



ROAD CHARGE: Opportunities and Barriers to Implementation

Jim Madaffer
Commissioner
California Transportation Commission

IBTTA Transportation Policy & Finance Summit
March 14, 2016



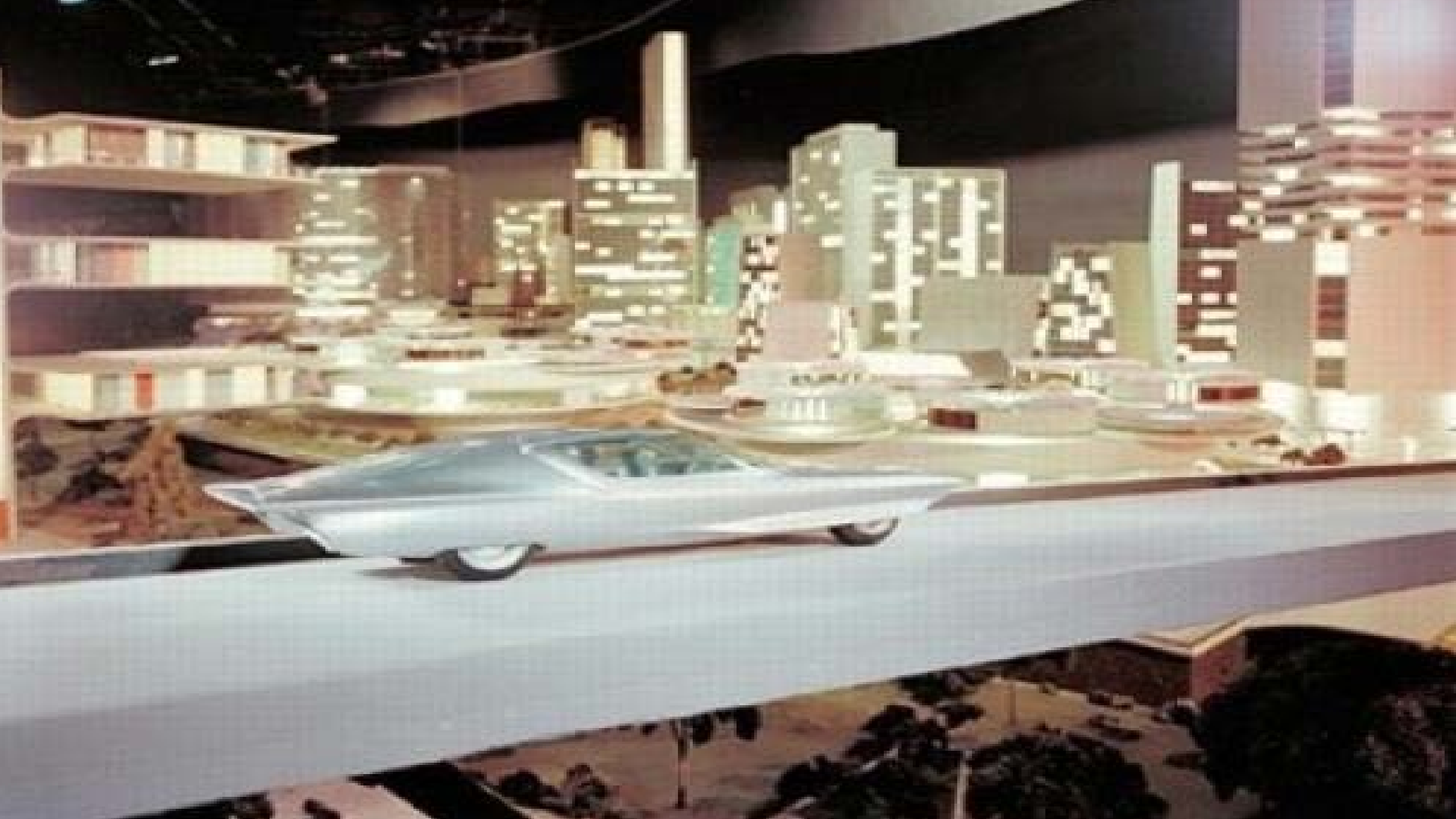
**I HAVE SEEN
THE FUTURE**

GENERAL MOTORS *Futurama*

TOMORROW-LAND

High spot of the New York World's Fair reopening this Spring—
GM Futurama!

You can look over GM's exciting "idea" cars—*Firebird IV* with television,
stereo, game table, refrigerator; *GM-X* with jet aircraft cockpit and con-
trols—fascinating design and engineering innovations right out of
tomorrow.





An efficient transportation system is critical to California's economy and quality of life...

Pay By The Mile – Road Charge – Mileage Based User Fee

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California Infrastructure Report Card

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✓ **\$59 Billion** - Deferred Transportation Maintenance

Source: Governor Brown's 2015 Five-Year Infrastructure Plan

✓ **45th** - State Ranking for Overall Highway Performance

Source: Reason Foundation's 21st Annual Report on the Performance of State Highway Systems

✓ **\$296 Billion** - Ten-Year Project Funding Shortfall

Source: California Transportation Commission's 2011 Statewide Transportation Needs Assessment

58% of California Roadways Require Rehabilitation or Pavement Maintenance

87% of California's Counties have an Average Pavement Rating of "At Risk" or "Poor"

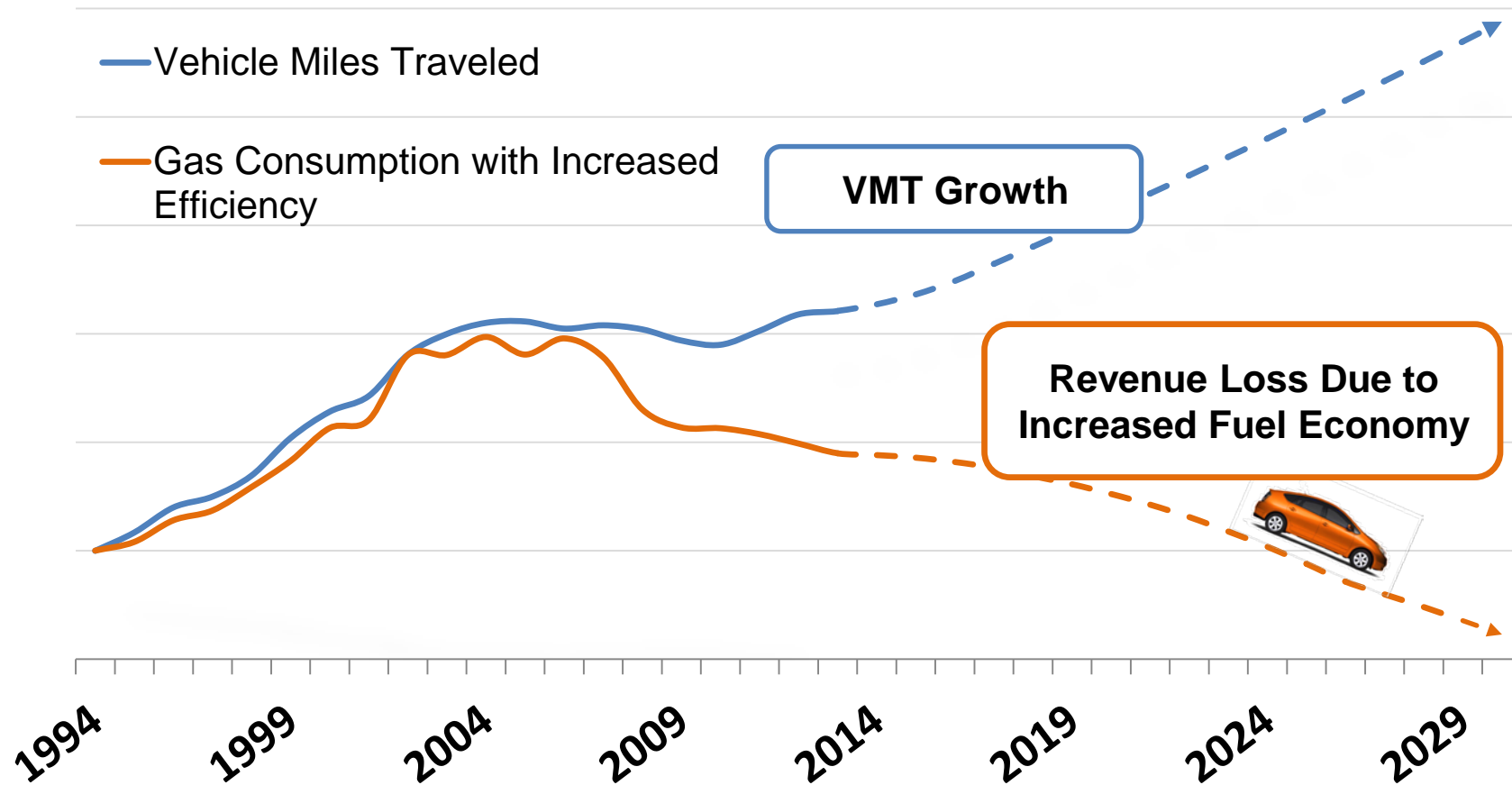
25% of Local Streets and Roads will be in "Failed" Condition by 2022 under our Current Funding Levels

6 of the Nation's 10 Worst Urban Area Pavement Conditions

...But our transportation system is in financial crisis

Pay By The Mile – Road Charge – Mileage Based User Fee

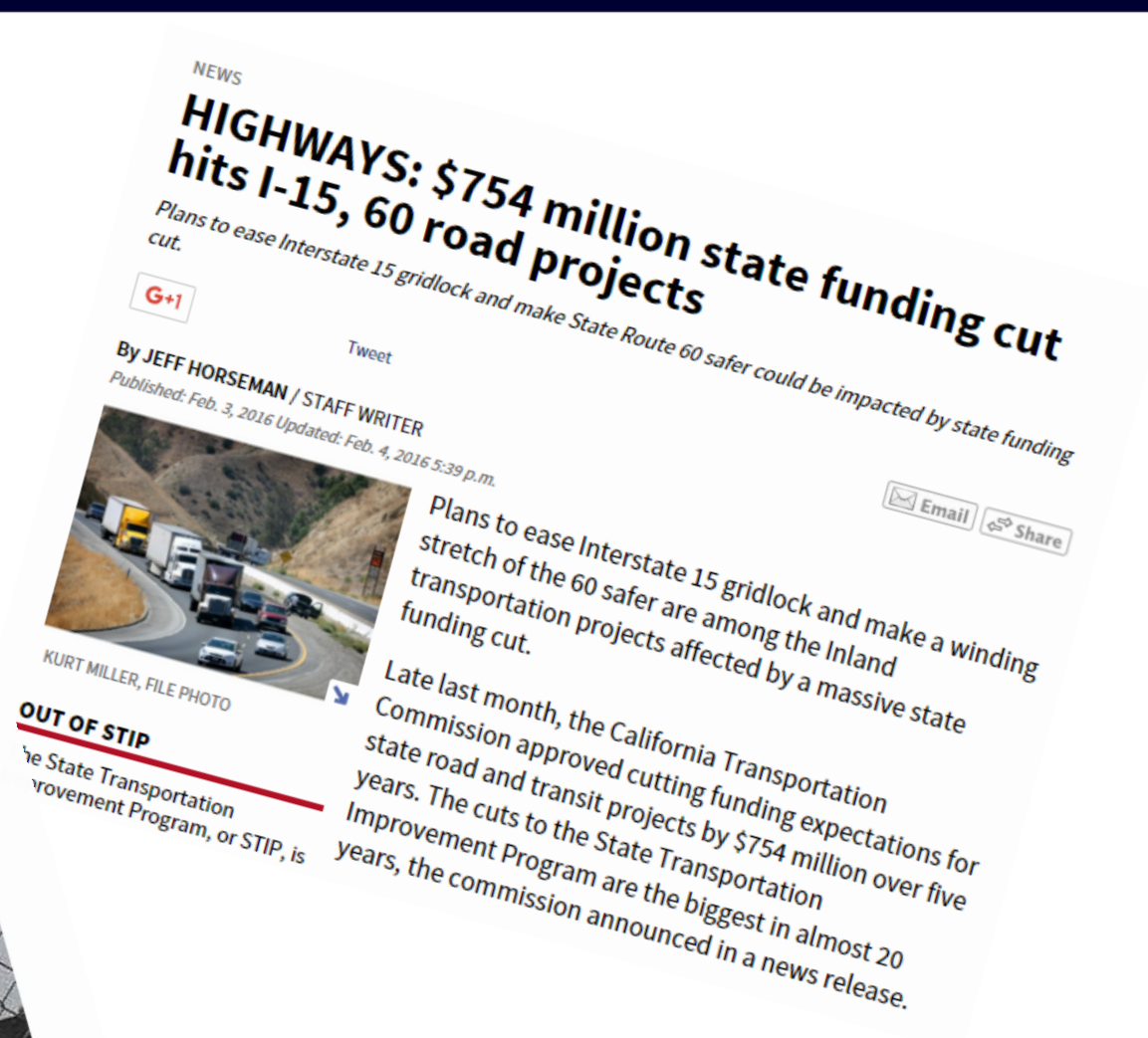
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...But our transportation system is in financial crisis

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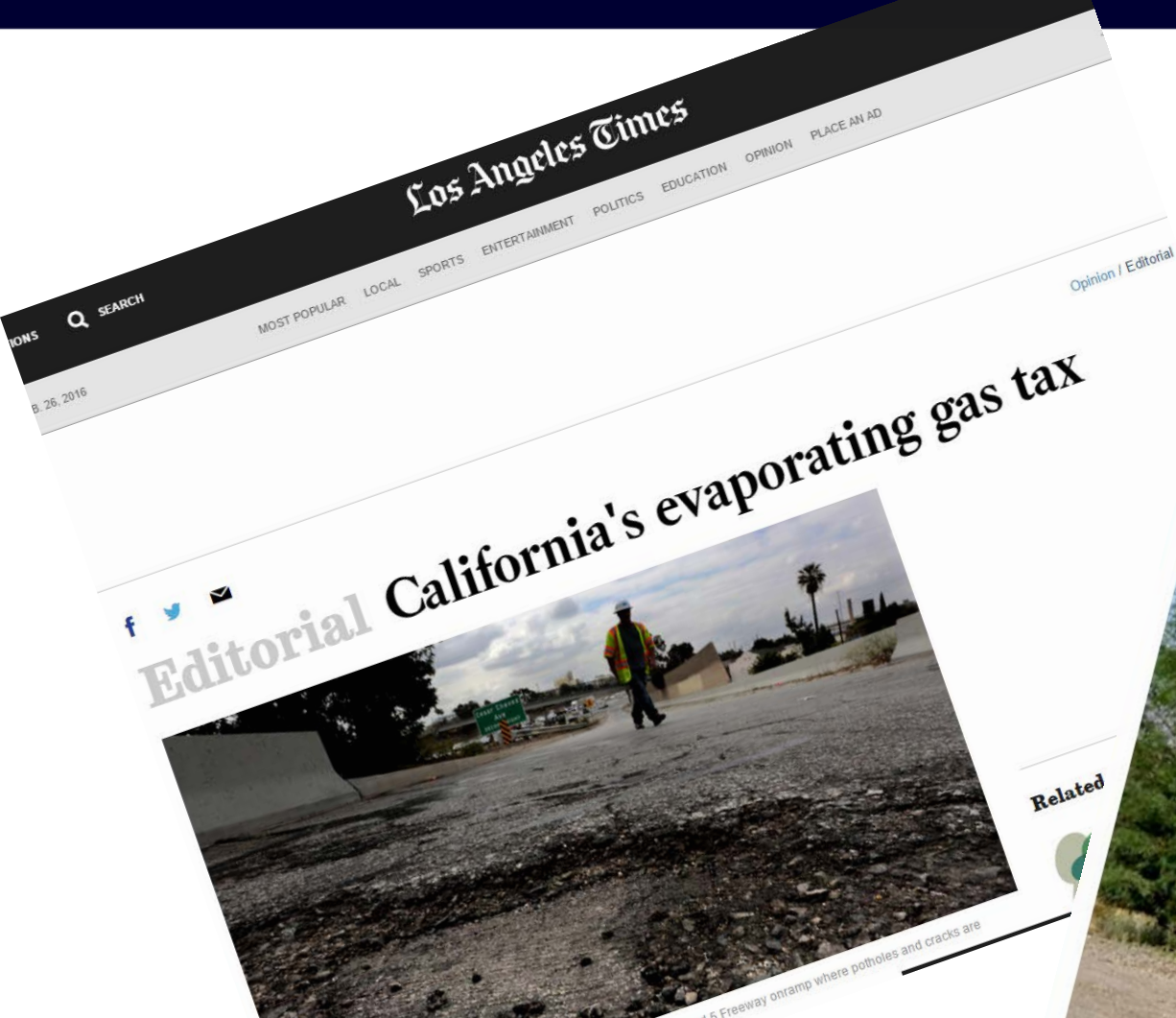
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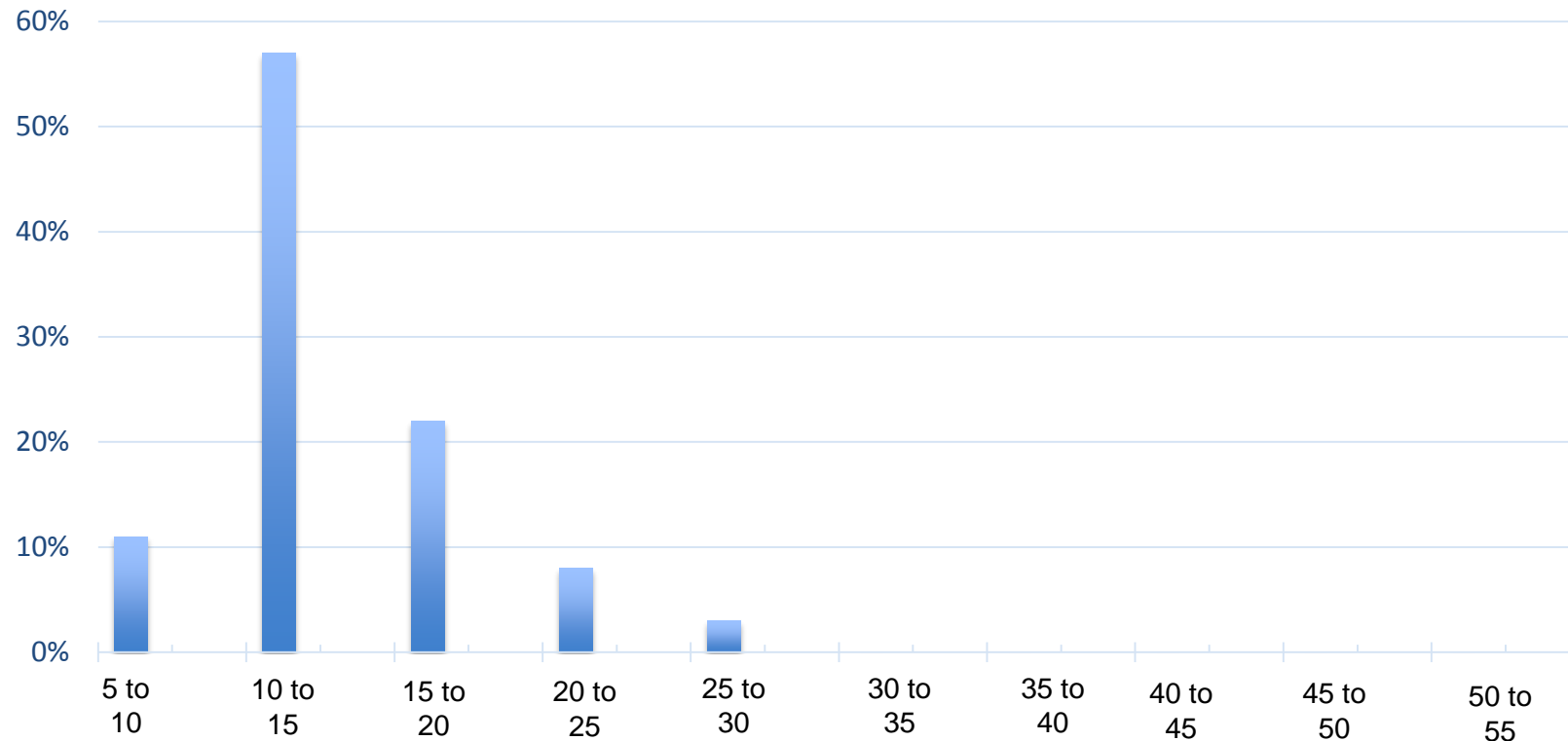


Evolution of Light-Duty Fleet Fuel Economy

Pay By The Mile – Road Charge – Mileage Based User Fee

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Model Year 1975

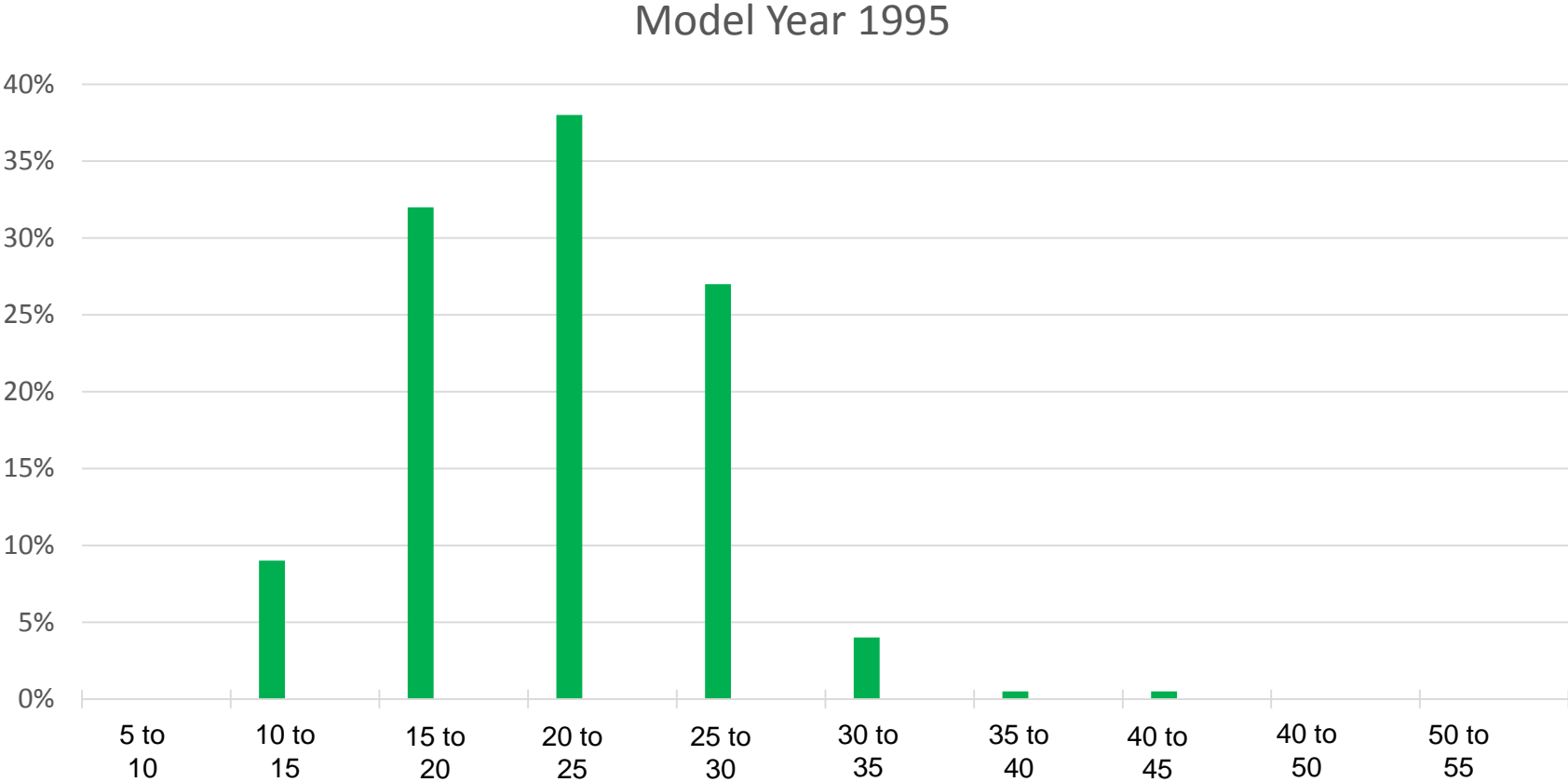


Source: EPA, Light-Duty Automotive Technology, Carbon Dioxide Emissions, and Fuel Economy Trends: 1975 Through 2014

Evolution of Light-Duty Fleet Fuel Economy

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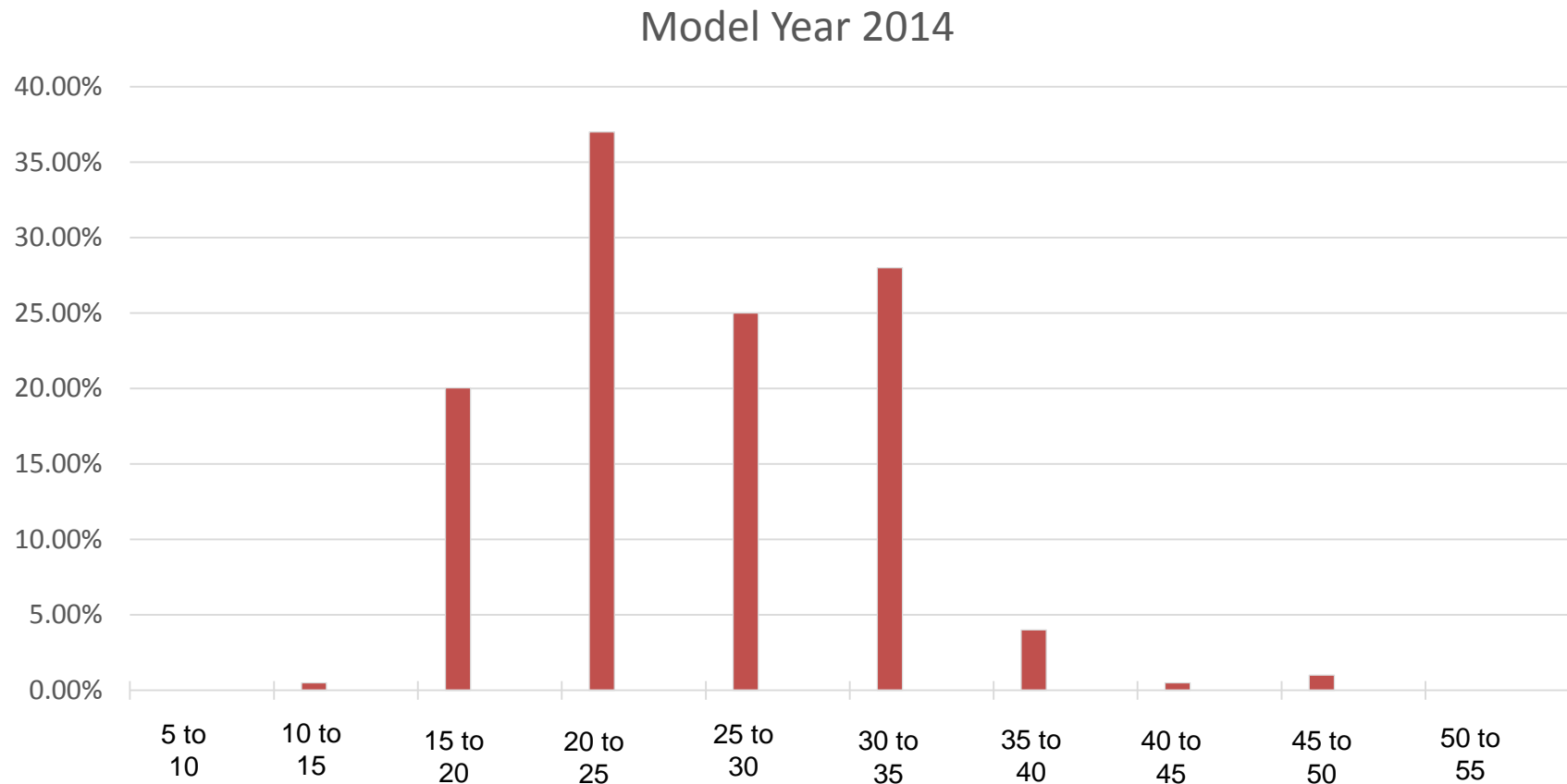


Source: EPA, Light-Duty Automotive Technology, Carbon Dioxide Emissions, and Fuel Economy Trends: 1975 Through 2014

Evolution of Light-Duty Fleet Fuel Economy

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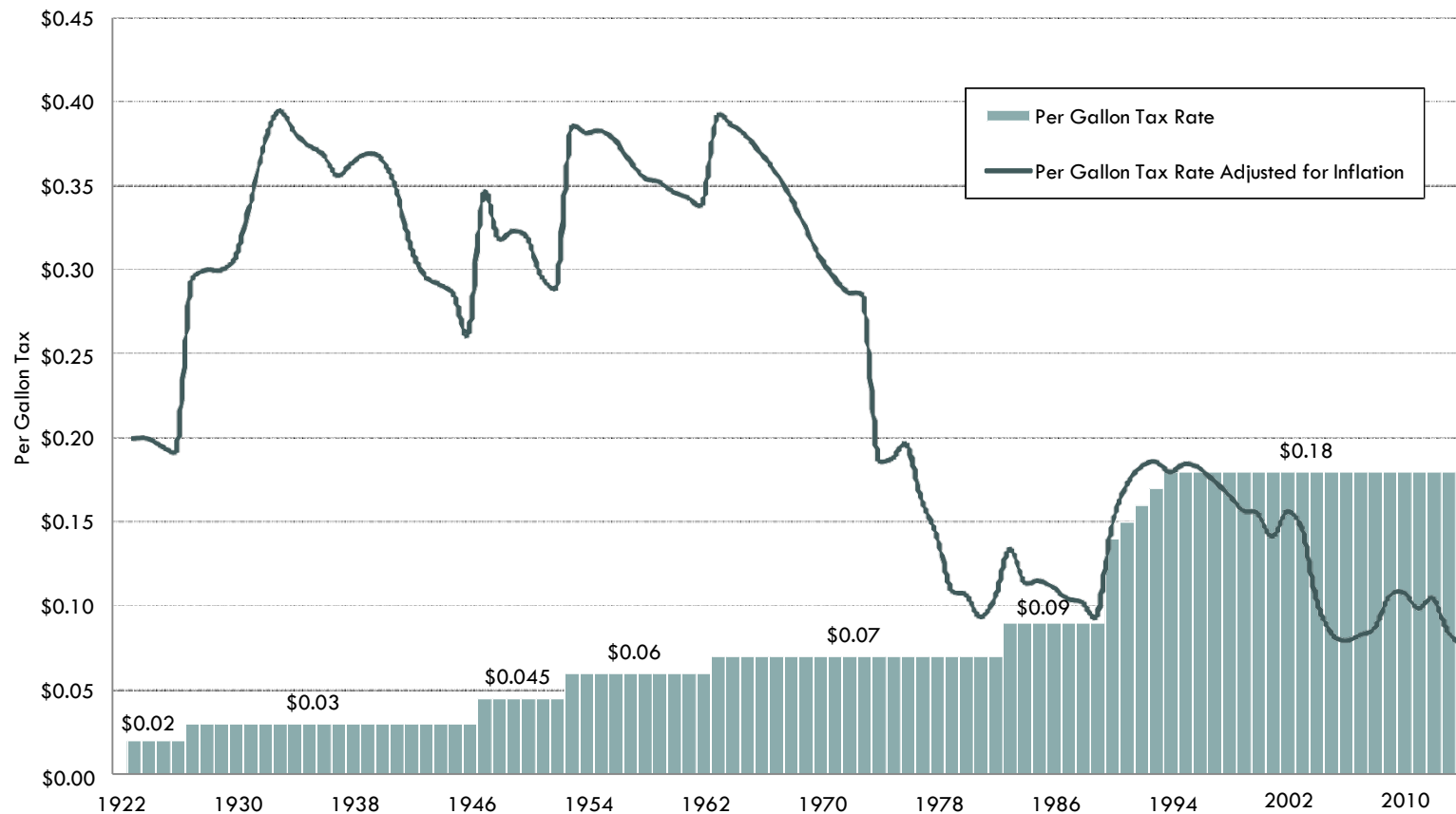
Source: EPA, Light-Duty Automotive Technology, Carbon Dioxide Emissions, and Fuel Economy Trends: 1975 Through 2014

Inflation Erodes Value of Tax Over Time

History of the Base Gasoline Excise Tax Rate

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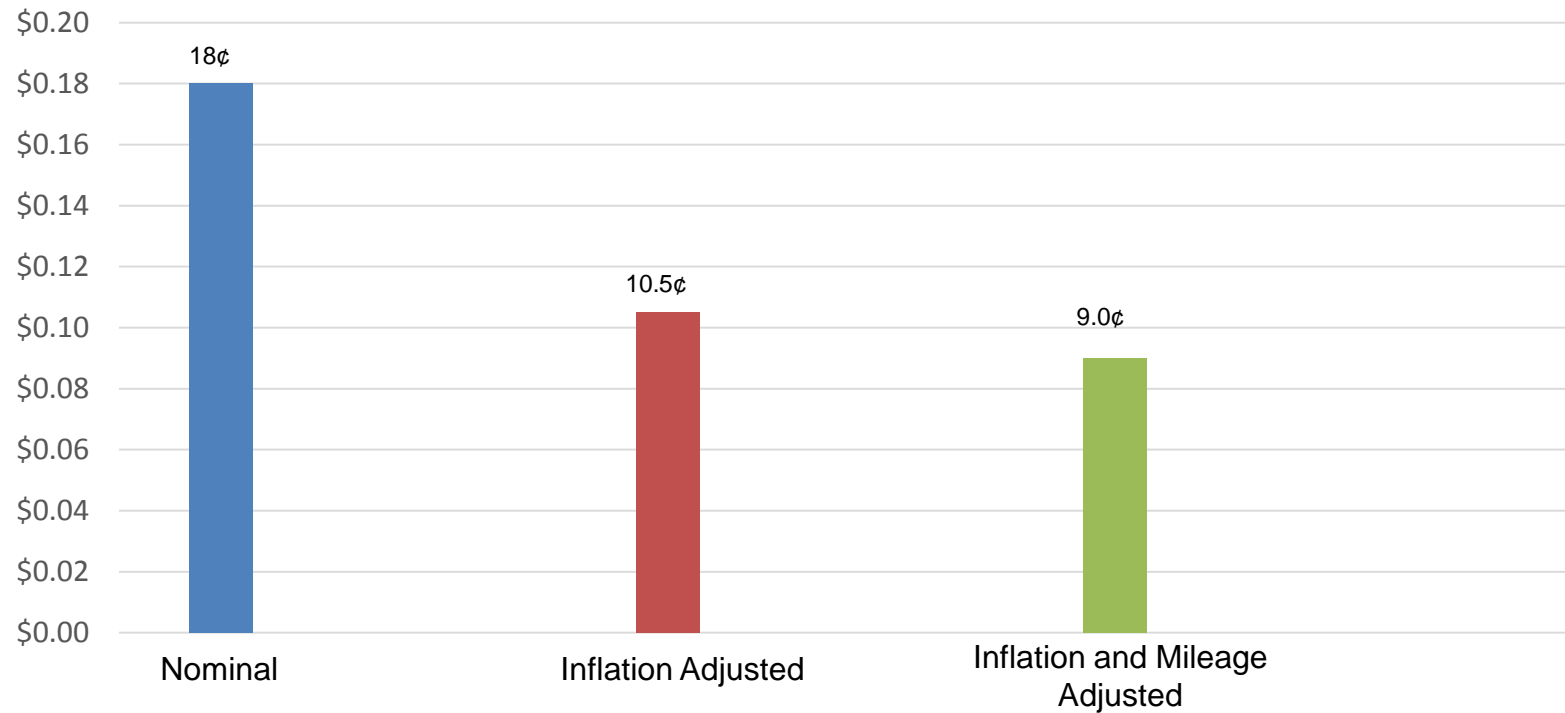
Source: Board of Equalization. Escalation based on California State Highway Construction Cost Index and Consumer Price Index

Inflation and Mileage Adjusted Value of the Excise Tax

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Inflation and Mileage Adjusted Value of State Fuel Excise Tax
(as of 2012)



This chart shows the relationship between the excise tax in 1994 and in 2012. The excise tax has remained at 18 CPG since 1994, despite significant increases in construction costs. In addition, the increase in vehicle fuel efficiency from 1994 to 2012 further decreases the value of the excise tax.

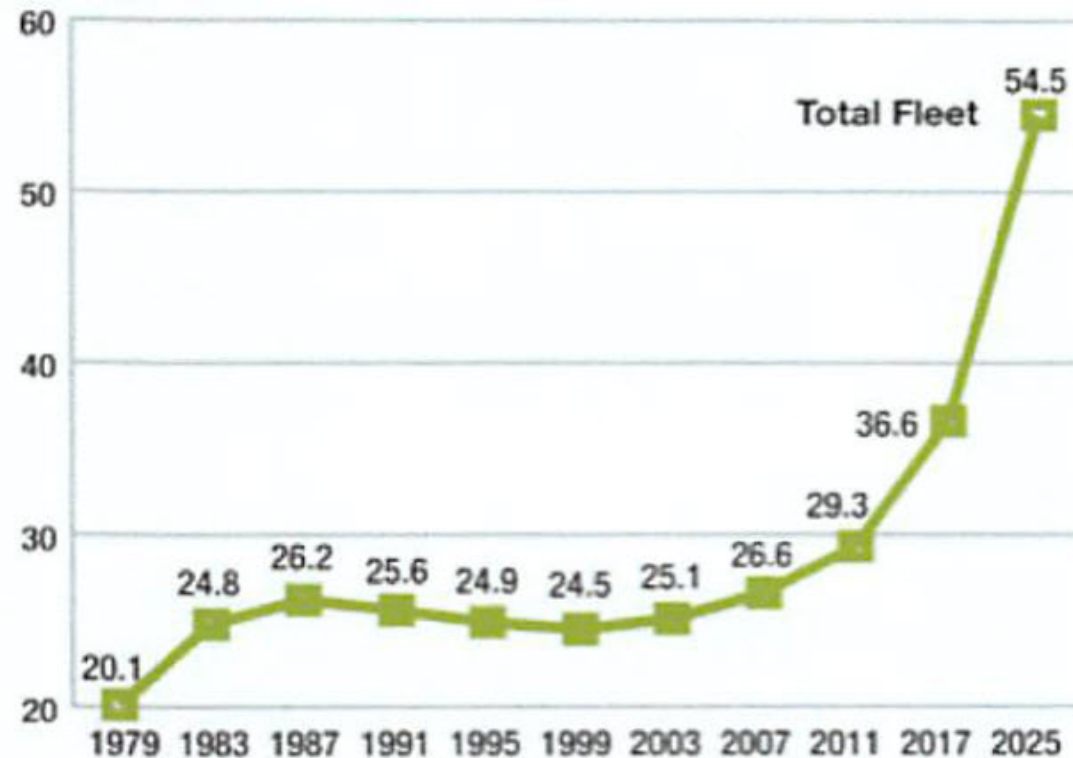
CAFÉ Standards

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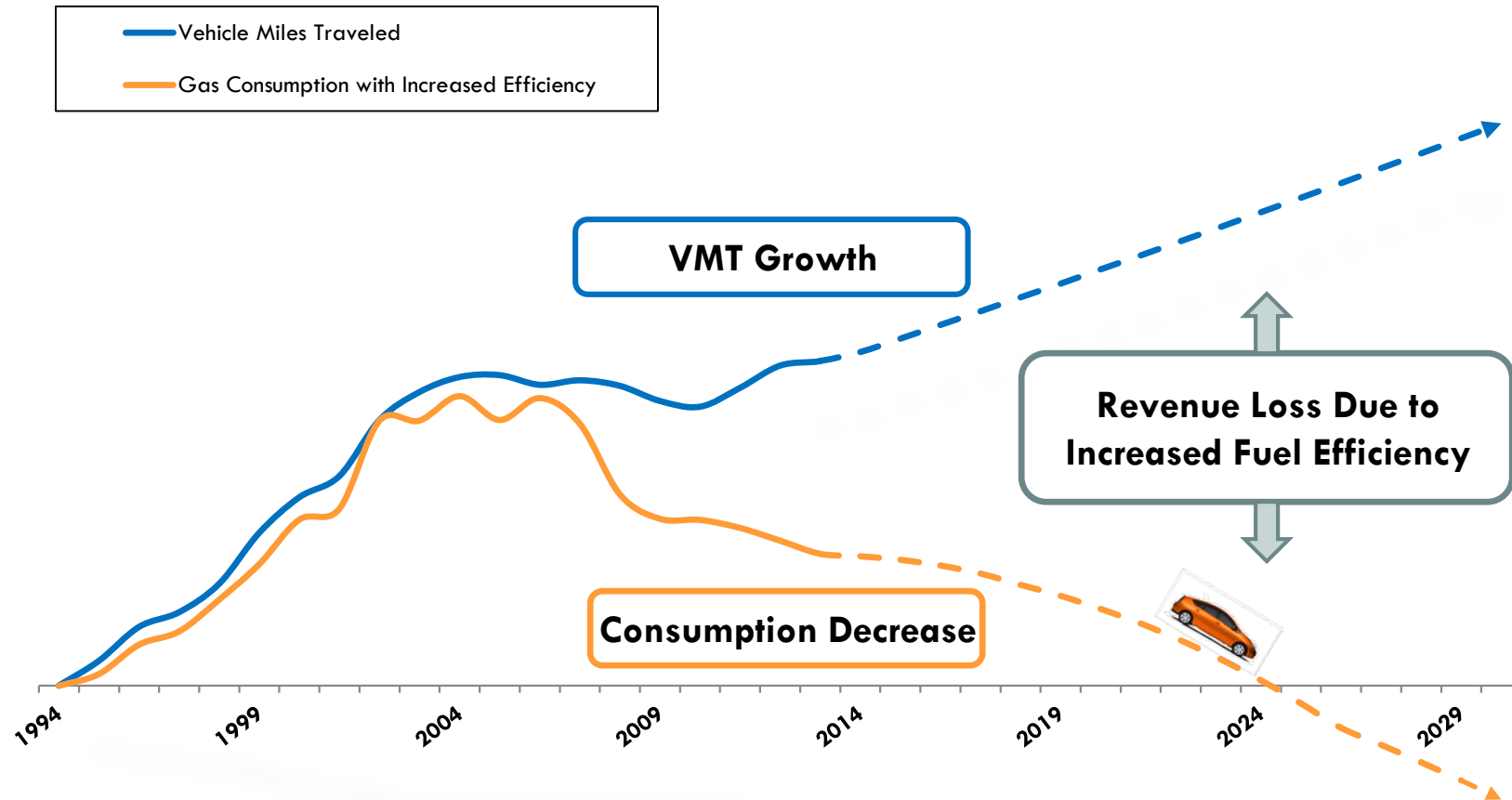
CAFÉ Standards

Rising Federal Fuel Efficiency Standards for Passenger Vehicles and Light Trucks



Source: National Highway Traffic Administration

Fuel Efficiency Contributes to Revenue Loss



In this conceptual chart, Vehicle Miles Travelled and Fuel Consumption have been indexed to the same starting point in 1994 to enable comparison of the relative change of the two metrics over time

Revenue Solutions

- **Near-Term Solutions**

- Truck Weight Fees
- Excise Tax
- VLF/VRF
- Early Loan Repayments
- Cap & Trade
- New legislation . . . Governor, Senator Beall, Assm Frazier

- **Long-Term Sustainable Solutions**

- Congestion Pricing/Tolling
- Public Private Partnerships (P3's)
- Road Charge Program (SB 1077)



Possible Proposed Funding Legislation – Governor

- \$3.6 billion dollar a year funding package
- Augmented during the first three years by a payback of \$879 million in loans.
- \$500 million in cap and trade revenue will be made available for the program, with \$400 million going to transit and \$100 million for complete streets.
- \$3.6 billion to be split 50-50 between the state and local needs and \$200 million of the state share will go for freight improvements plus some of the loan payback money.
- The remainder will go to SHOPP.
- Funds will be raised through a vehicle fee of \$65 plus a fix to the gas tax swap plus indexing of the excise tax going forward.

California Road Charge Pilot Program



- Senate Bill 1077 (2014)
- Directed the California Transportation Commission (CTC) to establish a Technical Advisory Committee (TAC)
- TAC provided report recommendations to the California State Transportation Agency (CalSTA)
- Requires CalSTA to implement a pilot program by ~~January 2017~~ **July 2016**
- Requires a report of findings and recommendations by ~~June 2018~~ **July 2017**



Road Charge Technical Advisory Committee Composition

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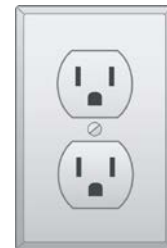
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- 15 members:
 - Telecommunications Industry
 - Data Security & Privacy Industry
 - Privacy Rights Advocacy Organizations
 - Regional Transportation Agencies
 - Members of the Legislature
 - Highway User Groups
 - National Research & Policymaking Bodies
 - Social Equity Advocacy
 - Other Relevant Stakeholders

Road Charging is ...

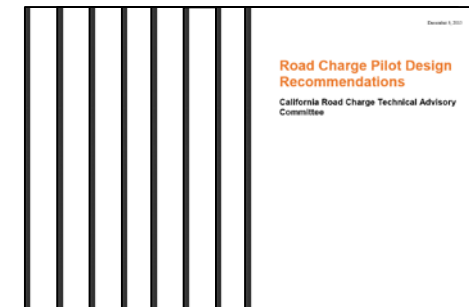
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- A policy whereby motorists pay for use based on the distance they travel on the roadway network.
- A “User Pays” principle – the more you drive, the more you pay.
- Similar to other utilities such as electricity, water, telephone.



Public Input Drives TAC Process

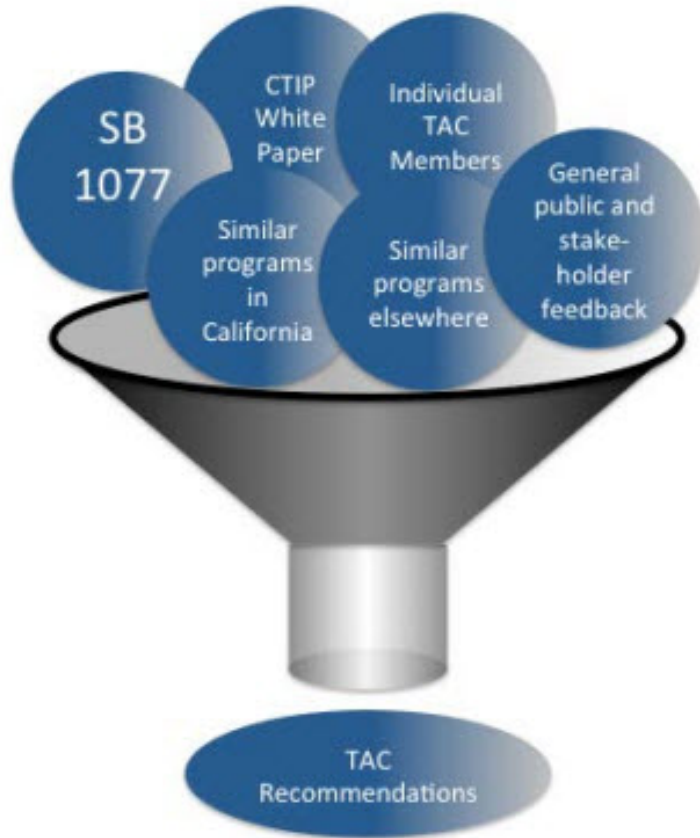
- Extensive Public Outreach Efforts
- TAC Pilot Design Recommendations
 - 5,000 participants statewide
 - Diversity in vehicle types
 - Commercial and State account managers
 - Multiple mileage reporting methods
 - Protect privacy
 - Ensure data security
 - Independent evaluation



TAC Design Volunteer Matrix

Pay By The Mile – Road Charge – Mileage Based User Fee

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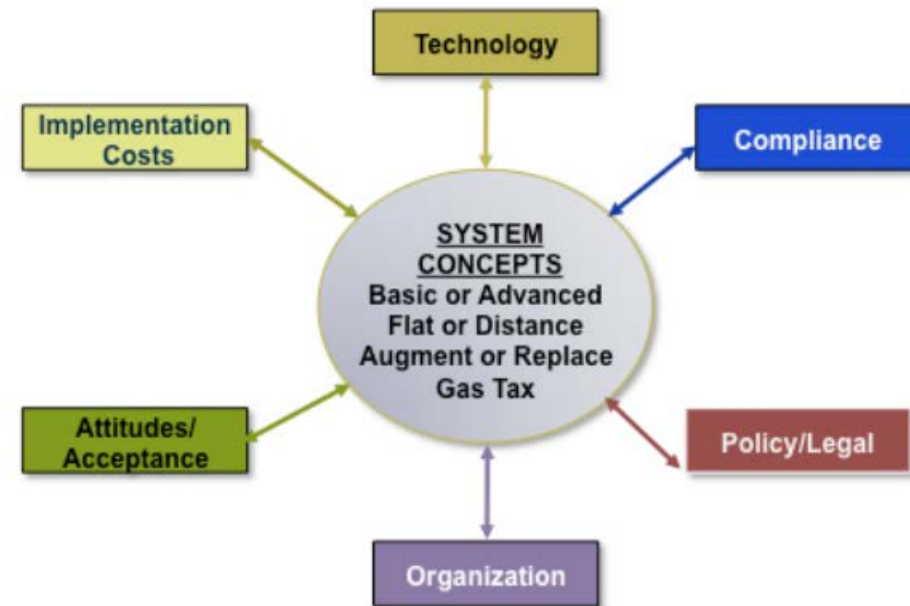
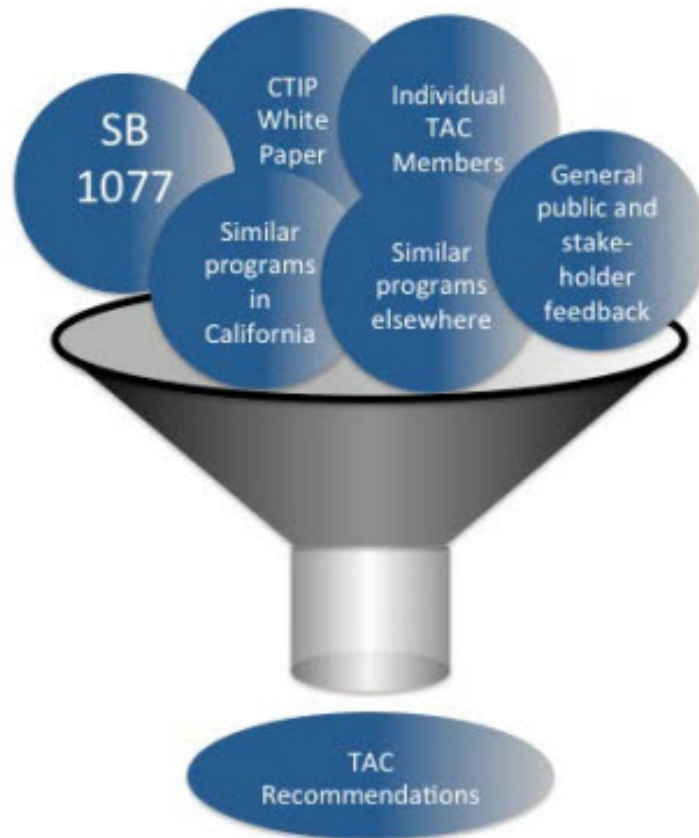
Participant matrix

| | | North | Central | South | Trucks | |
|---------------------------------------------|------|-------|---------|-------|--------|--|
| Commercial Vehicles (Businesses) | | 100 | 50 | 175 | 50 | |
| Private Vehicles (Individuals & Households) | | | | | Other | |
| Urban & Suburban | \$ | 475 | 175 | 1050 | 125 | |
| | \$\$ | 475 | 175 | 1050 | | |
| Rural & Agricultural | \$ | 200 | 200 | 150 | | |
| | \$\$ | 200 | 200 | 150 | | |

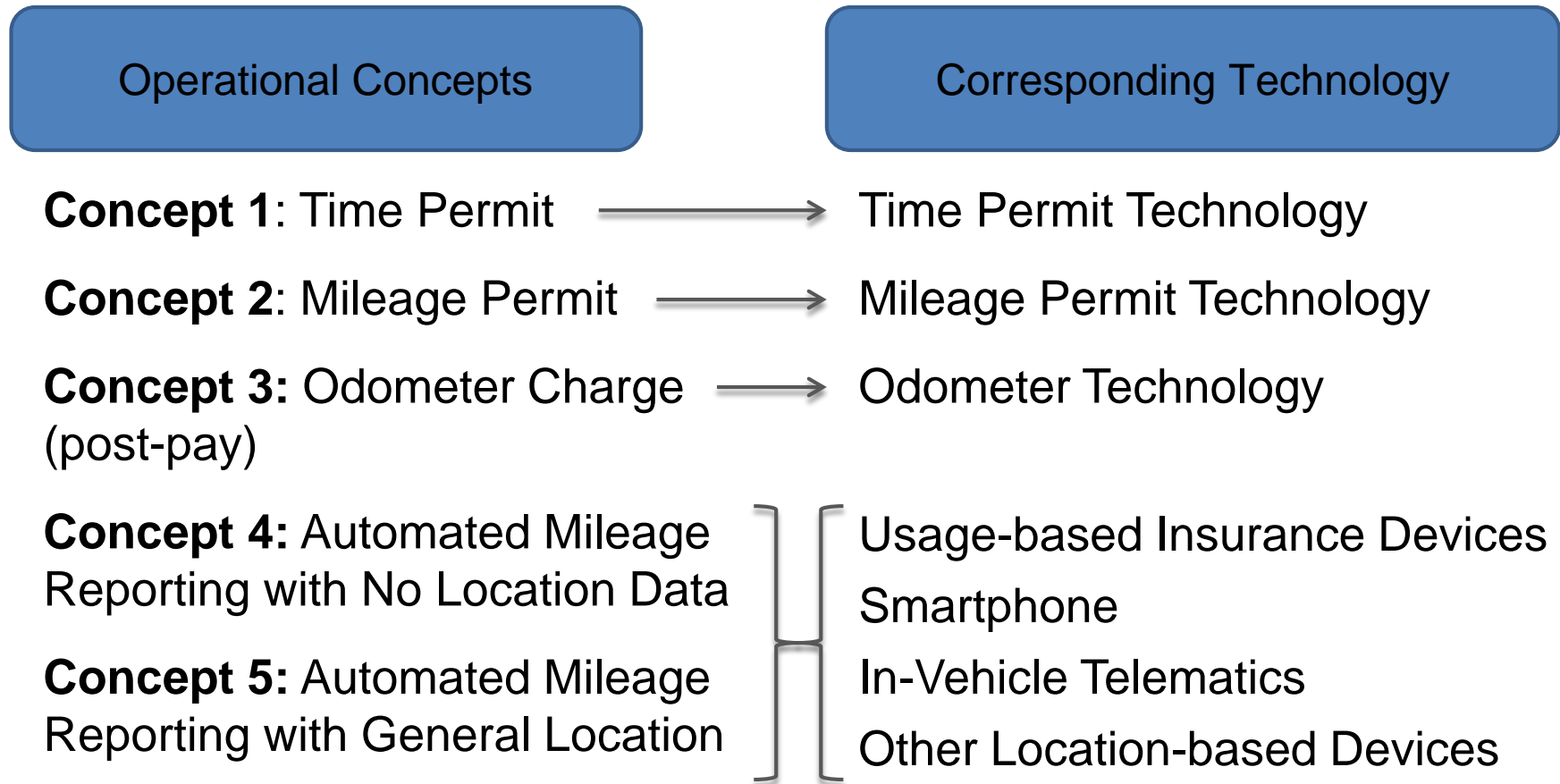
TAC Design Decisions

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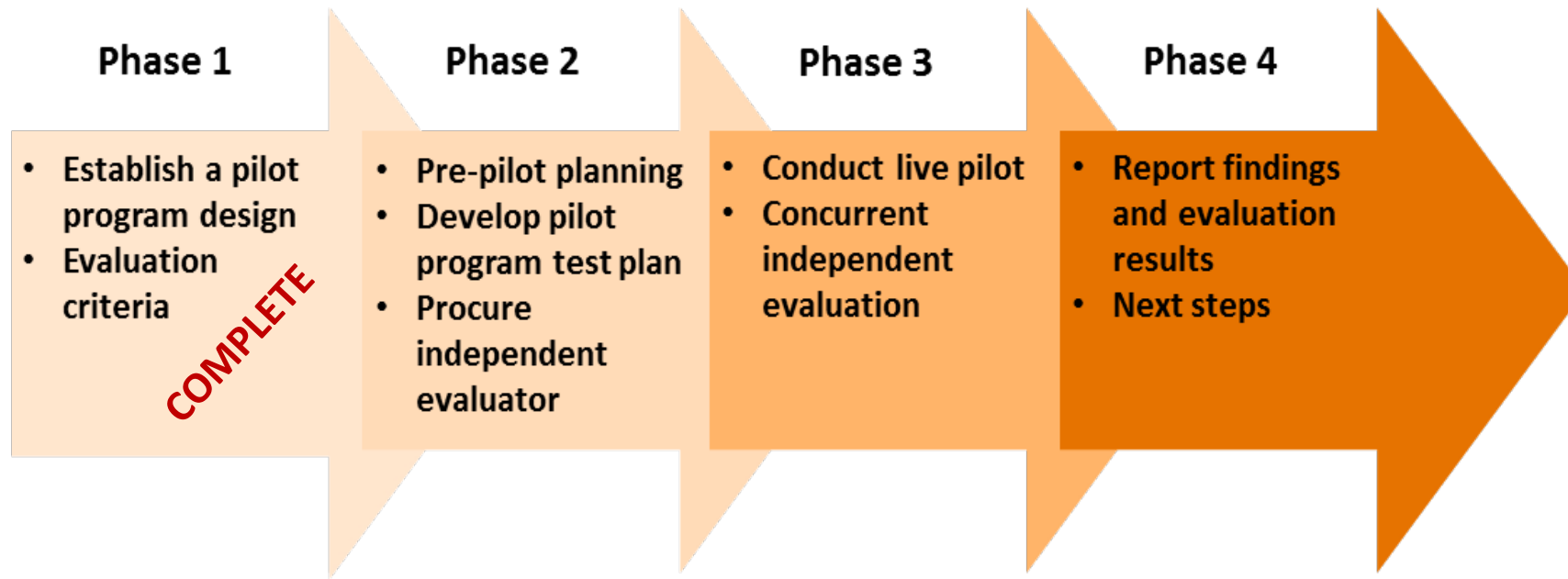
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Mileage Reporting Methods



Road Charge Pilot Program Status



Phase 1: Pilot Design/Public Outreach - **COMPLETE** December 2015

Phase 2: Recruitment/Procurement & Testing - December 2015 – Summer 2017

Phase 3: Live Pilot – Summer 2016 - Spring 2017

Phase 4: Final Report – Summer 2017

Volunteer For the Pilot!

- Recruitment Has Started
 - www.CaliforniaRoadChargePilot.com
- The Pilot will Include All:
 - Ages
 - Genders
 - Races
 - Incomes
 - Locations



How to Sign Up and Participate in the Pilot

The state is looking for volunteers for a 9 month long pilot test of road charging. Participants will be asked to test and report back on their experience using various options for reporting mileage and making simulated payments. If you would like to sign up for the pilot, follow these steps:

Step 1: Sign up to Volunteer!

- Go to <http://CaliforniaRoadChargePilot.com> and follow the links to sign up for the pilot. You will be asked to provide some basic information about how we can contact you, where you live, what kind of car you drive, and which reporting option you think you might like to test.

Step 2: Accept your Formal Invitation

- We want all ages, genders, races, income levels, and parts of the state to be represented. Therefore, it is possible that not every volunteer will be invited to join the pilot. If you are accepted, you will receive an Invitation to Register. To accept the invitation, follow the instructions in your acceptance email (or letter).

Step 3: Choose How You Report Your Miles

- As a Pilot Participant, you get to choose how to report the miles you drive.

Pay only for miles driven on California roads

Pay for all the miles you drive

Pay up-front for All-You-Can-Drive

Step 4: Choose Your Reporting Technology (or not!)

- Options range from no technology -- just a paper permit for a fixed number of miles or period of time -- to smartphone apps, telematics, and other fully automated reporting technologies. You pick -- no-tech, low-tech, or go-tech.

Step 5: Select Your Account Manager

- Every participant in the pilot will establish a road charge account -- think of it like your electric utility or water bill. You may choose between a no-frills account managed by the State of California, or you may select one of the Commercial Account Managers, which may offer value-added services. Note that during the pilot, none of the account managers are allowed to charge you for any services they provide.

Step 6: Drive!

- Drive like you normally would. If you selected a time permit, you will receive a reminder to renew just before your permit expires. If you selected one of the automated methods, you will receive monthly invoices from your account provider telling you how much you drove. You will have the option during the pilot to change how you report miles, as well as to try out different account managers.

Step 7: Tell Us What You Think

- The whole point of doing the pilot is to find out what Californians think about Road Charging as an option for *replacing* the gas tax. What do you like? What do you hate? What works well? What needs more thought? During the pilot you will be asked to complete surveys about your experiences in the pilot, and you may be invited to participate in a focus group. Tell us all about it -- the good, the bad, and the ugly.

Road Charge Implementation Scenarios

Pay By The Mile – Road Charge – Mileage Based User Fee

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Scenario 1: Near-Term Road Charge

- 40% mileage meter, 35% smartphone mileage meter, 5% everything else
- Payment locations and methods break down same as DMV today

Scenario 2: Intermediate Road Charge

- 25% telematics, 25% mileage meter, 30% smartphone mileage meter, 5% everything else
- Online payments increase to 75% of total

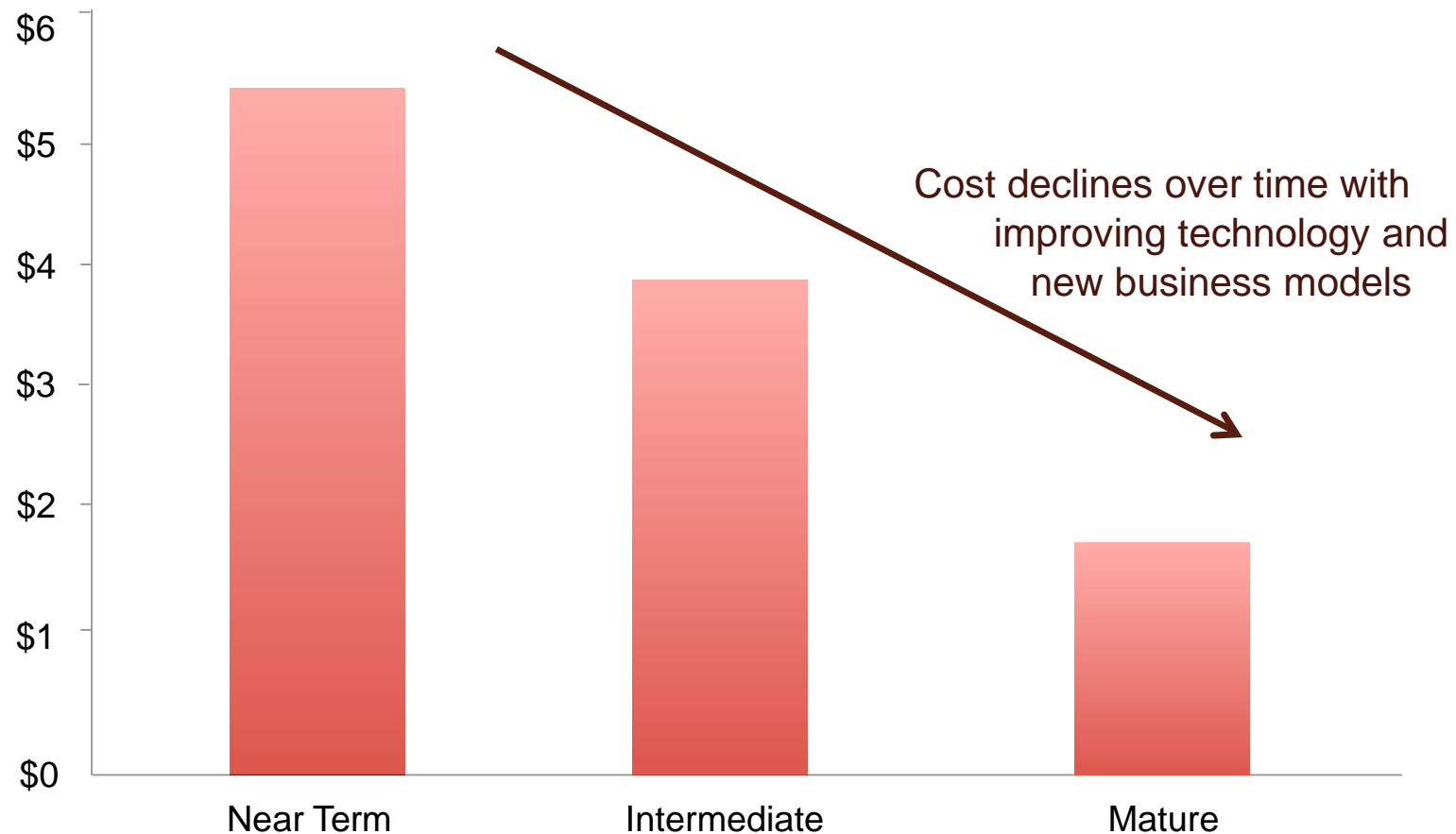
Scenario 3: Mature Road Charge

- 90% telematics
- Online payments increase to 90% of total

Initial Road Charge Account Management Cost Estimates for Three Scenarios

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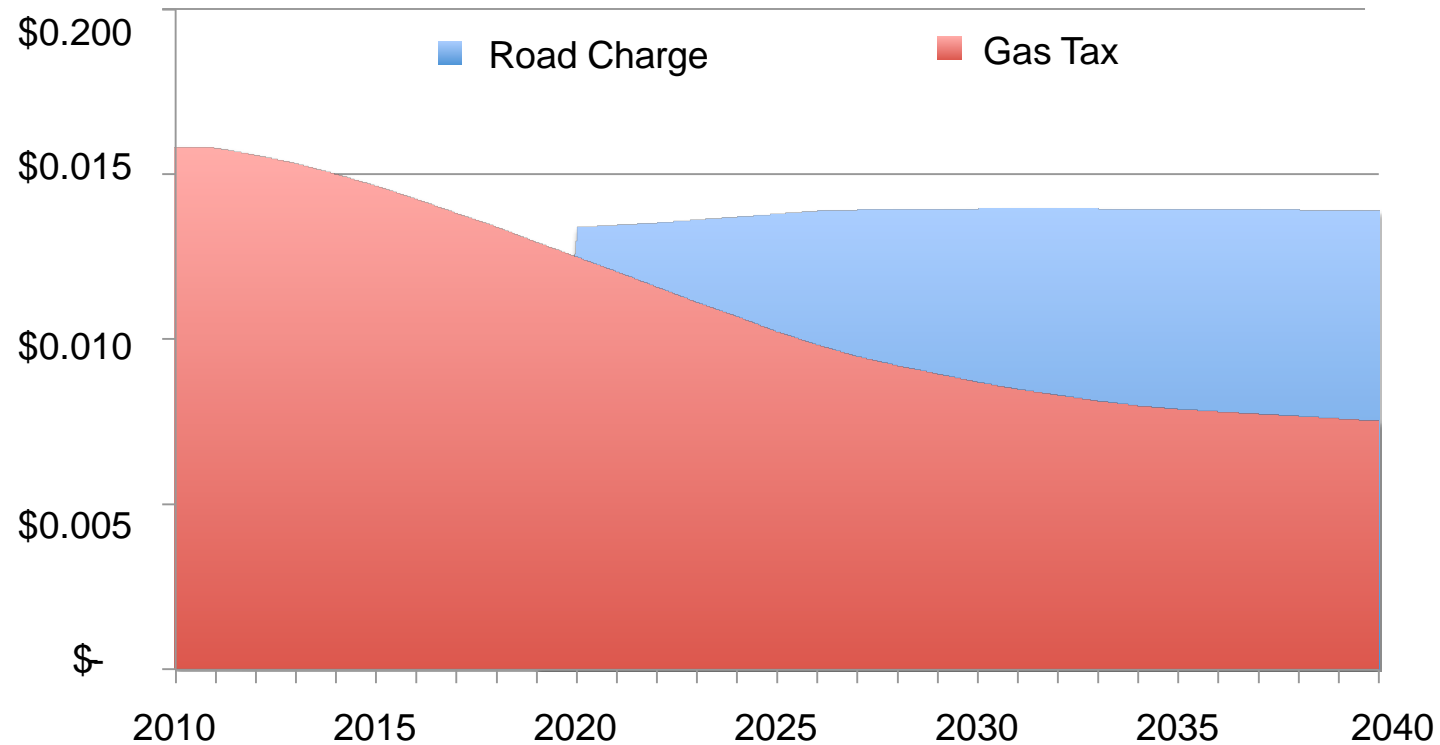
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Preview of Next Steps: Net Revenue Analysis

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**assumes Road Charge begins in 2020 at 1.4 cents/mile (gross revenue neutral with gas tax in 2016/2017)*



FLB 040

2007 DARPA Urban Challenge



'Boss' CMU Tartan Racing, 60 miles urban, 4h:10m

2008 Levandowski's Pribot



Delivered pizza across SF Bay bridge

2010 Audi 'Pikes Peak'



12 mile hill climb, 156 turns, 27min (cf 11m48s)

2011 AutoNOMOS Labs Berlin drive



50 miles of autonomous driving on Berlin roads

2013 Vislab BRAiVE, Parma



Rural-urban demo, in real, complex traffic, vision

2013 Daimler/Mercedes Bertha Benz Road Trip



60 mile rural-urban demo, vision based



RAILROAD
CROSSING
2
TRACKS

RED LIGHT
VIOLATION
\$336
MINIMUM FINE

Central Expwy

6YCT869

Google self-driving car

2014-2016 Google Prototype 'Vehicle' (NEV)



25mph, 100 pilot project CA for 2yrs. 2017-2019?...

2015 Tesla 'Autopilot' (Autonomous 2023)



'will go from on-ramp to off-ramp autonomously'

2015 Mercedes Benz F 015 Concept



“Innovative perspective into the future of mobility.”



2020-2025 Nissan Autonomous Drive



Range of Commercially viable AVs on road





MARCH 7, 2014

TIME

No traffic.
No accidents.
No deaths.

All you
have to
do is
**give up
your
right
to drive.**

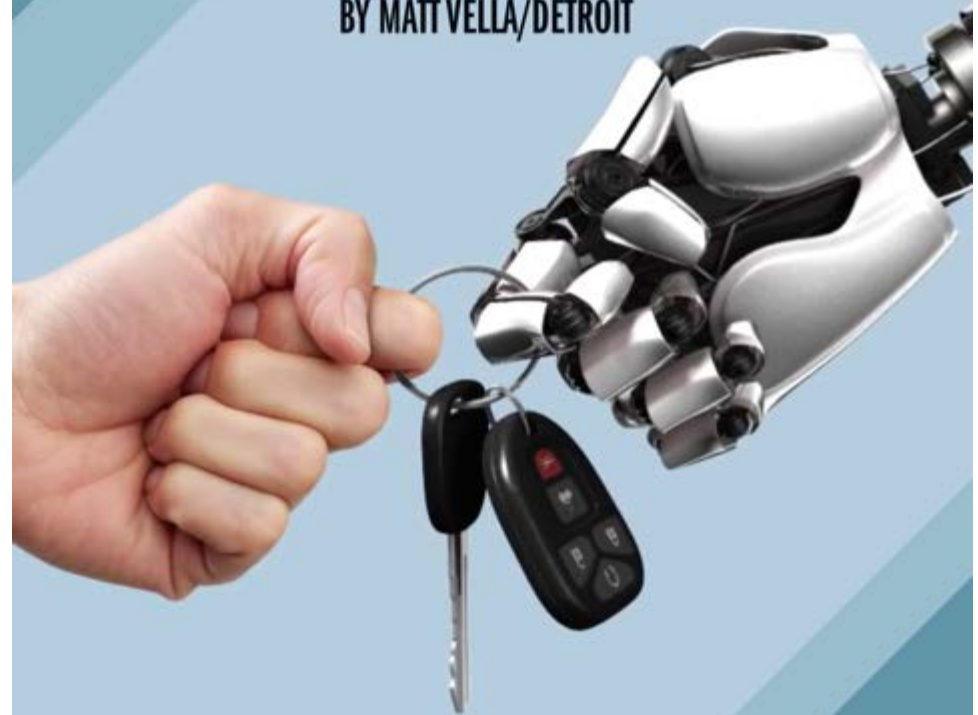
By Matt Vella



Tech

THE INCREASINGLY COMPELLING CASE FOR WHY YOU SHOULDN'T BE ALLOWED TO DRIVE

BY MATT VELLA/DETROIT



The Future is now!

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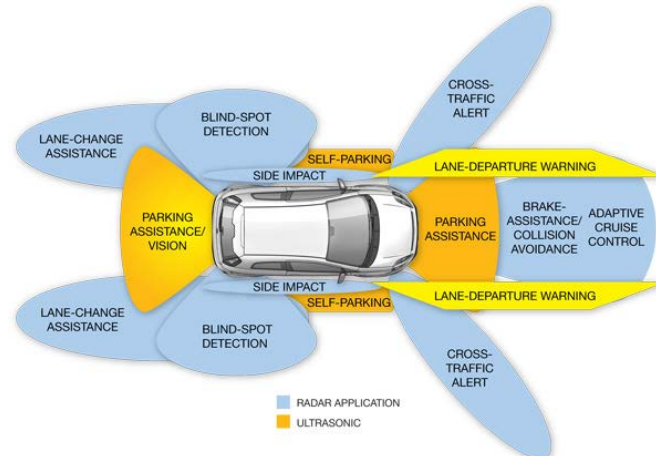
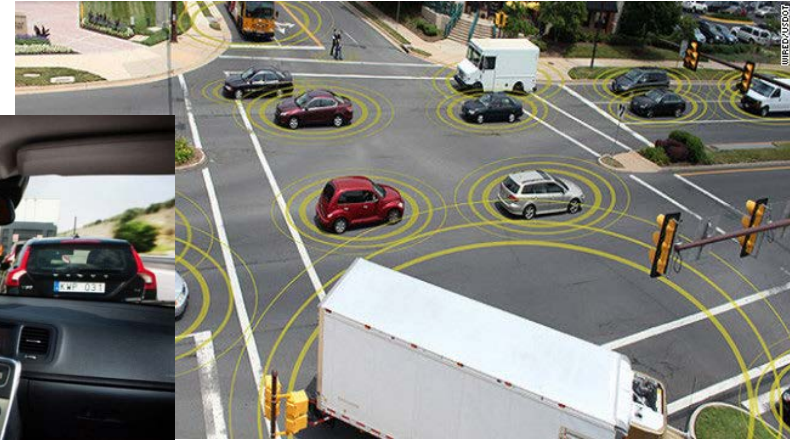
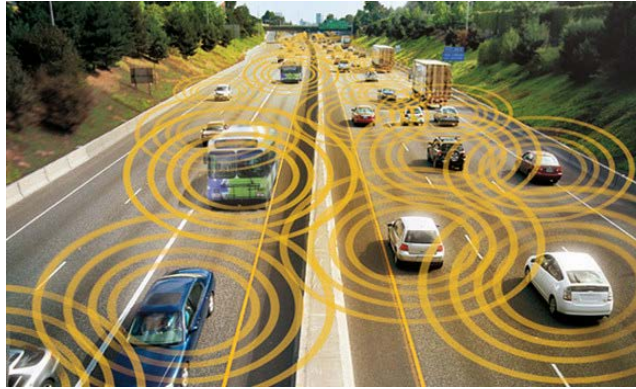


Figure 2 Several driver-assistance systems are currently using radar technology to provide blind-spot detection, parking assistance, collision avoidance, and other driver aids (courtesy Analog Devices).





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