



THE OHIO STATE UNIVERSITY

Mobility Solutions for Smart Cities to Improve Citizens Lives

September 30, 2016



AGENDA:

1. Background
2. Ohio Smart Mobility Initiative and Smart City Challenge Overall
3. Smart City Columbus Technical Presentation
4. Q&A

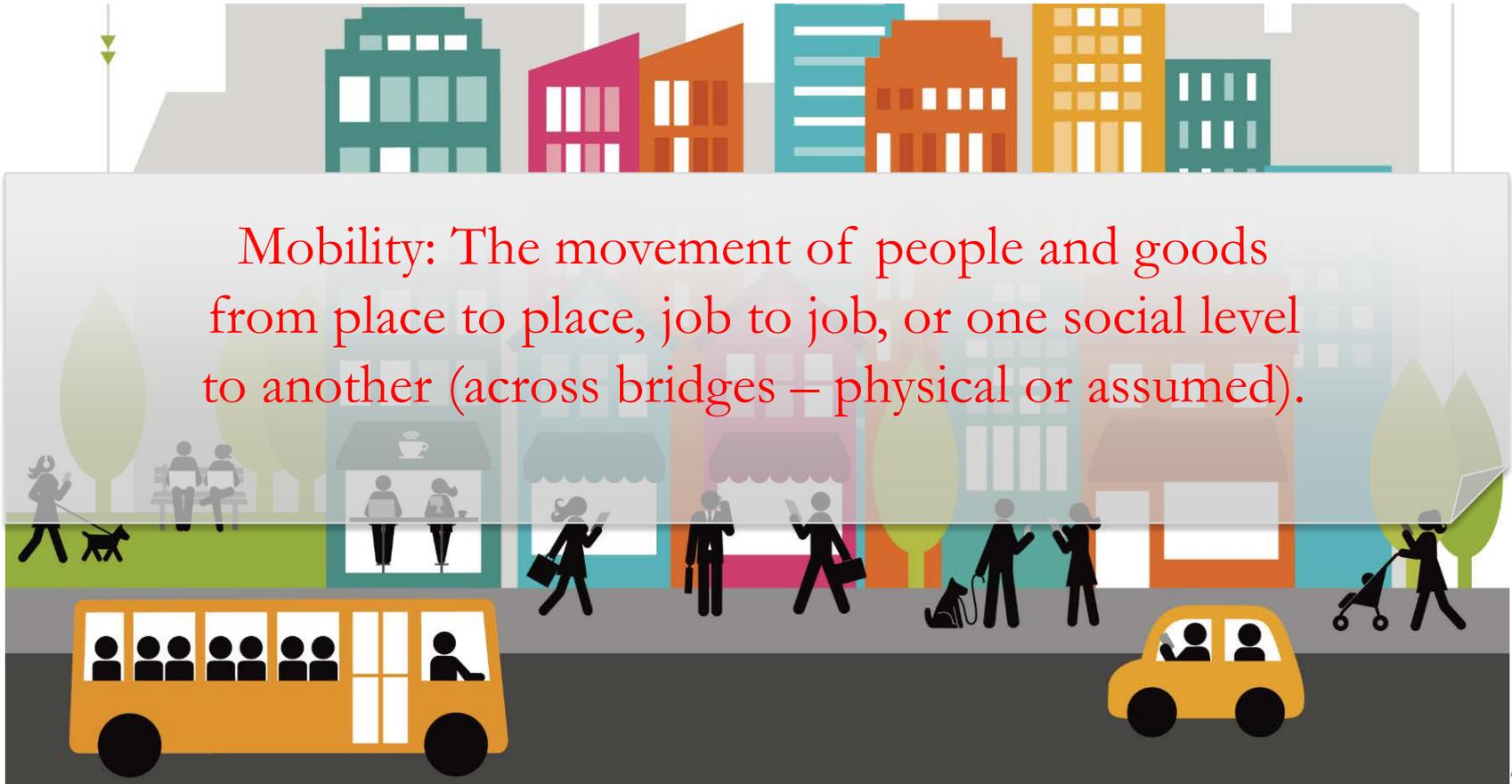


BACKGROUND

- Engineer
- 35 years in automotive industry – R&D focus
- Established SV office with AI focus
- Joined academia with focus on mobility research and business development
- University wide position – anything that moves people or goods.

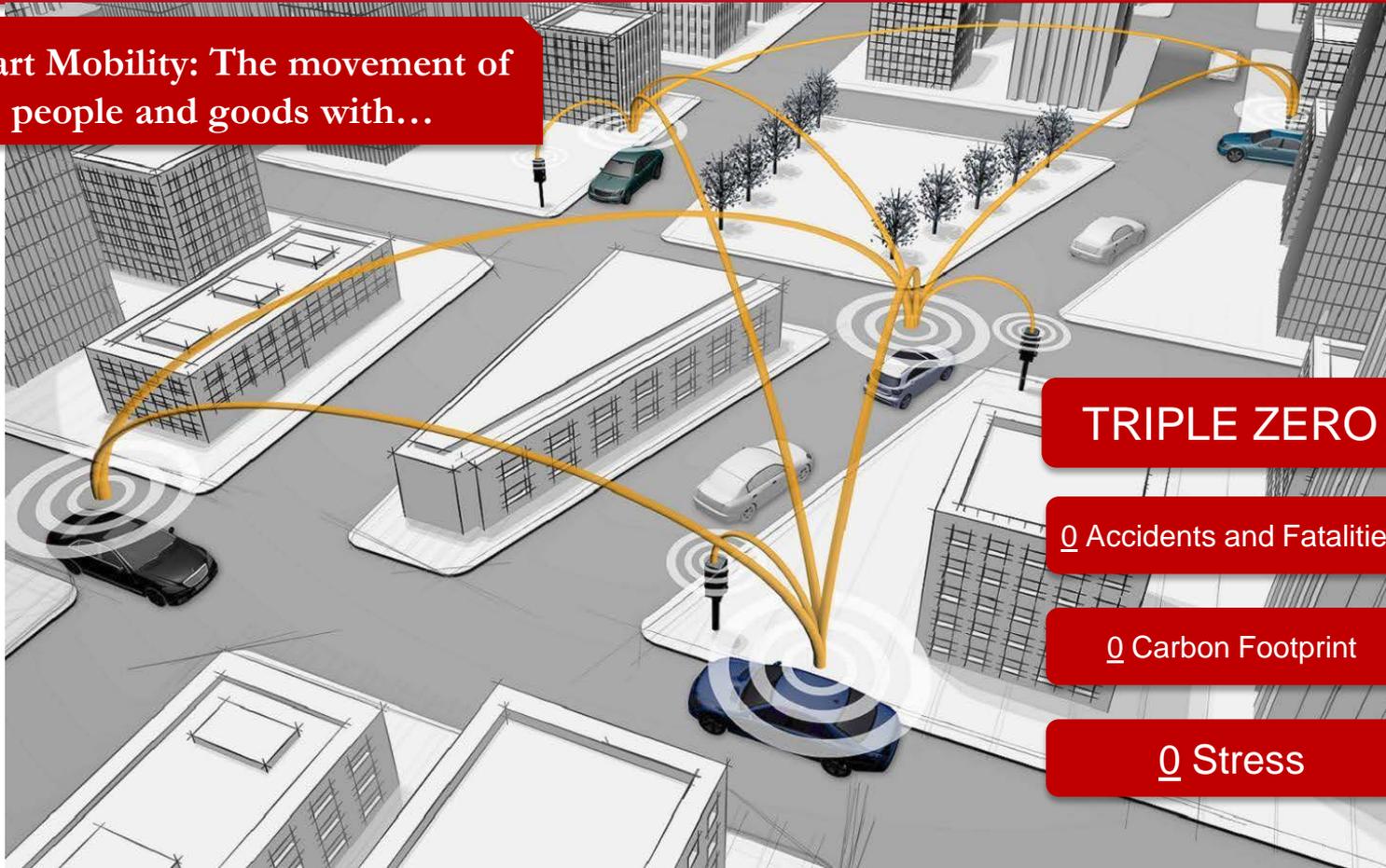


Mobility: The movement of people and goods from place to place, job to job, or one social level to another (across bridges – physical or assumed).





Smart Mobility: The movement of people and goods with...



TRIPLE ZERO

0 Accidents and Fatalities

0 Carbon Footprint

0 Stress



COLUMBUS SMART MOBILITY

Vision: Ohio leads the nation and world in the development of smart mobility and smart city technologies that have major impact on Ohio transportation industry and drives significant job growth





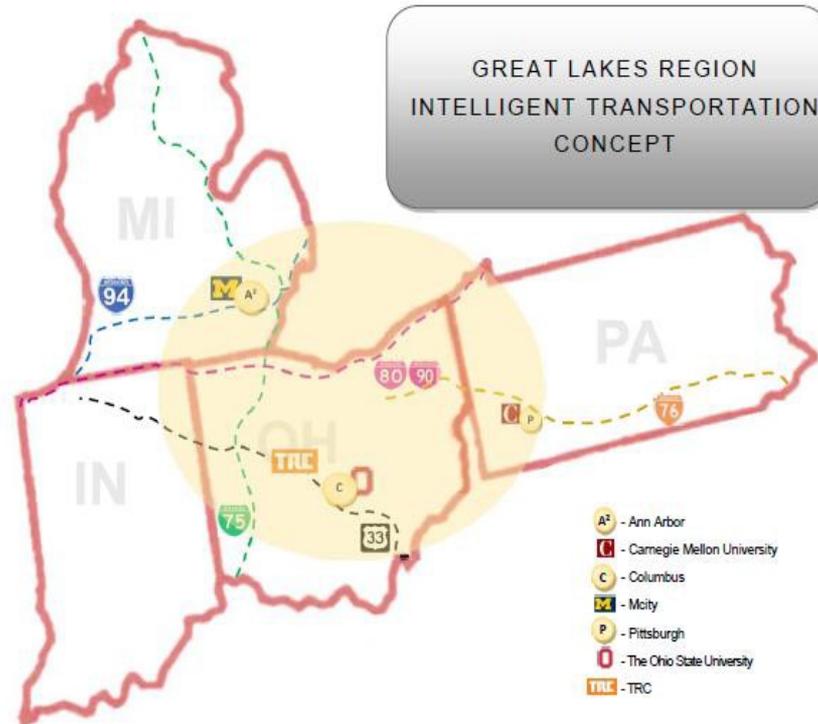
SMART MOBILITY COLLABORATION

Facilities:

- I-76
- City of Ann Arbor
- City of Columbus
- Mcity
- TRC

Smart Roads:

- I-75 Corridor
- I-80/I-90 Turnpike
- I-94 Corridor
- US-33 Corridor
- I-76 Corridor



Stakeholders:

- Columbus 2020
- Carnegie Mellon University
- JobsOhio
- Michigan Dept of Transportation
- Ohio Dept of Transportation
- The Ohio State University
- Ohio Turnpike
- Rev1 Ventures (TechColumbus)
- TRC
- University of Michigan



WHY?

Provide the three zeroes:

Zero Accidents & Fatalities

Zero Carbon Footprint

Zero Stress



- Save Lives
- Improve Lives of Older Adults and People with Disabilities
- Transportation in Era of Urbanization
- Environmental Sustainability
- Economic Sustainability





Smart Cities:

The
deployment of
technology
and data...



...to improve
people's
lives.



\$40 Million Funding from US DOT
\$10 Million Funding from Vulcan Inc.
\$90 Million Matched by Columbus

TO DEMONSTRATE CV/AV TECHNOLOGY TO
REDUCE CONGESTION, GIVE ACCESS TO ALL,
AND IMPROVE THE ENVIRONMENT



#SMARTCOLUMBUS Project Guideposts

VISION

**ACCESS
TO JOBS**

**SMART
LOGISTICS**

**CONNECTED
RESIDENTS**

**CONNECTED
VISITORS**

**SUSTAINABLE
TRANSPORTATION**

VISION **ACCESS TO JOBS** **SMART LOGISTICS** **CONNECTED RESIDENTS** **CONNECTED VISITORS** **SUSTAINABLE TRANSPORTATION**

ENABLING TECHNOLOGIES



Columbus Connected Transportation Network (CCTN)



Integrated Data Exchange



Enhanced Human Services



Electric Vehicle Infrastructure

OUTCOMES DEPLOYMENT



RESIDENTIAL DISTRICT



COMMERCIAL DISTRICT



DOWNTOWN DISTRICT



LOGISTICS DISTRICT



SAFETY



MOBILITY



LADDERS OF OPPORTUNITY



CLIMATE CHANGE

Enabling Technologies



Columbus Connected Transportation Network (CCTN)

Integrated Data Exchange

Enhanced Human Services

Electric Vehicle Infrastructure

Columbus Traffic Signal System

Central Ohio Transit Authority

Mid-Ohio Regional Planning Commission

Columbus Connected Transportation Network (CCTN)

Quantity	Component
200	DSRC Roadside Unit (RSU)
3,000	DSRC Connected Vehicles (OBU)
200	Smart Street Lights with WiFi
350	Mobileye Shield + and Enhanced Transit Safety Retrofit
12	Transit Bus Stop Pedestrian Warning System
100	Traffic Signal Controller Upgrades
175	DSRC Enabled Signalized Intersections
10	Multi-Media Kiosks
10	Video-Based Parking Detection System
50,000	RFID Customized Windshield Stickers
10	Point of Service RFID Readers
10	Mobile RFID Readers

Integrated Data Exchange (IDE)

Non-Transportation Data Sources

Data from Smart COLUMBUS Program

Transportation Data Sources

Integrated Data Exchange (IDE)

Private App Developers

Public Sector

Private Sector

Independent Evaluators

Enhanced Human Services (EHS)



**Multi-Modal
Trip Planning
Application**



**Integrated
Common
Payment System**



**Inclusive
Mobility**

Electric Vehicle Infrastructure

Electricity Supply
Decarbonization

Outcomes

- 915 MW Solar/Wind Statewide
- 3.4 MW Installed



Electric Vehicle Infrastructure

Fleet Electrification

Outcomes

- Fleet Electrification
- 300 Public Fleet EVs
- 30 Car Share/Ride Share EVs
- 448 Private Fleet EVs



Electric Vehicle Infrastructure

Transit, Autonomous, &
Multi-Modal Systems

Outcomes

- 6 EAVs
- 50 EV Pedal Assist Bicycles



Electric Vehicle Infrastructure

Driving Consumer Adoption

Outcomes

- 3,200 Registered EVs by 2018



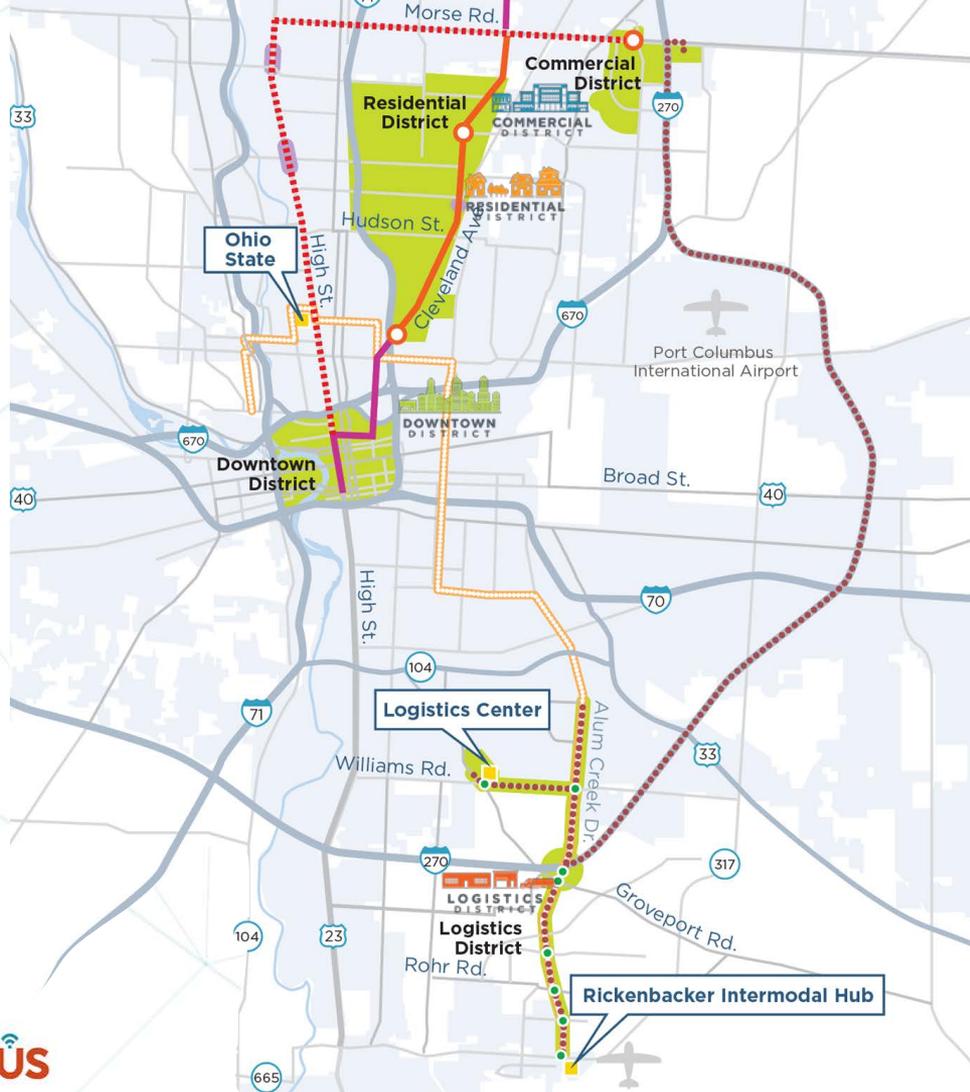
Electric Vehicle Infrastructure

Charging Infrastructure

Outcomes

- 1,600 New Level 1 Chargers
- 300 New Level 2 Chargers







RESIDENTIAL DISTRICT



DOWNTOWN DISTRICT



COMMERCIAL DISTRICT



LOGISTICS DISTRICT





Greater Columbus
Arts Council



Mid-Ohio Regional Planning Commission



HONDA



Battelle



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Local
Partners

DELIVERING SUCCESS



COLLIMBERS

#SMARTCOLUMBUS

Engaging with USDOT Partners



U.S. DEPARTMENT OF
ENERGY



AUTODESK

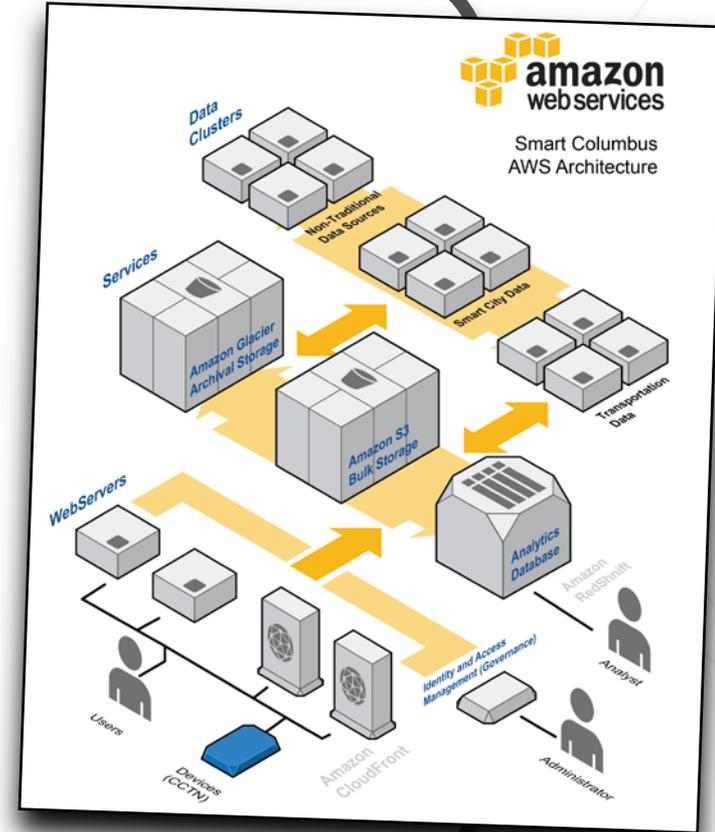


MOBILEYE



amazon
web services™

sidewalk
LABS



Engaging with Partners

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HONDA



Battelle



Roles



Tasks



Deliverables



*Monthly
Progress
Meetings*

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Performance Measures and Outcomes

Safety

Reduction in truck
incidents

Freight throughput in
Logistics District



SAFETY



Performance Measures and Outcomes

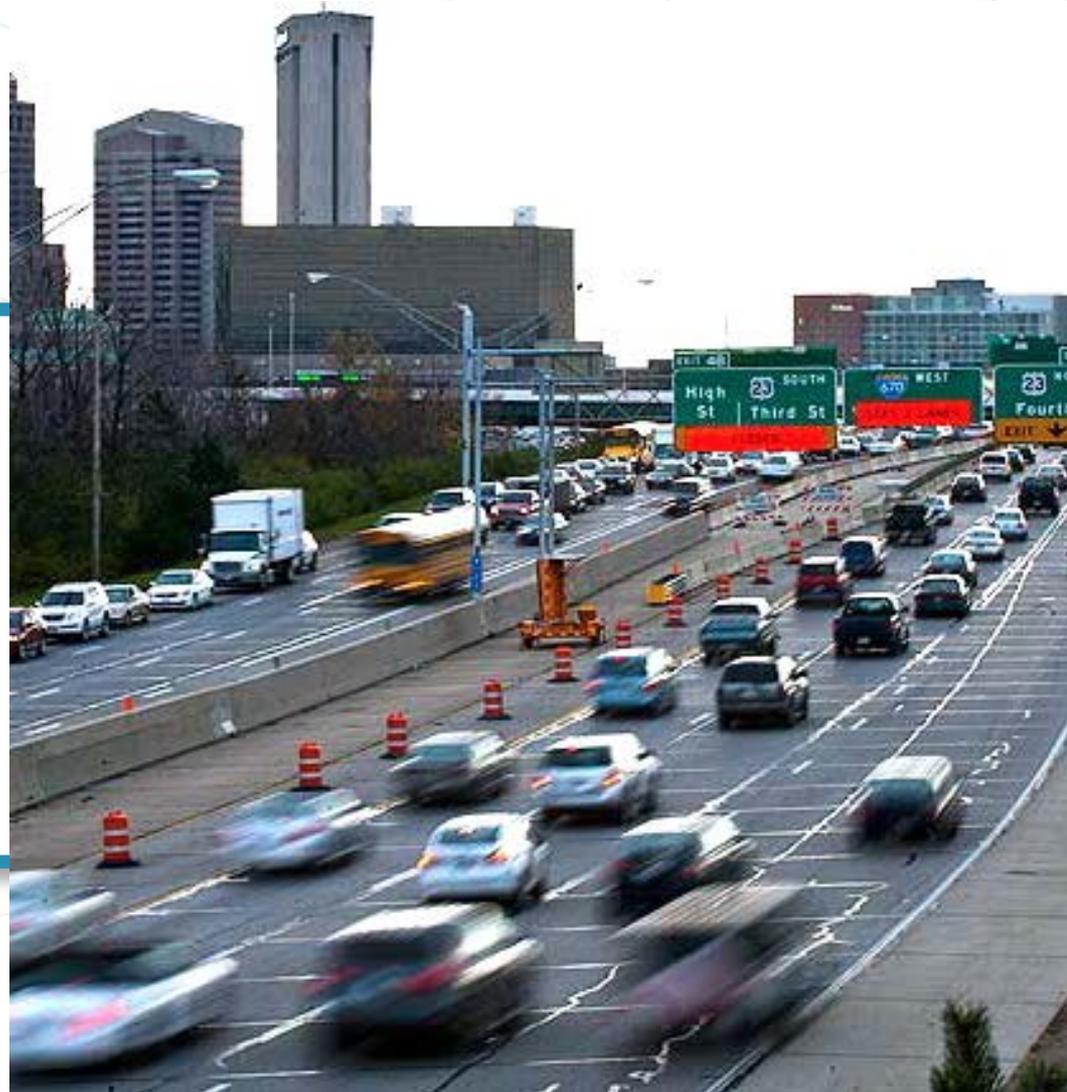
Enhanced Mobility

Commuters using EAV

Parking Satisfaction

Travel Time Reliability

Reduction in Congestion Index



Performance Measures and Outcomes

Ladder of Opportunity

Missed prenatal /
pediatric visits

Job turnover rate

Residential complaints
through 311



LADDERS OF
OPPORTUNITY

#SMARTCOLUMBUS



Performance Measures and Outcomes

Address Climate Change

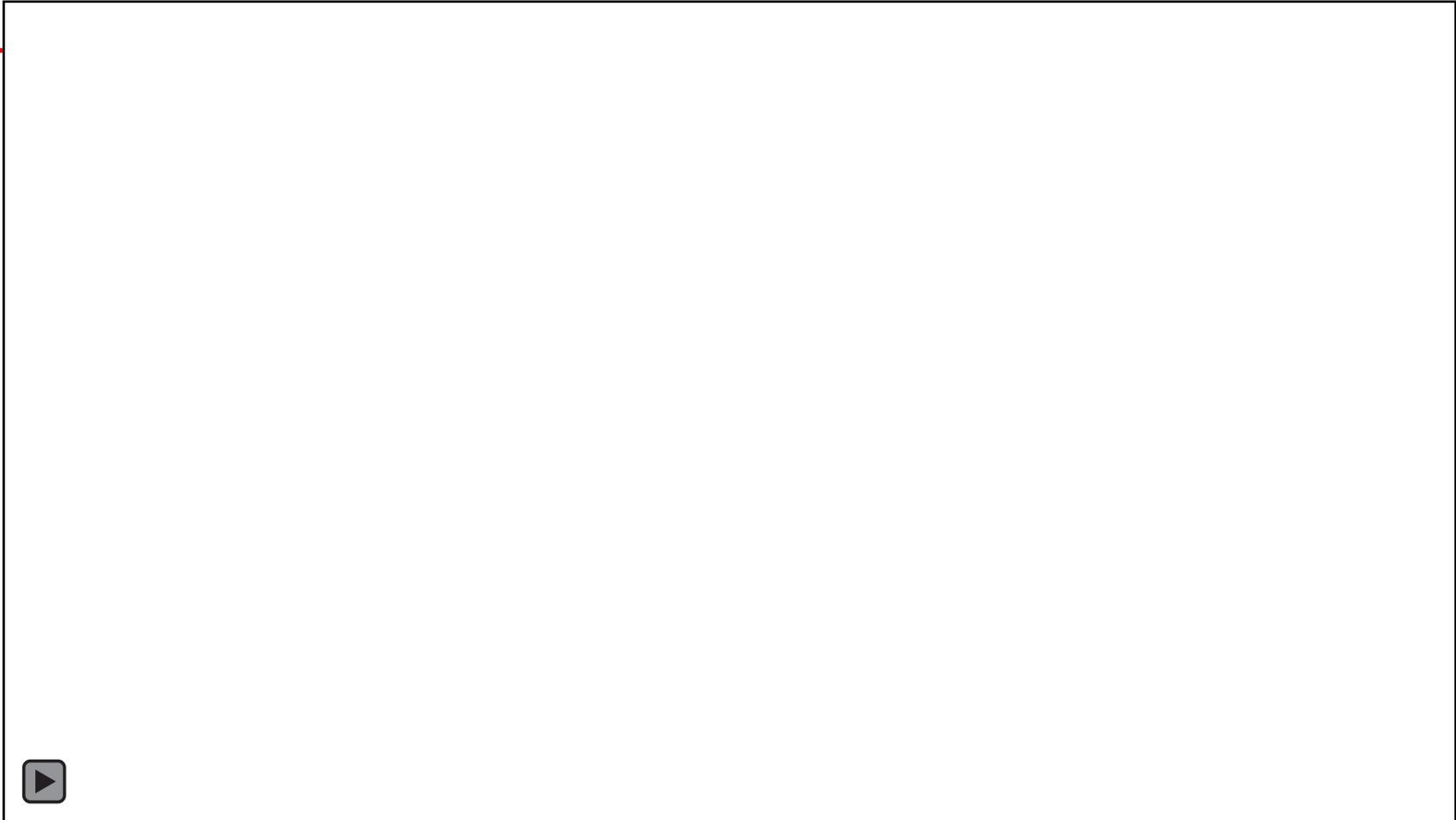
Travel time to
Loading Zone within
Downtown District

Adoption rate of EVs
and charging stations



CLIMATE
CHANGE







Q&A