

Future of US Transport

September 2010

Prague, Czech Republic





Transformational Thinking

“Imagination is more powerful than knowledge. It is key to bringing change into our reality.”

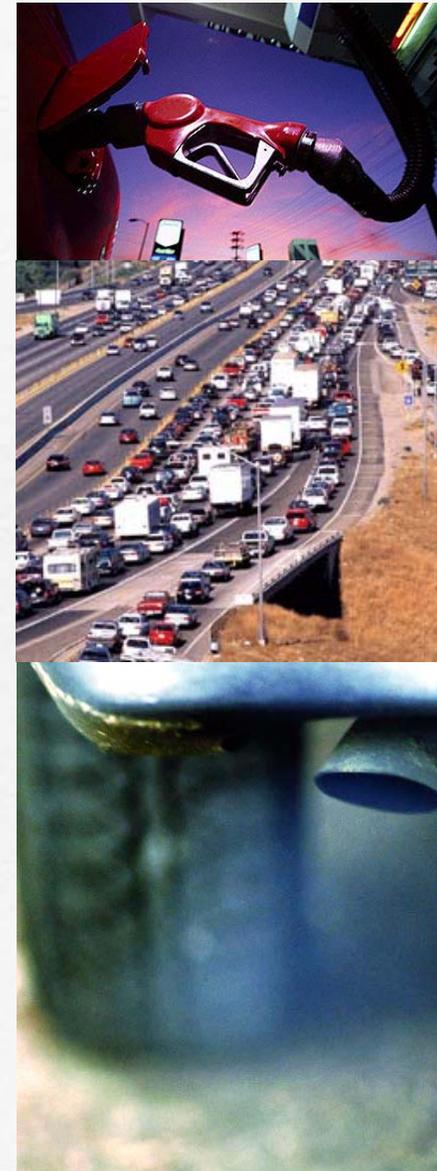
Albert Einstein



Key Issues around transportation today

- ❑ Energy
- ❑ Environment & Climate Change
- ❑ Social equity
- ❑ Revenue & funding

“CONGESTION”





Policy Objectives:

Traditional

- Increase Supply to meet Demand
- Provide more reliable journey times
- Reduce impact of incidents
- Improve safety

New

- Reduce congestion
- Reduce impact on environment
- Sustainability
- 'Live ability'



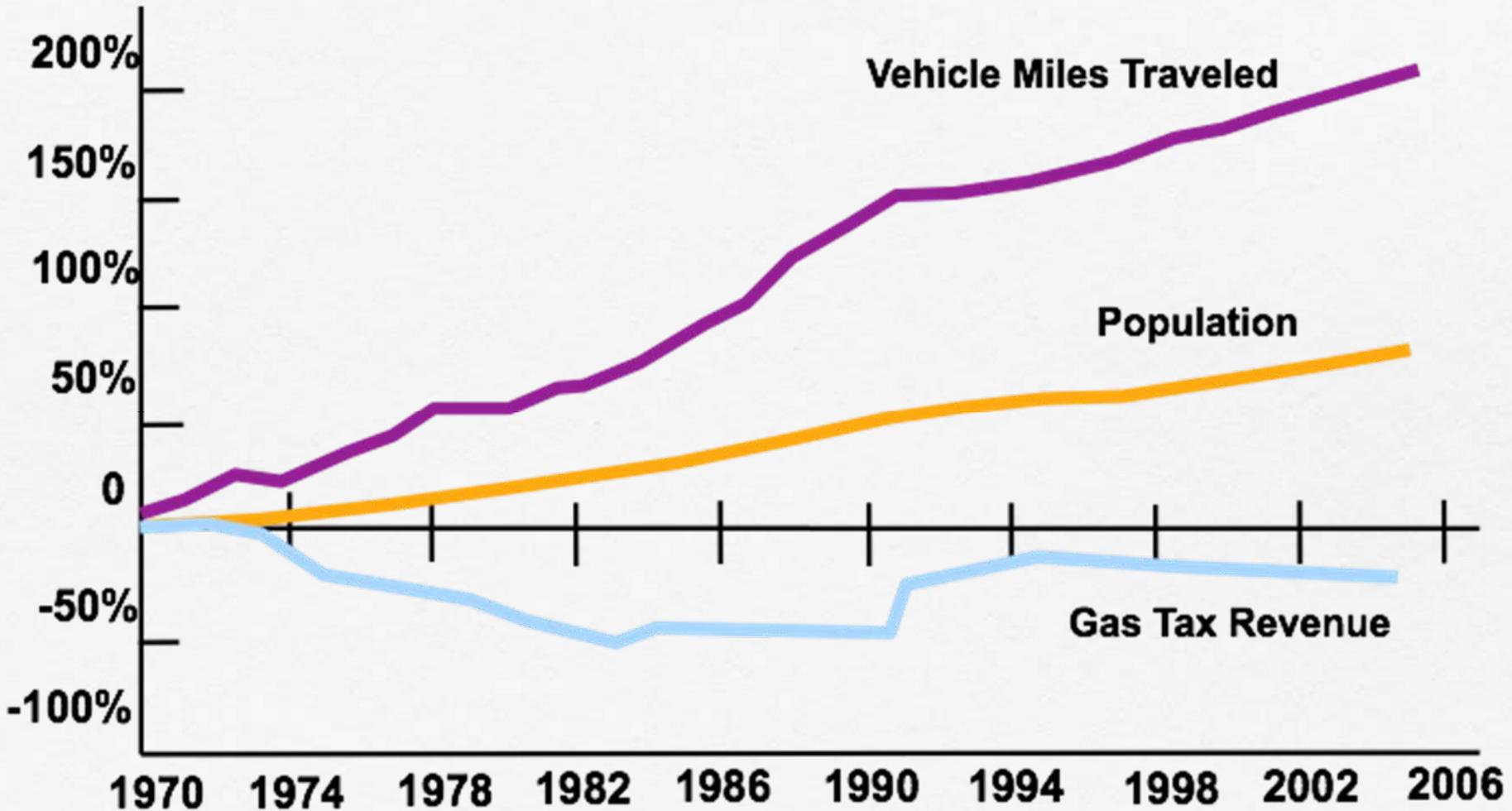


Needs

- **USA needs to spend \$225 to \$340 billion per year on average through 2055**
 - ◆ Highway
 - ◆ Bridge
 - ◆ Public transit
 - ◆ Freight rail
 - ◆ Intercity passenger rail
- **Currently USA spending is less than \$90 billion per year**



Gas Tax Revenue has not kept up



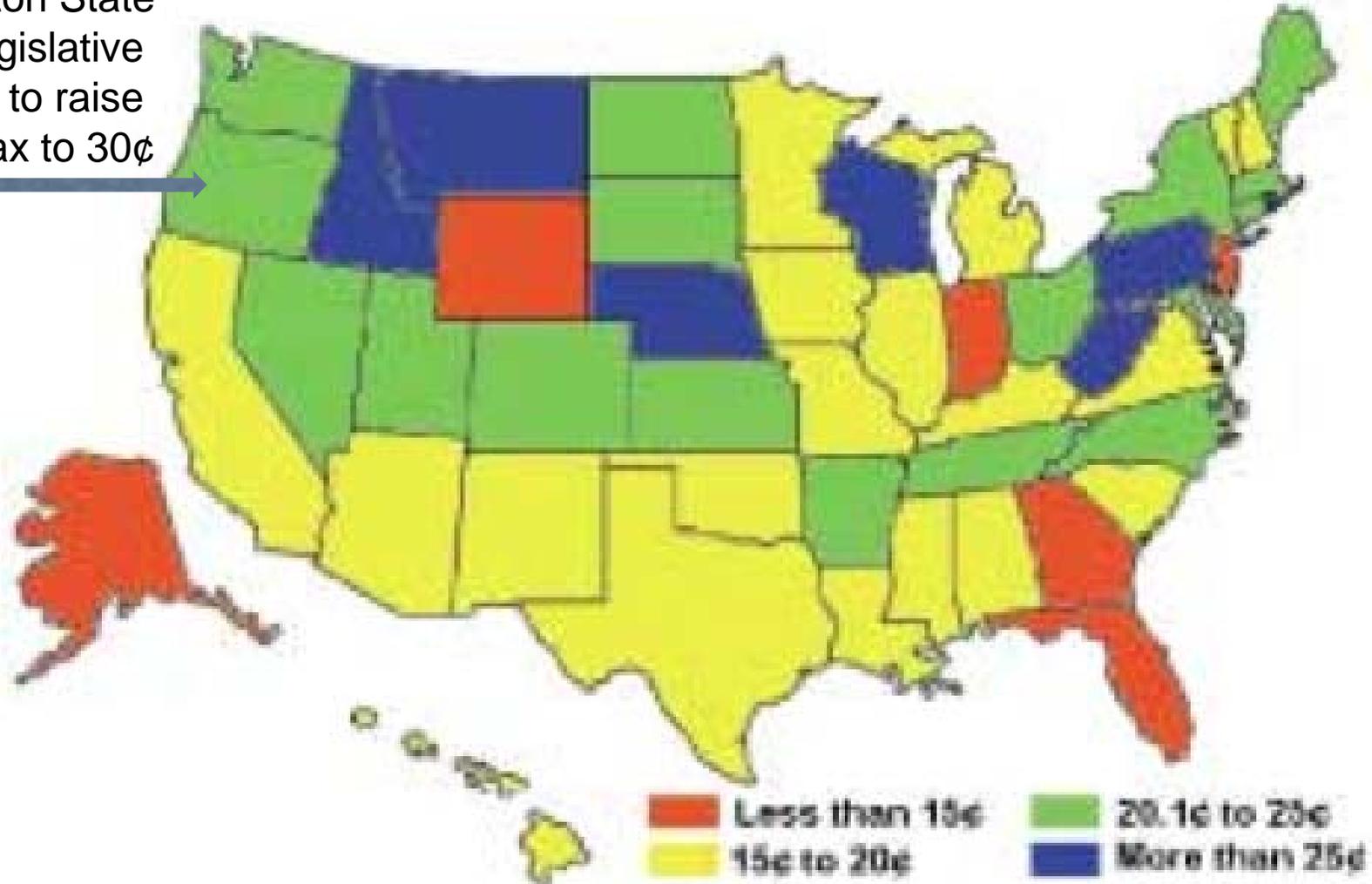
Note: Southern California Association of Government Data - RTP 2006



State Additions to Federal Gas Tax

Federal Excise Tax on Fuel = 18.4¢

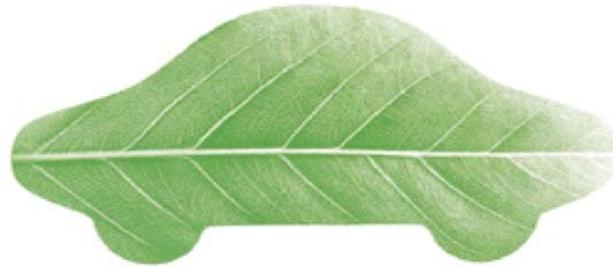
Washington State
current legislative
measure to raise
fuel tax to 30¢



Note: Does not include local fuel tax measures



New technologies and new energy sources are being introduced



Energy diversity

CO₂ reduction

Air quality

Hybrid technology

Gasoline,
diesel

LP, Natural
Gas - fuels

Biofuels

Synthetic
fuels

Electricity

Hydrogen

The right car, the right place, the right time



Recommendations from National Surface Transportation Infrastructure Financing Commission

- ❑ **The current path is unacceptable**
- ❑ **System demands are outpacing current investments**
- ❑ **Fuel tax-based funding approach is insufficient at current rates**
- ❑ **Sustainability of fuel taxes is eroding quickly and unlikely to follow smooth path, with technology advancement and determination to address global climate change**
- ❑ **In the short term, feasible options are limited**



Recommendations from National Surface Transportation Policy and Revenue Study Commission

- Begin transition to mileage-based user (VMT) fee as soon as possible, with 2020 as implementation goal**
- Maintain/strengthen integrity of the Highway Trust Fund**
- Increase existing HTF revenue sources**
- Tolling and Other Direct User Fee Initiatives**
- Federal Assistance, Financing Incentives, Tax Policy**
- Private Sector Financial Participation (PPPs)**



Key Issues - Future mobility and behaviour change

- ❑ **Demand Management / Road Pricing will be a key driver.**
- ❑ **Clearly technology is evolving for both the vehicle and the infrastructure through developments in Video, RFID, DSRC, GPS with wireless communications, ITS and the 'connected vehicle' are merging.**
- ❑ **How beneficial this will be will depend upon how 'joined up' and 'coordinated' the developments will be or perceived.**
- ❑ **Decisions will need to be made soon to harness these opportunities in the near future as "pilots".**
- ❑ **Where will the investment come from? Who will invest in it? Who will own it? Who will manage it?**



USA Aggregate Public Opinion on Road Pricing

Type	For	Against
HOT Lanes	73%	15%
Traditional Tolling	71%	26%
Express Toll Lanes	62%	23%
Zone/Cordon Pricing	32%	53%
Private Ownership	0%	60%



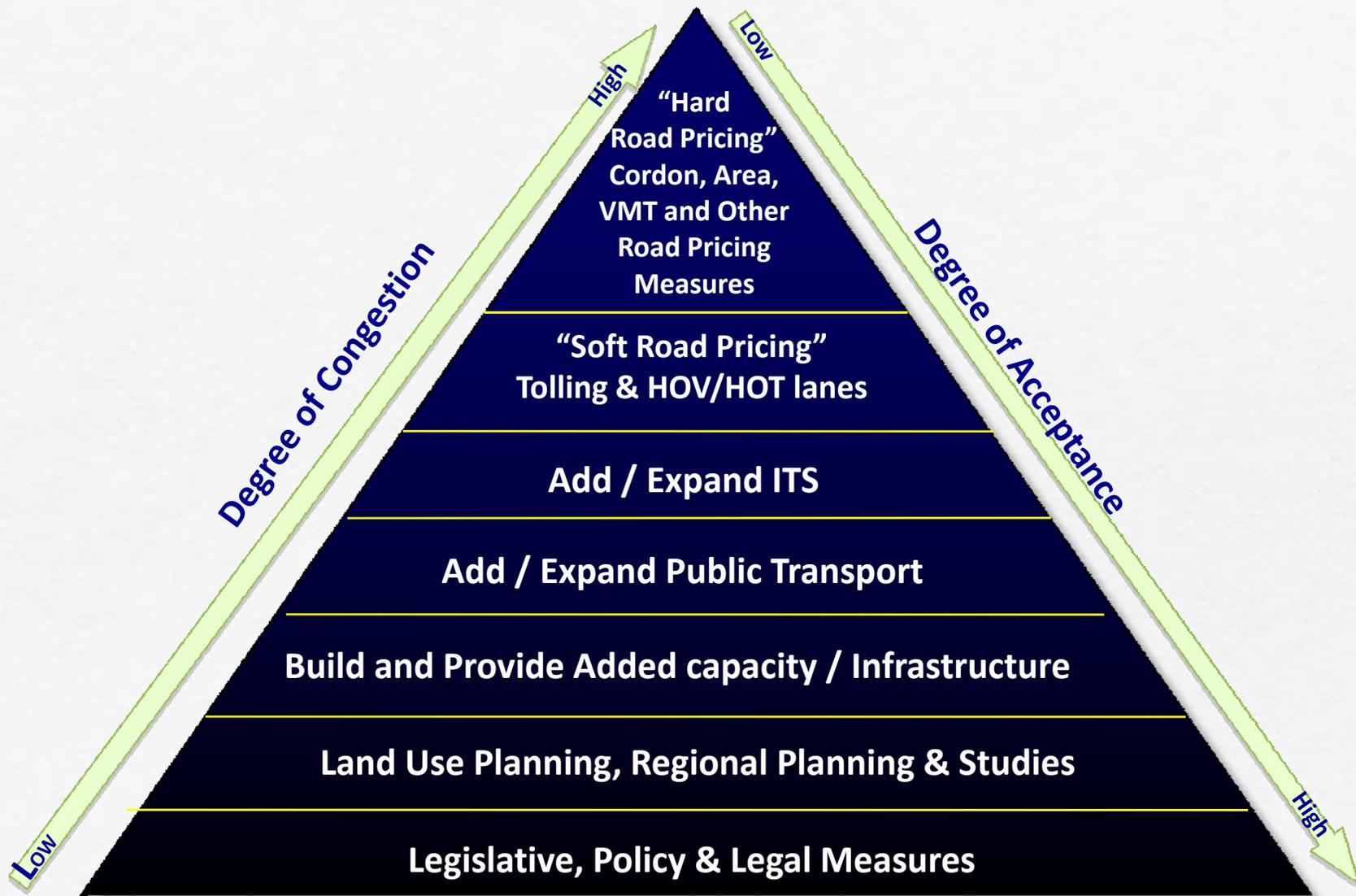
Transformation — Financing Mobility and Infrastructure Debate

- **Central Funding:** Revenue competes with defense, health, education and welfare funding.
- **User Pays (Gas Tax):** Increases in Fuel Excise Tax at Federal, State and Local Levels.
- **User Pays Plus (Gas Tax + Sales Tax + Tolls):** Fuel Excise Tax remains the same but augmented by other taxes and greater use of tolls at State and Local Levels.
- **VMT Tax:** Vehicle Miles Traveled Tax replaces Fuel Excise Tax at Federal, State and local levels over next 15 years.
- **Restructure Into Social Shearholding Corp:** Create new Citizen Shared Entity authorized to collect RUC and tasked to manage State Road Network.



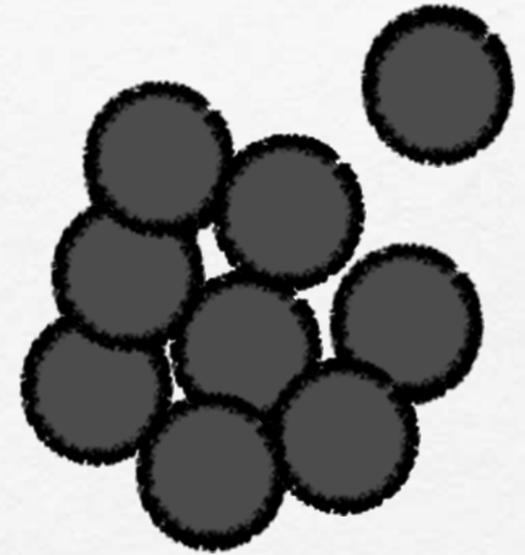


Transport Policy - Hierarchy of Needs





There are no silver bullets...
but there is platinum buckshot! ..



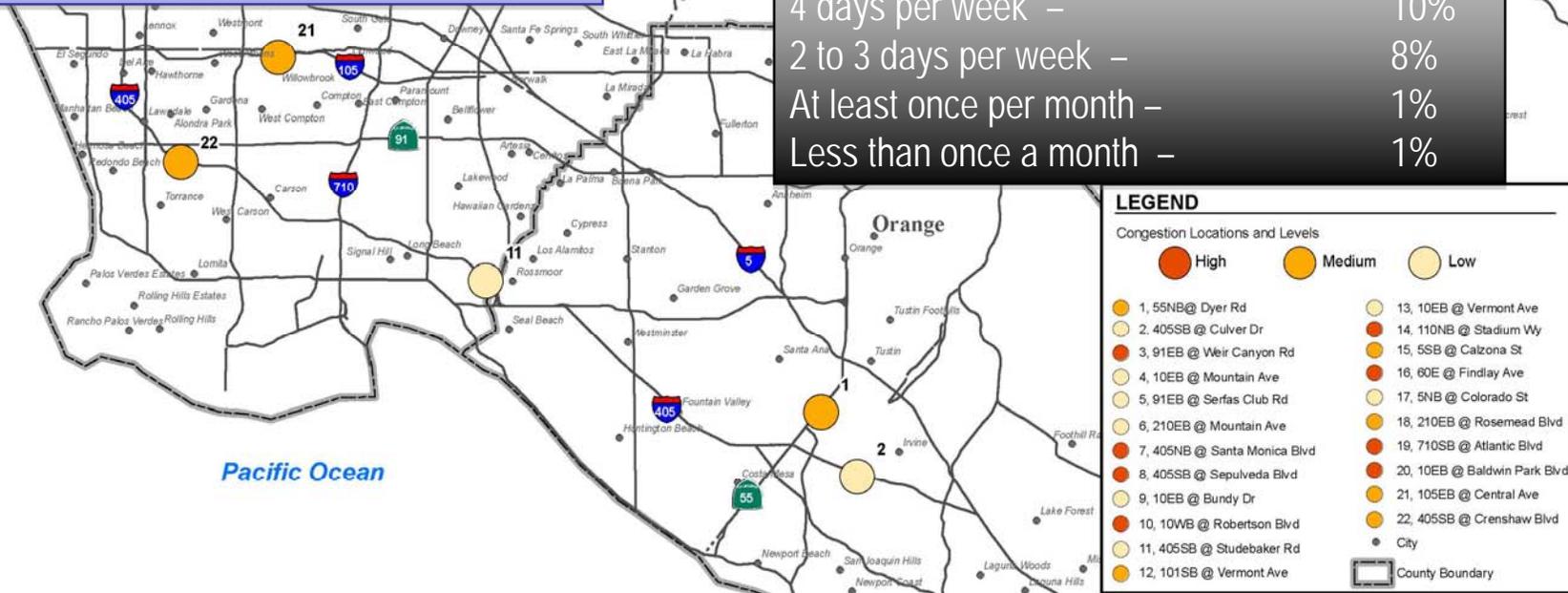


Congestion in SCAG Region

Population —	18.1M
Employment full time —	44%
Employment part-time —	10%
Self-Employed at Home —	2%
Self Employed working outside home —	3%
Unemployed —	5%
Homemaker (not employed) —	5%
Student —	6%
Retired —	16%
Other —	1%

Drive by yourself —	81%
Carpool —	7%
Bus —	5%
Light Rail—	1%
Bike —	1%
Walk—	2%
Motorcycle —	1%
Other —	1%

5 or more days per week —	80%
4 days per week —	10%
2 to 3 days per week —	8%
At least once per month —	1%
Less than once a month —	1%





Public Opinion Polls on Road Pricing *“Attitudes”*

	Agree	Disagree
Traffic Congestion is a way of life in the area	84%	14%
When Gas prices were high (\$4/g) I cut down on unnecessary car trips	77%	22%
Even with high gas prices, tolls & congestion, I will still drive & NOT use PT	68%	30%
With increased gas prices, tolls & congestion, I am looking for ways to drive less & use PT more	48%	51%
I am willing to pay a little more in transport fees to reduce my commute or travel time.	42%	55%
When gas prices were high (\$4/g) I increased my use of PT	32%	68%



Public Opinion Polls on Road Pricing *“Charging Concepts”*

	Favor	Oppose
One or two lanes where traffic could move faster	47%	53%
Variable Priced Parking	33%	64%
Charging all lanes by TOD & Congestion level	17%	81%
Charging for Access to area or zone	20%	76%
Charging for total miles driven	19%	80%
Distance based fee to replace gas tax	32%	69%



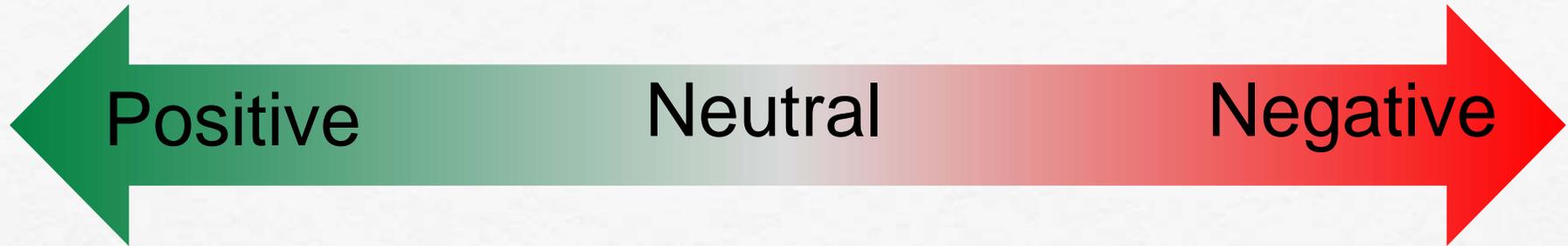
Public Opinion Polls on Road Pricing

“Features”

	More Likely	Less Likely	No Opinion
Ensuring all funds collected are spent on transport improvements in the area they are collected	58%	22%	17%
Establish a citizen oversight committee to determine whether funds collected were spent efficiently, effectively & as promised	54%	27%	19%
Testing a road pricing approach on a temporary basis to determine if it works	52%	35%	13%
Offering it as one part of a comprehensive solution to reduce traffic congestion	51%	33%	15%
Establishing an annual independent audit to determine whether funds collected were spent efficiently, effectively & as promised	47%	27%	18%



Public Opinion Polls on Road Pricing *"Reference Terms"*



Express Lanes

Choice Lanes

Smart-Choice Fees

'TIF' - Transit Improvement Fees

Transportation User Fees

Congestion Pricing

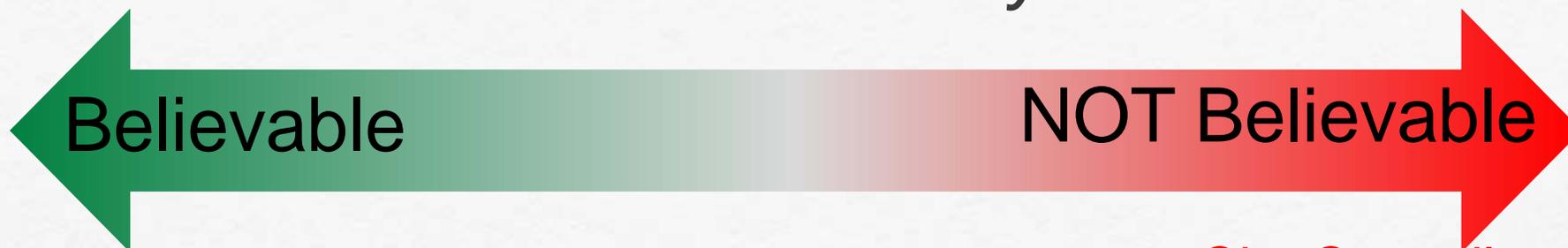
Toll Lanes

Traffic Relief Fees

Facility Pricing



Public Opinion Polls on Road Pricing *"Believability"*



Local Firefighters

AAA – Automobile Club

Traffic Engineer

Local Law Enforcement

Driver who tried it

University Traffic Expert
Small Business Owners

City Council

County Board of Supervisors

Local Labor Unions

Chamber of Commerce

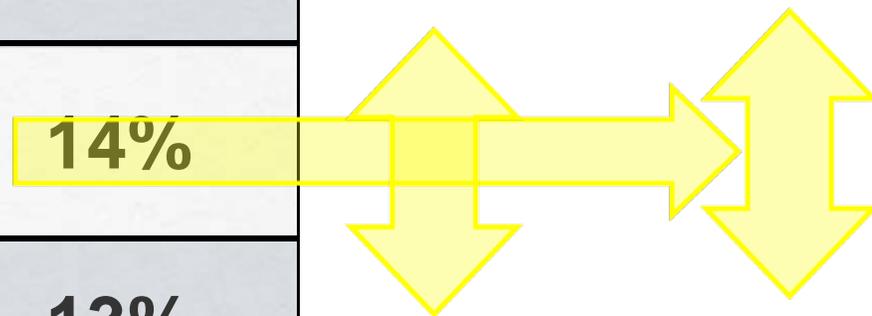
Mayor

Environmental Groups



Public Opinion Polls on Road Pricing *"Impressions"*

	Initial
Strongly Favor	13%
Somewhat Favor	24%
Need More Information	14%
Somewhat Oppose	13%
Strongly Oppose	34%





Future for Mobility and behaviour change? Intelligent Infrastructure

- ❑ **Intelligent design:** Infrastructure *'fit for purpose'* and flexibility
- ❑ **Intelligence from Infrastructure:** Information collected and collated to optimise use and measure performance/effectiveness
- ❑ **Design in intelligence:** Built as *"open systems/standards"* into vehicles and local autonomous systems
- ❑ **Intelligent use:** For people, by people, and Influences behaviour by choice & fitting style





EXAMPLE: V2V & V2I will transform transport

Government

Communicaitons

- ▶ Communications

Highway Departments

- ▶ Improved traffic management
- ▶ Improved safety

Transit Industry

- ▶ Improved operations

Freight Industry

- ▶ Increased efficiency

Citizen Groups

- ▶ Equality

Privacy Groups

- ▶ Privacy

Insurance Providers

- ▶ Improved safety
- ▶ Lowered regulation costs
- ▶ Better customer data

Customers

- ▶ Improved safety
- ▶ Improved mobility
- ▶ Commercial and consumer applications

Vehicle Manufacturers

- ▶ Potential increased vehicle sales
- ▶ Additional service and device revenues
- ▶ Real-time vehicle data for improved service and reduced warranty costs
- ▶ Direct access to customer; improved Customer Relationship Management

Automobile Dealers

- ▶ Sales of services and vehicles
- ▶ Marketing

Hardware Suppliers

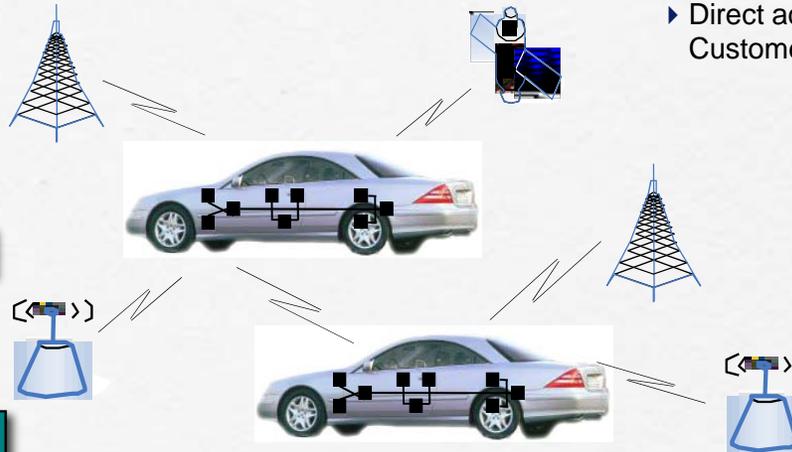
- ▶ Sales

Service/Content/Application Providers

- ▶ Subscribers
- ▶ Service and hardware revenue
- ▶ Access to customer base

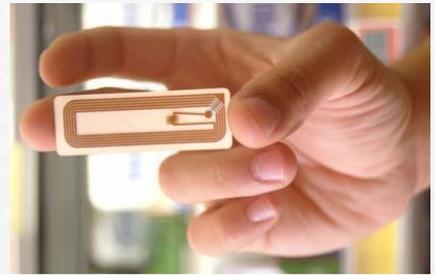
Carriers

- ▶ Air time
- ▶ New subscribers
- ▶ Data services

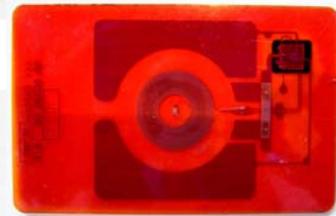
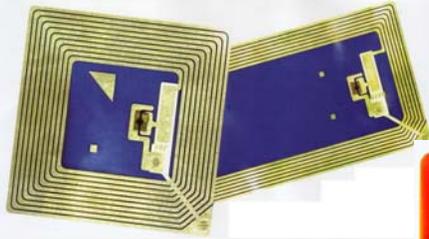
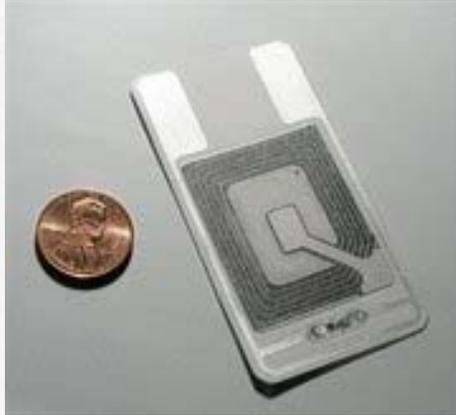
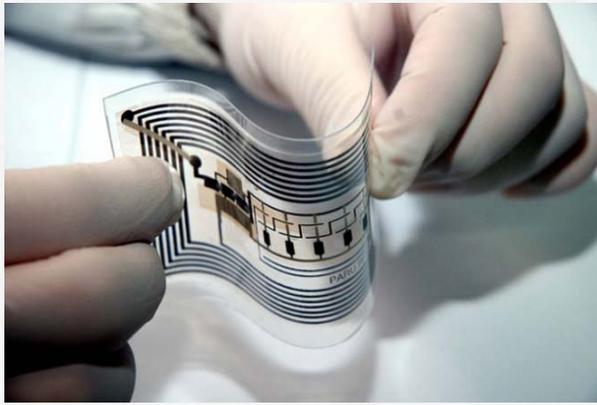




EXAMPLE: Ubiquitous micro-electronics



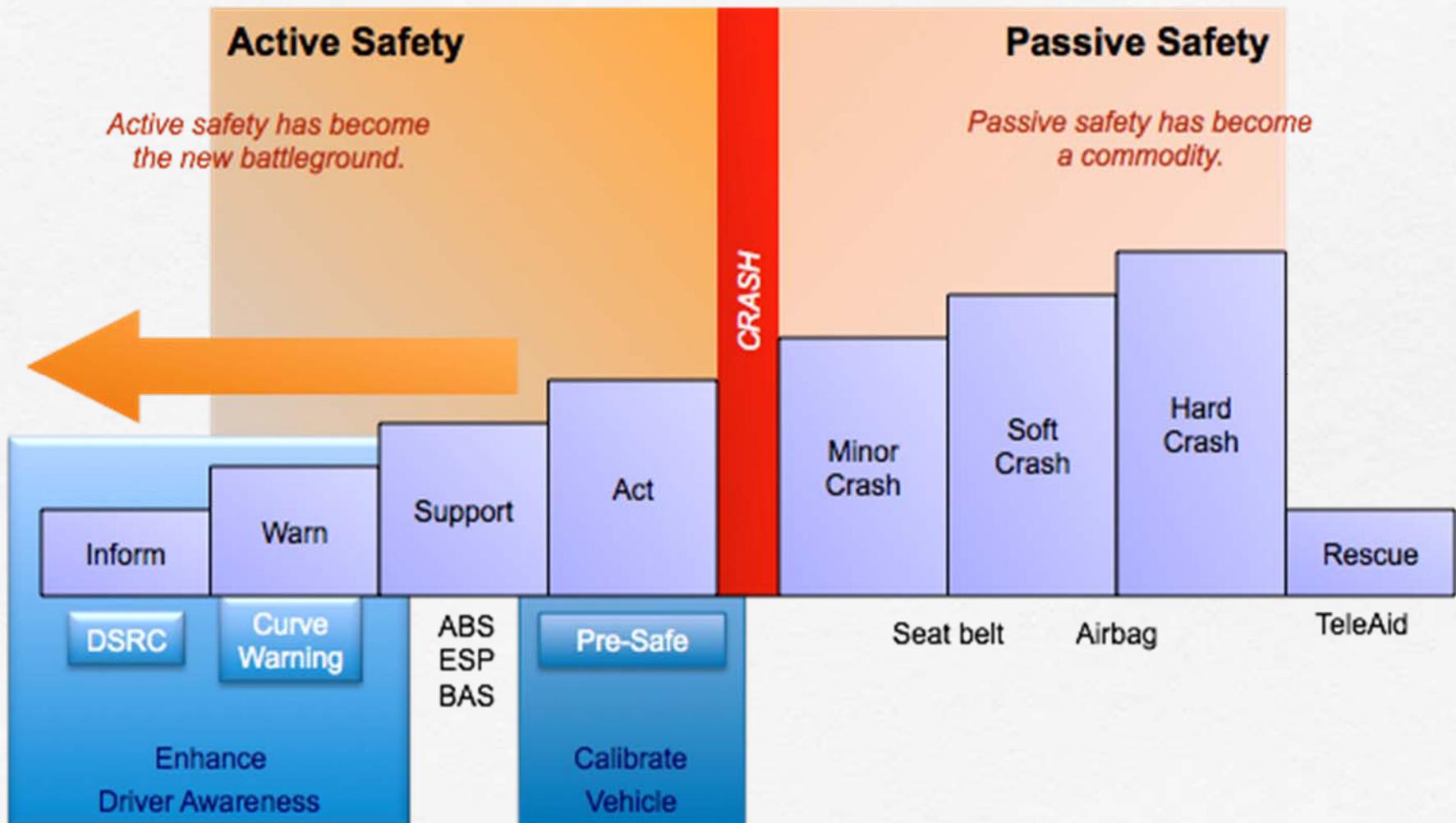
6C sticker tag - actual size





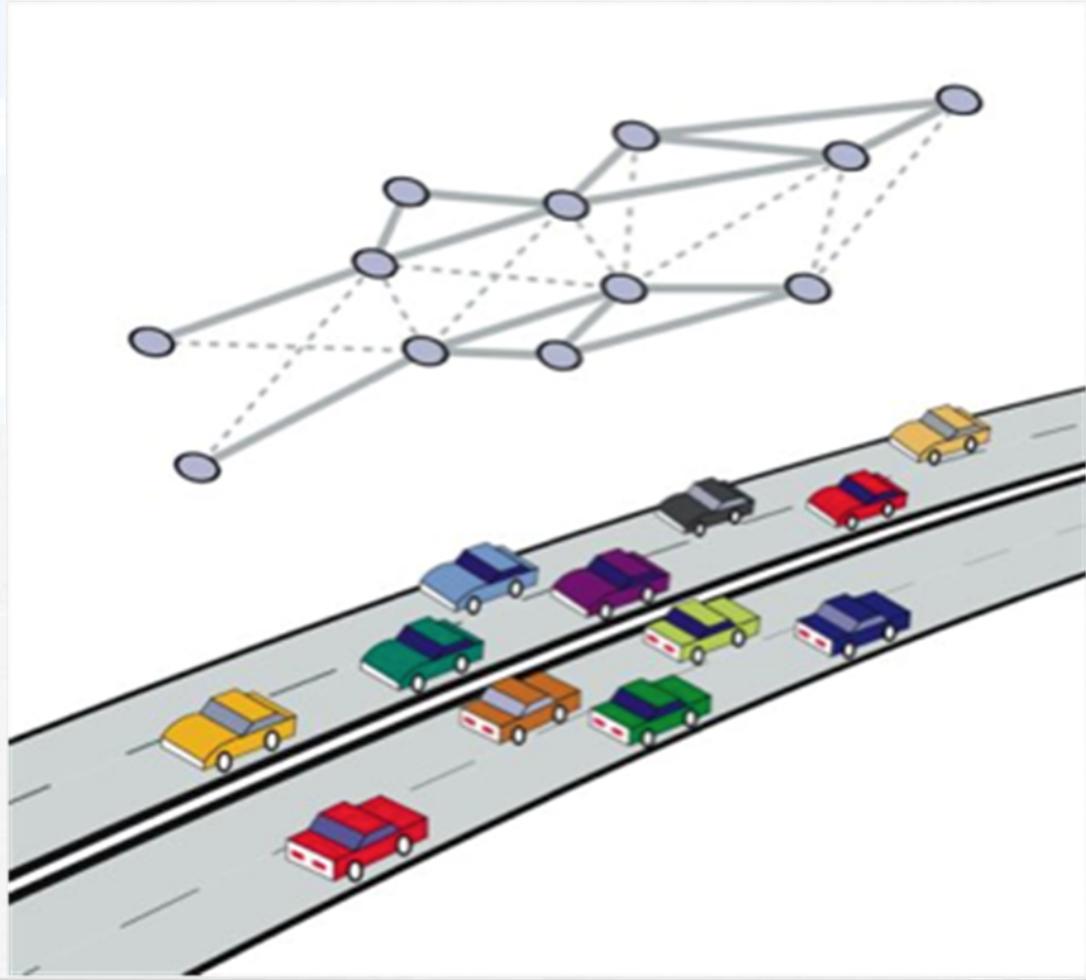
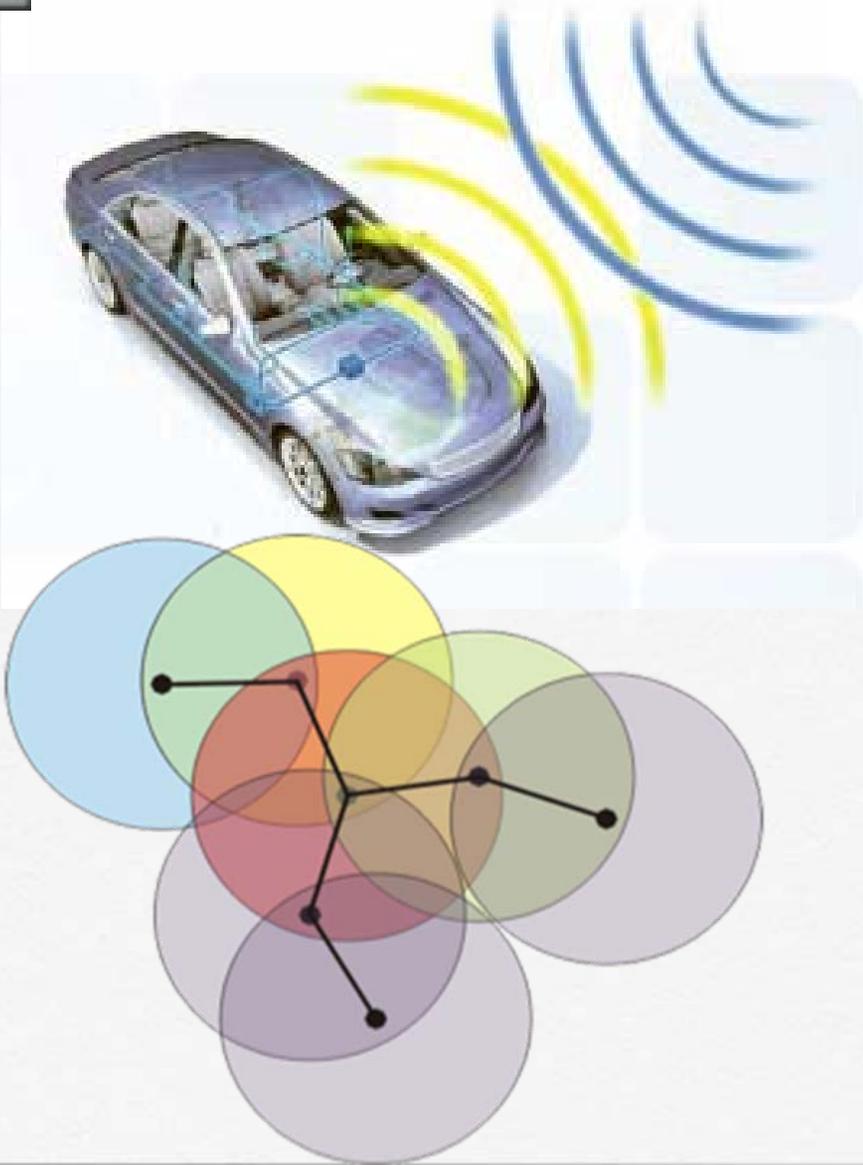
EXAMPLE: Safety - Reactive to predictive

Focus in safety shifts towards accident avoidance and collision mitigation.





EXAMPLE: "All Seeing" Networks

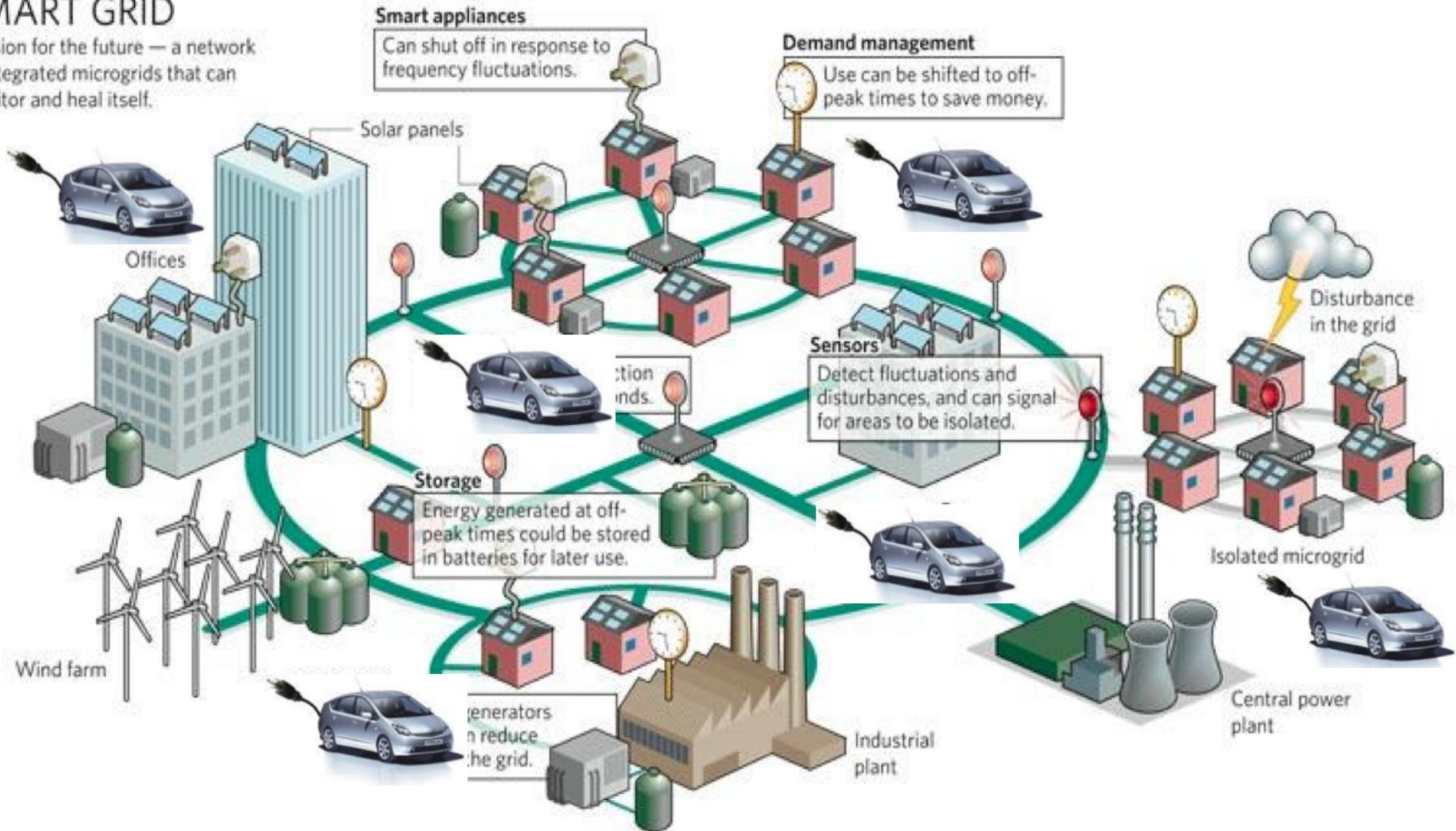




EXAMPLE: "Smart" Energy Grids

SMART GRID

A vision for the future — a network of integrated microgrids that can monitor and heal itself.





EXAMPLE: Mobile Payment Evolution



Metal token



Coins



Paper ticket



Carnet Tickets



Magnetic ticket



Mylar Magnetic ticket



Contact Smart Card



DSCR RW Transponder



Contactless Smart card



Blink Contactless Credit Cards



Blink Contactless Credit Cards



Smart token



Limited Use smart ticket



Low Usage (LU) smart ticket



NFC Phone

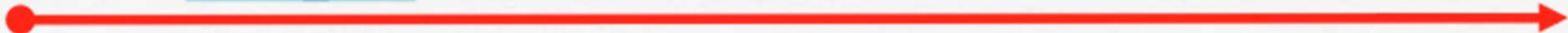


1980

1990

2000

2010



Credit Card Industry - Visa and MasterCard

- ❑ Convenience and flexibility are the keys to success
- ❑ Strategy - allow transactions anywhere, anytime and in any way using a range of devices
- ❑ Time saving solutions and increased benefits are based on functionality and usability
- ❑ Cost savings is based on economies of scale
- ❑ Growth is expected at 15% annually for the next 10 years doubling transaction volumes by 2010
- ❑ Electronic payment industry is re-thinking their business models and creating an atmosphere for partnership amongst the many desperate payment systems worldwide

Visa

- ▶ 1.3 billion cards in circulation
- ▶ \$4 trillion volume
- ▶ 24 million merchants
- ▶ 160 countries
- ▶ 20,000 member financial institutions

MasterCard

- ▶ 749 million cards in circulation
- ▶ \$1.74 trillion volume
- ▶ 24 million merchants
- ▶ 19.1 billion transactions
- ▶ 25,000 member financial institutions

Near Field Communication is a very-short-range radio frequency connectivity technology that enables two-way interactions among electronic devices



NFC



- Jointly developed by Philips and Sony
- Based on RF technology at 13.56 MHz
- Standard ISO 18092 and backward compatible with ISO 14443
- Typical Operating distance of up to 10 cm/4 inches
- Data exchange rate up to 424 Kbit/sec (1 Mbit planned)
- Easy and intuitive to use



Mobile NFC (Near Field Communication) enables uses cases with attractive revenue opportunities for transportation and adjacent industries

1

Payment

▶ Mobile payment:

- Retail stores (POS)
- Tolling
- Road Charging
- Restaurants
- Substitute credit / debit cards



Overview of Mobile NFC Use Cases



2

Ticketing

▶ Mobile ticketing:

- Public transport
- Concerts
- Sport events
- Ski lifts



3

Marketing

- ▶ Loyalty programmes
- ▶ eVouchers
- ▶ NFC enabled posters / billboards



4

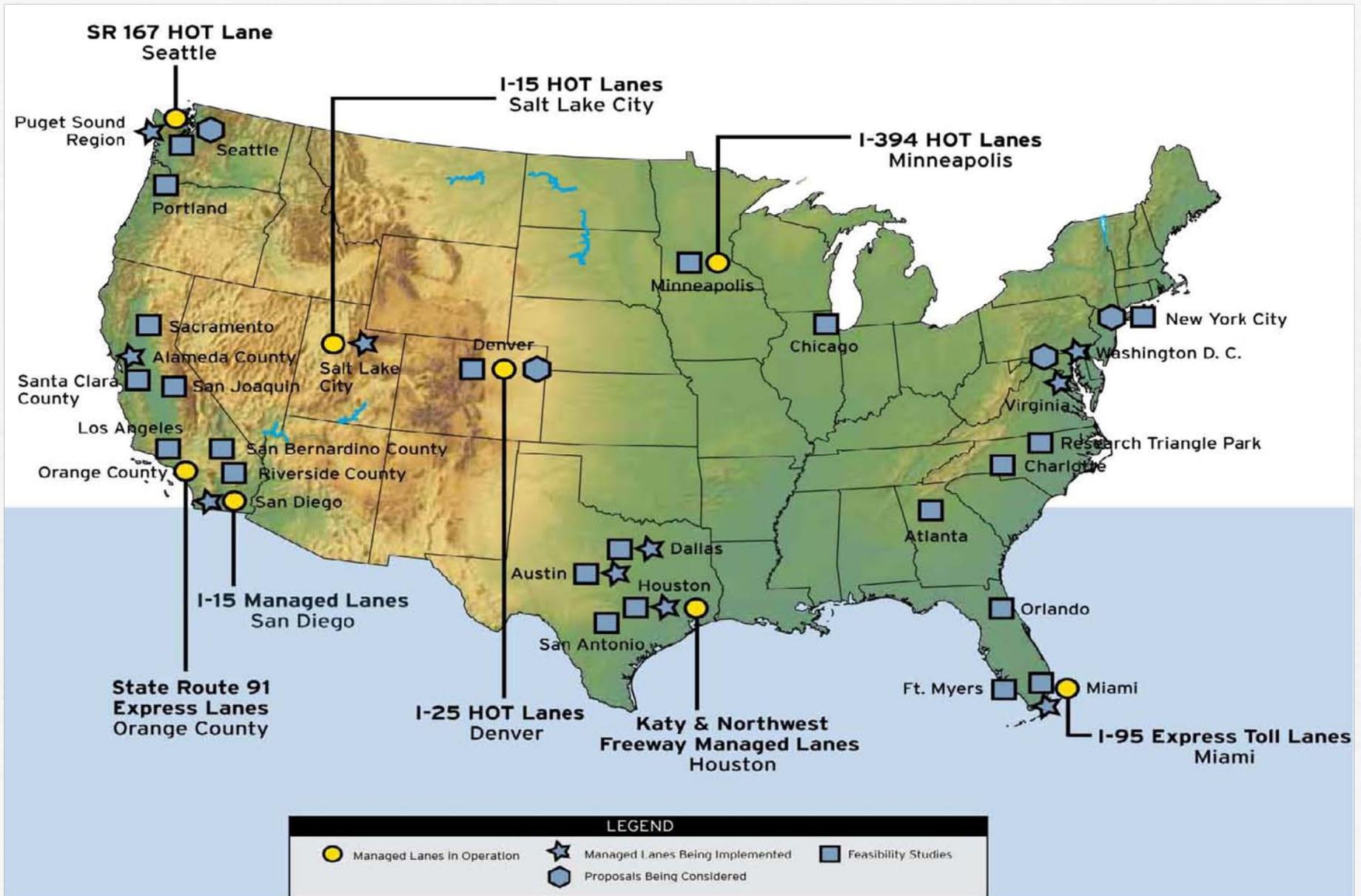
Access Control

▶ Access control:

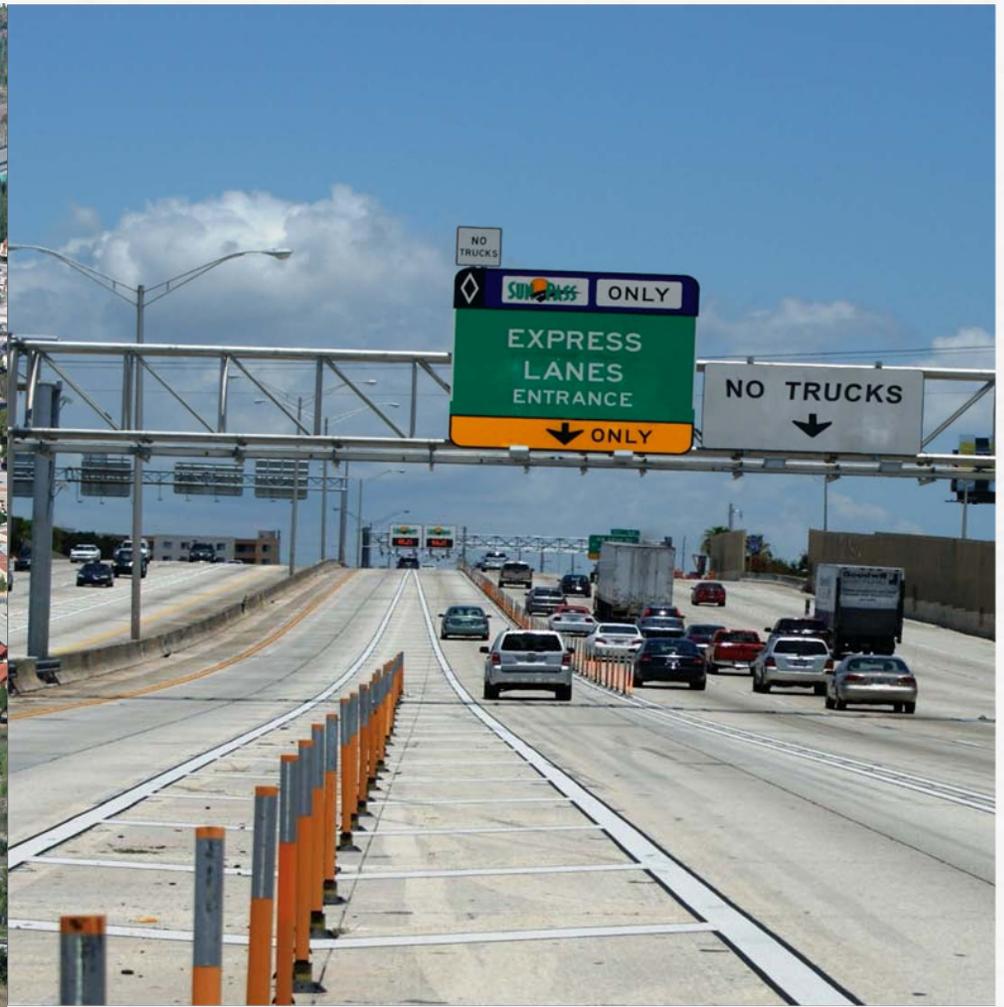
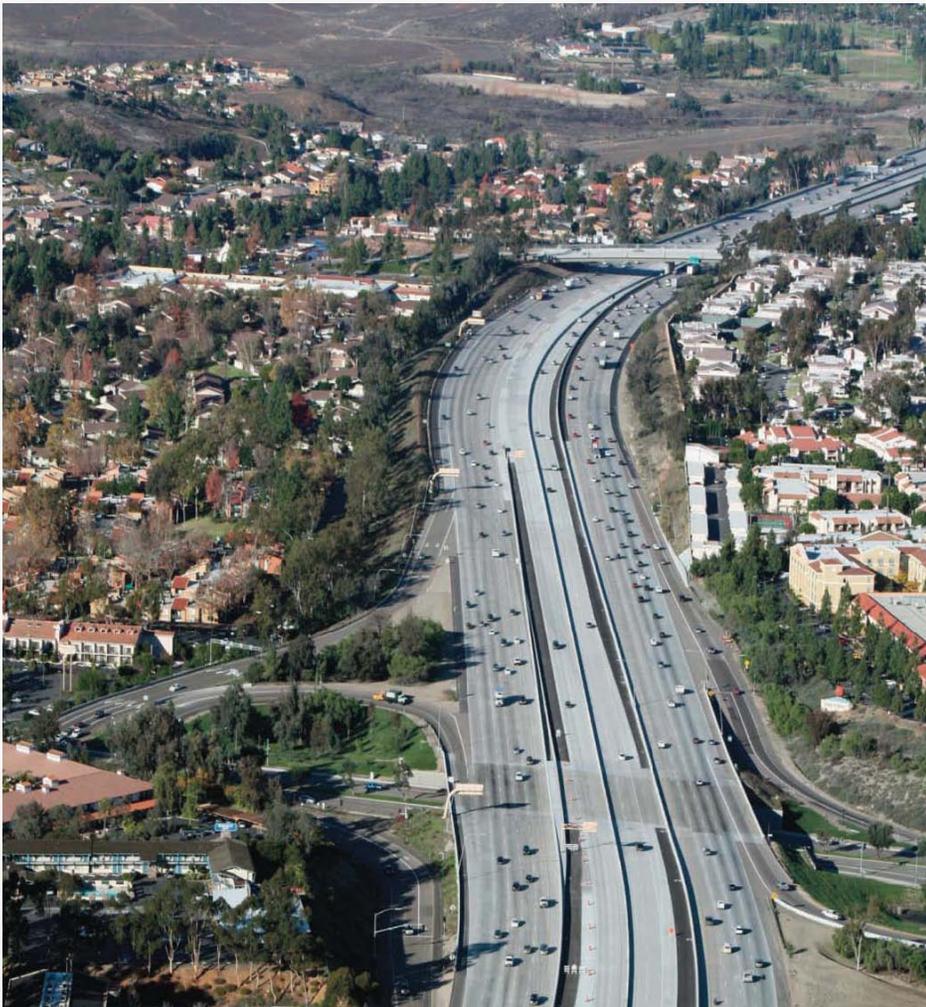
- Office buildings
- Computer Systems
- Cars



Transition — “Soft Road Pricing” — Hotlanes

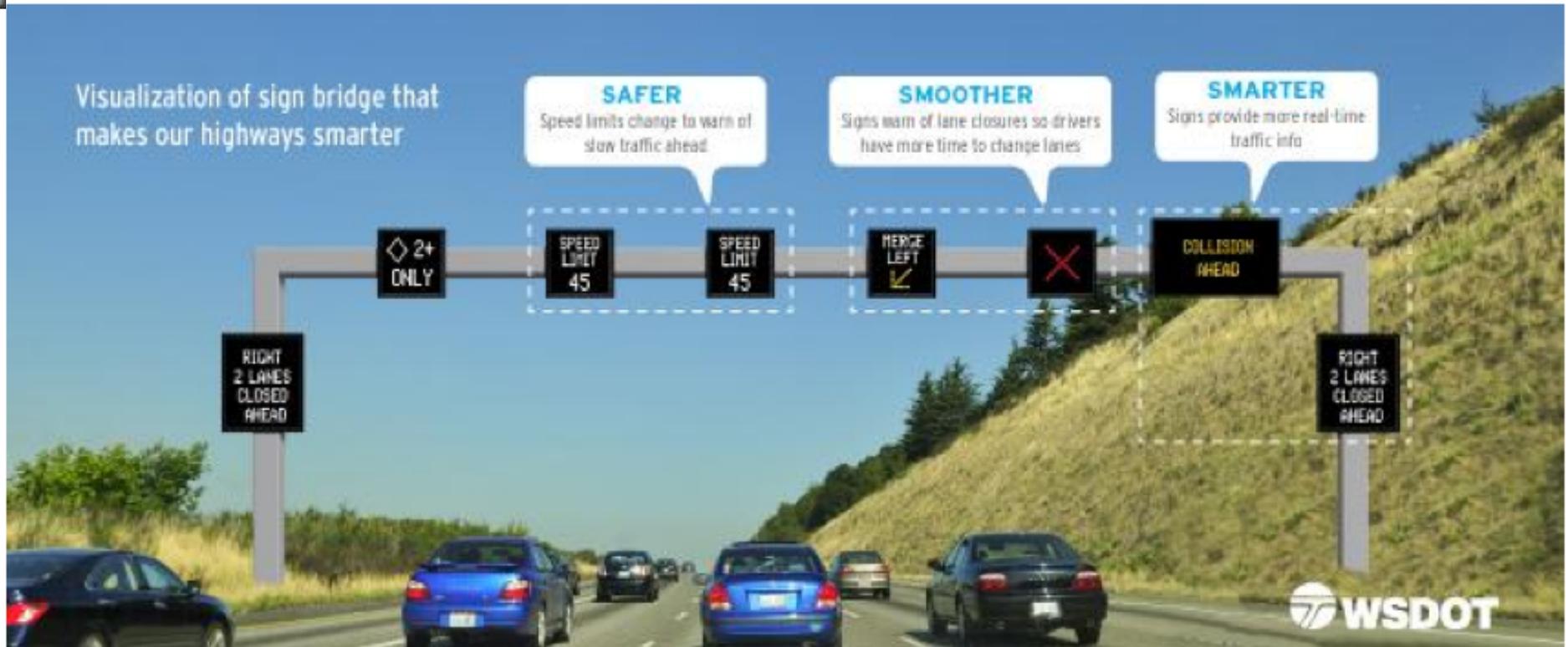


Examples of HOT Lanes





Washington State Department of Transportation's Implementation of Active Traffic Management



- **Variable speed limits**
- **Lane control**
- **Automatic, instant traffic information**

Signs every half mile warn of slower traffic and blocked lanes ahead to prevent collisions that causes congestion.

Information instills trust; trust means compliance.





Transition — “Network in a Network”

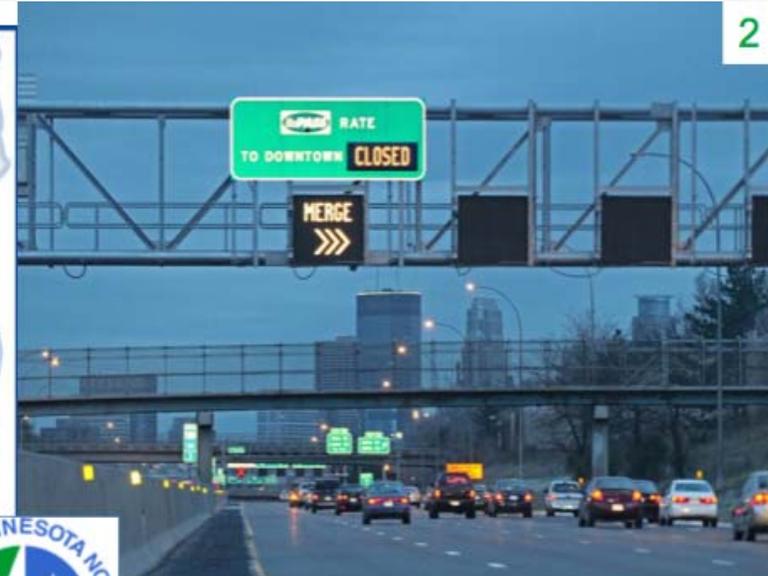
Bay Area Express Lane Network

- 800 miles total
- 500 miles of converted HOV
- 300 miles of new lanes (60% are “gap closures”)
- 5% increase in freeway mileage





Transition — “MN Pass HOT Network”





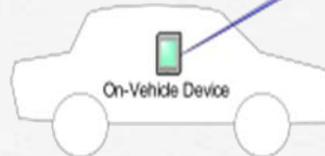
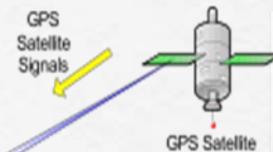
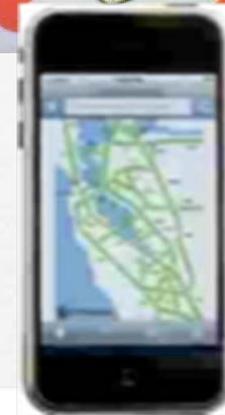
Future: VMT - Initial Concepts

□ Begin Initial R&D, Pilot Programs on “Road Pricing”

- ◆ Document baselines and B/C analysis
- ◆ Address charging and rate structure
- ◆ Standardize “open” technology platforms
- ◆ Address IC Act for cross border enforcement
- ◆ Investigate and address Treasury/Financial System for payments/accounts

□ Transition Plan:

- ◆ Gas Tax Increases
- ◆ Mandate end date
- ◆ Opt-in Choice
- ◆ Establish staggered ramp-up
- ◆ Vehicle Manufacturing Mandate - based on safety





Future VMT - An alternate to fuel excise tax

- ❑ **Vehicle Miles Travelled (VMT) taxing is:**
 - ◆ The most favored road pricing alternative to gas tax
 - ◆ Tax on infrastructure usage that does not diminish with increasing fuel efficiency
 - ◆ Allows countrywide, national, free flow tolling/pricing
- ❑ **Technology options for VMT measurement:**
 - ◆ Time Metering or Odometer
 - ◆ Vehicle Inertial Navigation Sensors (INS)
 - ◆ Cell phone triangulation
 - ◆ RFID / DSRC/5.9 GHz WAVE or CALM (802.11p)
 - ◆ GPS
- ❑ **Challenges:**
 - ◆ Politically difficult (perhaps easier than raising gas tax)
 - ◆ Challenge to integrators, governance
 - ◆ Enforcement of out-of-jurisdiction vehicles
 - ◆ Transition and phasing

Pay by the mile | Oregon recently tested a system for charging road users by the mile to replace the dwindling gas tax. The yearlong test involved about 285 vehicles and two service stations:



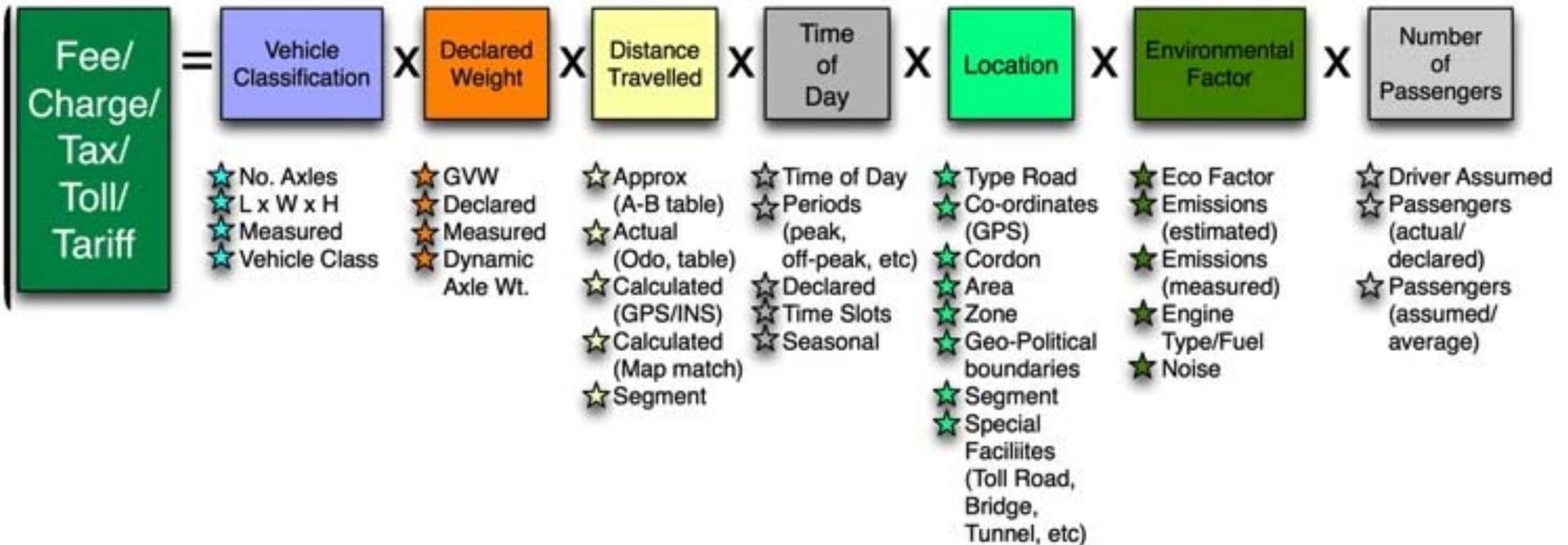
Source: Oregon Department of Transportation

STATE OF OREGON | BUREAU OF TRANSPORTATION



VMT Tariff can match Policy Objectives

Key Issue: What are the objectives?



Keep It Simple



SUMMARY: TRANSFORMATION

Building acceptability for future funding mechanisms

- **Recognize the acceptability drivers:**
 - ◆ Use “positive” terms
 - ◆ Run pilots to “experience” benefits
 - ◆ Transparency
 - ◆ Citizen oversight

- **Technology is NOT the pacing item, using it intelligently is! Advancement is oblique**

- **Recognize the impending death of the fuel tax**
 - ◆ Fleet fuel efficiency increasing from 2.2% to ~3.6%+ p.a.
 - ◆ Greater number of fuel efficiency vehicles
 - ◆ Reduction of revenue by 32% to 40+% in 10 years



Transformational Thinking - Policy of Change

“ We can't solve problems by using the same kind of thinking we used when we created them. ”

Albert Einstein



Thank you!

Jack Opiola
Senior Partner

jack.opiola@me.com

Direct: +1 (703) 391-0018

Mobile: +1 (703) 622-6446