



The Road to Automated Vehicles
Audi of America Government Affairs | 10.2017



Caltrans is doing away with its signature raised white discs on freeways

They're called Botts' Dots



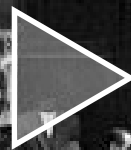
A new future?

100 years of vertical autonomy...





It took 40 years to change...





"Let me give you a lift"
OTIS ELEVATOR COMPANY





FATALITIES

Elevator: 31 per year
Vehicles: 100 per day

We cannot afford to waste 40 years of benefits horizontal automation can provide...

Percentage Change in Total Traffic Fatalities, 1960 - 2016



37,461 lives
were lost on U.S. roads in
2016, an **increase of**
5.6% from 2015.

Sources: 1960-1974: National Center for Health Statistics, HEW, and State Accident Summaries (Adjusted to 30-Day Traffic Deaths by NHTSA); FARS 1975-2015 Final File 2016 Annual Report File (ARF).

AV Benefits

**Elderly &
Disabled**

**Accessible
Mobility**

Safety

Blind

**Reduced
Congestion &
Emissions**

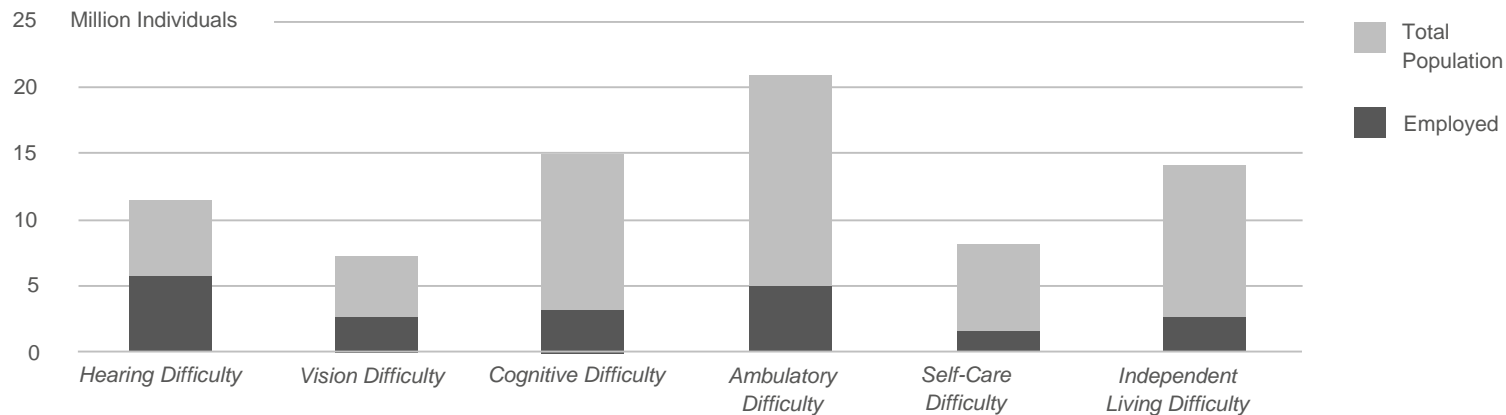


57m

People in the U.S. have a disability



Estimated Population with a Disability by Type & Employment Status, 2015



Source: Census Bureau, 2015 ACS



Mitigating transportation obstacles...

6m

with a disability have difficulty accessing transportation.

+2m

Employment opportunities for individuals with disabilities

-\$19b

Healthcare expenditures for missed appointments

1/3

Of people over 65 have a disability that limits mobility.



43.1m

Population over 65 - 2012



83.7m

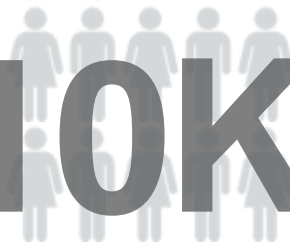
Population over 65 - 2050



21% of 65 & up do not drive.

10K

Baby Boomers retire per day, many will lose their driver's license in 10 years.



States are requiring more frequent driver's license renewals, vision and road tests for 65 or older.

Level 4-5 AVs will offer increased access to mobility

Level 4 – High Automation



Level 5 – Full Automation





4.6%

Of 57 million in the U.S. have a vision disability with blindness or serious difficulty seeing



37%

Individuals who are legally blind or visually impaired are employed.



45%

Of Americans with vision loss live alone & often do not leave their homes

2x

By 2030, rates of vision loss will double with the U.S. aging population.



45%

Of Americans lack access to transit.



Inaccessibility of transportation may be associated with **less health care utilization, lack of regular medical care and missed medical appointments**, particularly for those with lower income.



Population Moving into Urban Areas

30%

1950 Worldwide

54%

2014 Worldwide

66%

2050 Worldwide

\$3.50

Taxi Cost Per Mile Today



\$0.35

Taxi Cost Per Mile with AV

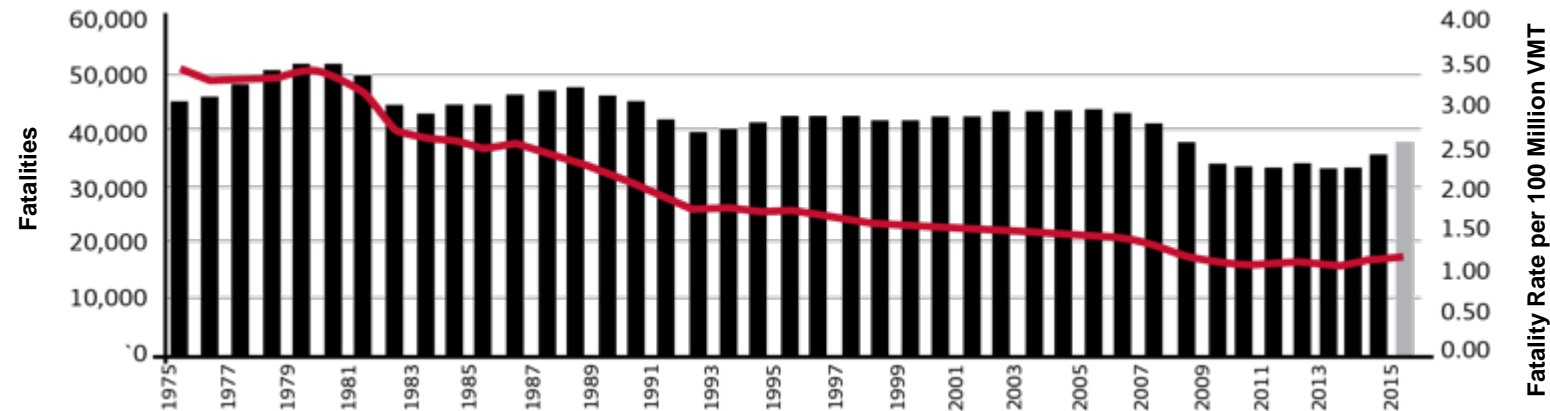


5.6%

Increase in fatalities from 2015 to 2016 despite safety advancements.



Fatalities and Fatality Rate per 100 Million VMT, by year, 1975-2016



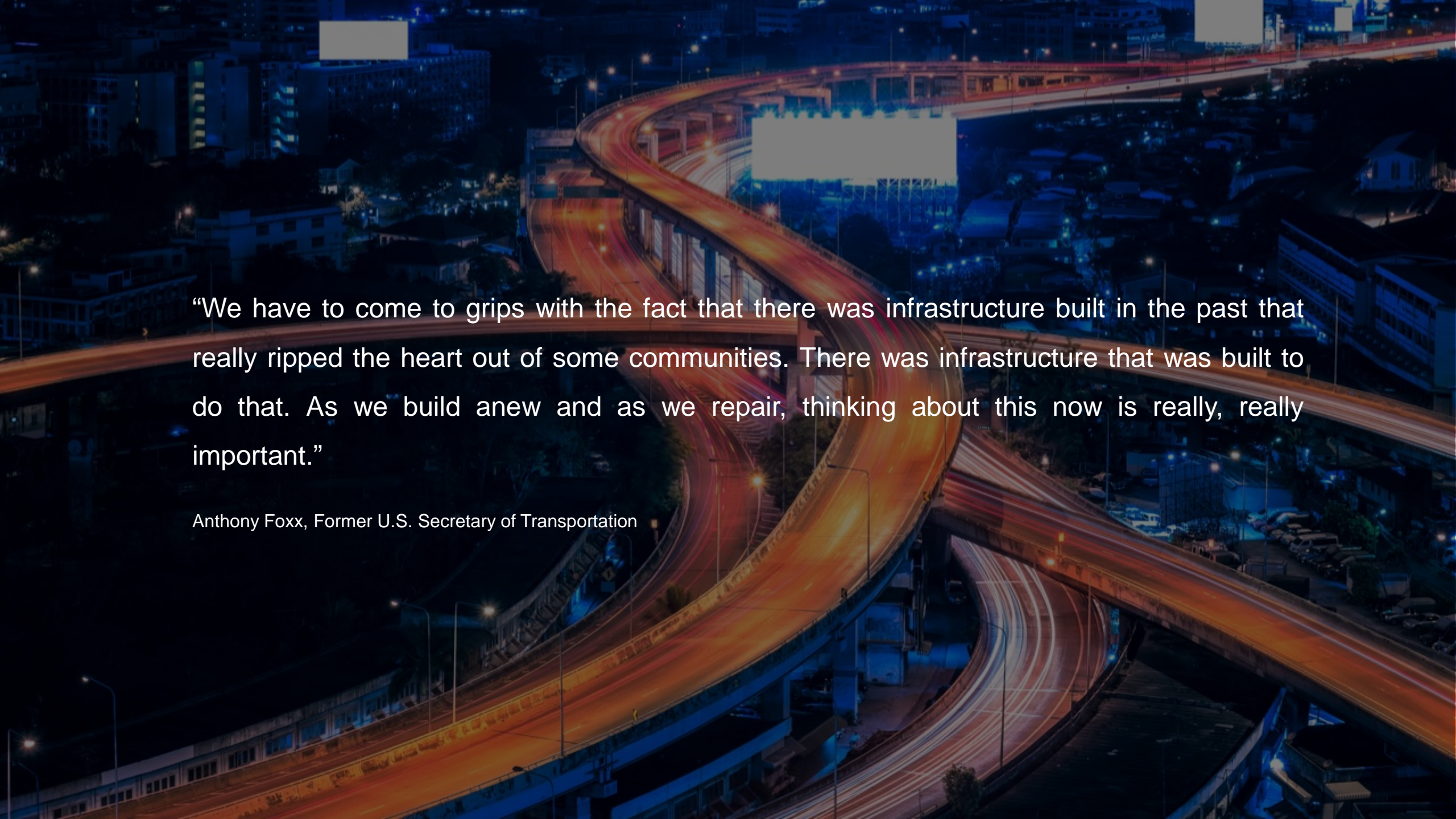
FMVSS No. and Topic	Lives Saved	FMVSS No. and Topic	Lives Saved
208/209/2010 Seat belts	329,715	213 Child safety seats	9,891
203/204 Energy-absorbing steering assemblies	79,989	212 Adhesive windshield bonding	9,853
308 Frontal air bags	42,856	126 Electronic Stability Control	6,169
206 Door locks, latches and hinges	42,135	216 Roof crush resistance	4,913
201 Occupant protection in interior impact	34,477	108 Trailer conspicuity tape	2,660
214 Side impact protection (incl. side air bags)	32,288	225 Rollover curtains	178
105/135 Dual master cylinders/front disc brakes	18,350	301 Fuel system integrity	26
		TOTAL	613,501



-80%

Accident frequency reduction by 2040 due to autonomous vehicle technology.

Sources: NHTSA, 2016 Fatal Motor Vehicle Crashes: Overview; KPMG, Marketplace of change: Automobile insurance in the era of autonomous vehicles White Paper; Lives saved 1960-2012, NHTSA

An aerial, long-exposure photograph of a complex highway interchange at night. The image shows multiple levels of elevated roads curving and crossing each other. The lights from the vehicles create vibrant, blurred streaks of orange, red, and white, contrasting with the dark blue and black tones of the night sky and surrounding city buildings. The overall scene conveys a sense of constant motion and modern infrastructure.

“We have to come to grips with the fact that there was infrastructure built in the past that really ripped the heart out of some communities. There was infrastructure that was built to do that. As we build anew and as we repair, thinking about this now is really, really important.”

Anthony Foxx, Former U.S. Secretary of Transportation



One automated vehicle must access many international markets. The need for **one** U.S. framework is imperative.

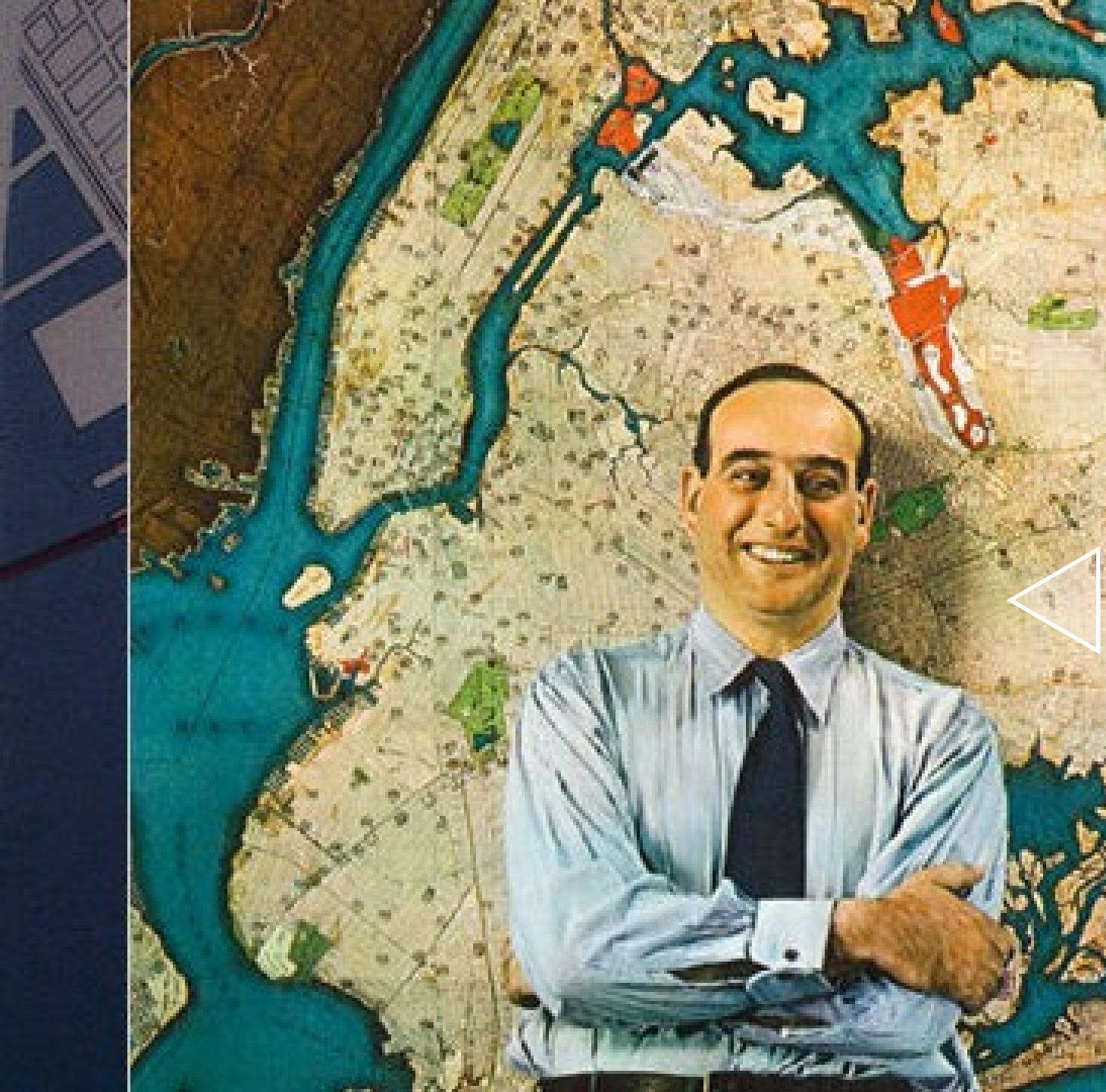
Challenges

Auto Development
Cycle every
6-7 years

City Infrastructure
Change every
20-30 years

AV Advances
Change every
6- 12 months

NHTSA Rulemaking
10 years



We must learn from past mistakes...





I-110 & I-450 Mixing Bowl



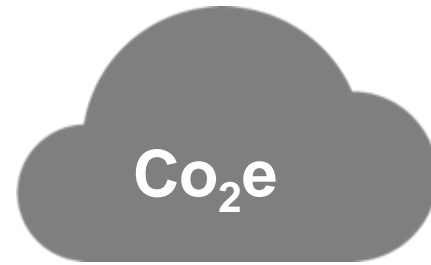
City + State Benefits



C O N G E S T I O N

-20%

Commuter time



E M I S S I O N S

-80%

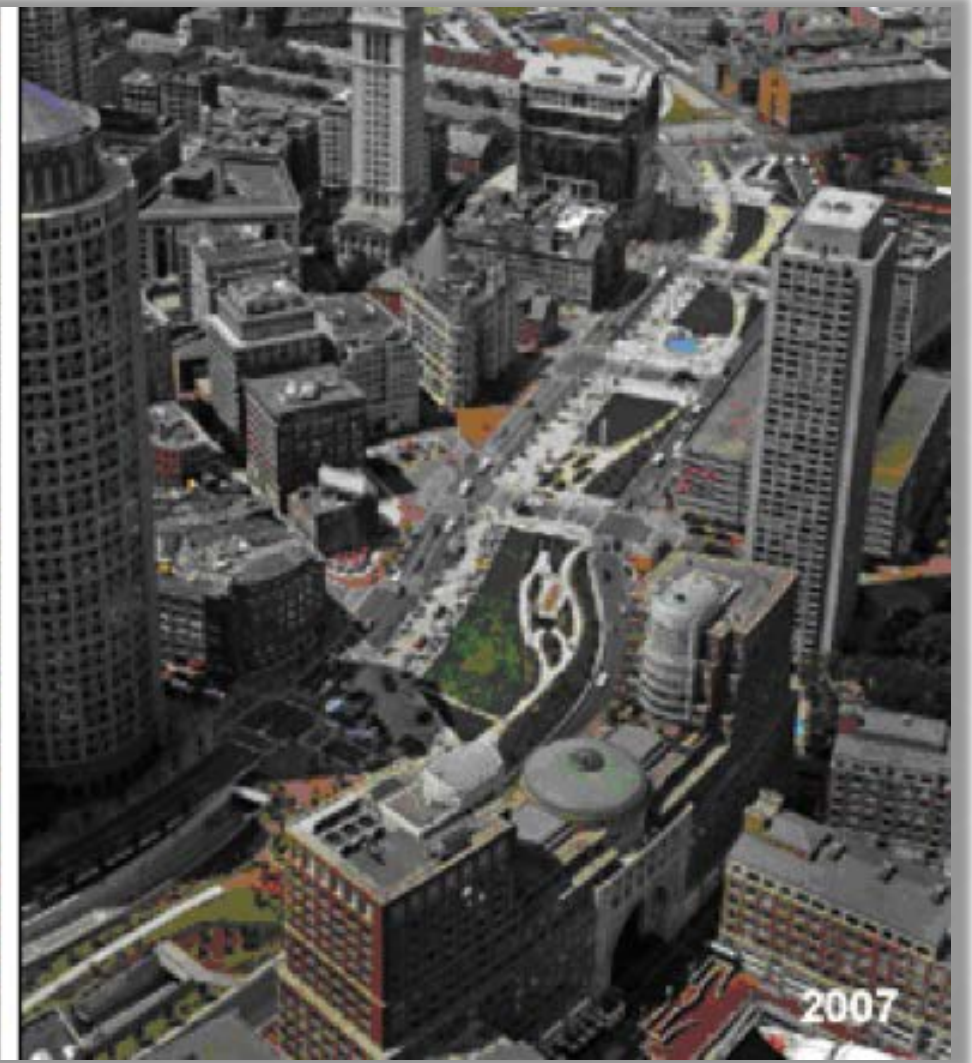
Reduction by
2050



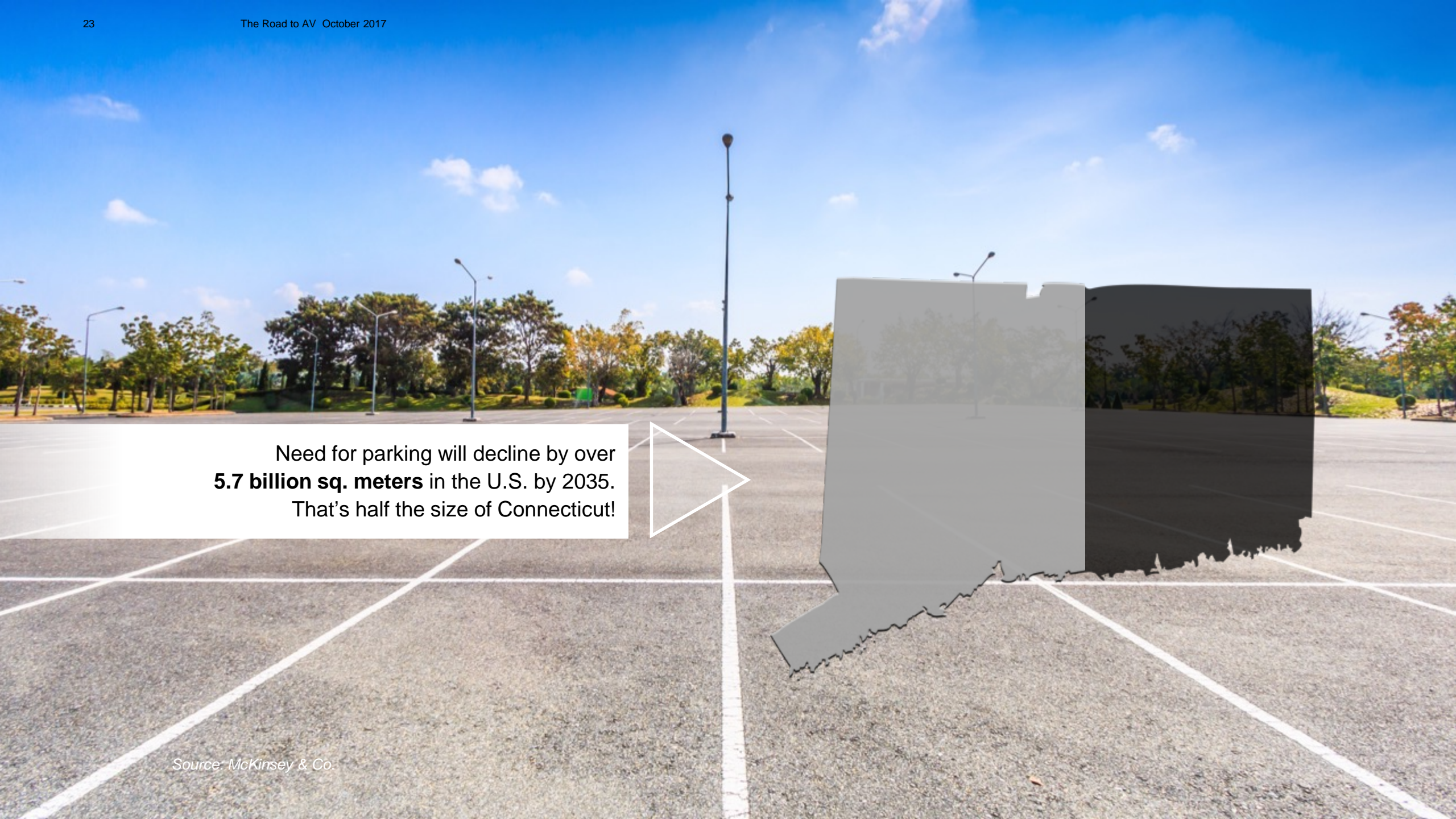
L A N D U S E

-60%

Less parking
space



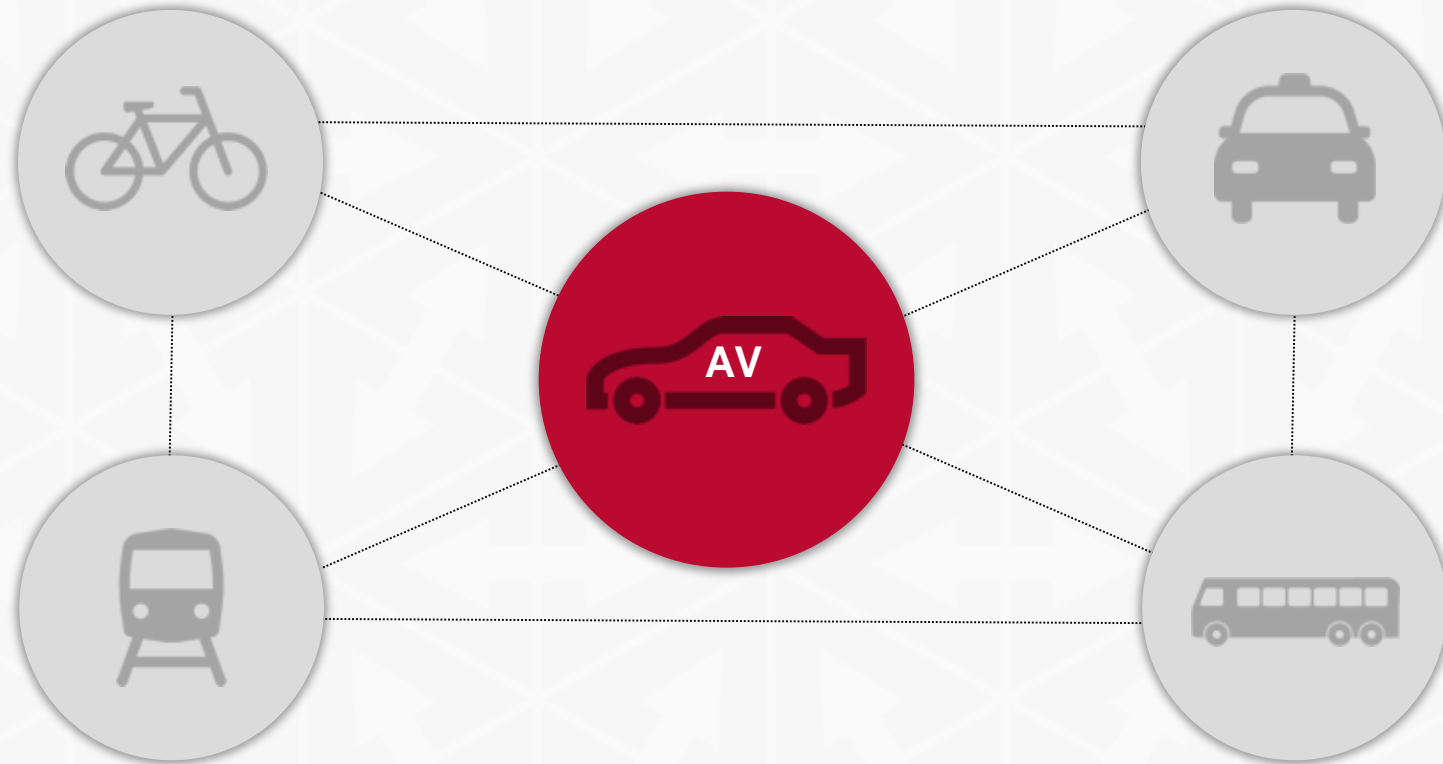




Need for parking will decline by over
5.7 billion sq. meters in the U.S. by 2035.
That's half the size of Connecticut!

Source: McKinsey & Co.

**Automated vehicles will not replace mass transit,
they will be part of a connected multi-modal approach.**



Cities spend...

\$65b

Mass Transit

\$41b

Operations & Repairs

**New forms of mobility can
reduce costs**

Source: Morgan Stanley

City/state areas of focus



Synchronized Street Lights + Traffic Light Grids

Utilizing Existing Mass Transit Systems

Pick-up and Drop-off Zones

AV | EV | Shared Mobility

- Synchronized signal system to reduce intersection crashes, reduce costs and travel time.

- Enhance existing mass transit by enabling first and last-mile transportation to destinations that may not be next to the metro or bus stops.

- Repurpose existing urban parking spaces as shared transportation zones that do not disrupt traffic.

- Ensure sufficient charging hubs so cities can navigate charging stations as fleets of shared AVs and EVs are deployed.



EVERYTHING UNDER THE SUN
Bloomingdale's
DEPARTMENT STORE

ALL CARS
TO TRANSFER

H-O
THE ONLY STEAM COOKED
Oatmeal
Ready to Serve
in 20 Minutes

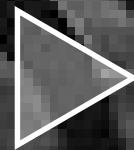
MICHAEL DI MARSICO
PHARMACEUTICAL
CHEMIST
SPECIALITA IPPODERMICHE
PER USO MEDICO

DR. CORELLI
DENTIST

SUBWAY CAFE



When did you last play stickball?





Thank you!