

***US DOT's Smart City
Challenge and FTA's MOD
Sandbox: Advancing
Multimodal Mobility and
Best Practices***

February 13, 2017, TRB Webinar



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Webinar Overview

- Features thought leaders and winners of the U.S. DOT Smart City Challenge and FTA's MOD Sandbox
- Emphasizes role of public transit, partnerships, shared mobility, advanced technology, and future of mobility; next steps and plans for researching the pilots and best practices
- Sponsored by TRB Standing Committee on Emerging and Innovative Public Transport and Technologies (APo20)



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Webinar Presentations

**Susan Shaheen, Transportation Sustainability
Research Center, UC Berkeley (Moderator)**

**Mark Dowd, Formerly of U.S. DOT and the Office of
Management and Budget of the White House**

**Aparna Dial, City of Columbus, Smart City
Challenge Winner**

**Gwo-Wei Torng, U.S. Federal Transit
Administration**



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Agenda

- **Introduction and review of the Smart City Challenge**
- **Winning the bid**
- **Review of the Federal Transit Administration's Mobility on Demand (MoD) Sandbox**
- **Q&A (30 minutes)**



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The logo consists of a large white circle with a thick blue border. Inside this circle is a dark blue circle containing a white silhouette of a city skyline. The skyline is composed of various building shapes of different heights and widths, arranged in a semi-circular arc. The text "SMART CITY CHALLENGE" is centered within the dark blue circle in a white, sans-serif font.

SMART CITY
CHALLENGE

WHAT WE LEARNED FROM ACROSS AMERICA

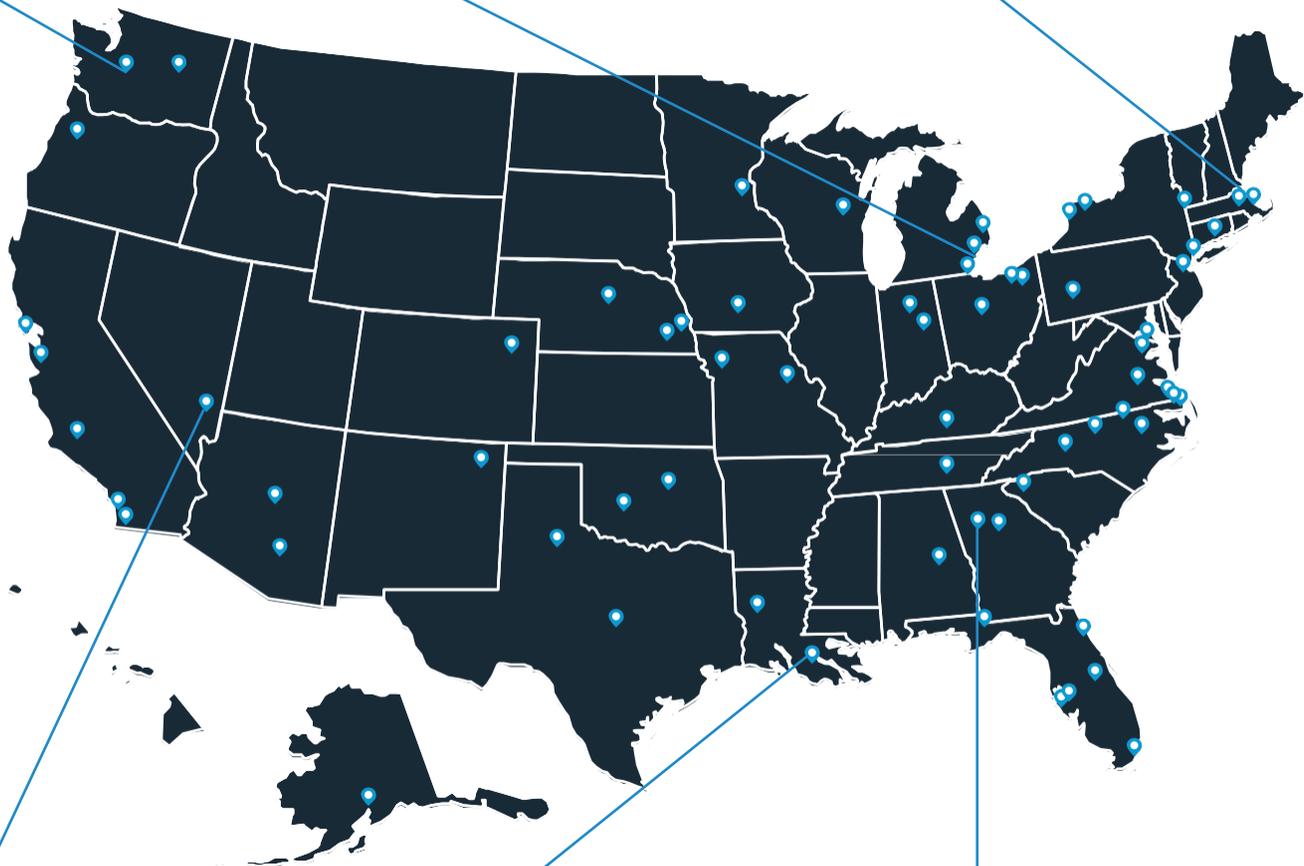
The response to the challenge was unprecedented—we received 78 applications. Cities from Albuquerque to Anchorage and Providence to Portland took the Challenge as an opportunity to create blueprints of their cities' transportation futures.

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.

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.



Coordinating data collection and analysis across systems and sectors



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

Reducing inefficiency in parking systems and payment

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



Limiting the impacts of climate change and reducing carbon emissions

The **78 applicant cities** represent over one billion metric tons of **CO₂ emissions** per year.



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

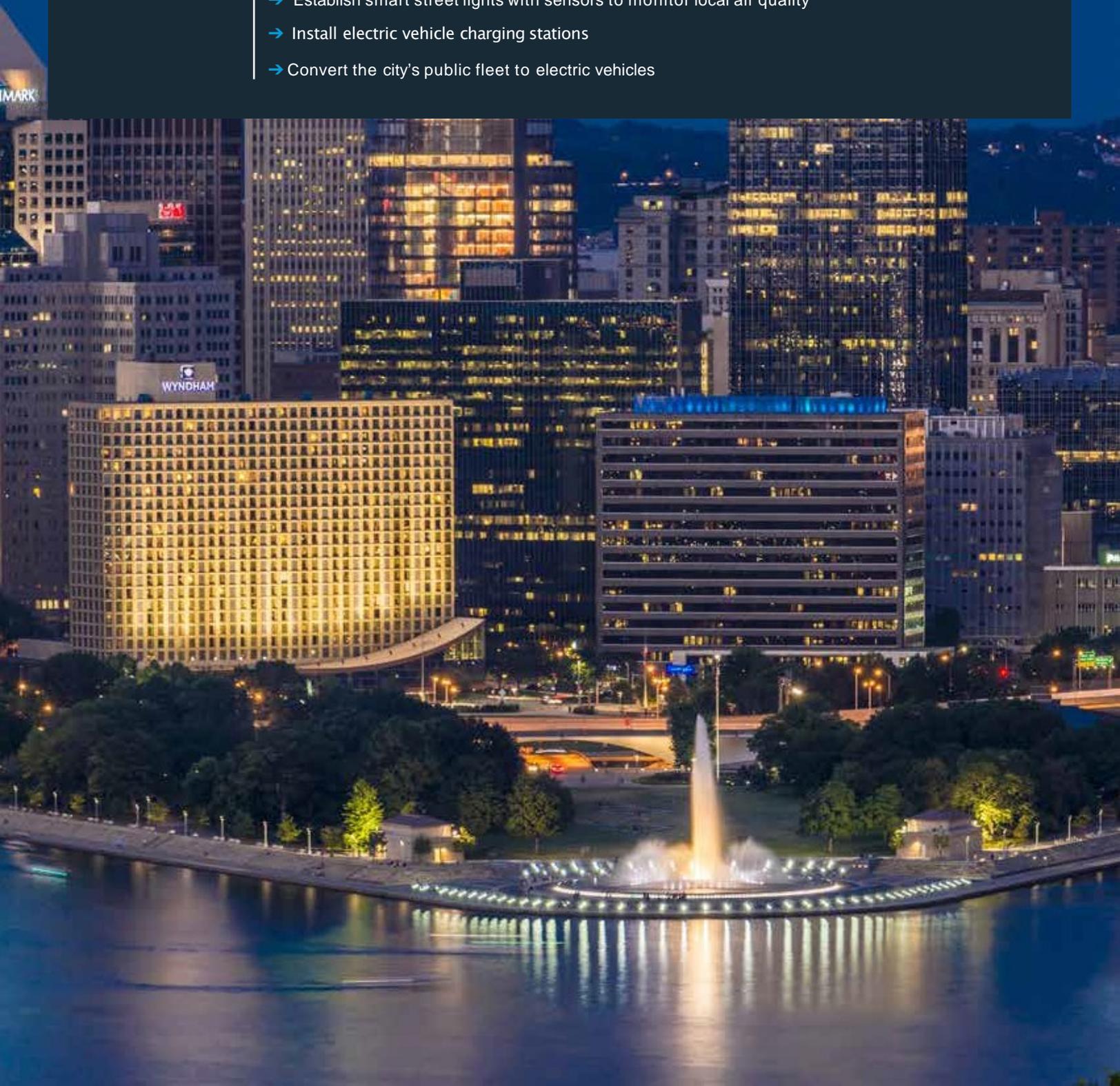
Pittsburgh has one of the highest air pollution levels in the country, and poor air quality is well known to cause serious health and social impacts.

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

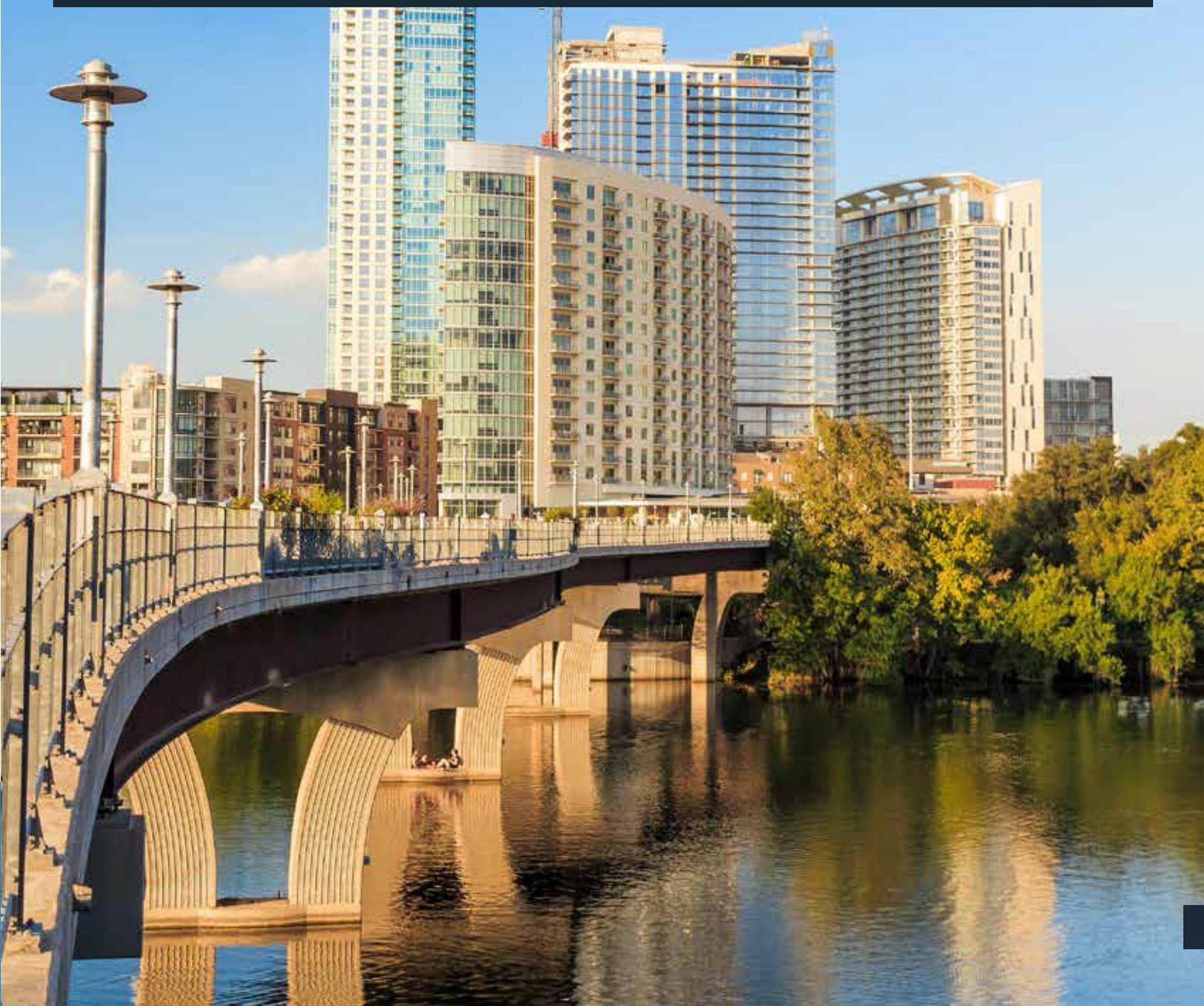
In the early 1960s, the I-35 highway was built through the low-income neighborhoods, dividing the city into West and East Austin. The region's racial divides have become increasingly acute for its minority populations, which struggle with higher poverty rates, more isolated neighborhoods, lower educational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

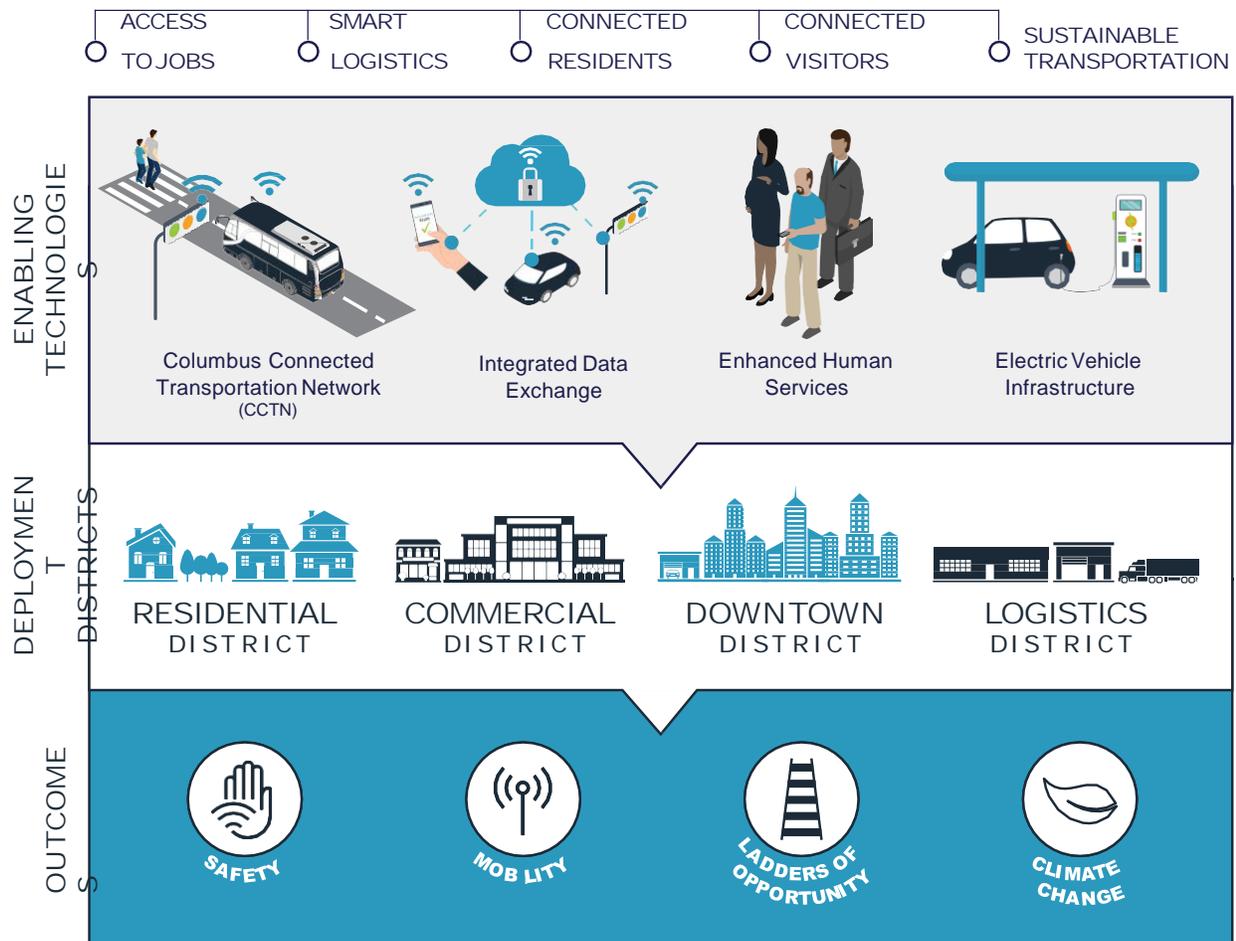


THE WINNER: COLUMBUS, OHIO

Columbus Smart City Challenge Implementation Vision

VISION

SMARTCOLUMBUS

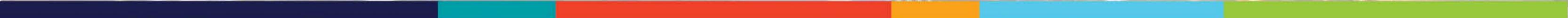


WHAT COMES NEXT

- **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.

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.**

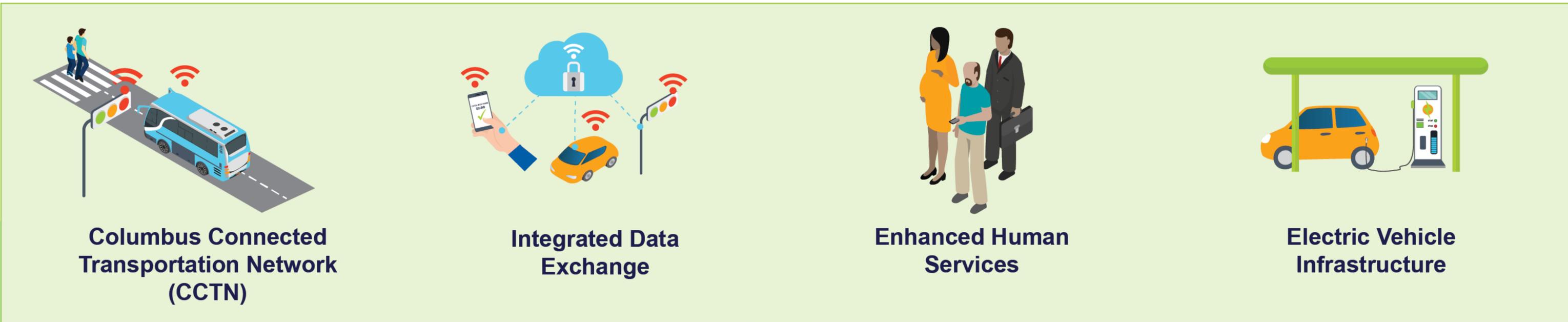
SMARTCOLUMBUS



SMARTCOLUMBUS VISION



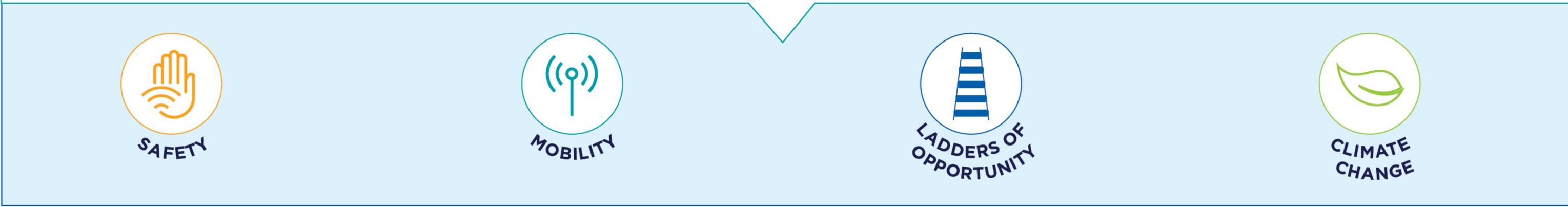
ENABLING TECHNOLOGIES



DEPLOYMENT DISTRICTS



OUTCOMES





RESIDENTIAL DISTRICT



DOWNTOWN DISTRICT



COMMERCIAL DISTRICT

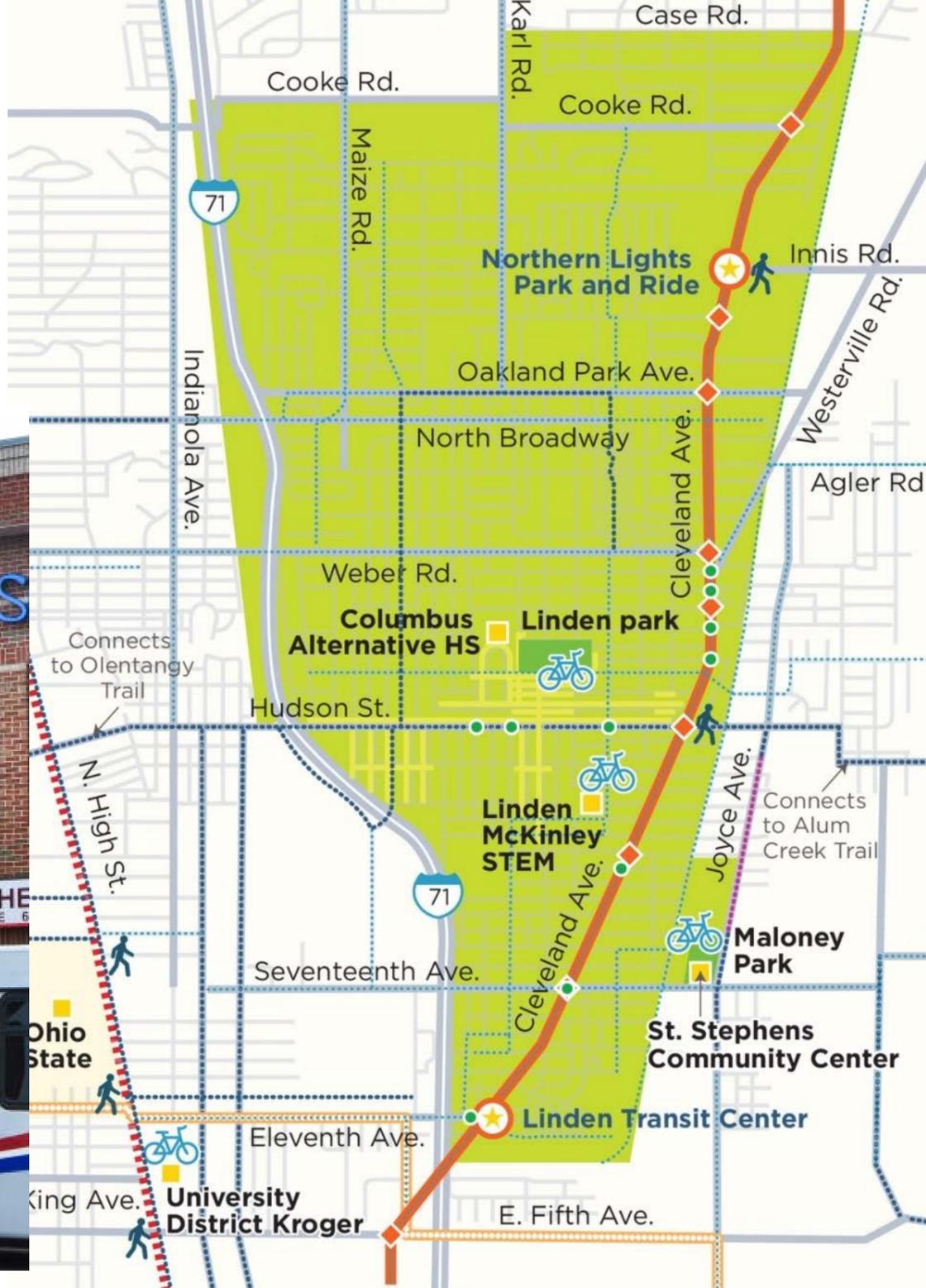


LOGISTICS DISTRICT





RESIDENTIAL DISTRICT



The Linden District





RESIDENTIAL DISTRICT





RESIDENTIAL DISTRICT



RESIDENTIAL DISTRICT



SMARTCOLUMBUS



RESIDENTIAL DISTRICT



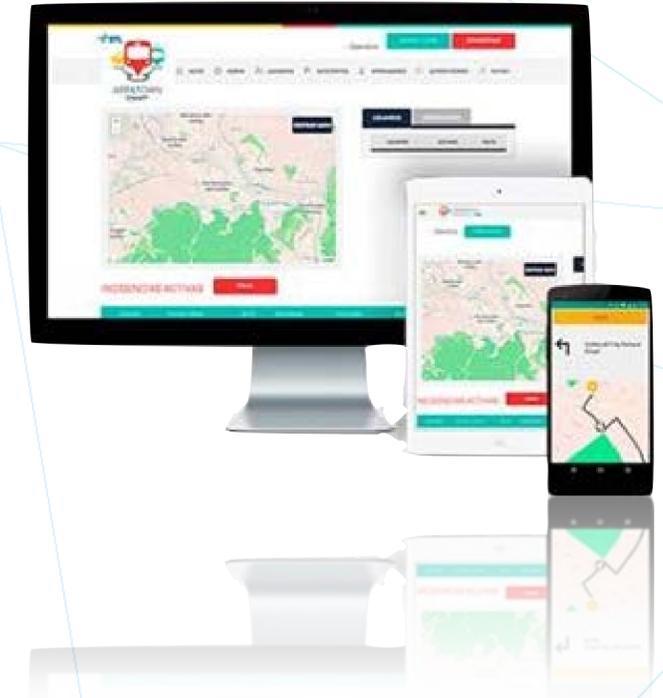
Common Payment System



Multi-Modal Trip Planning Application



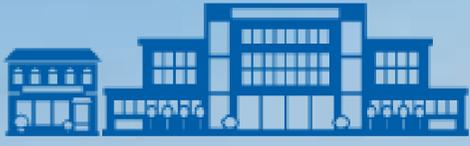
Smart Mobility Hubs



Mobility Assistance for People with Cognitive Disabilities

Smart Street Lighting

Pedestrian Collision Avoidance



COMMERCIAL
DISTRICT





**COMMERCIAL
DISTRICT**

**Connected Electric
Automated Vehicle**



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**DOWNTOWN
DISTRICT**

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DOWNTOWN
DISTRICT

**Delivery Zone
Availability**

**Enhanced Permit
Parking**

**Parking
Management**



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LOGISTICS DISTRICT



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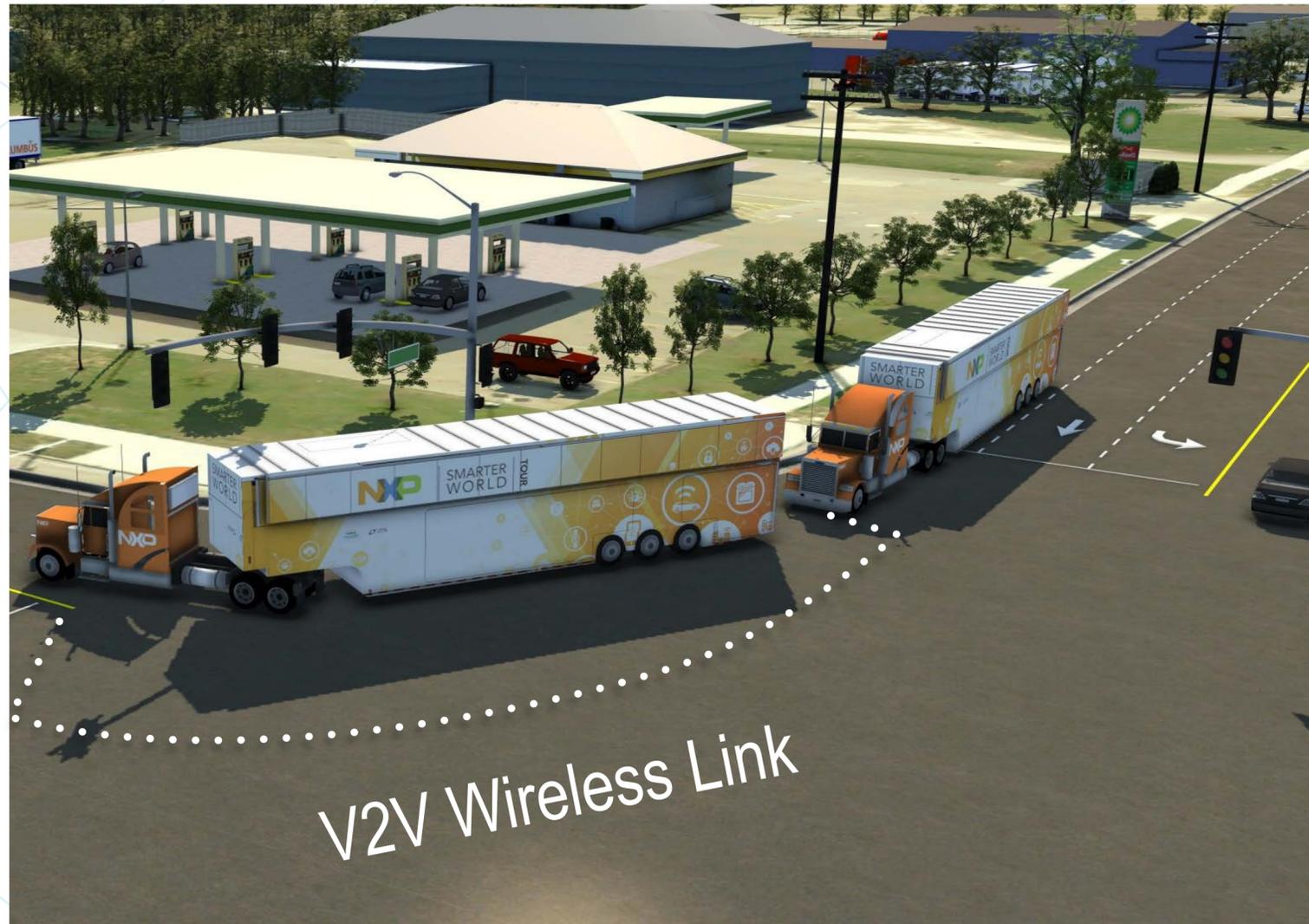


LOGISTICS DISTRICT

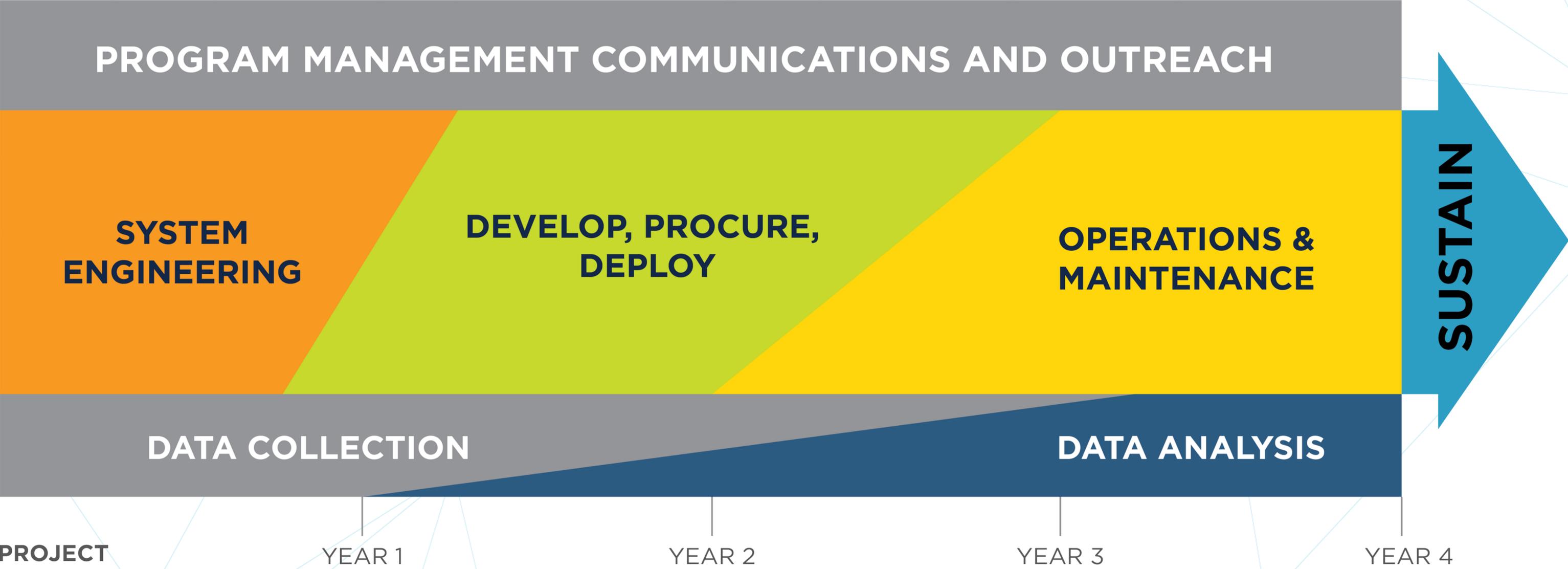
Truck Platooning

Oversize Vehicle Routing

Interstate Truck Parking Availability



USDOT program



Progress

- 📶 USDOT Cooperative Agreement - executed
- 📶 Project Kickoff – completed
- 📶 Project Management Plan - completed
- 📶 Working Groups – meetings began in December and ongoing
- 📶 Communications and Outreach Plan – Submitted to USDOT
- 📶 System Engineering Management Plan – submitted to USDOT

Up Next in 2017

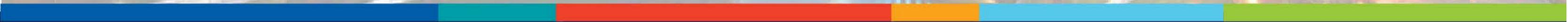
- 1) Concept of Operations
- 2) Demonstration Site Map
- 3) System Architecture and Standards Plan
- 4) Performance Measurement Plan

USDOT Working Groups

Working Group	Projects
1. Connected Vehicles	Connected Vehicle Environment (CVE)
2. Connected Travelers	Common Payment System
	Multi-Modal Trip Planning
3. Data and Analytics	Integrated Data Exchange
4. First/Last Mile	Smart Mobility Hubs
5. Downtown Parking	Enhanced Permit Parking
	Delivery Zone Availability
	Event Parking Management
6. Smart Street Lighting	Smart Street Lighting
7. Transit/Pedestrian Safety	Transit/Pedestrian Collision Avoidance System
8. Mobility Assistance	Mobility Assistance for People with Cognitive Disabilities
9. Autonomous Vehicles	Connected Electric Automated Vehicle (EAV)
10. Truck Platooning	Truck Platooning
11. Smart Logistics	Oversize Vehicle Routing
	Interstate Truck Parking Availability

An aerial photograph of a city skyline at dusk. The sky is a mix of light blue and orange. In the foreground, a river flows through the city, reflecting the lights of the buildings. Several modern, multi-story buildings are visible, some with illuminated windows. The overall scene is a vibrant urban landscape.

Lessons Learned

A horizontal bar composed of several colored segments: blue, teal, orange, yellow, light blue, and green.

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Thank you

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Review of FTA's MOD Sandbox

February 13, 2017

TRB Webinar

Evolving Mobility Landscape



= Quality & Carefree Mobility Choices

About MOD Sandbox Program

Demonstration Program to Explore MOD Models

- **Explores** innovative approaches to integrate MOD solutions with public transportation
- **Empowers** project teams to implement innovate business models to expand mobility options
- **Informs** future MOD policies at all levels
- Why “Sandbox”?



Image source: www.adventurouschild.com

2016 MOD Sandbox Program

Funding and Eligible Applicants

- **\$8 Million** in FTA research funds
- **Local Share Minimum of 20%** of the net project cost
- **Providers of public transportation** with one or more strategic partners
- Projects solicited through Notice of Funding Opportunity (NOFO) published May 3, 2016, with proposals due July 5
- 12-month development, followed by 12-month implementation



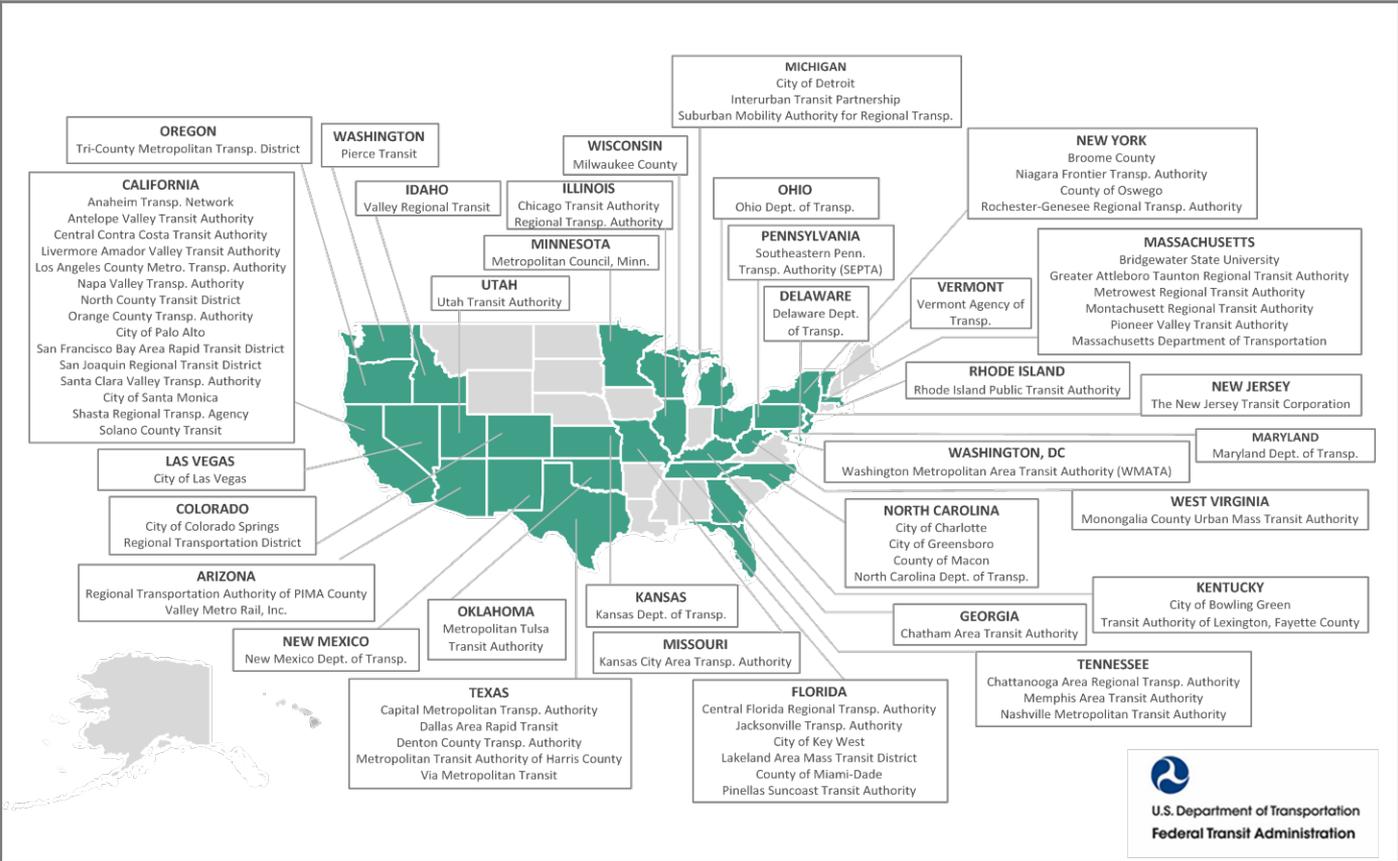
Mobility on Demand (MOD) Sandbox

78 eligible applications to FTA for the MOD Sandbox

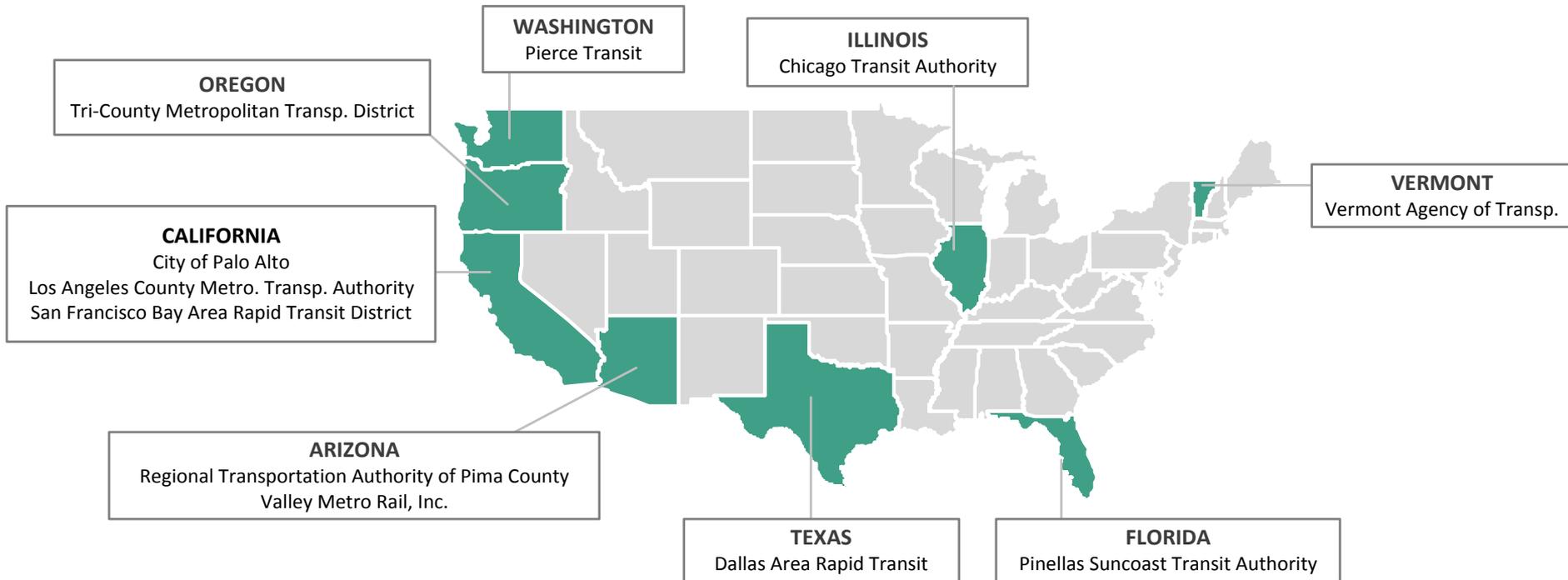
33 states, including DC, submitted applications

\$57 million in FTA funding requested with a minimum of \$112,000 and a maximum of \$3.5M requested

\$8 million in federal funding available from the MOD Sandbox



FY16 MOD Sandbox Program



11 Projects: \$7,931,080

2016 MOD Sandbox Themes

- Paratransit and Demand Response Service
- First Mile/Last Mile
- Multimodal App/Payment
- Incentive Strategies
- Carpooling and Ridesharing
- Integrated Bikesharing

MOD Sandbox: At a Glance



REGIONAL TRANSPORTATION AUTHORITY OF PIMA COUNTY (PIMA COUNTY, AZ)

Integrating fixed route, subscription based ride-sharing and social carpooling services into a platform to address first mile/last mile issues



VALLEY METRO RAIL (PHOENIX, AZ)

Smart phone mobility platform that integrates mobile ticketing and multimodal trip planning, including ride-hailing, bike sharing, and car-sharing companies



CITY OF PALO ALTO, CA

Commuter-focused project incorporating trip reduction software, a multi-modal trip planning app, and workplace parking rebates.



LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION

Mobility on demand partnership with TNC. This project, led by LA Metro, includes a companion project with Sound Transit in Seattle, WA.

MOD Sandbox: At a Glance



SAN FRANCISCO BAY AREA RAPID TRANSIT

Commuter-focused integrated carpool-to-transit program.



PINELLAS SUNCOAST TRANSIT AUTHORITY (PINELLAS COUNTY, FL)

On-demand paratransit using taxis and a car-sharing company to provide door-to-door service



TRI-COUNTY METROPOLITAN TRANSPORTATION DISTRICT OF OREGON

Platform integrating transit and shared-use mobility options. By integrating data, the project will allow users to plan trips that address first/last mile issues while traveling by transit.



DALLAS AREA RAPID TRANSIT

Integrates ride-sharing services into DART's GoPass ticketing app.

MOD Sandbox: At a Glance



VERMONT AGENCY OF TRANSPORTATION

Statewide transit trip planner incorporating flex-route, hail-a-ride, and other non-fixed-route services into mobility apps.



PIERCE TRANSIT (PIERCE COUNTY, WA)

Limited Access Connections project connects service across two transit systems – local and regional – and ride-share companies to increase transit use across the Seattle region.



CHICAGO TRANSIT AUTHORITY

Incorporates local bike-sharing company Divvy into CTA's transit trip planning app.

More Information on MOD Sandbox

- Internet Search: [FTA MOD Sandbox](#)
 - FY16 MOD Sandbox solicitation
 - A 2-pager description for each FY16 Sandbox projects
 - FTA Shared Mobility FAQs
 - FTA Shared Mobility Online Dialogue



The screenshot shows the Federal Transit Administration website page for the Mobility on Demand (MOD) Sandbox Program. The page features a navigation menu with options like 'About', 'Funding', and 'Regulations & Guidance'. The main content area is titled 'Mobility on Demand (MOD) Sandbox Program' and includes a large image of a person holding a smartphone displaying a transit app. To the right, there is a sidebar with 'Related Links' and 'Related Documents' sections. The 'Related Links' section lists several resources, including 'FY 2016 Mobility on Demand (MOD) Sandbox Program Projects', 'MOD Grant Notice Page', and 'Press Release: 2016 MOD Funding Opportunity'. The 'Related Documents' section lists '2016 Mobility on Demand Sandbox Demonstration Program Supplemental Form' and 'Mobility on Demand (MOD) Sandbox Webinar May 25, 2016'. Below the sidebar, there is a 'What's New' section with a list of recent events, including a listening session on January 11, 2017, and an announcement of project selections for \$8 million in funding for MOD public transportation projects in October 2016.

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Technology

Training and Workforce Development

Bus Rapid Transit

International Public Transportation Program

Bus Testing

Related Links

Mobility on Demand (MOD) Sandbox Program



Related Links

- [FY 2016 Mobility on Demand \(MOD\) Sandbox Program Projects](#)
- [MOD Grant Notice Page](#)
- [Press Release: 2016 MOD Funding Opportunity](#)
- [Press Release: US DOT Announces Advanced Technology Transportation Grants](#)
- [Shared Mobility guidance](#)

Related Documents

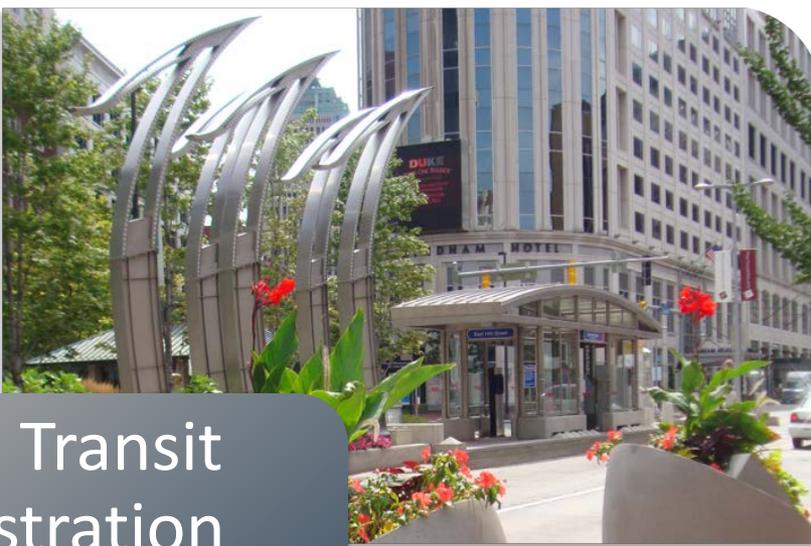
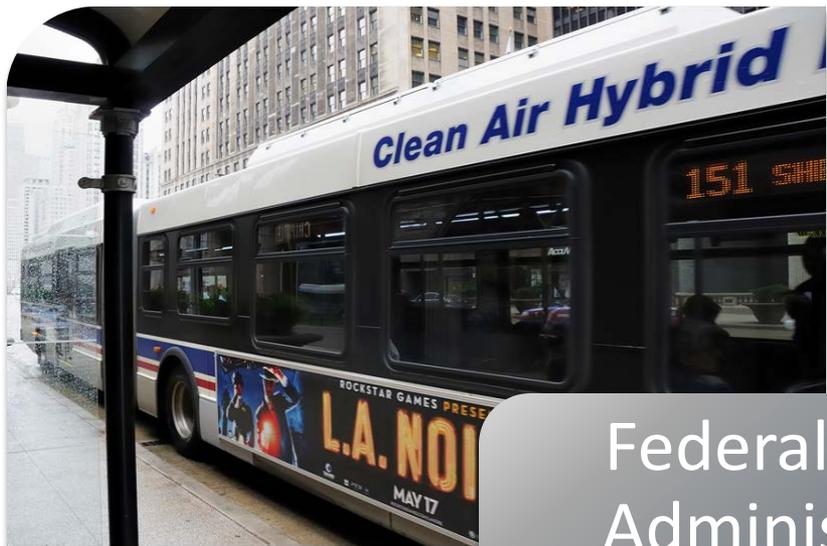
- [2016 Mobility on Demand Sandbox Demonstration Program Supplemental Form](#)
- [Mobility on Demand \(MOD\) Sandbox Webinar May 25, 2016](#)

Contact Us

Office of Research, Demonstration, and Innovation

What's New

- Join FTA at a listening session at 2:30 p.m. Wednesday, January 11 as part of the Transportation Research Board (TRB)'s 2017 annual meeting. Similar to a highly successful effort during the 2016 TRB Annual Meeting, this two-hour listening session will share lessons learned from MOD Sandbox 1.0, recent MOD activities, and discuss how to shape MOD Sandbox 2.0. Download the [session flyer](#).
- In October, 2016, FTA announced project selections for \$8 million in funding for Mobility on Demand public transportation projects. The



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