



# Impacts of Connectivity in Transportation

Alan Clelland  
Sr. Vice President, Iteris  
October 22, 2015

# Indicators of likely demands.....

Study of 14 to 29 year olds:

Question posed :“I cannot imagine a life without .....

..... my mobile phone: 97%

..... the internet: 84%

..... my car: 64%

..... my current partner: 43%



Source: BITKOM Study of Telecommunications and New Media

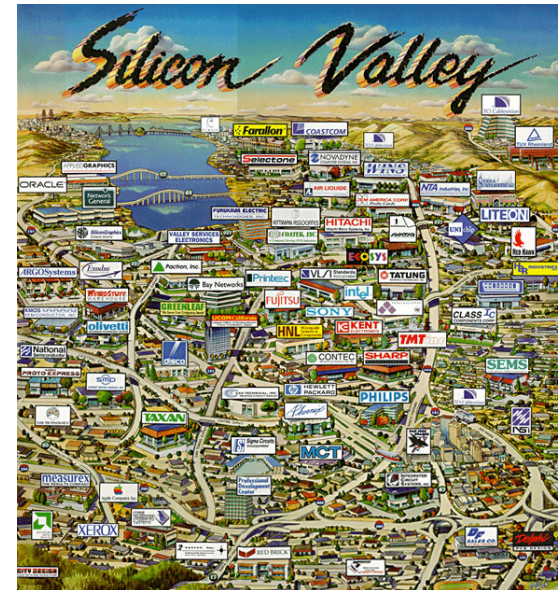
# Trend indicator....

- A move away from the auto-centric view of personal transportation
- Greater willingness to consider and use other modes
  - Transit
  - Bike



# Why should we be surprised?

- The success of **Transit Oriented Development** in changing land use and promoting transit use
  - In Long Beach.....decrease by almost a half in average number of parking spaces per living unit
- Regeneration of the **urban core**
  - Mixed use... live where I work
- **Business Clusters**
  - Silicon Valley..... Silicon Beach



4 **Results: Shorter trips ..... modal shift**

# Meeting the Demand by Ridesharing

- No secret: Transit is not ideal .....Taxis are expensive.....
- Now we're connected (and won't give it up)
- Enter the world of Technology Enabled Ridesharing
  - Uber
  - Lyft
  - SideCar

## Transportation Network Companies



# TNC Issues

- CA Public Utilities Commission ruled that carriers such as Lyft, SideCar, and Uber must obtain operating authority from the CUPC
  - Services continuing to evolve and grow.....but
  - Regulation is needed for health, safety and welfare reasons
- As transportation professionals:
  - How to ensure equity of served neighborhoods?
  - How to ensure equity across the population
    - Access-enabled for the aging population?

**Impact: The solution to  
first/last mile access to  
transit**

# ... and Car Sharing



**Enabled by mobile  
devices and  
connectivity**



# Personal Connectivity Impacts .....

## Zipcar & Other Car-Sharing Services Have Killed 200,000 Auto Sales

On average, 9 to 13 vehicle sales are lost for every vehicle added to a car-sharing fleet. VMT is reduced by 27% to 43%.

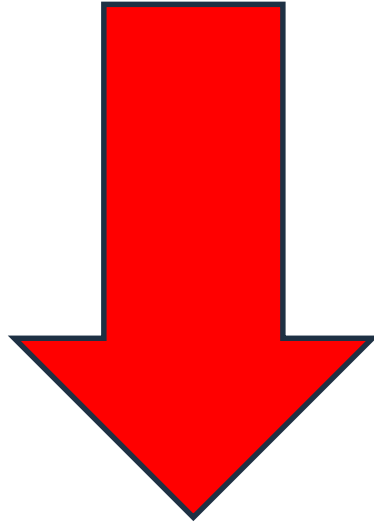


- Source: Shaheen and Cohen, 2014

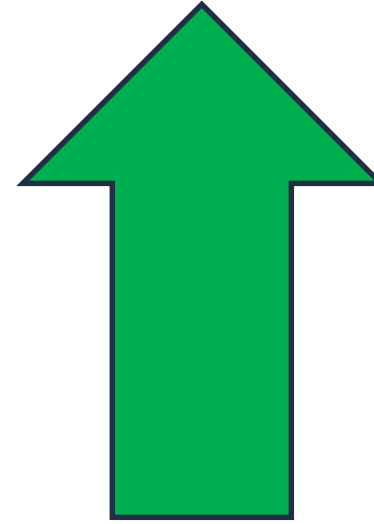


# Re-evaluation

---



- Car ownership
- Car sales



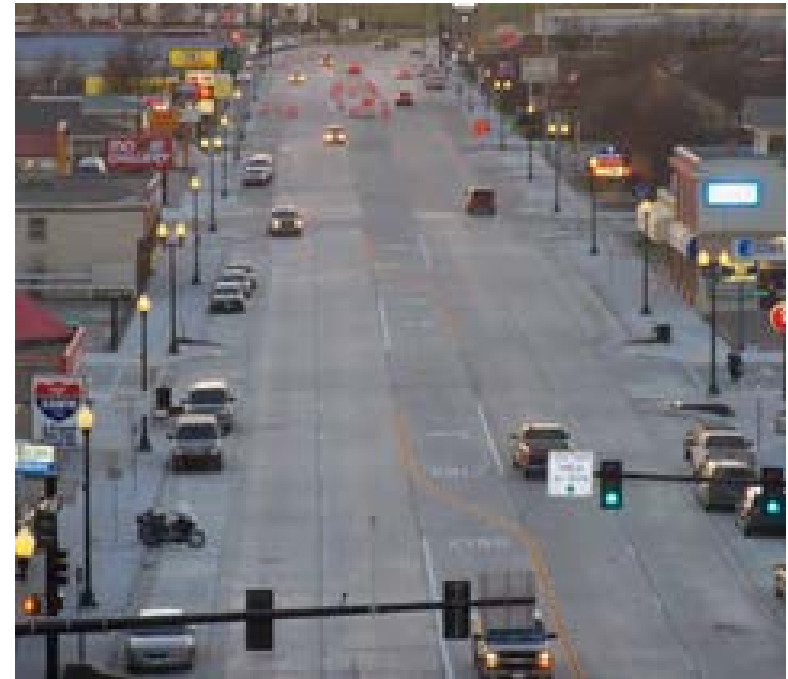
- Transit use
- Bike use
- Walking

**We need to get away from STROADS**

# STROADS

The STROAD design -- a street/road hybrid -- is the **futon of transportation alternatives**. Where a futon is a piece of furniture that serves both as an uncomfortable couch and an uncomfortable bed, a STROAD moves cars at speeds too slow to get around efficiently but too fast to support productive private sector investment. The result is an expensive highway and a declining tax base.

*Chuck Marohn, "recovering traffic engineer" and founder of the nonprofit Strong Towns*



# Complete Streets .....the anti-Stroad

---

Road systems that provide safe, convenient access for all users including motorists, bicyclists, transit operators and users, and pedestrians of all ages and abilities.

- **Help Keep Kids Safe**
- **Promote Good Health**
- **Make for a Good Ride**
- **Encourage Economic Revitalization**
- **Improve Safety for Everyone**
- **Create Livable Communities**



## **GREAT STREETS**

---

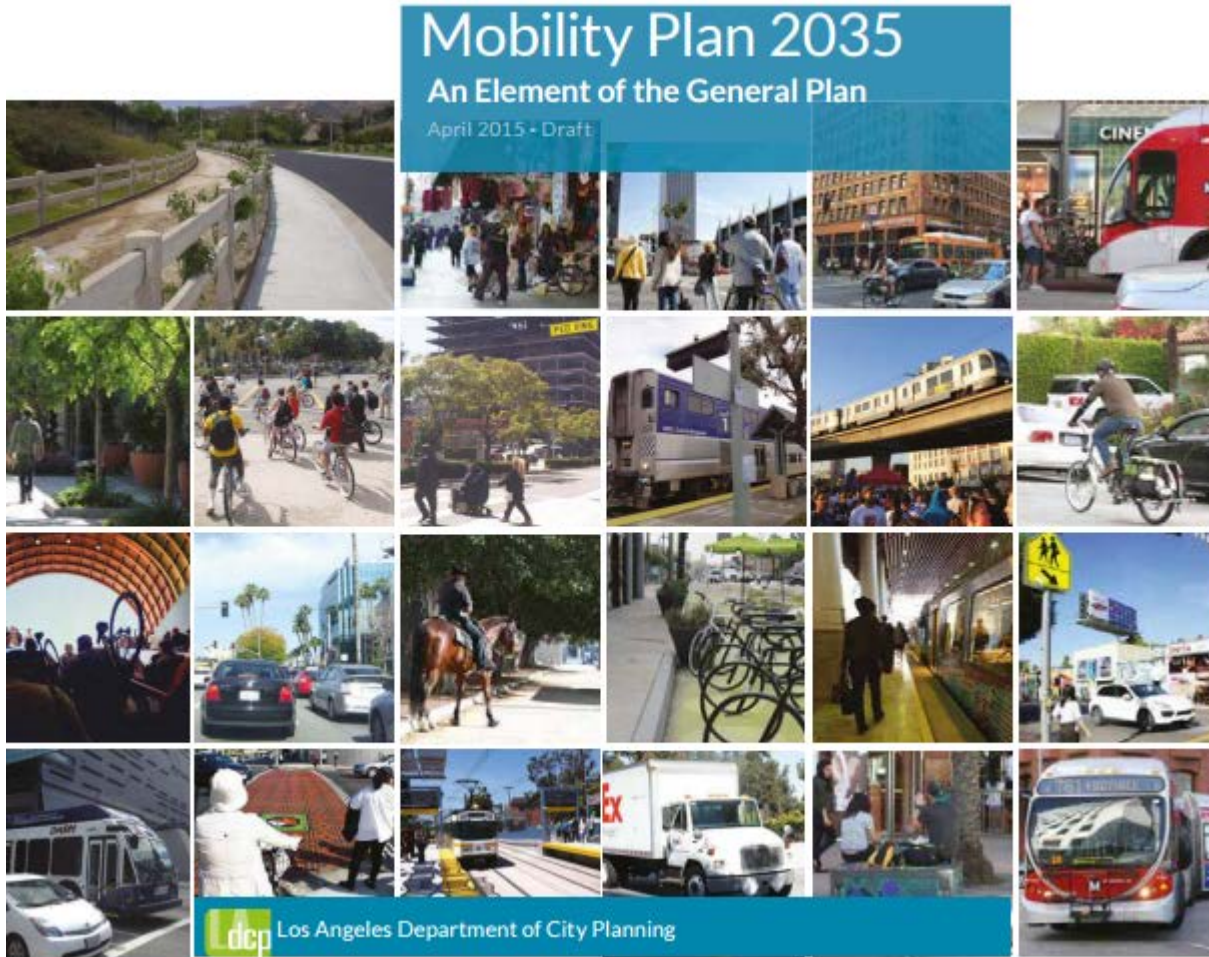
FOR LOS ANGELES

STRATEGIC PLAN

The logo for LADOT, with the letters "LADOT" in a bold, blue, sans-serif font. The "L" and "A" are connected, and the "D" and "O" are connected.

City of Los Angeles  
Department of Transportation

# ... and it is gaining momentum



Department of City Planning (DCP) staff emphasized that the city “cannot widen our way out of congestion” and that this multi-modal plan will provide choices, by making a “conscious shift toward complete streets.”

# But it is generating concern.....



“Why Fix The City Opposes MP2035 – The “ImMobility” Plan”

“Fix The City Files Suit Over #MP2035”

“@LATStevlopez Covers the Rowena Road Diet Saying It Leaves Some “Hungry For Workable Solutions”

..... as it seems to take road space away from vehicles and so increases congestion SOMEWHERE ELSE.....

But wait....there's more

---



# **The Car As You Know It Is Dead**

**GOODBYE, MOTORING.  
HELLO, MOBILITY.**

# First Step.... The Connected Vehicle



**V2I – Vehicle to Infrastructure**

**V2V – Vehicle to Vehicle**

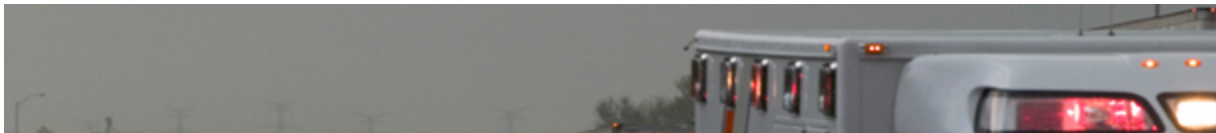


**New NHTSA Ruling : All light vehicles to have the Basic Safety Message**

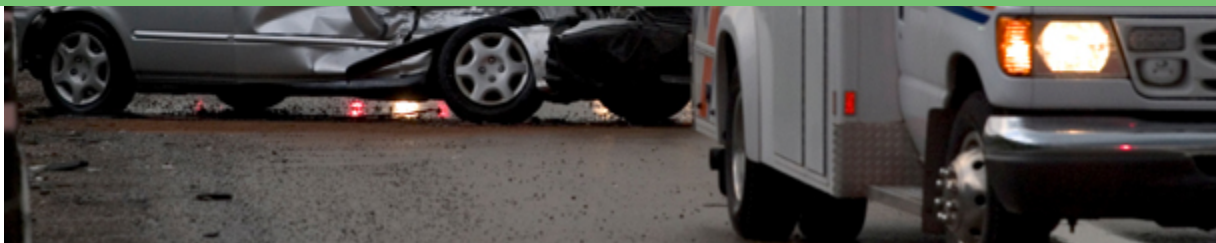
**NHTSA estimates that connected vehicle technology could potentially address 80 percent of all unimpaired crash scenarios**

# Impacts of V2I and V2V .....

**The annual societal cost of traffic crashes is \$299.5 billion, more than three times the \$97.7 billion cost of congestion.**



**By 2020, 75% of the 92million cars shipped globally will be built with the necessary hardware to connect to the internet.**



- Sources: AAA's "Crashes vs. Congestion – What's the Cost to Society?" and BI Intelligence



# Next Step: Vehicular ad hoc Networks

---

- Vehicle-to-Pedestrian (V2P):
  - Messages are transmitted between vehicles and pedestrians/bikes who send and receive messages via their phones or other wireless devices.
- As a transportation professional :
  - How do I take advantage of these capabilities?

**Check out the CVRIA:  
Connected Vehicle Reference  
Implementation Architecture**

**Defines over 90  
applications  
using CV  
technologies**

# CV Impacts: Re-thinking the urban landscape



- Short term - transition
  - Coping with the mixed vehicle fleet (CV/non-CV)
  - Infrastructure detection still needed, but for how long?
- Longer term, change in design standards:
  - As throughput increases and accidents/crashes//incidents decrease (disappear?)
  - Self parking vehicles – narrower parking spaces
  - V2V
    - Platooning of trucks
    - HOT lanes become CV lanes? – shorter headways, higher density
    - Why traffic signals? (because pedestrians still need to cross the road)

# Final Step: Autonomous Vehicles



Not only will they happen....



**They are here now!**

A **car** that can drive itself

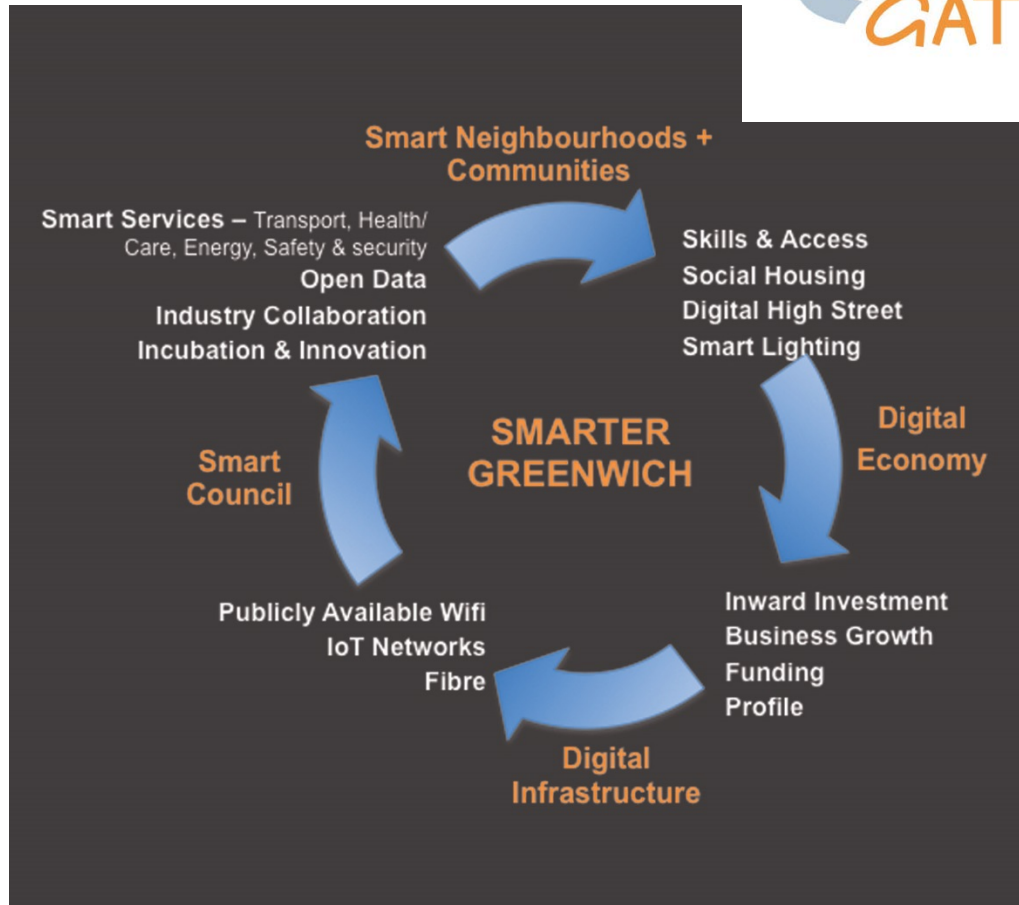


.... and in some new shapes!



A **vehicle** that can drive itself

# Connectivity Impacts: Smart Cities

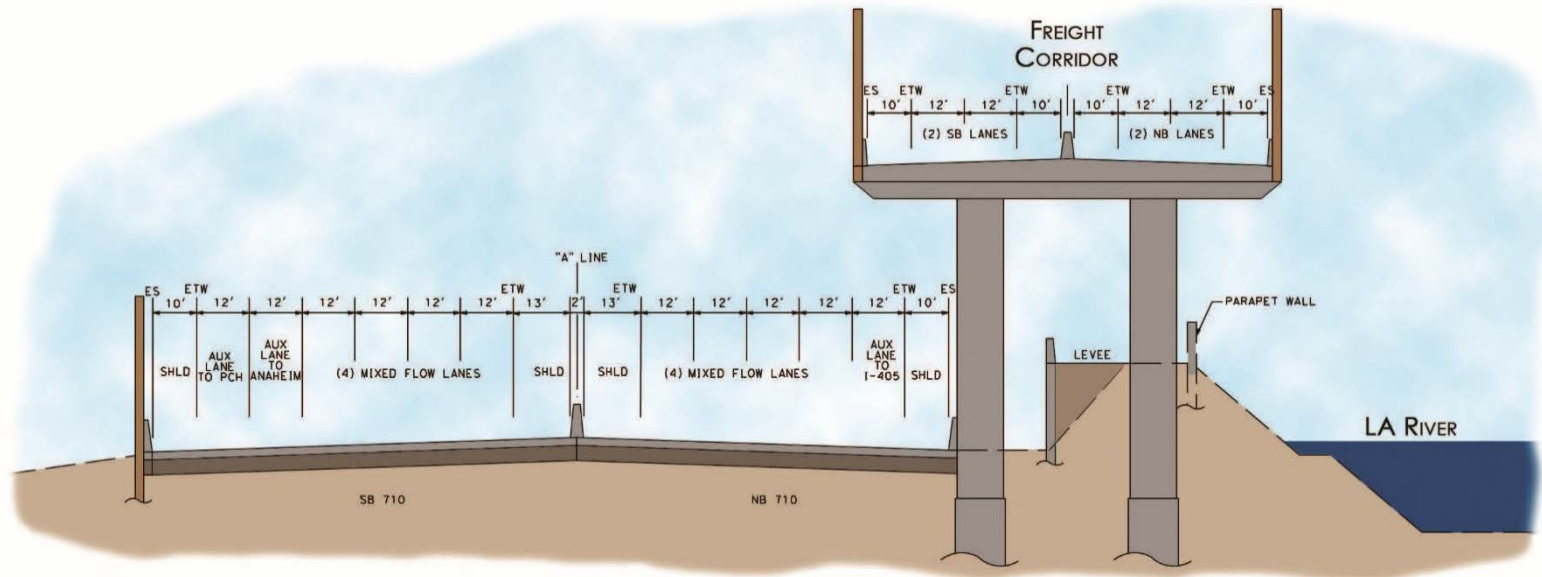


- Greenwich Automated Transport Environment
- \$13m funding:
  - Funding is a mix of government (business department) and industry
- One element of the Smarter Greenwich Concept

# CV Impacts: Re-thinking the urban landscape



- Short term: Separated facilities to maximize the benefit.



**ROUTE 710 (BETWEEN PACIFIC COAST HWY AND WILLOW ST)**

- Source: Courtesy of the Gateway Cities Council of Governments

# Connectivity and AV....

Connectivity is enabling Autonomous Vehicles by addressing their weak spot: the need for the latest information on changing roadway and traffic conditions



Cars won't sit idle in the office parking lot all day – they'll be more in use, for longer periods of the day, for multiple members of the family ..... What about VMT?

# AV Impacts ..... are we ready for this?

## Decreasing miles traveled



Is this going to provide the opportunity for Complete Streets to flourish?

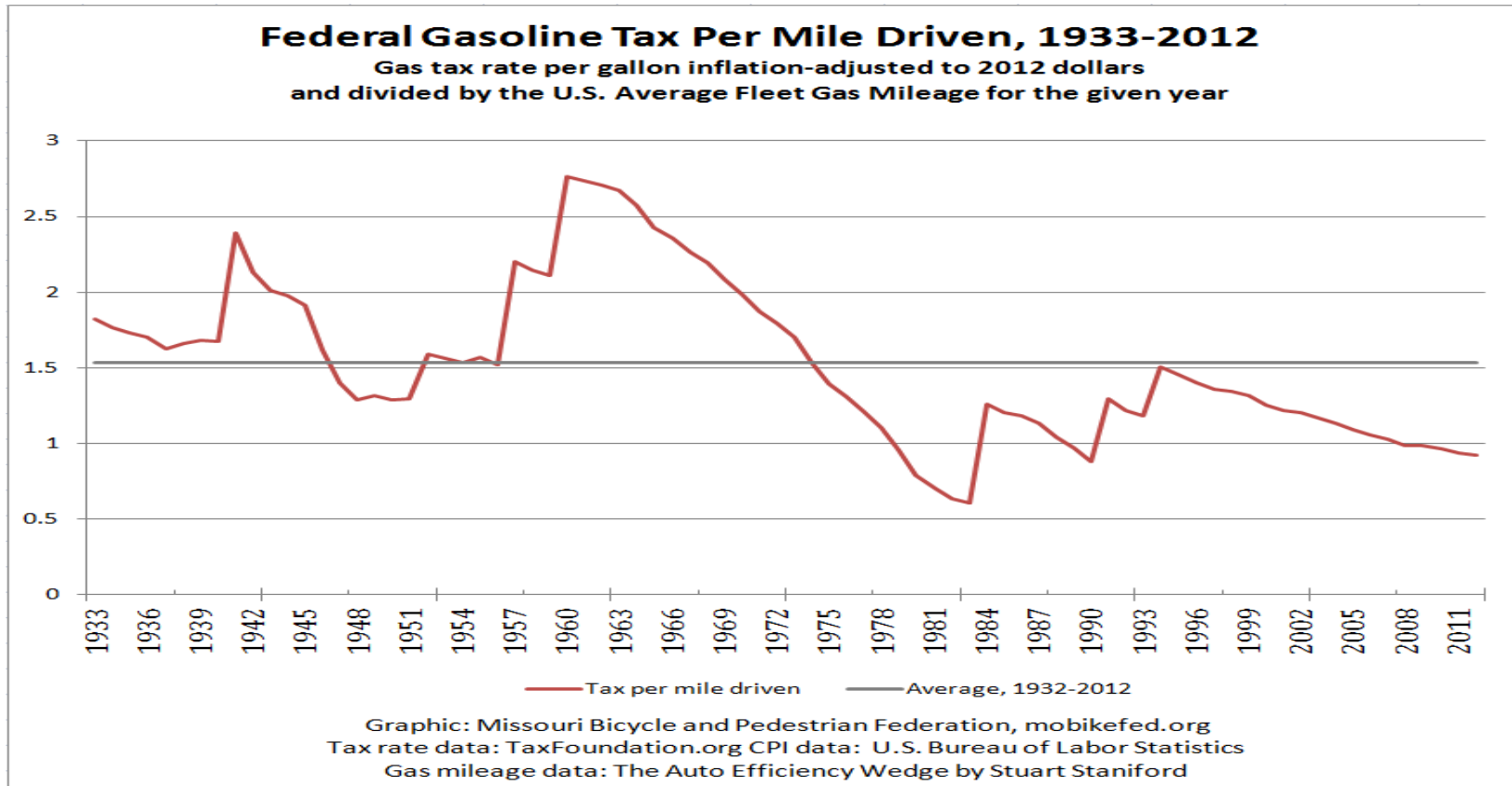
NCHRP Report: Future VMT estimates range from increasing at 6% per year to dropping by 50% by 2055



Source: The State Smart Transportation Initiative, University of Wisconsin



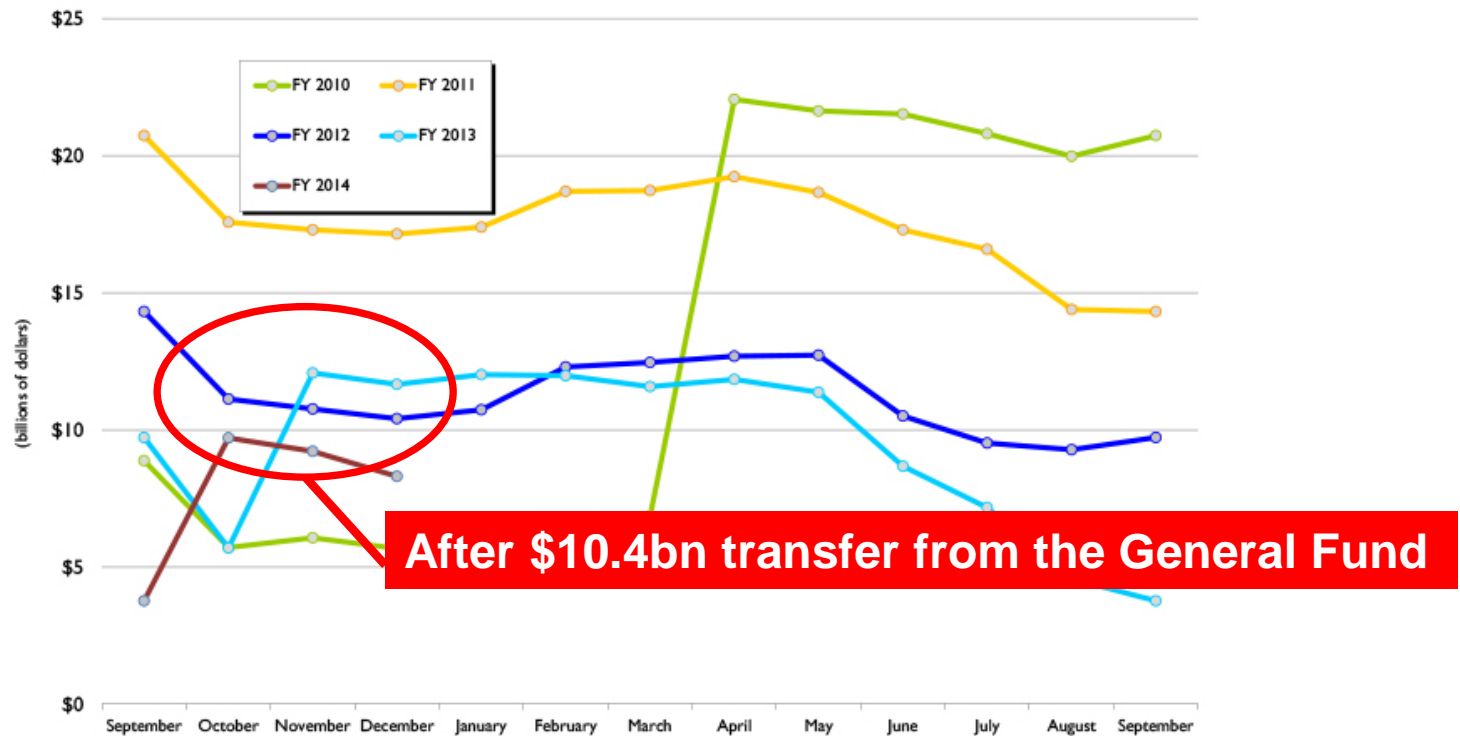
# Decreasing VMT Means less gas tax revenues.....



# Means less federal dollars .....

## The Highway Trust Fund

Highway Account Balance



Ending balance for FY 2010 includes \$14.7 billion transferred from the General Fund in April pursuant to Public Law 111-147.  
 Ending balance for FY 2012 includes \$2.4 billion transferred from the Leaking Underground Storage Tank Trust Fund in August pursuant to Public Law 112-141  
 Ending balance for FY 2013 includes \$6.2 billion transferred from the General Fund in November pursuant to Public Law 112-141, of which \$316.2 million was sequestered in August.  
 Ending balance for FY 2014 includes \$10.4 billion transferred from the GF in October pursuant to Public Law 112-121 less sequester of \$748.8 million

# The Private Sector as A Solution

---

- Public Private Partnerships (P3)
  - Design, Build and Operate (Tolls)
  - Risk and Revenue Sharing (511 Systems)



# The Next Big Thing is here.....

---

- There's a lot of data out there
  - Data collected from mobile sources (GPS, smartphones, cellular phones)
  - Vehicle fleets
- Already provides speed, location and direction, travel times  
..... for a fraction of the cost of infrastructure based detection

# Think different .....

---

- Infrastructure-based detection is expensive, time consuming to install, operate and maintain.
- I can get 15 minute data for the whole of LA County for last year for \$10K..... tomorrow
- I can get real time data for \$12K
- I can identify hot spots for further analysis and future project definition
- I can see what impact a project/development had (even if I did not collect before data)
- I can create OD matrices

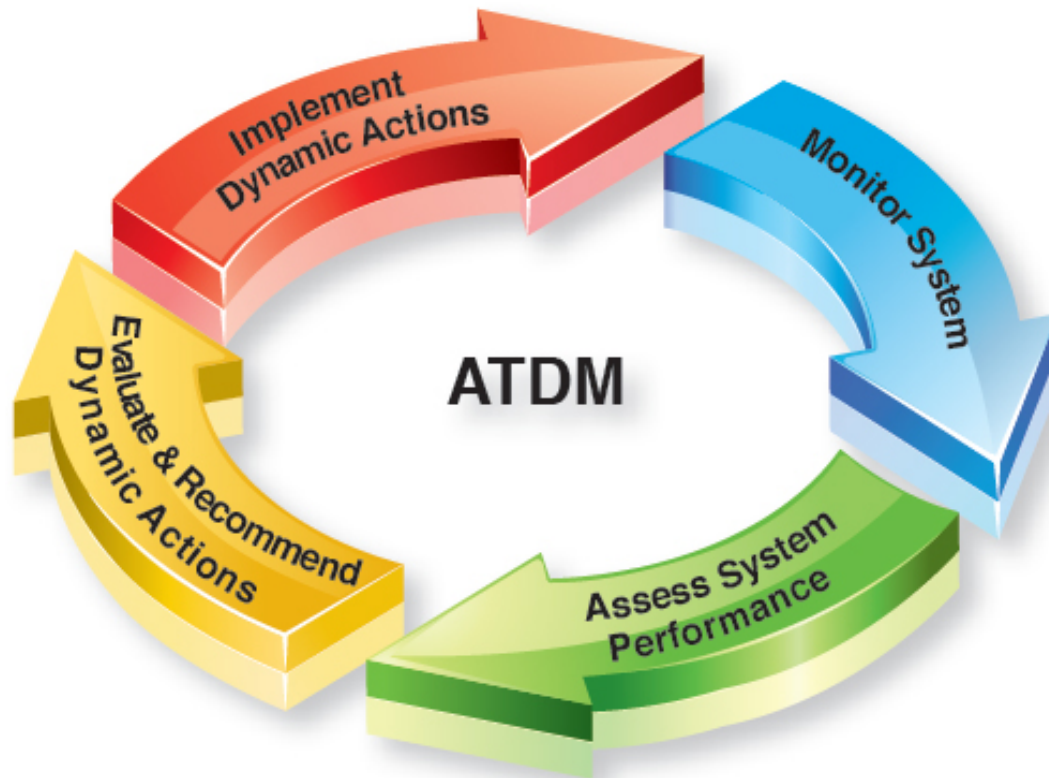
# Other data points

- New sources of data for analysis Twitter feeds, Yelp messages .....
- Cisco : Only 1% of things that can be connected to the internet, are connected
- All those Connected Vehicles coming on-line
- More data, better data, cheaper data
- All without building more infrastructure



**EVEN  
BIGGER  
DATA!**

# Active Transportation and Demand Management



“Hands-on” operations! More and better data – improved decision making?

# Lane Management Strategies



**As we build less, we need to operate better**



... because this is not acceptable



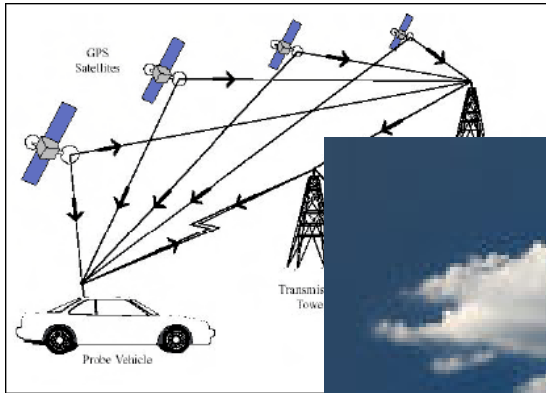
**The Day We Lost Atlanta**

How 2 lousy inches of snow paralyzed a metro area  
of 6 million.

By REBECCA BURNS

January 29, 2014

# The Age of Info and Telecomm



**Probe Data**



**Cloud Computing**

**Crowd sourcing**



**So it's not about building infrastructure any more .....**

# Public vs Private Sector roles

---

- Financial pressures are causing public agencies to hand over more and more activities to the Private sector:
  - Trash collection
  - Parking management
  - Signal operations
  - TMC operations
- Performance-based contracting is reducing costs and improving services to the community
- The shift from building to operating means a re-evaluation of the public sector role in transportation

# The impact of better data through connectivity:



WAZE is being criticized for routing traffic through residential areas – using routes that are not meant for through traffic (remember STROADS??)

Public agency and private sector company goals may not be compatible

Can effective P3 arrangements be agreed upon to provide benefit to the public while not compromising these goals?

# Conclusions

---

- **Connectivity** is changing the way we view and **access** transportation
- **Car sharing** is paving the way to improving not only mobility but accessibility **without the need for vehicle ownership**
- Connected and Autonomous Vehicle technologies are **here, now**
- Successful testing promises to **increase the extent of deployments** to embrace public roadways as the technology grows under the Smart Cities umbrella

**It's all about ACCESSABILITY ..... Being available when needed**