SMART CITY CHALLENGE

U.S. Department of Transportation

# WHAT WE LEARNED FROM ACROSS AMERICA

The response to the challenge was unprecedented—we received 78 applications. Cities from Albuquerque to Anchorage and Providence to Portland took the Challenge as an opportunity to create blueprints of their cities' transportation futures.

The applications proposed a wide range of innovative approaches to tackling urban mobility challenges. Here are just a few of the ideas from the 78 Smart City visions:

SEATTLE – shared data would provide dynamic routing for truck traffic, promote off-peak and overnight deliveries, and enable car share operators to deliver packages

DETROIT – partnerships with industry leaders in the automotive and technology fields and academic institutions would help provide access to electric car shares, automated shuttles, and on-demand delivery trucks through integrated mobility apps

BOSTON – "radically programmable" city streets with dynamic markings that can change from loading zones, to thoroughfares, to spaces for street hockey, depending on the time of day and season
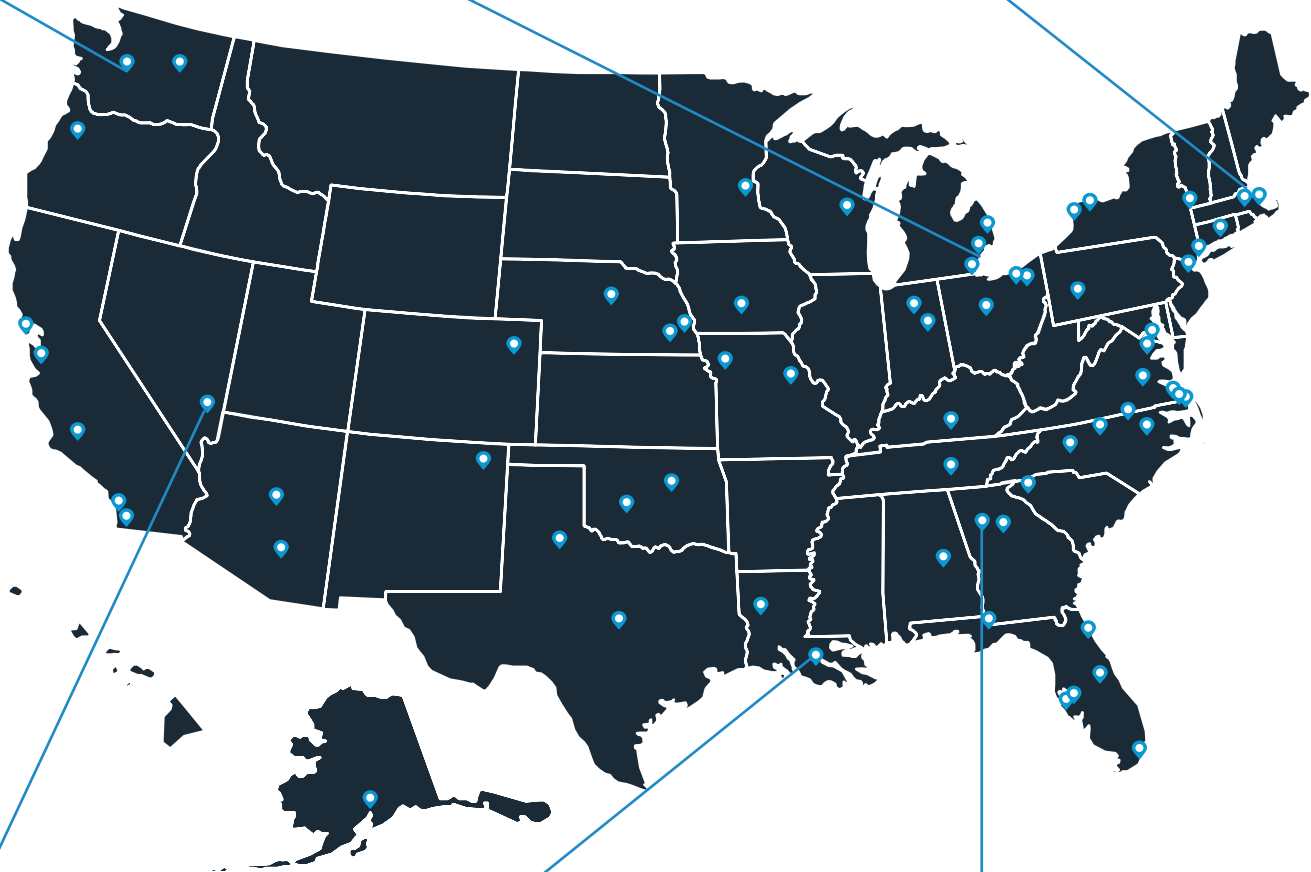
LAS VEGAS – new connected autonomous shuttles would transport workers to Las Vegas Boulevard, and new solar powered electric vehicle charging stations would help reduce emissions

NEW ORLEANS – dynamically-routed on-demand minibuses would provide affordable first mile/last mile transportation options to underserved communities

ATLANTA – a network of multimodal transportation centers serving as hubs for mobility, economic development, and community activity

While the cities were diverse, many of the 78 applicants faced similar urban mobility challenges:

Providing first-mile and last-mile service for transit users to connect underserved communities to jobs

The typical job is accessible to only about **27 percent** of its metropolitan workforce by transit in **90 minutes or less.**

Coordinating data collection and analysis across systems and sectors

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28 percent of all of the transit agencies in the United States have open data systems that freely provided transit times to the public.

Limiting the impacts of climate change and reducing carbon emissions

The **78 applicant cities** represent over one billion metric tons of CO_2 **emissions** per year.
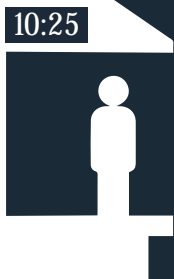
CO$_2$

Facilitating the movement of goods into and within a city

Trucks stuck in stop-and-go traffic in metropolitan areas cost shippers an estimated **$28 million annually** in truck operating costs and wasted fuel.

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Reducing inefficiency in parking systems and payment

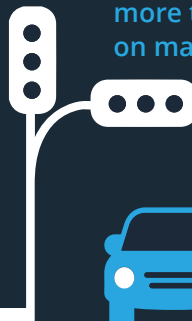An estimated **30 percent of traffic** in urban areas is caused by cars looking for parking.

Optimizing traffic flow on congested freeways and arterial streets

Outdated traffic signal timing causes more than **10 percent of all traffic** delay on major routes in urban areas.

How We Move

44 cities proposed projects to test the use of automated shared use vehicles to help travelers connect to their destinations.

How We Move Things

11 cities envisioned improving urban freight delivery by implementing smarter curb space management (through sensors, dynamic reservations, and other technologies) to speed loading and unloading.

How We Adapt

17 cities proposed using inductive wireless charging to charge electric vehicles, buses, or shuttles.

How We Move Better

53 cities proposed implementing Dedicated Short Range Communication (DSRC) to connect vehicles to infrastructure and each other.

How We Grow Opportunity

9 cities proposed providing free public WiFi on buses, taxis, and public spaces. The seven Smart City Challenge finalists proposed over 60 unique strategies to increase access to jobs, provide training, reach underserved areas, and ensure connectivity for all.

How We Align Decisions and Dollars

45 cities proposed implementing a unified traffic or transportation data analytics platform, which would help them make better decisions with their limited resources.

San Francisco

The Challenge

As the search for affordable housing continues to push people commuting into San Francisco further from the city, the roads into downtown experience ever growing congestion.

The Goal

Grow the number of regional commuters that use carpooling to improve affordability, increase mobility and relieve congestion on roads and transit.

The Solution

→ Create connected regional carpool lanes and designate curb space for carpool pick-up/drop-off

→ Make carpooling easy by developing a smartphone app for instant carpool matching and establish carpool pickup plazas for riders without smart phones

→ Use connected infrastructure to monitor and optimize the performance of carpool lanes

Denver

The Challenge

The health of Denver's economy is closely connected to efficient freight movements, yet growing populations along key freight corridors are creating congestion and reducing reliability, while the air pollution and noise caused by freight traffic disproportionately impact underserved communities.

The Goal

Make freight delivery more reliable and reduce air pollution, idling, and engine noise.

The Solution

Establish a connected freight efficiency corridor with comprehensive freight parking and traffic information systems, freight signal prioritization, designated parking and staging areas.

Pittsburgh

The Challenge

Pittsburgh has one of the highest air pollution levels in the country, and poor air quality is well known to cause serious health and social impacts.

The Goal

Jump-start electric conversion to reduce transportation emissions by 50% by 2030. Through demonstration projects in street lighting, electric vehicles, and power generation.

The Strategy

→ Convert up to 40,000 streetlights to LEDs to reduce energy use

→ Establish smart street lights with sensors to monitor local air quality

→ Install electric vehicle charging stations

→ Convert the city's public fleet to electric vehicles
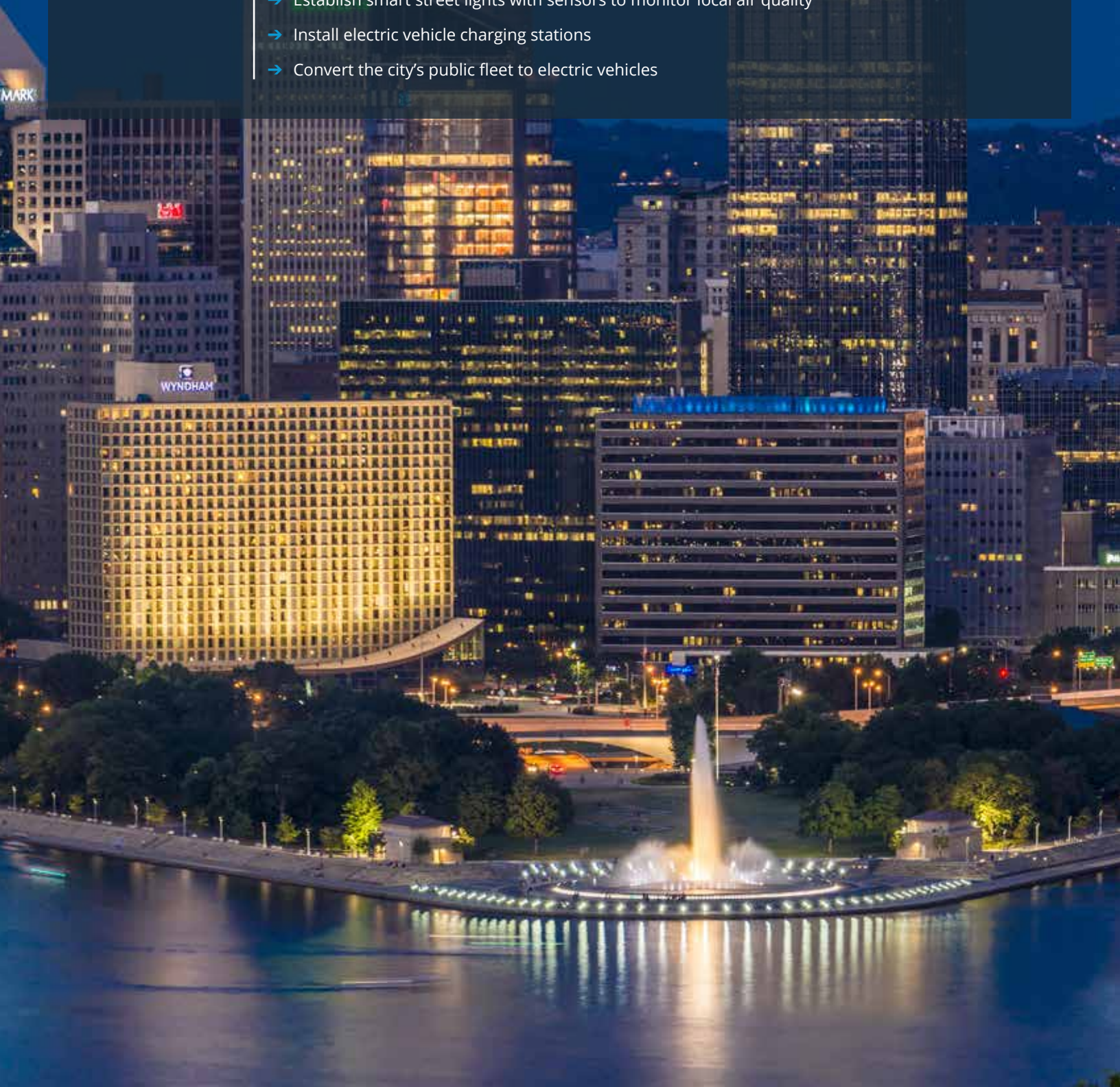
Kansas City

The Challenge | Despite advances in transportation technology and urban planning, we still lack basic data on how cities work and how infrastructure affects the everyday lives of our citizens.

The Goal | Advance our understanding of urban travel and quality of life to inform the transportation decisions of citizens and public officials.

The Strategy | Make the urban core a more 'Quantified Community,' by collecting and analyzing data on:

- → Travel flows
- → Traffic crashes
- → Energy usage
- → Air pollution
- → Residents' health and physical activity

Make these data available through an open data architecture, to allow for unprecedented studies in transportation engineering, urban systems operation, planning, and the social sciences, promote entrepreneurship and empower citizens.

Austin

The Challenge | In the early 1960s, the I-35 highway was built through the low-income neighborhoods, dividing the city into West and East Austin. The region's racial divides have become increasingly acute for its minority populations, which struggle with higher poverty rates, more isolated neighborhoods, lower educational attainment, and lower employment levels.

The Goal | Connect underserved communities to economic opportunities and reduce the spread of poverty.

The Strategy | Austin will create a Mobility Marketplace that will improve access to mobility services for unbanked users, older Americans, and those with disabilities. Multi-lingual Smart Ambassadors will partner with community organizations to demonstrate new technologies and mobility services and engage with citizens in underserved communities to understand their needs.
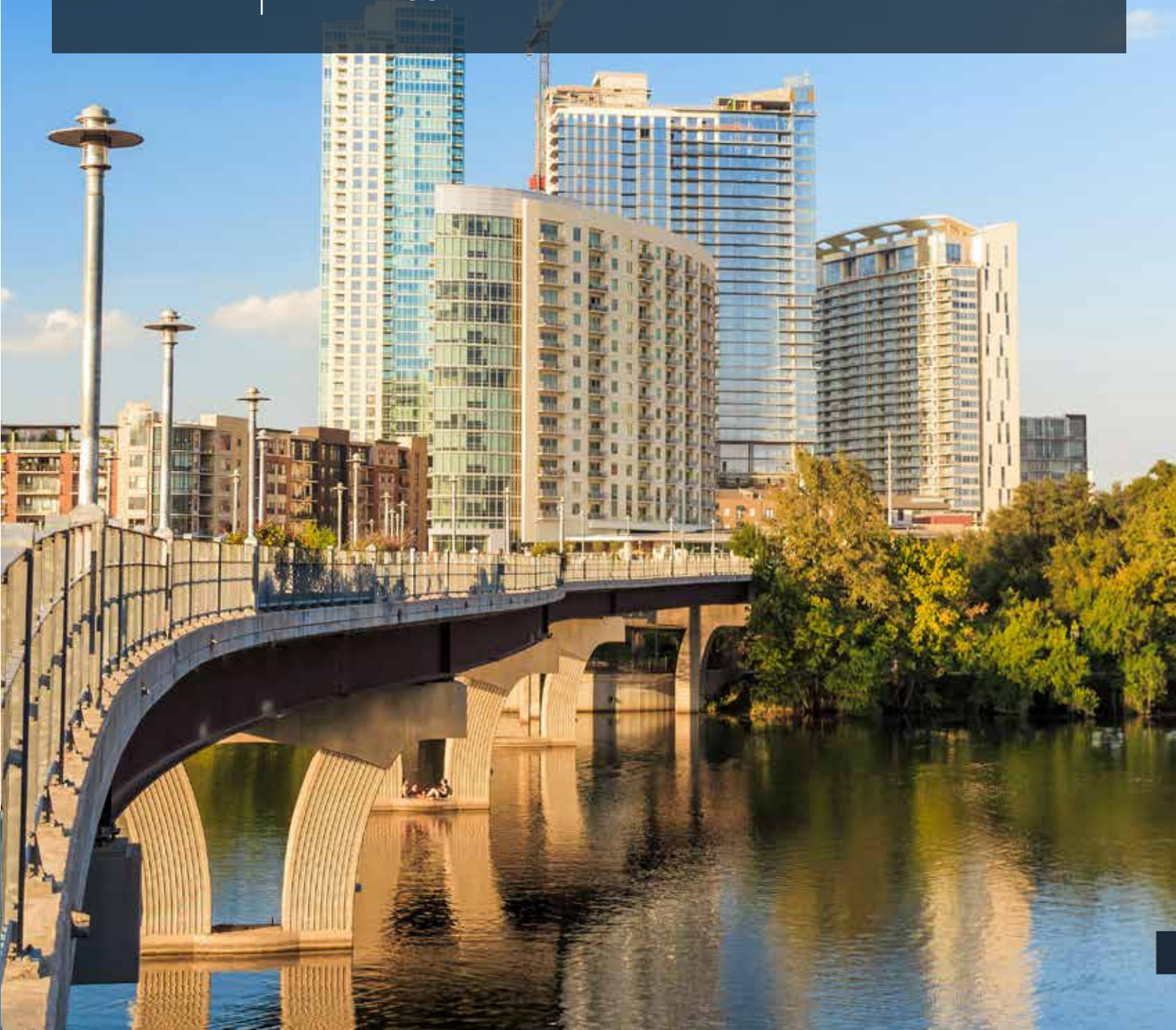
Portland

The Challenge

People in underserved communities are at a higher risk of missing out on new technological advances; these citizens may lack access to new tools, and more significantly, their needs and issues may not feed into the data collection and study that guides development of those tools.

The Goal

Ensure that all communities have access new transportation options and improved methods for making informed transportation choices.

The Strategy

Make community members a part of the development and implementation of Smart City technologies from beginning to end through a public education campaign and a smart city video contest.

Establish partnerships with community organizations to ensure that low-income, disabled, older, minority, and immigrant residents have a voice.

Engage with residents through walking and van tours, "pop ups", idea walls, supper chats and youth-led canvas initiatives.

Columbus

The Challenge

Each year in Franklin County, 150 babies die before their first birthday. And, twice as many African-American babies are likely to die as white children. In Columbus, these deaths are concentrated in neighborhoods in which there are lower levels of income, education and health. One neighborhood loses four times as many babies as in the neighborhood next door.

The Goal

Reduce infant mortality by 40 percent and to cut the health disparity gap in half by 2020.

The Solution

Columbus will leverage a new central connected traffic signal and integrated transportation data system to develop a suite of applications to deliver enhanced human services to residents and visitors. The City plans to integrate an electronic appointments and scheduling platform for doctor visits with transit tracking so that rescheduling is automated and expecting mothers need not wait weeks to reschedule appointments. These applications include a multi-modal trip planning application, a common payment system for all transportation modes, a smartphone application for assistance to persons with disabilities, and integration of travel options at key locations for visitors. Columbus will establish a smart corridor connecting underserved neighborhoods to jobs and services. The smart corridor will enhance Bus Rapid Transit (BRT) service by installing smart traffic signals, smart street lighting, traveler information and payment kiosks, and free public Wi-Fi along the route. Six electric, accessible, autonomous vehicles will be deployed to expand the reach of the BRT system to additional retail and employment centers.

THE WINNER: COLUMBUS, OHIO

Columbus put forward an impressive, holistic vision for how technology can help all residents move better and access opportunity .

The City of Columbus proposed a comprehensive, integrated plan addressing challenges in residential, commercial, freight, and downtown districts using a number of new technologies, including connected infrastructure, electric vehicle charging infrastructure, an integrated data platform, autonomous vehicles, and more. Columbus plans to work closely with residents, community and business leaders, and technical experts to implement their plan. They have committed to collaborate with Austin, Denver, Kansas City, Pittsburgh, Portland, and San Francisco to share best practices to help other cities across America replicate their successes. Public roll-out of the various Smart Columbus pilot projects will begin in 2017.

Columbus Smart City Challenge Implementation Vision
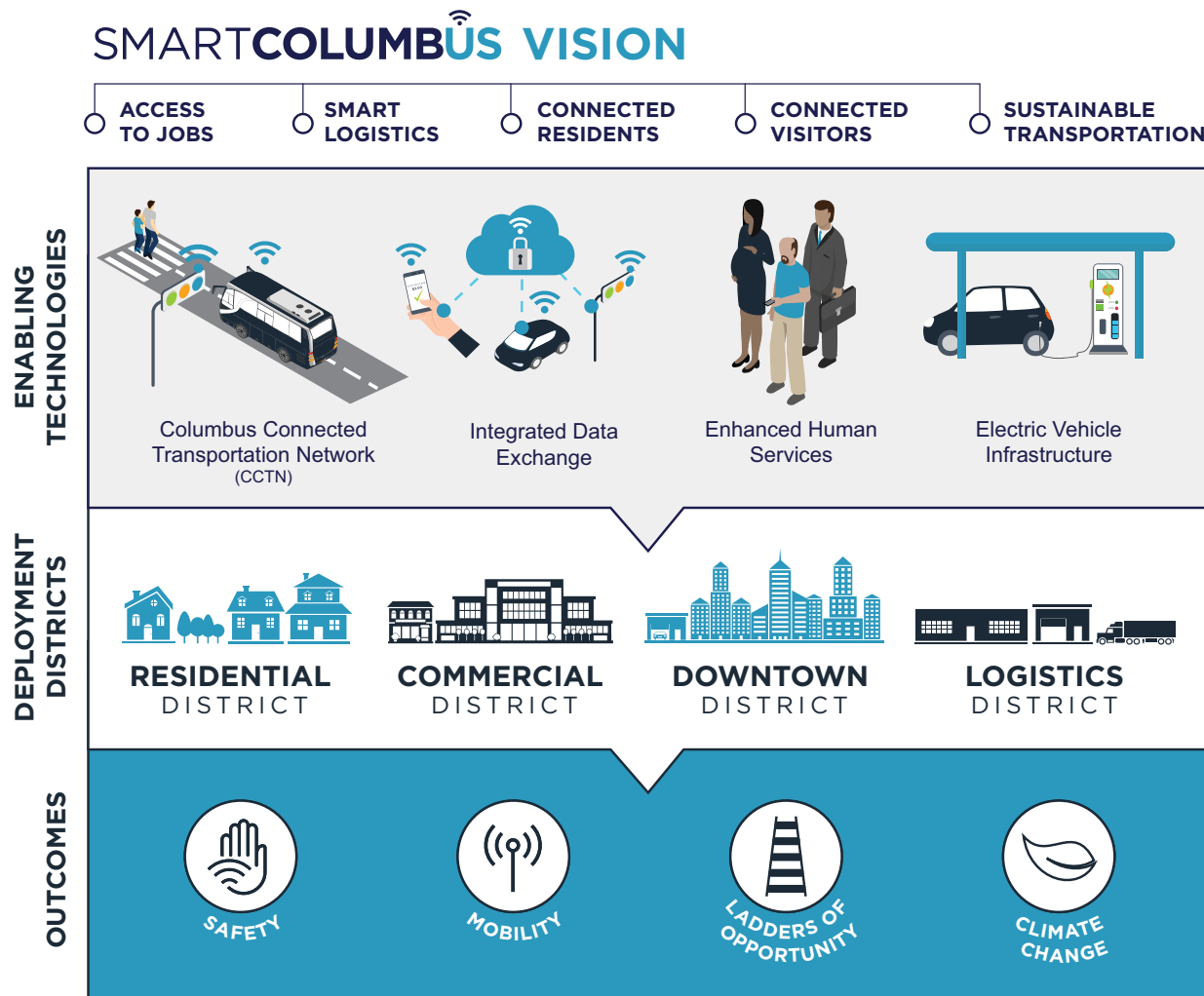
At U.S. DOT, we expect Columbus – and all seven finalists – to serve as models for cities looking to become smarter. We are committed to providing continued support to all of the finalists by connecting them to partnerships, technical assistance, and funding opportunities. The Department identified $2 billion in Federal funding opportunities to help other American cities implement Smart City projects.

We plan to monitor the progress of Columbus and other cities closely, and to collect and share their success stories and lessons learned. Our hope is that the Smart City Challenge marks an important first step in the transformation of urban mobility and accessibility, not just in Columbus or our finalist cities, but across the country. We're excited to see where this journey takes us.

WHAT COMES NEXT

"From automated vehicles to connected infrastructure to data analytics, technology is transforming how we move around our country, and some of the most exciting innovation is happening at the local level"
– Secretary Anthony Foxx .

In October 2016, Secretary Foxx announced an additional $65 million in grants to support community-driven advanced technology transportation projects — including support for four of the Smart City Challenge finalists to implement ideas developed as part of their applications. In all, these advanced technology grants will fund 19 technology-driven projects in local areas to fight congestion, increase connectivity, and improve access to opportunity.

Smart Cities Challenge finalists receiving grants included:

→ Pittsburgh - nearly $11 million to deploy smart traffic signal technology – proven to reduce delays at street lights by up to forty percent – along major travel corridors.

→ San Francisco - nearly $11 million to implement connected vehicle technologies to allow the signal system to detect red light-violating vehicles and adjust timing, and personal wireless devices to prioritize pedestrian travel and safety at intersections. This includes a pilot of a shared, electric, autonomous shuttle.

→ Denver - $6 million to upgrade its traffic management center, build a connected vehicle network, and install automated pedestrian detection at difficult crosswalks.

→ Portland - the transit agency, TriMet, will receive funds to integrate shared-use mobility options into its existing trip planning app, allowing users to plan efficient trips even without nearby transit access.

Projects supported by these grants are building on the success of the Smart City Challenge. Leveraging funding from local and private partners, these cities will bring cutting-edge technology to their communities, demonstrating in real-world settings the tools that will transform our transportation system in the next 30 years.

The Smart City Challenge finalists' proposals identified more than 150 industry and non-profit partners pledging more than $500 million in resources, technology solutions, and technical support to implement smart city initiatives.