SOUTHERN CALIFORNIA ASSOCIATION of GOVERNMENTS

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JOINT MEETING OF THE

REGIONAL COUNCIL; COMMUNITY, ECONOMIC AND HUMAN DEVELOPMENT; ENERGY AND ENVIRONMENT; AND TRANSPORTATION COMMITTEES

Please Note Time
Thursday, April 2, 2015
10:45 a.m. – 12:15 p.m.

SCAG Main Office
818 W. 7th Street, 12th Floor
Board Room
Los Angeles, CA 90017
(213) 236-1800

If members of the public wish to review the attachments or have any questions on any of the agenda items, please contact Lillian Harris-Neal at (213) 236-1858 or via email at harris-neal@scag.ca.gov. In addition, regular meetings of the Regional Council may be viewed live or on-demand at http://www.scag.ca.gov/NewsAndMedia/Pages/SCAGTV.aspx

Agendas & Minutes for the Regional Council are also available at: http://www.scag.ca.gov/committees/Pages/default.aspx

SCAG, in accordance with the Americans with Disabilities Act (ADA), will accommodate persons who require a modification of accommodation in order to participate in this meeting. SCAG is also committed to helping people with limited proficiency in the English language access the agency's essential public information and services. You can request such assistance by calling (213) 236-1858. We request at least 72 hours (three days) notice to provide reasonable accommodations. We prefer more notice if possible. We will make every effort to arrange for assistance as soon as possible.

The Regional Council consists of 86 elected officials representing 191 cities, six counties, six County Transportation Commissions, one representative from the Transportation Corridor Agencies, one Tribal Government representative and one representative for the Air Districts within Southern California.

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JOINT MEETING OF THE
REGIONAL COUNCIL AND POLICY COMMITTEES
(COMMUNITY, ECONOMIC AND HUMAN DEVELOPMENT COMMITTEE; ENERGY AND ENVIRONMENT COMMITTEE; TRANSPORTATION COMMITTEE)
AGENDA
APRIL 2, 2015

CALL TO ORDER & PLEDGE OF ALLEGIANCE
***(Hon. Carl Morehouse, President*)**

PUBLIC COMMENT PERIOD – Members of the public desiring to speak on items on the agenda, or items not on the agenda, but within the purview of the Council, must fill out and present a Public Comment Card to the Assistant prior to speaking. Comments will be limited to three (3) minutes per speaker. The President has the discretion to reduce the time limit based upon the number of speakers. The President may limit the total time for all public comments to twenty (20) minutes.

CONSENT CALENDAR		**Page No.**
Approval Item		
1. Minutes of the February 5, 2015 Joint Meeting of the Regional Council and Policy Committees	**Attachment**	**1**
DISCUSSION ITEM		
2. Southern California's Transportation System Preservation and Operations ***(Hasan Ikhrata, Executive Director)***	**Attachment**	**6**

ADJOURNMENT

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MINUTES OF THE JOINT MEETING OF THE REGIONAL COUNCIL, COMMUNITY, ECONOMIC & HUMAN DEVELOPMENT (CEHD) COMMITTEE; ENERGY AND ENVIRONMENT COMMITTEE (EEC); AND THE TRANSPORTATION COMMITTEE (TC) OF THE SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS FEBRUARY 5, 2015

THE FOLLOWING MINUTES ARE A SUMMARY OF ACTIONS AND/OR DISCUSSIONS THAT OCCURRED AT THE JOINT MEETING. A VIDEO RECORDING OF THE ACTUAL MEETING IS AVAILABLE AT http://scag.ca.gov/NewsAndMedia/Pages/SCAGTV.aspx

The Joint Meeting of the Regional Council and Policy Committees of the Southern California Association of Governments (SCAG) held its meeting at the SCAG Los Angeles Office. There was a quorum.

TC Members – Present:

Chair*	**1.**	**Hon. Alan Wapner**	**Ontario**	**SANBAG**
Vice-Chair*	2.	Hon. Barbara Messina	*Alhambra*	District 34
	*3.	Hon. Dante Acosta	*Santa Clarita*	District 67
	4.	Hon. John Addleman	*Rolling Hills Estates*	SBCCOG
	*5.	Hon. Bruce Barrows	*Cerritos*	District 23
	*6.	Hon. Glen Becerra	*Simi Valley*	District 46
	*7.	Hon. Ben Benoit	*Wildomar*	WRCOG
	8.	Hon. Russell Betts	*Desert Hot Springs*	CVAG
	9.	Hon. Don Campbell		ICTC
	*10.	Hon. Diana Lee Carey	*Westminster*	OCCOG
	*11.	Hon. Jonathan Curtis	*La Cañada/Flintridge*	District 36
	*12.	Hon. Gene Daniels	*Paramount*	District 24
	*13.	Hon. Steve De Ruse	*La Mirada*	District 31
	*14.	Hon. Paul Eaton	*Montclair*	District 9
	15.	Hon. Bert Hack	*Laguna Woods*	OCCOG
	*16.	Hon. Curt Hagman		San Bernardino County
	*17.	Hon. Jan Harnik	*Palm Desert*	RCTC
	*18.	Hon. Carol Herrera	*Diamond Bar*	District 37
	*19.	Hon. Steve Hofbauer	*Palmdale*	District 43
	*20.	Hon. Jim Hyatt	*Calimesa*	District 3
	*21.	Hon. Jim Katapodis	*Huntington Beach*	District 64

TC Members – Present *(continued):*

	22.	Hon. Micheál O'Leary	*Culver City*	WSCCOG
*	23.	Hon. Clint Lorimore	*Eastvale*	District 4
*	24.	Hon. Michele Martinez	*Santa Ana*	District 16
*	33.	Hon. Andrew Masiel, Sr.	*Pechanga Band of Luiseño Indians*	Tribal Government
*	25.	Hon. Ryan McEachron	*Victorville*	SANBAG
	26.	Hon. Marsha McLean	*Santa Clarita*	North L. A. County
*	27.	Hon. Kris Murray	*Anaheim*	District 19
*	28.	Hon. Frank Navarro	*Colton*	District 6
*	29.	Hon. Linda Parks		Ventura County
*	30.	Hon. Sam Pedroza	*Claremont*	District 38
*	31.	Hon. Gregory Pettis	*Cathedral City*	District 2
	32.	Hon. Teresa Real Sebastian	*Monterey Park*	SGVCOG
	33.	Hon. David Spence	*La Cañada/Flintridge*	Arroyo Verdugo Cities
*	29.	Hon. Karen Spiegel	*Corona*	District 63
	30.	Hon. Tim Spohn	*City of Industry*	SGVCOG
*	31.	Hon. Jess Talamantes	*Burbank*	District 42
	32.	Hon. Brent Tercero	*Pico Rivera*	GCCOG
*	34.	Hon. Marty Simonoff	*Brea*	District 22
*	35.	Hon. Michelle Steel		Orange County
*	36.	Hon. Cheryl Viegas-Walker	*El Centro*	District 1
*	37.	Hon. Chuck Washington	*Temecula*	District 5
*	38.	Hon. Michael Wilson	*Indio*	District 66

CEHD Members – Present:

Chair*	1.	**Hon. Margaret E. Finlay**	***Duarte***	**District 35**
Vice Chair*	2.	**Hon. Bill Jahn**	***Big Bear Lake***	**District 11**
	3.	Hon. Carol Chen	*Cerritos*	GCCOG
*	4.	Hon. Steven Choi	*Irvine*	District 14
	5.	Hon. Debbie Franklin	*Banning*	WRCOG
	6.	Hon. Tom Hansen	*Paramount*	GCCOG
*	7.	Hon. Barbara Kogerman	*Laguna Hills*	District 13
	8.	Hon. Paula Lantz	*Pomona*	SGVCOG
*	9.	Hon. Larry McCallon	*Highland*	District 7
	10.	Hon. Joseph McKee	*Desert Hot Springs*	CVAG
*	11.	Hon. Carl Morehouse	*San Buenaventura*	District 47
*	12.	Hon. Gene Murabito	*Glendora*	District 33
*	13.	Hon. Steve Nagel	*Fountain Valley*	OCCOG
	14.	Hon. Edward Paget	*Needles*	SANBAG
*	15.	Hon. Jim Predmore	*Holtville*	ICTC
*	16.	Hon. Julio Rodriguez	*Perris*	District 69
	17.	Hon. Becky Shevlin	*Monrovia*	SGVCOG
*	18.	Hon. Tri Ta	*Westminster*	District 20
	19.	Hon. Frank Zerunyan	*Rolling Hills Estates*	SBCCOG

*Regional Councilmember

EEC Members – Present:

Chair*	1.	**Hon.**	**Deborah Robertson**	***Rialto***	**District 8**
	2.	Hon.	Denis Bertone	*San Dimas*	SGVCOG
*	3.	Hon.	Ross Chun	*Aliso Viejo*	TCA
*	4.	Hon.	Margaret Clark	*Rosemead*	District 32
	5.	Hon.	Jordan Ehrenkranz	*Canyon Lake*	WRCOG
	6.	Hon.	Larry Forester	*Signal Hill*	GCCOG
	7.	Hon.	Laura Friedman	*Glendale*	Arroyo Verdugo Cities
	8.	Hon.	Sandra Genis	*Costa Mesa*	OCCOG
	9.	Hon.	Steve Hwangbo	*La Palma*	District 18
	10.	Hon.	Diana Mahmud	*South Pasadena*	SGVCOG
	11.	Hon.	Thomas Martin	*Maywood*	GCCOG
	12.	Hon.	Geneva Mojado		Soboba Band of Luiseño Indians
*	13.	Hon.	Mike Munzing	*Aliso Viejo*	District 12
	14.	Hon.	David Pollock	*Moorpark*	VCOG
*	15.	Hon.	Carmen Ramirez	*Oxnard*	District 45
	16.	Hon.	Lupe Ramos Watson	*Indio*	District 66
	17.	Hon	Meghan Sahli-Wells	*Culver City*	WCCOG
	18.	Hon	Diane Williams	*Rancho Cucamonga*	SANBAG
	19.	Hon.	Bonnie Wright	*Hemet*	WRCOG

*Regional Councilmember

Staff Present

Hasan Ikhrata, Executive Director
Sharon Neely, Chief Deputy Executive Director
Debbie Dillon, Deputy Executive Director, Administration
Joe Silvey, General Counsel
Joann Africa, Chief Counsel
Basil Panas, Chief Financial Officer
Rich Macias, Director, Transportation Planning
Huasha Liu, Director, Land Use and Environmental Planning
Darin Chidsey, Director, Strategy, Policy and Public Affairs
Lillian Harris-Neal, Clerk of the Board
Tess Rey-Chaput, Office of Regional Council Support

CALL TO ORDER AND PLEDGE OF ALLEGIANCE

President Carl Morehouse called the meeting to order at 10:06 a.m. Supervisor Linda Parks, Ventura County, led the Pledge of Allegiance.

PUBLIC COMMENT PERIOD

There was no public comment received.

ANNOUNCEMENTS

President Morehouse announced that online registration for the SCAG 2015 Regional Conference and General Assembly is now available and invited the councilmembers to attend as SCAG will also be celebrating is 50th Anniversary. He encouraged the Regional Councilmembers to wear the commemorative SCAG 50th Anniversary lapel pins that were provided to them and to distribute the save-the-date cards to help promote to their colleagues and their respective city staff. President Morehouse stated that the one of the highlights of the conference is the Sustainability Awards Program.

President Morehouse reminded the members regarding SCAG's electronic voting system process that requires members to vote on the communicator keypad using a pre-coded identifying smartcard. He asked the members to insert the smartcards in the keypad when voting; to remove the cards if they need to leave the meeting room; and to re-insert the cards when they return to the meeting. President Morehouse cautioned the members to use care when selecting their votes while using the keypad as the Minutes of the Meetings will be based on these electronically-recorded votes which will indicate how each member voted and will be a part of the official record of the minutes.

CONSENT CALENDAR

Approval Item

1. Minutes of the November 6, 2014 Joint Meeting of the Regional Council and Policy Committees

A MOTION was made (Jahn) to approve the Minutes of the November 6, 2014 Regional Council and Policy Committees' Meeting. Motion was SECONDED (M. Martinez) and passed by the following votes:

AYE/S: Acosta, Addleman, Barrows, Becerra, Bertone, Betts, Campbell, Carey, Chen, Choi, Chun, Clark, Curtis, Daniels, Ehrenkranz, Finlay, Forester, Franklin, Genis, Hack, Hansen, Harnik, Herrera, Hofbauer, Hyatt, Jahn, Mahmud, M. Martinez, Martin, Masiel, Sr., McCallon, McEachron, McKee, Messina, Mojado, Morehouse, Murabito, Murray, O'Leary, Paget, L. Parks, Pedroza, Pettis, Pollock, Predmore, Ramirez, Ramos Watson, Robertson, Rodriguez, Sahli-Wells, Real Sebastian, Shevlin, Sibert, Spence, Spohn, Talamantes, Tercero, Terrazas, Viegas-Walker, Wapner, Williams, Wilson, Wright and Zerunyan.

NOE/S: None.

ABSTAIN: De Ruse, Hwangbo, Katapodis, Lantz, Lorimore, Nagel, Navarro, Procter, Simonoff, Steel, Ta and Washington.

DISCUSSION ITEM

2. Framework for Development of the 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy (2016 RTP/SCS) and Progress Report on 2012-2035 RTP/SCS

President Morehouse introduced the item and provided background information. Hasan Ikhrata, Executive Director, provided a presentation on the goals and the framework of the RTP/SCS; its state and

federal requirements; regional challenges; past RTP/SCS accomplishments; implications and changes in demographic trends; the cycle and roles of the inter-generational partnership; projected growth; workforce issues; unemployment; performance outcomes of the 2012 RTP/SCS; SCAG's focus on infrastructure investment, goods movements, mileage-based user fee (MBUF), Active Transportation, implementation of the SCS component of the RTP, public health, and collaboration with county transportation commissions; and policy challenges. Mr. Ikhrata also discussed the emerging opportunities including its outcomes and asked each of the Policy Committee Chairs to discuss their respective committees' role in the bottom-up planning process. In closing, Mr. Ikhrata discussed the next steps.

Discussion ensued and comments/suggestions were made regarding the incorporation of resiliency into the Plan; regional projects and connectivity; poverty issues; environmental justice and public health issues; to work more on public outreach and education; engage and representation of millennials; travel options for all generations; collaboration regarding the Plan; cities' differing bicycle plans/rules; safe public and active transportation in other states; transportation system; and emergency preparedness in the region (Sahli-Wells, McLean, Addleman, Genis, Carey, Tercero, Rodriguez, Clark, Medina, M. Martinez, O'Leary and Spiegel).

President Morehouse asked that the presentation and information be shared with the council of governments. Mr. Ikhrata noted and acknowledged the request.

ADJOURNMENT

There being no further business, President Morehouse adjourned the Joint Meeting of the Regional Council and Policy Committees at 11:58 a.m.

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REPORT

AGENDA ITEM NO. 2

DATE: April 2, 2015

TO: Regional Council (RC)
Transportation Committee (TC)
Community, Economic and Human Development (CEHD)
Energy and Environment Committee (EEC)

FROM: Hasan Ikhrata, Executive Director, 213-236-1944, Ikhrata@scag.ca.gov

SUBJECT: Southern California's Transportation System Preservation and Operations

EXECUTIVE DIRECTOR'S APPROVAL: 

RECOMMENDED ACTION:
For Information Only – No Action Required.

EXECUTIVE SUMMARY:
SCAG is in the process of reviewing and updating the system preservation and operation elements of the 2012 RTP/SCS. The purpose of today's workshop is to provide you an opportunity to hear from the experts and thought leaders on this important topic in preparation of the development of the 2016 RTP/SCS.

STRATEGIC PLAN:
This item supports SCAG's Strategic Plan, Goal 1: Improve Regional Decision Making by Providing Leadership and Consensus Building on Key Plans and Policies; Objective: a) Create and facilitate a collaborative and cooperative environment to produce forward thinking regional plans.

BACKGROUND:
In preparation of the development of the 2016 RTP/SCS, today's workshop will focus on preservation of transportation infrastructure and making sure that the system is operating efficiently and effectively. According to SCAG's research, maintaining local streets and roads in the SCAG region over the next 20 plus years will need $55 Billion to ensure proper maintenance and according to the California Transportation Commission, the State Highway Operation and Protection Plan (SHOPP) has $87 billion need over ten (10) years. This poor road quality from lack of investment in the regions infrastructure has resulted in the SCAG region having the highest vehicle operating cost in the Country. The 2012 RTP/SCS recommended that System Operation and Maintenance remain a top priority and the President and Governor have both supported 'fix it first' policies. Today's workshop will provide an opportunity to hear from the experts and thought leaders on this important topic in preparation of the development of the 2016 RTP/SCS.

The workshop is divided into two sessions. The first will deal with system preservation on the State Highway System (SHS). California Transportation Commission (CTC) Deputy Executive Director Susan Bransen will provide an overview on SHS needs, deferred maintenance, and associated risks in light of the latest draft SHOPP Plan. The second session will address operations and will include presentations from the private sector (Harry Voccola, Nokia HERE),

Caltrans District 7 (Ali Zaghari, Deputy Director of Operations), and the Director of the Institute of Transportation Studies (Mr. Alexandre Bayen).

Aging transportation infrastructure is a major issue confronting our region. Crumbling infrastructure poses serious threat not just to mobility and safety, but also to the economic wellbeing of our region. Furthermore, deferring maintenance ends up costing substantially more in the long run, exacerbating the problem even more. The session on this topic will focus on the current state of state highway system and local roads. CTC Deputy Executive Director Susan Branson will speak on the state highway needs with a focus on the most recent State Highway Operation and Protection Program (SHOPP). Tarek Hatata, SCAG consultant will provide an update on the infrastructure condition of the local roads based on the most recent data collection efforts commissioned by SCAG since the adoption of the 2012 RTP/SCS.

As roadway expansion becomes limited as an option to address the region's mobility and accessibility challenges due to limited funding, environmental constraints and/or political challenges, it becomes all the more important to ensure that the existing and planned infrastructure is performing at the most productive level. So, this second session will focus on improving operation of the roadways. Caltrans District 7 Deputy Director of Operations, Ali Zhagari will provide an overview of the role of operations and discuss some of the current state initiatives. He will be followed by Alex Bayen, Director of the Institute of Transportation at UC Berkeley, who will provide a specific example of an operation strategy with a focus on the I-210 Corridor. Lastly, technology could play a big role in achieving higher levels of productivity from our roadway infrastructure. Harry Vocola, Vice President of Nokia HERE, will provide a private sector perspective on the role of technology in improving operation with specific examples.

FISCAL IMPACT:
Work associated with this item is included in the Fiscal Year 2014-2015 Overall Work Program (WBS Number 15-010.SCG00170.01: RTP Support, Development, and Implementation).

ATTACHMENTS:
1. State Highway System Preservation Needs – PowerPoint Presentation
2. Local Roads Preservation Needs – PowerPoint Presentation
3. Caltrans Transportation System Management - PowerPoint Presentation
4. Technology and Future of Transportation Management - PowerPoint Presentation
5. Dynamic Data Usage for System Management - PowerPoint Presentation

Preservation of California's Transportation System

Presented to

Southern California Association of Government's
Joint Policy Board

Presented by

Susan Bransen, Chief Deputy Director
California Transportation Commission
April 2, 2015

California Infrastructure Report Card

✓ **$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 Projected Funding Shortfall

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

California Infrastructure Report Card

Pavement

58% of California Roadways Require Rehabilitation or Pavement Maintenance

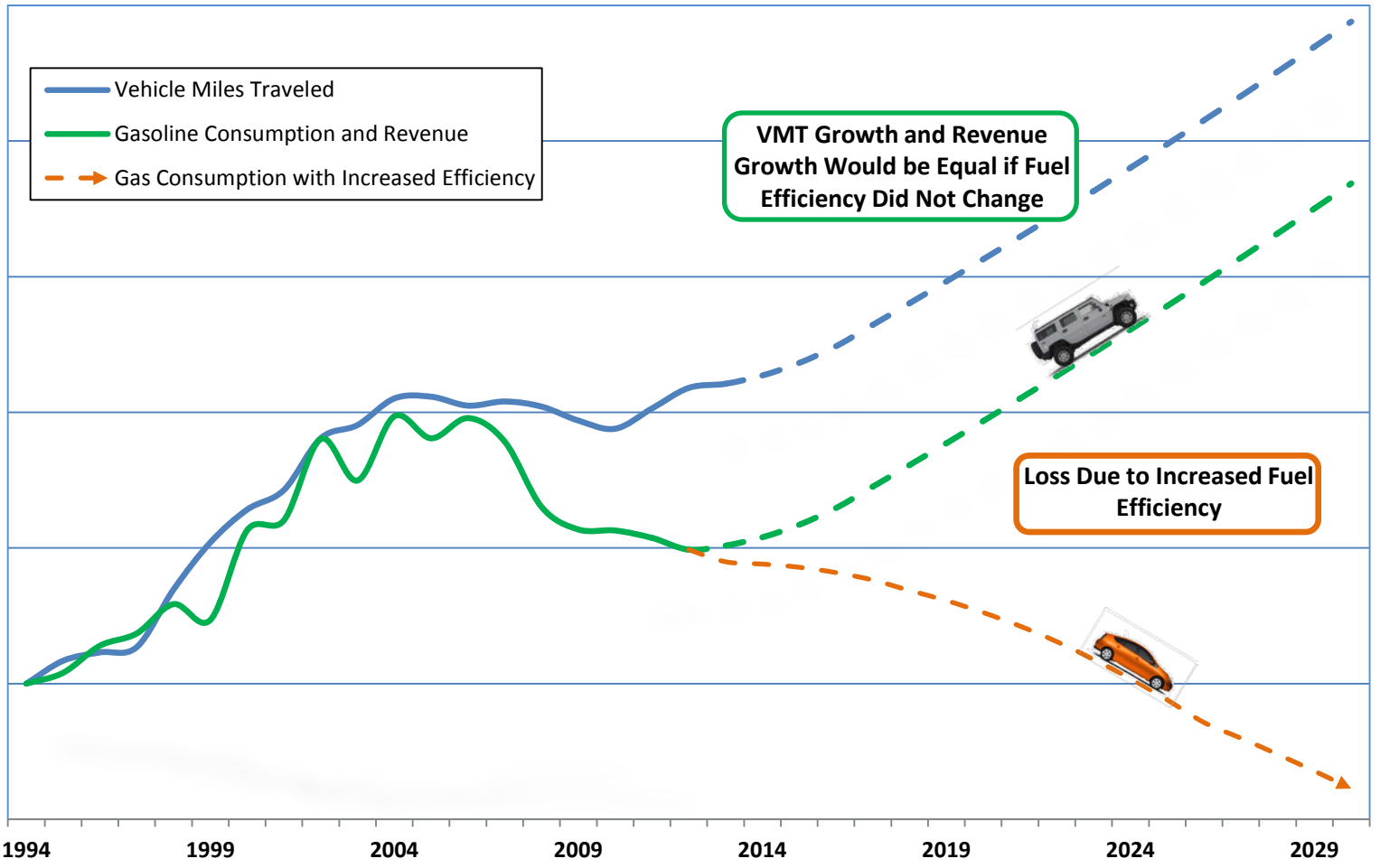
87% of California's Counties have an Average Pavement Rating of "At Risk" or "Poor"

25% of Local Streets and Roads will be in "Failed" Condition by 2024 under our Current Funding Levels

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

Source: Transportation California

Revenue Loss Due to Increases in Fuel Economy



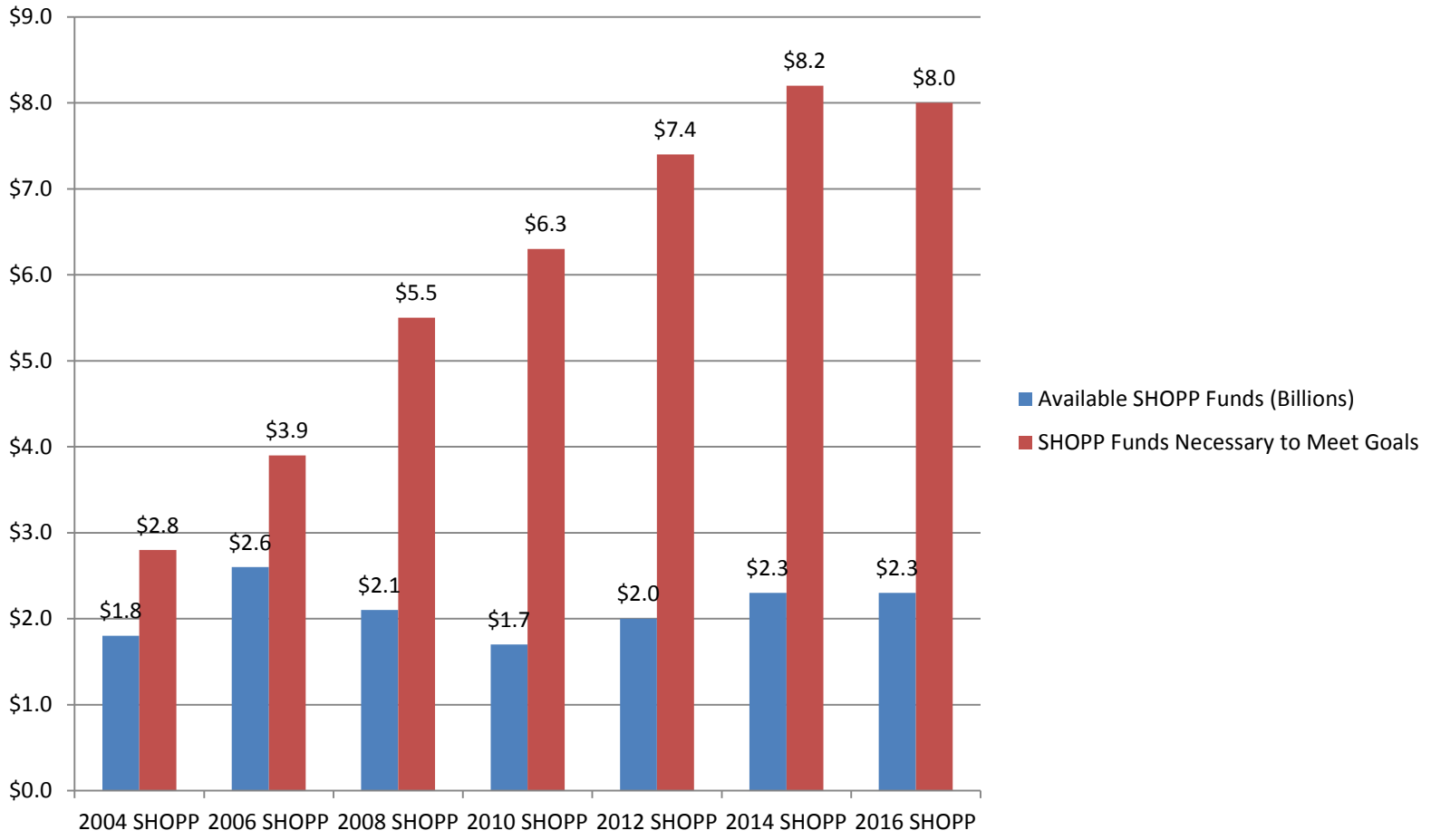
Source: Department of Transportation 2015

State Highway Operations & Protection Program (SHOPP) 10-Year Plan

- Plan to maintain and preserve the State Highway System and supporting infrastructure.
- "Fix-it First" perspective.
- Plan to preserve the billions of dollars already invested in the existing State Highway System.

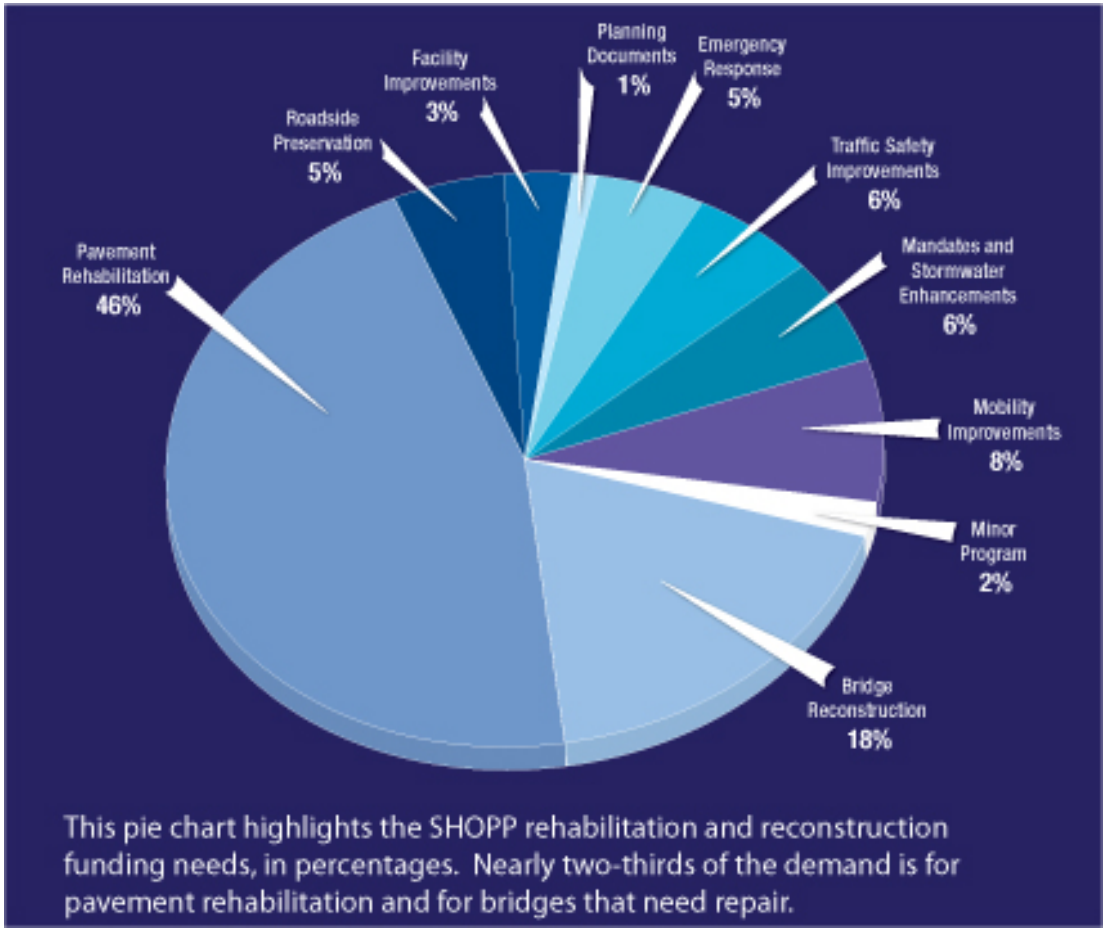
Source: Department of Transportation 2015

Available Funding vs. Need



Source: Department of Transportation 2015

State Highway Operation & Protection Program (SHOPP) - Needs

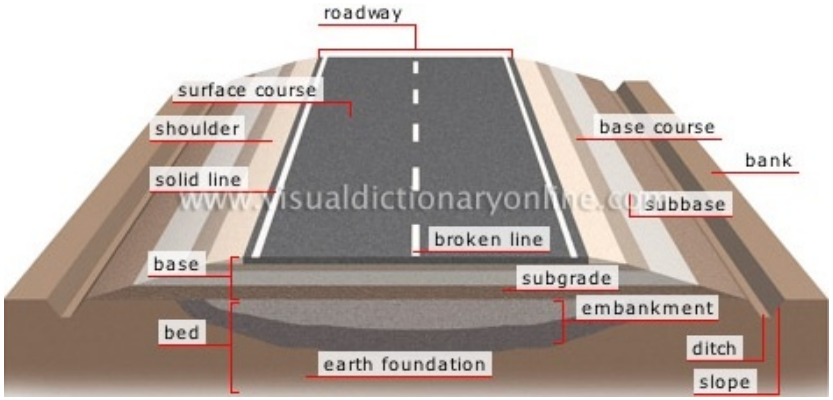


This pie chart highlights the SHOPP rehabilitation and reconstruction funding needs, in percentages. Nearly two-thirds of the demand is for pavement rehabilitation and for bridges that need repair.

Source: Department of Transportation 2015

Pavement Rehabilitation

- More than 50,000 lane-miles of state-owned highways
- Pavement makes up the largest single item in deferred maintenance
- Includes appropriate treatments for pavement and underlying structure



Pavement cross section

Source: Department of Transportation 2015

Bridge Rehabilitation and Repair

- 13,000 bridges on the State Highway System
- Average age of 43 years
- Strategies include replacement, rehabilitation, retrofit, and scour mitigation

Source: Department of Transportation 2015

Invisible Infrastructure: Culverts

- More than 200,000 culverts on the State Highway System
- About 13% are at risk of critical failure
- Culvert failures often affect roadway surfaces and water quality

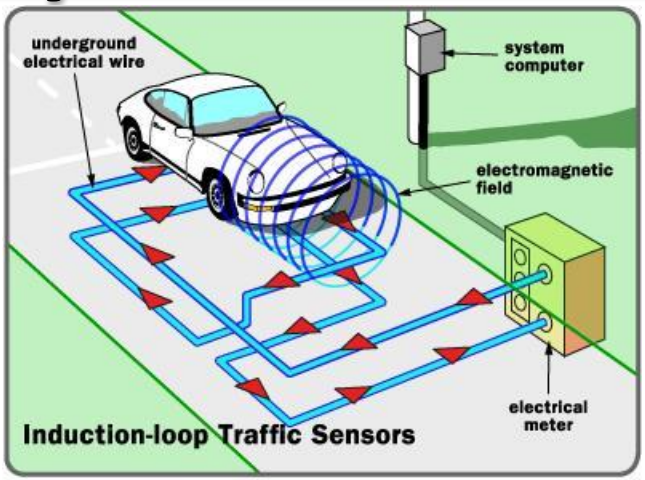
Failed culvert entrance view

Failed culvert street view

Source: Department of Transportation 2015

Invisible Infrastructure: Intelligent Transportation Systems

- More than 50,000 ITS elements on the State Highway System
- Manage traffic flow and increase efficiency of existing system
- About 30% are in need of rehabilitation or replacement



Caltrans programmed freeway onramp traffic lights to alternate so cars merge once onto the freeway, eliminating the additional merge within the onramp.

Asset Management Plan & SHOPP
Senate Bill 486 (DeSaulnier, 2014)

- Asset Management Plan
  - Assesses State Highway System Health & Condition
  - Identifies Effective Application of State's Limited Resources.
  - Designed to Achieve Targets & Performance Measures

- State Highway Operation & Protection Program (SHOPP)
  - Four Year Program of Projects - Maintenance, Safety, Rehabilitation Capital Preservation Improvements
  - Informed by Asset Management Plan

- Increases Transparency & Accountability
  - Plain Language Performance Reports
  - Budget to Actual Expenditure Information

QUESTIONS

Susan Bransen, Chief Deputy Director
California Transportation Commission
Susan.Bransen@dot.ca.gov
www.catc.ca.gov

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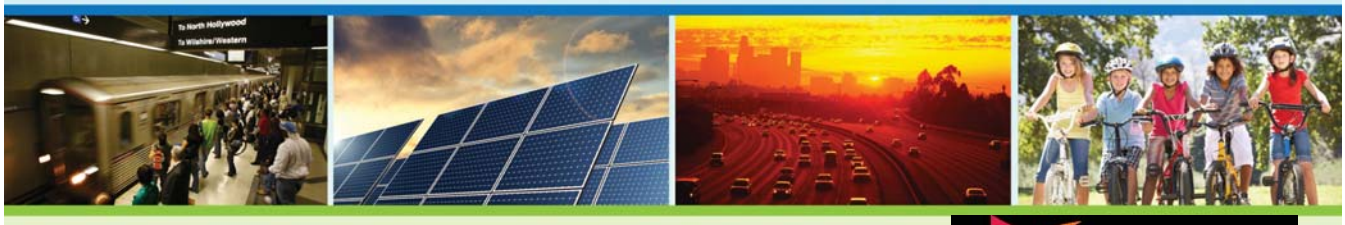
Local Roads Preservation Needs

Joint Policy Meeting
April 2, 2015



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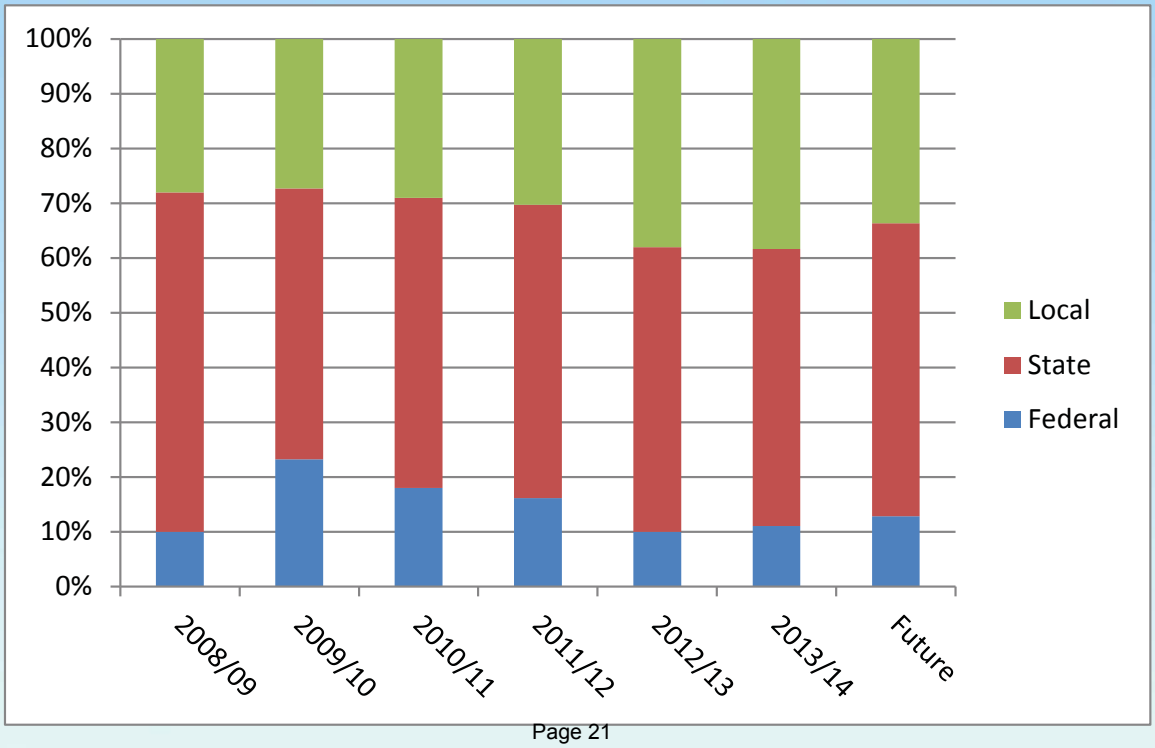
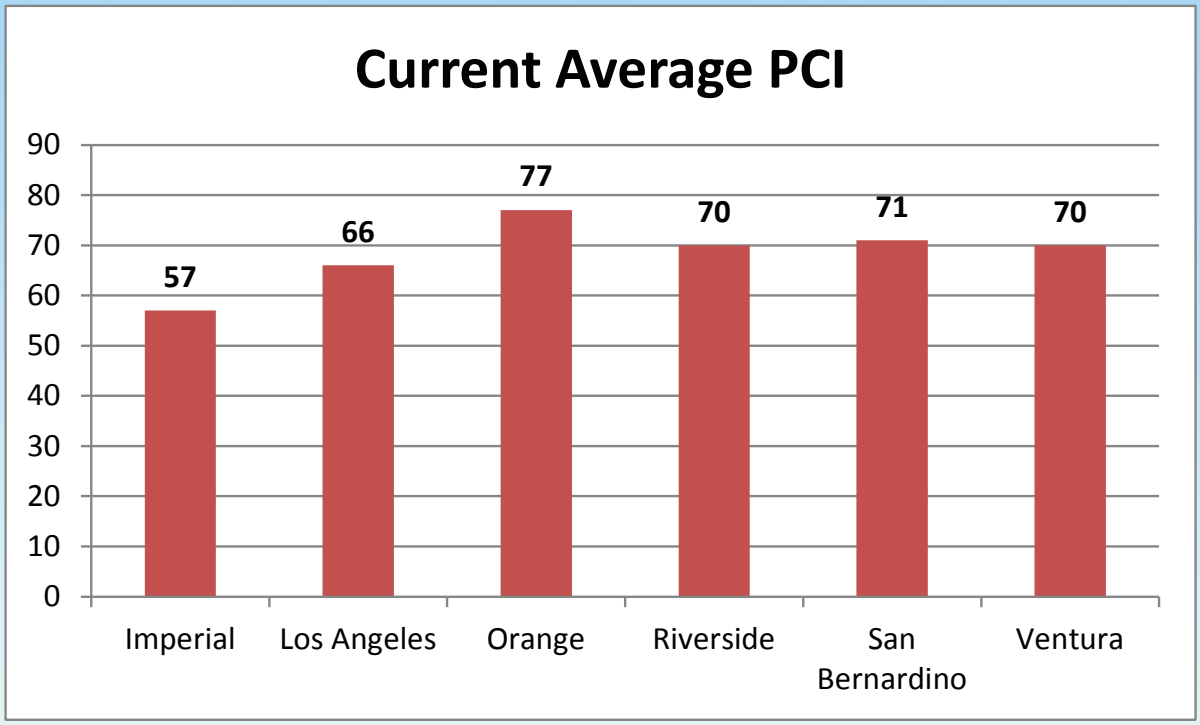
Funding Sources for Local Roads

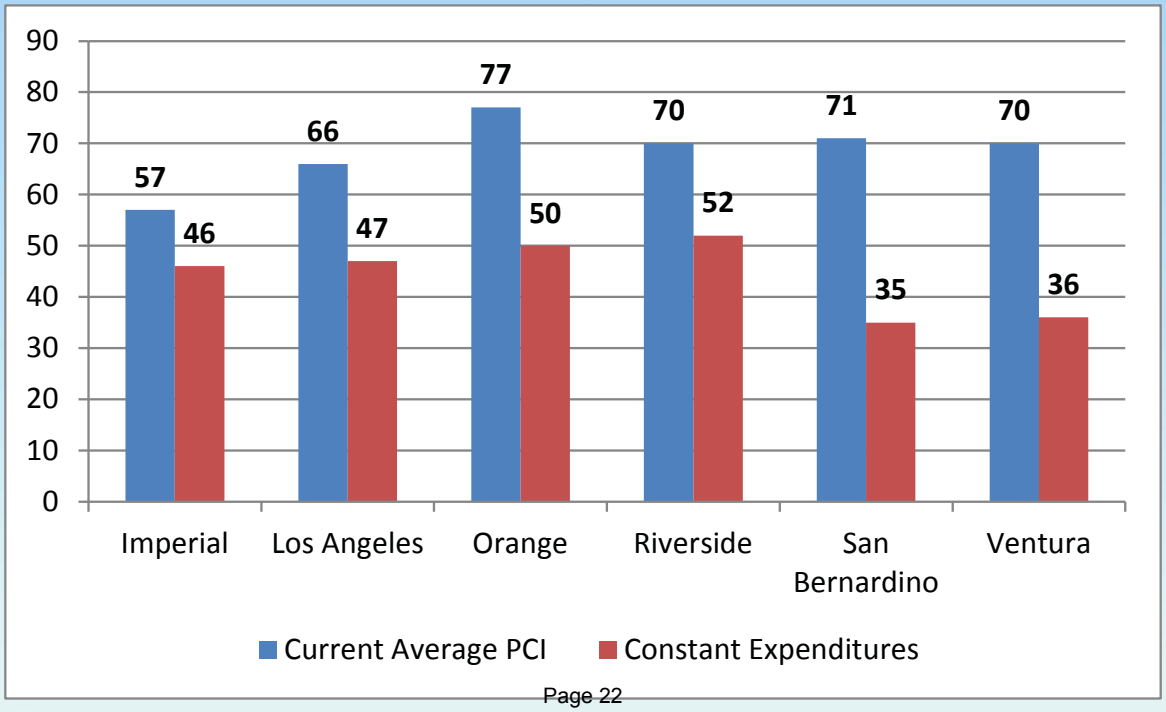


Current Local Roads Conditions



3

Constant Expenditures Conditions by 2040



4

Pavement Conditions by PCI

PCI = 54

PCI = 27

5

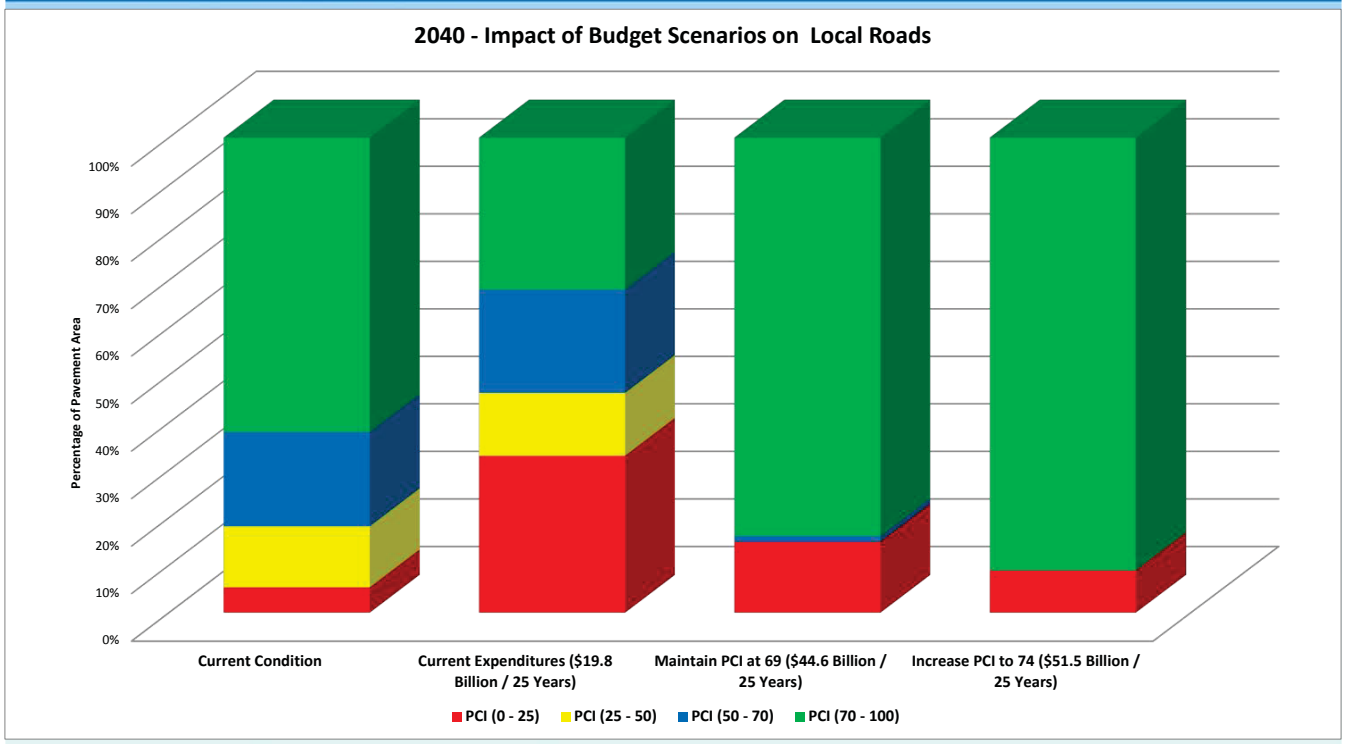
Needs by Scenario

	Budget Required ($ million)	Deferred maintenance ($ million)	Total Needs	PCI_{2039}
Existing Budget	$ 19,838	$ 80,506	100,344	46
Maintain PCI	$ 44,583	$ 25,362	69,945	69
Increase PCI by 5	$ 51,451	$ 14,984	66,434	74
State of Good Repair	$ 66,862	$ -	66,862	80

* Existing Budget based on statewide survey results

** Existing Budget scenario does not assume reduction in funding due to reduced gas tax receipts

2012 RTP/SCS Addressed Regional Challenges



Discussion

SCAG Joint Policy Meeting
April 2, 2015
Caltrans Transportation Systems Management and Operations Initiatives

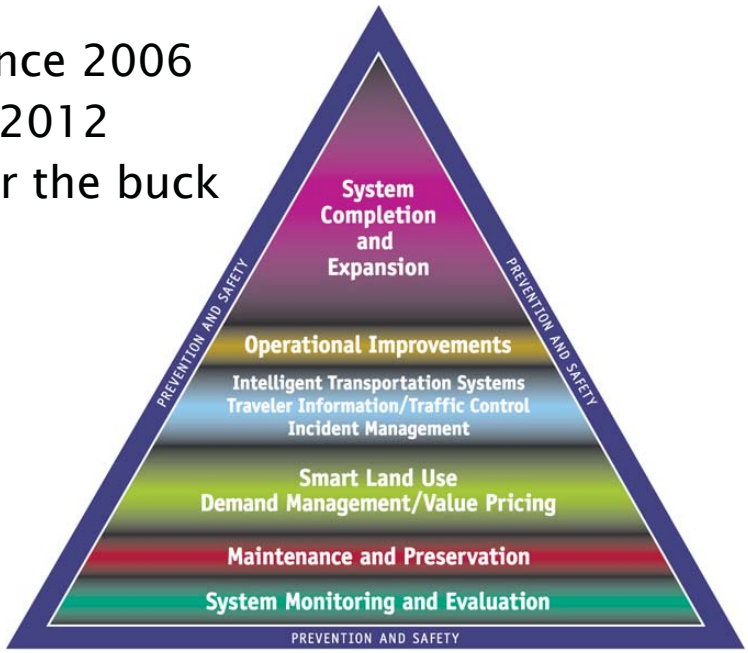
Carrie Bowen, District 7 Director
Ali Zaghari, Deputy District Director,
Traffic Operations

Agenda

- System Management Model
- Reorganizing for Corridor Management
- Connected Corridors Pilot on I-210

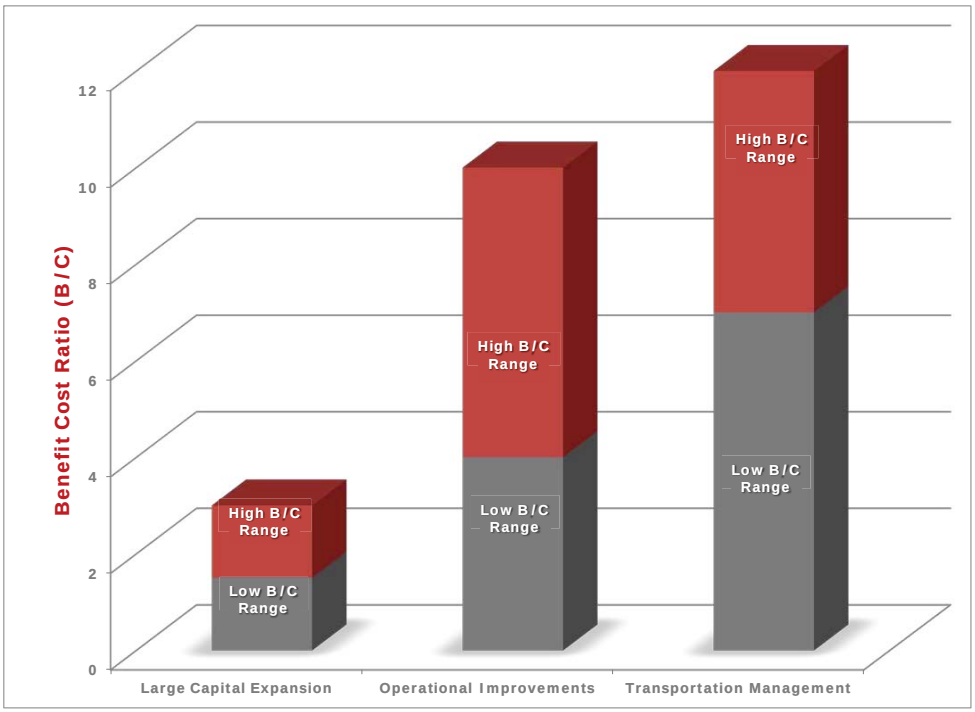
System Management or Mobility Pyramid

- Emphasized since 2006
- RTP 2008 and 2012
- Bigger bang for the buck



Transportation Investments have more impact if built upon this foundation

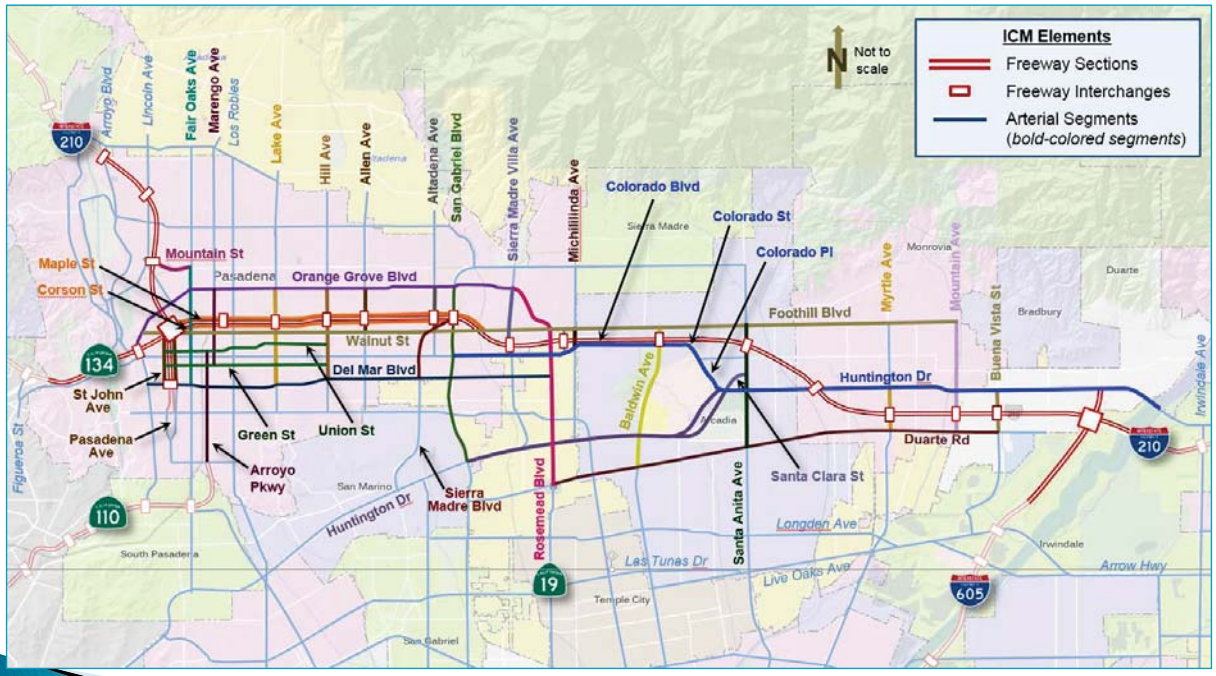
Compelling Return on Investments



Why the I-210

Item	Rating	Notes
Geometry	Excellent	Several Parallel arterials in close proximity of I-210; freeway frontage streets in Pasadena
Jurisdictional Environment	Good	Possibility of doing pilot deployment within one or two cities
Freeway Traffic Detection	Very Good	Sensors on mainline and most ramps.
Arterial Traffic Detection	Promising	Many intersections already equipped with traffic sensors
Traffic Demand Patterns	Very Good	Westbound traffic during AM peak; eastbound traffic during PM peak, average % of trucks
Existing Freeway Control	Excellent	Existing HOV lanes; ramps and freeway interchanges metered
Existing Arterial Control	Good	Traffic responsive system already in place on some arterials, participation of key cities in IEN.
Existing Transit Services	Very Good	Metro Gold Line running parallel to I-210, in close proximity
Park-and-ride capabilities	Uncertain	Many facilities exhibit high occupancy rates
ICM Opportunities – Peak Hour	Challenging	High congestion level on freeway; some arterials with limited extra capacities at some intersections; incident response needs; different traffic pattern on Fridays
ICM Opportunities – Off Peak	Excellent	Many large scale events; incident response needs

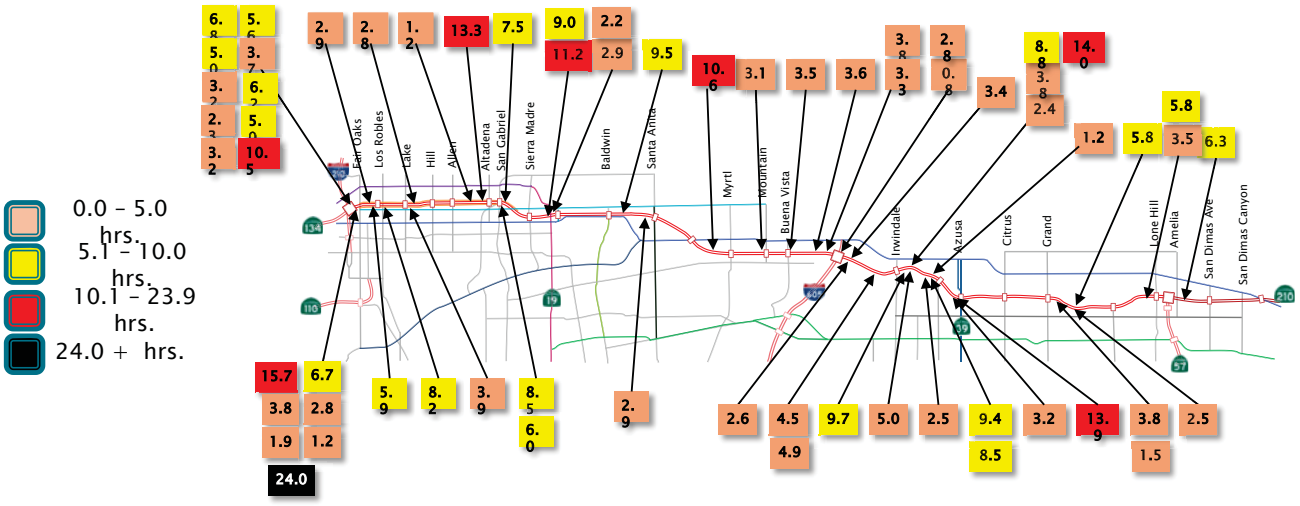
The I-210 Connected Corridors Pilot



The I-210 Pilot Stakeholders and Partners!

AT&T
California Department of Transportation: Districts 7 and 11
California Department of Transportation: Headquarters
California Highway Patrol
Cambridge Systematics
City of Arcadia
City of Duarte
City of Monrovia
City of Pasadena
Foothill Transit
HERE (Nokia/Navteq)
INRIX
Iteris, Inc.
LA County Coroner
LA County Dept. of Public Works
Los Angeles County Metropolitan Transportation Authority (Metro)
National Science Foundation
Okawa Foundation
Parsons
Pasadena Area Rapid Transit System (ARTS)
San Diego Association of Governments (SANDAG)
San Gabriel Valley Council of Governments
Southern California Association of Governments (SCAG)
Schneider Electric
Stantec
System Metrics Group
Transport Simulation Systems
U.S. Dept. of Transportation/ Federal Highways

Major Incidents on I-210 (2009 – 2013)

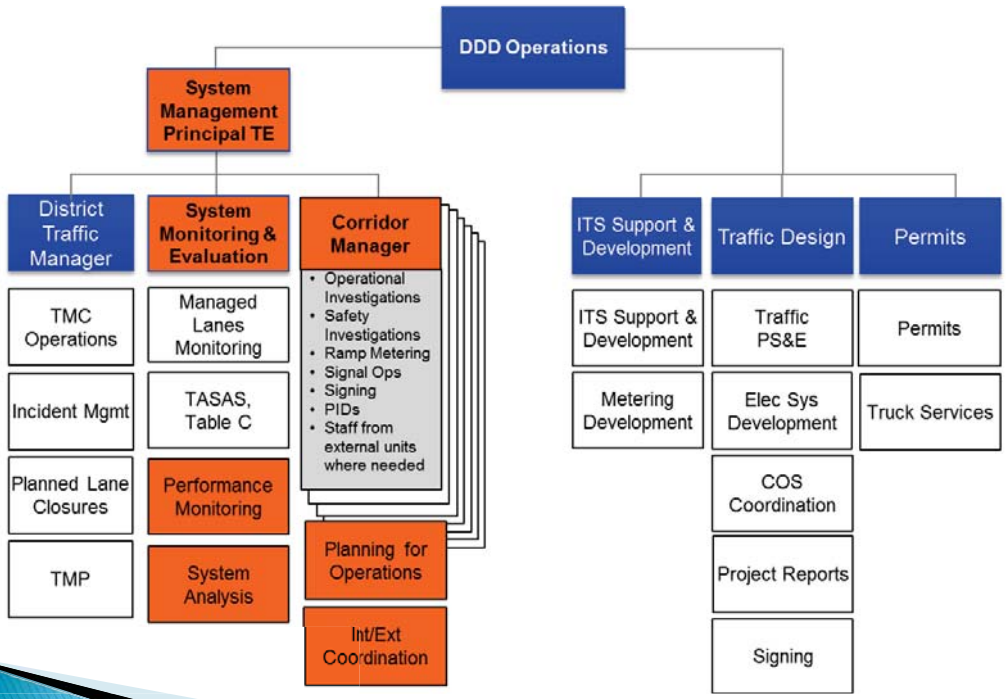


- In 2013 a total of approximately 6,000 incidents were reported within the project limits. (500 per month)


Sky2
Big Rig Crash
PASADENA
2

Caltrans Reorganization

(Paradigm shift is in progress!)



Technology and the Future of Transportation Management

ALEXANDRE BAYEN, UC BERKELEY/ITS-PATH

April 2, 2015

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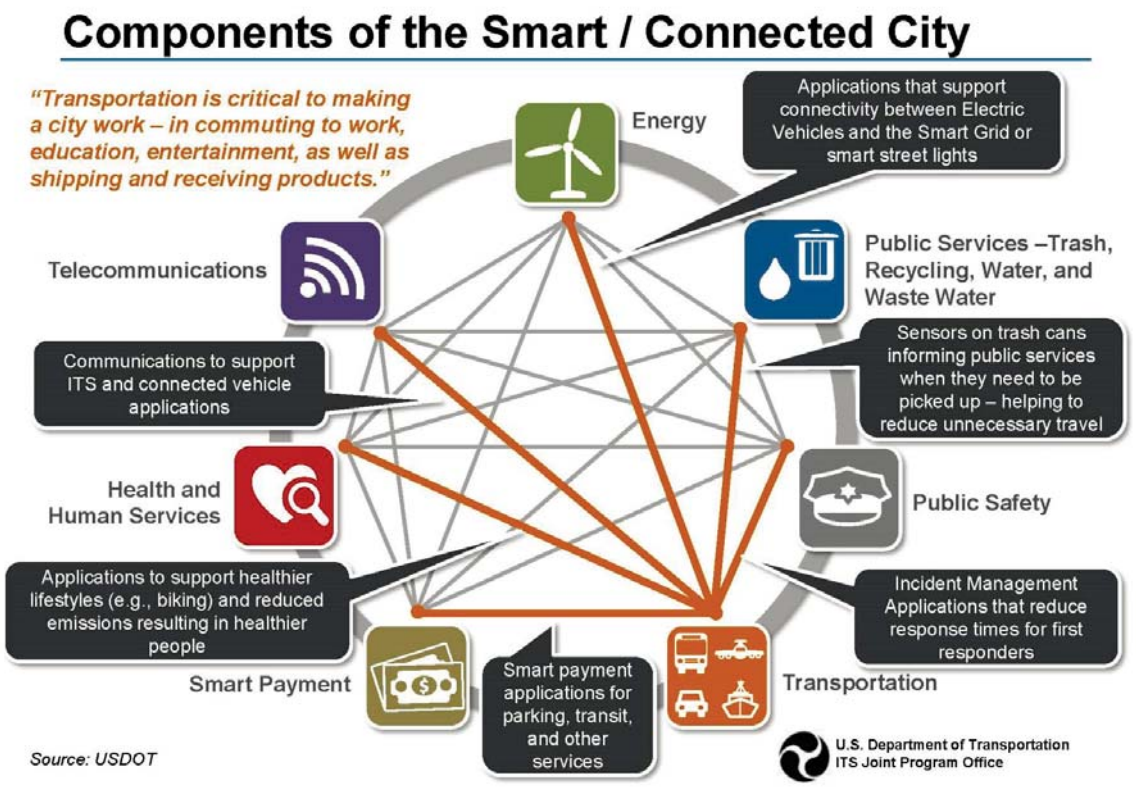
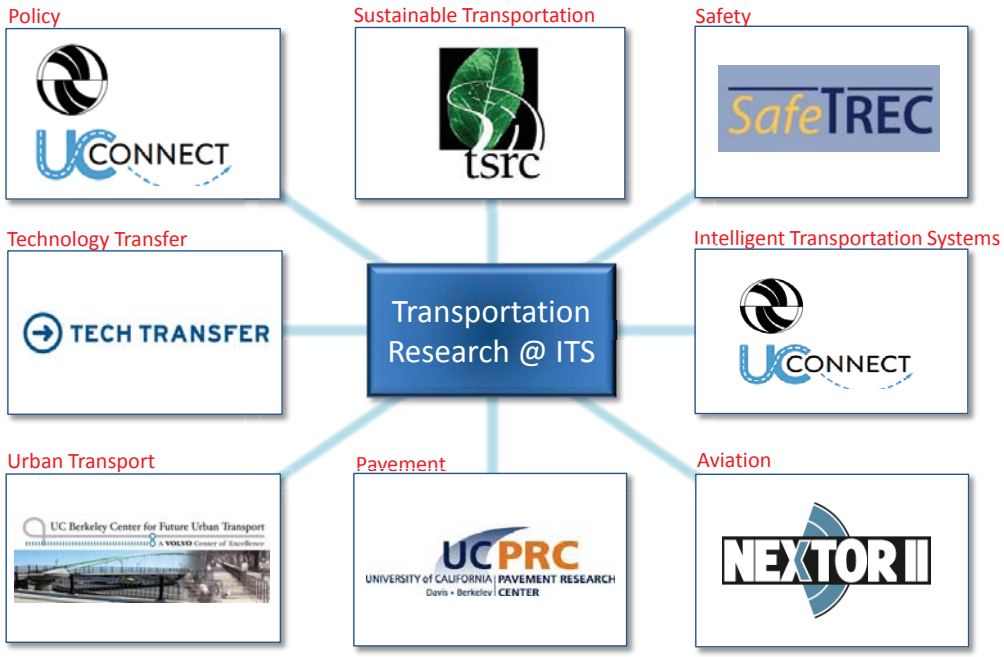
Technology and the Future of Transportation Management

ALEXANDRE BAYEN, UC BERKELEY/ITS-PATH

April 2, 2015

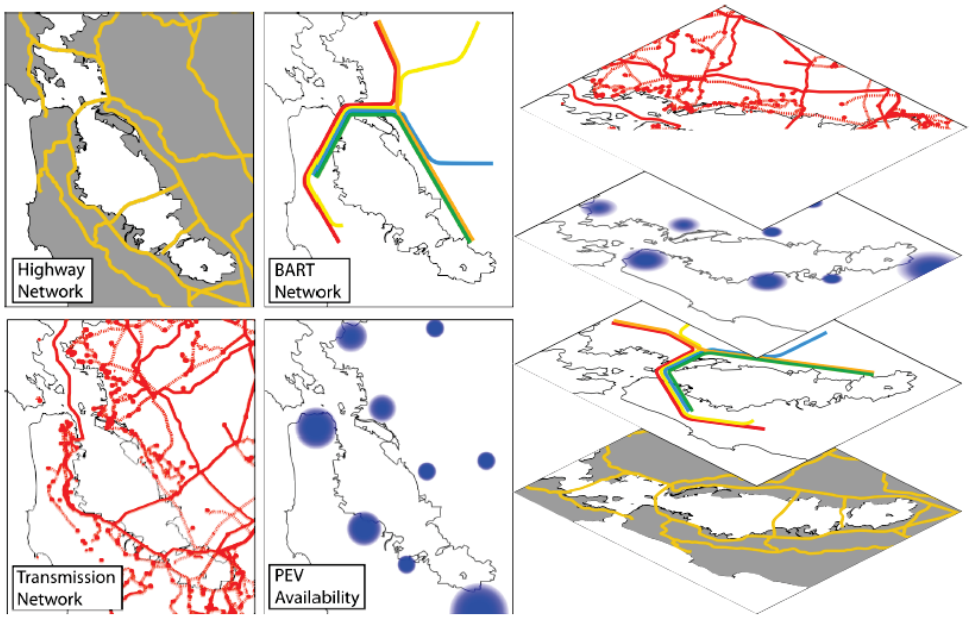


Institute of Transportation Studies



Resilient coupled energy / transportation networks

5

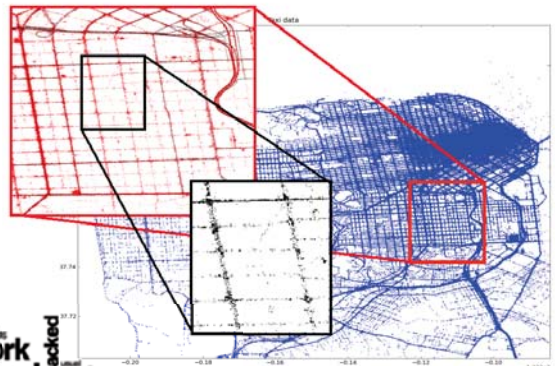


Courtesy S. Moura, ITS/CEE, Berkeley

Connected Corridors at PATH: cellPath

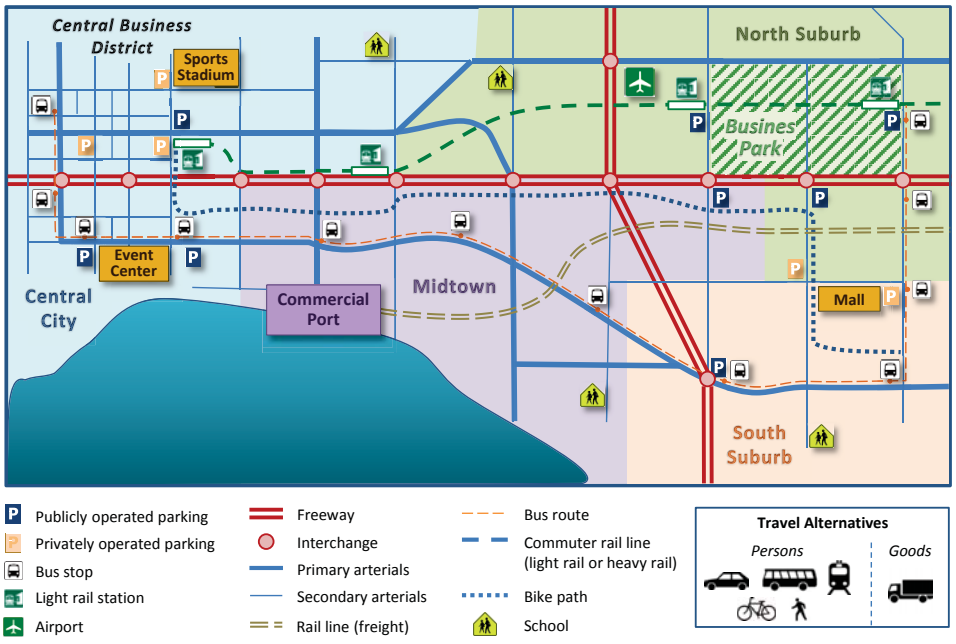
6

Large scale mobility inference from data fusion in mega cities (Los Angeles – scale)
Examples: dozens of data feeds fused from single database in citywide simulator: AT&T cell tower, Waze postings, NAVTEQ GPS



A Typical ICM

7



Stakeholders

State DOT – Freeway Management

Local Jurisdictions – Arterial & local traffic management

Transit Agencies – Bus, rail and other public transportation

Parking operators

Information service providers

Potentially many mores…

SOUTHERN CALIFORNIA ASSOCIATION of GOVERNMENTS

Connected Corridors

7

Typical Benefits per Corridor

8

	San Diego	Dallas	Minneapolis
Annual Travel Time Savings (Person-Hours)	246,000	740,000	132,000
Improvement in Travel Time Reliability (Reduction in Travel Time Variance)	10.6%	3%	4.4%
Gallons of Fuel Saved Annually	323,000	981,000	17,600
Tons of Mobile Emissions Saved Annually	3,100	9,400	175
10-Year Net Benefit	$104M	$264M	$82M
10-Year Cost	$12M	$14M	$4M
Benefit-Cost Ratio	10:1	20:1	22:1

Technology is essential

9

- Sensing
- Communication
- Data Quality and Management
- Software
- Decision Support
- Controllers
- 511 and Social Media
- Software Apps and Personnel Devices
- Personnel trained and empowered to use it

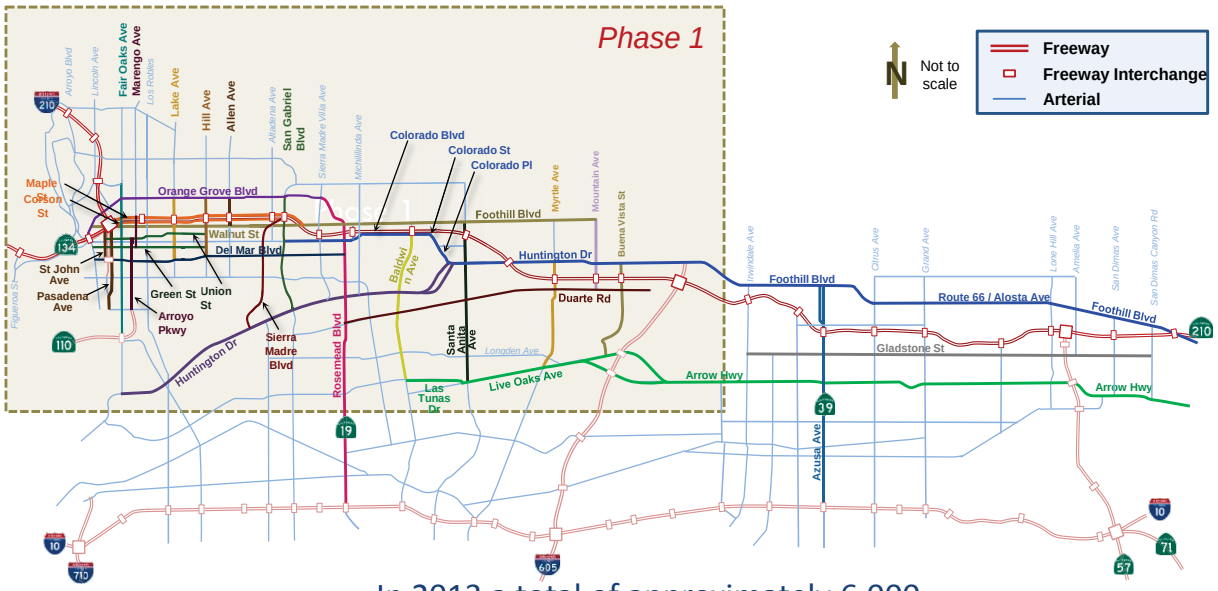
We need Intelligent Collaboration

10

- Los Angeles County has
  - 20,000 miles of roads, 10,000,000 people and many traffic signals (over 4400 in LA City alone). Information on this scale is Mega Data, not just Big Data.
- But:
  - It lacks good measurement and the quality of data is unreliable
  - Communication systems are old and error prone
  - Controllers are old and not well coordinated
  - There are no collaborative decision support functions
- Industry is willing, able and needed to help
  - New data sources, routing assistance, traveler information, decision support systems
- However:
  - Only government can weigh city wide interests in growth, environment, energy, water, etc.
  - Government can only do this effectively with technology and the assistance of the populace
- Collaborative Commuting
  - Emergent behavior from social networks can be transformative but intelligently guided collaborative decision making is more reliable and effective
- Connected Corridors and the I-210 Pilot is an effort to make this happen

I-210 Corridor Boundaries

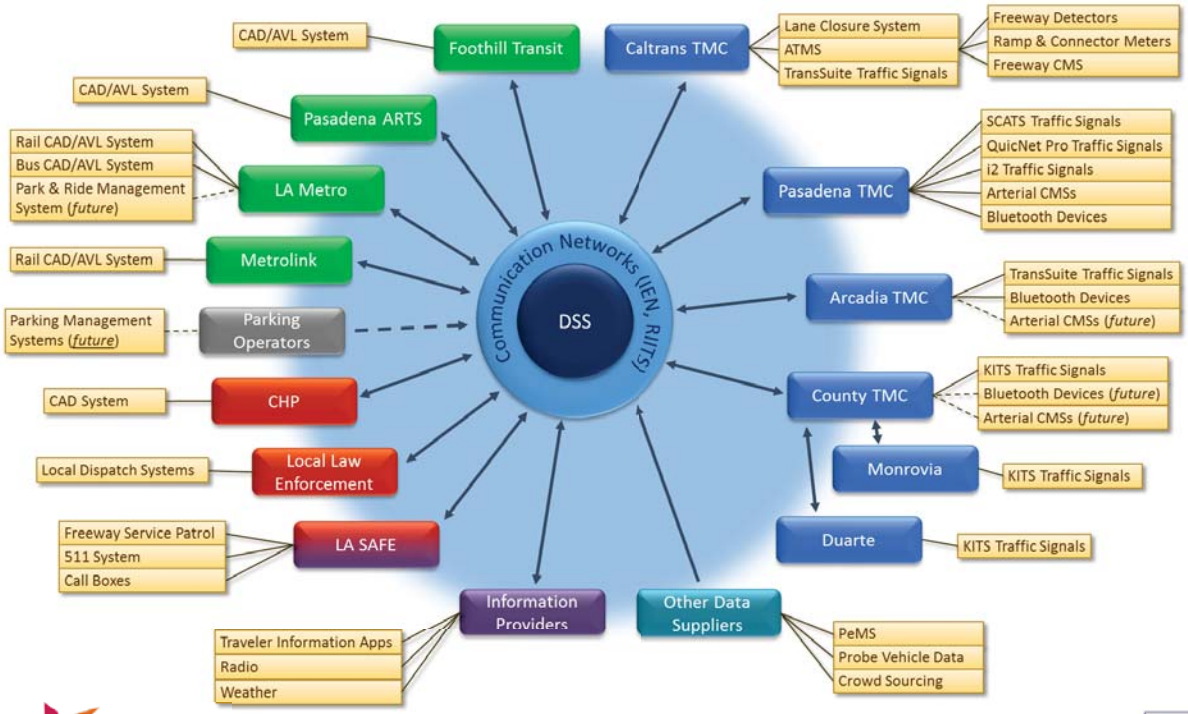
11



In 2013 a total of approximately 6,000 incidents were reported within the project limits. (500 per month)

Stakeholders and Systems

12



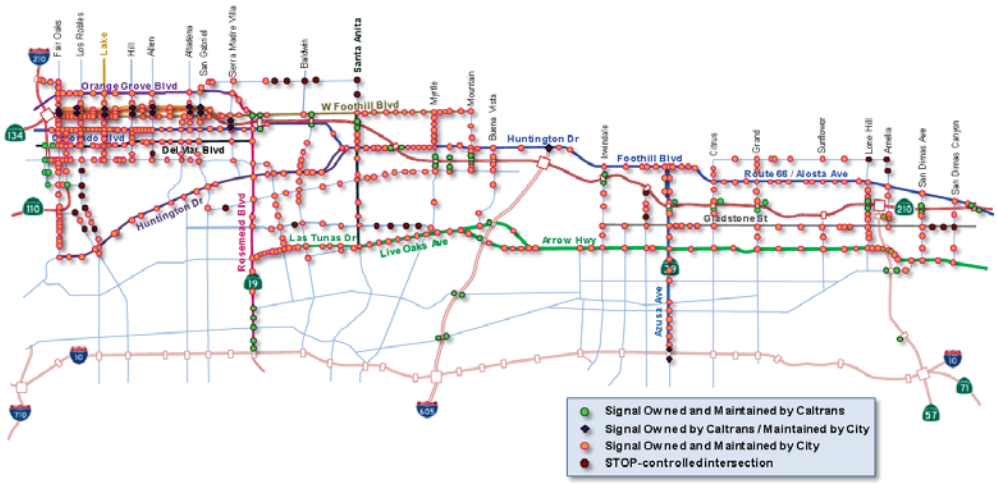
ITS Assets on I-210 in Pasadena

13

Mission 2016: full coordinated control of I210

14

- 20 miles of freeways
- 5 major arterials
- Hundred of traffic lights, meters, changeable message signs
- Several radio stations, and multiple phone apps



ICM Element Examples

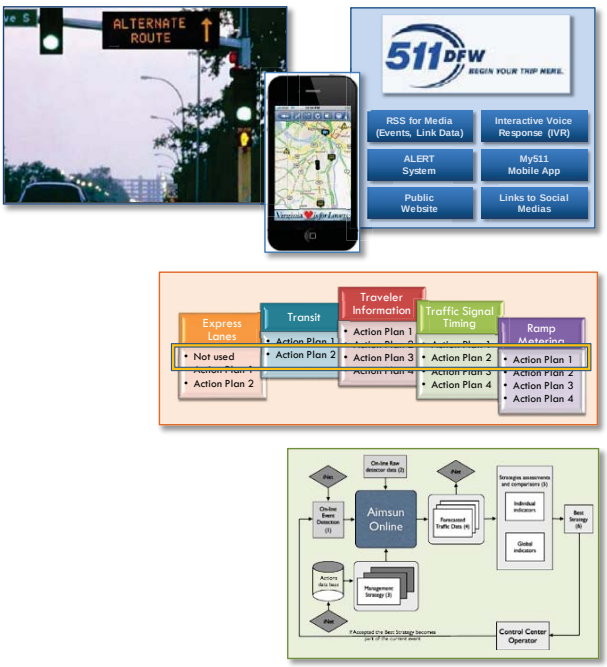
15

- Enhanced traffic monitoring systems
  - Collection of real-time freeway, arterial, transit and weather data
- Enhanced communication
  - Data sharing capabilities among agencies
  - Information service provider access to select datasets
- Freeway operations
  - Traffic-responsive ramp metering
  - Coordination of ramp meters with arterial traffic signals
  - Dynamic HOV/HOT restrictions
  - Ramp queue warning
  - Variable advisory speeds
  - Dynamic Lane use control
  - Dynamic hard shoulder running

ICM Element Examples

16

- Arterial operations
  - Traffic-responsive signal control
  - Transit signal priority
  - Emergency preemption
- Enhanced traveler information
  - Multi-modal 511 systems
  - Real-time traffic/transit/parking info
  - Comparative trips across modes
  - Freeway CMSs
  - Arterial trailblazer signs
  - Mobile travel information applications
  - Social media links
- Decision support system
  - Automated response plan development
  - Evaluation of impacts using simulation



Operational Scenario – Capacity Management

Freeway CMS

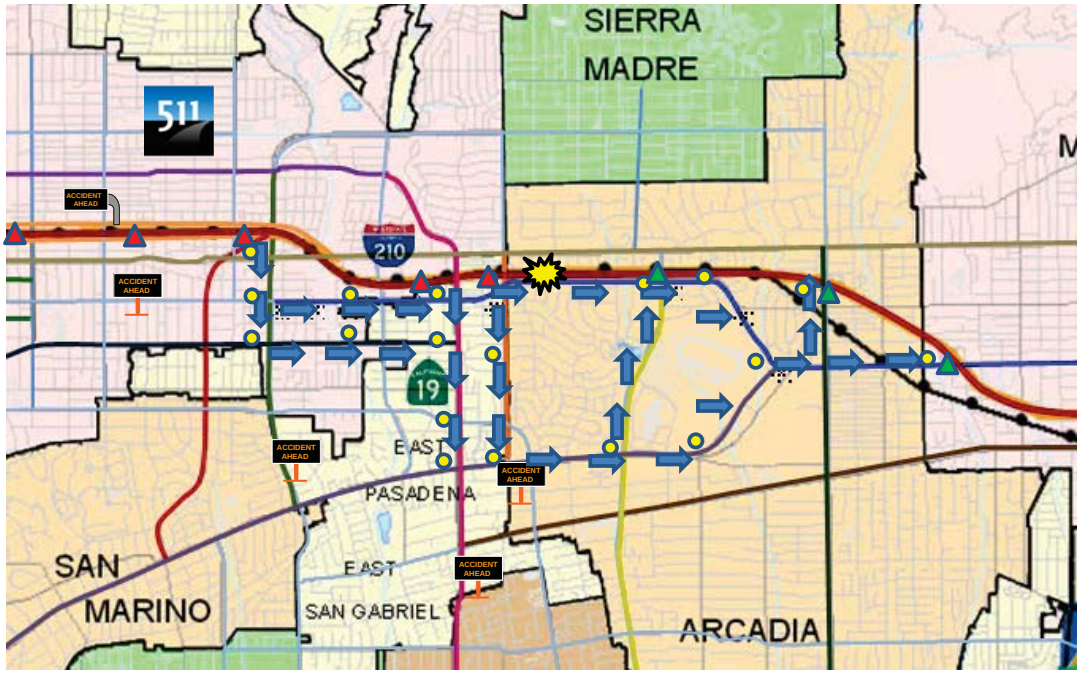
DMS/Trailblazer

Adjust Upstream Ramp Meter

Adjust Downstream Ramp Meter

Adjust Signal Timing

Go 511

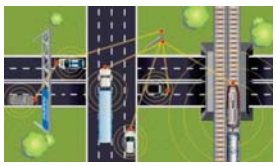


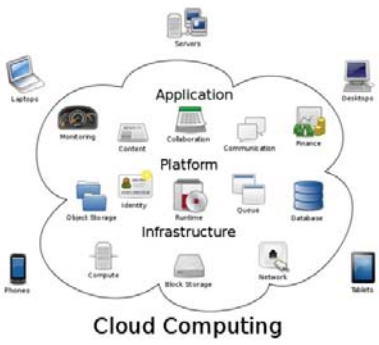
SOUTHERN CALIFORNIA ASSOCIATION of GOVERNMENTS

Connected Corridors

New Technology

18





NATIONAL COMPLETE STREETS COALITION

Connected Corridors is New Technology and More

19

Connected corridors is more than just "managing traffic":

- It relies on interagency collaboration
- It relies on private sector / public sector partnerships
- Its basis relies on classical approaches:
  - Metering, CMS, HOV/HOT, special use operations
  - Arterial / highway coordination
- It also will be the battleground for new approaches to emerge
  - CMS based reroutes, incentivization, tolling
  - Modeshift, integration of transit in management schemes
- It will also rely on new technologies
  - Social networks
  - Mobile / connected devices / connected cars

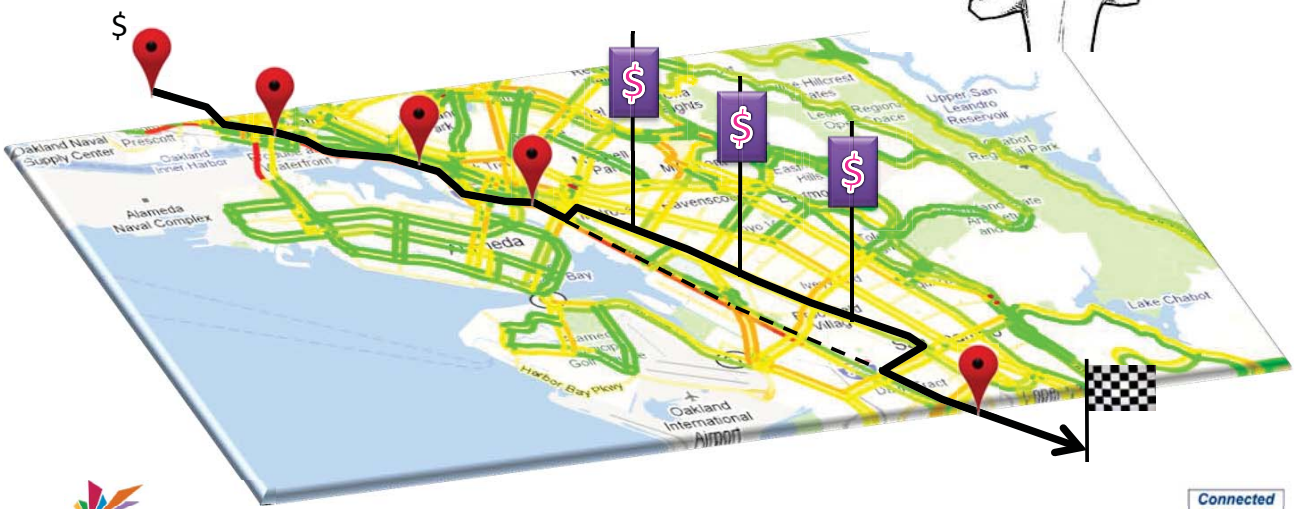
Connected corridors is new engagement of commuters

- Collaborative commuting, empowerment of the commuters
  - Comuto, rideshare programs, taxi share programs
  - Last mile problems, traffic Air B&B, etc.
- Moving management from TMC centric to decentralized
- Travel collaboration: a new paradigm to emerge

Routing games

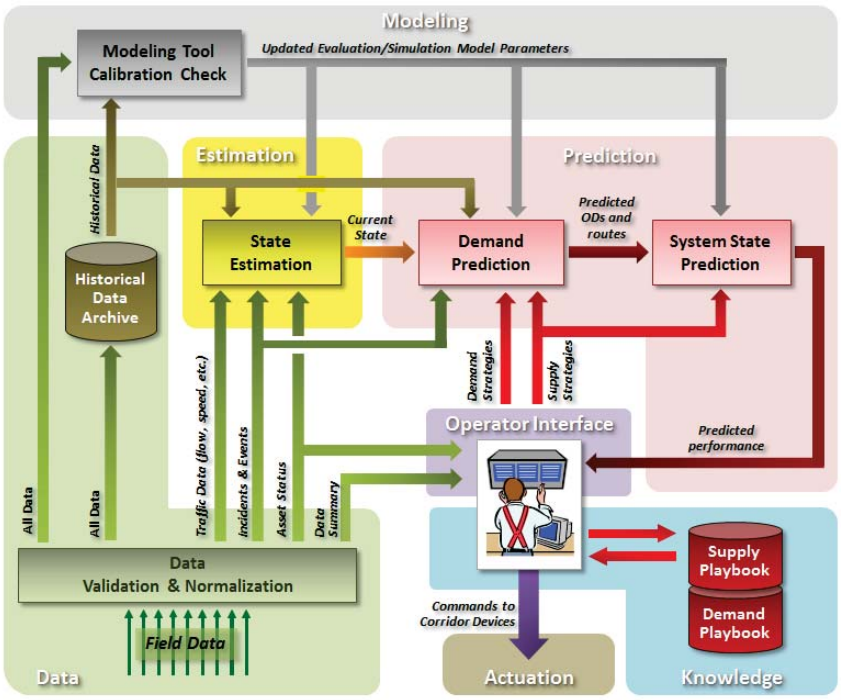
20

What happens is one subset of the population changes its behavior (for the good or for the bad), when everybody else in the system is proceeding normally?



Smart Decisions

21

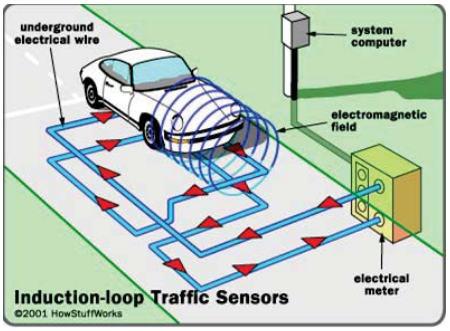


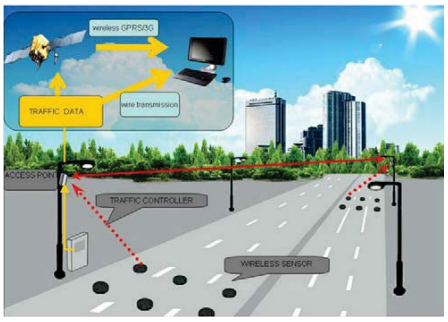
SOUTHERN CALIFORNIA ASSOCIATION of GOVERNMENTS

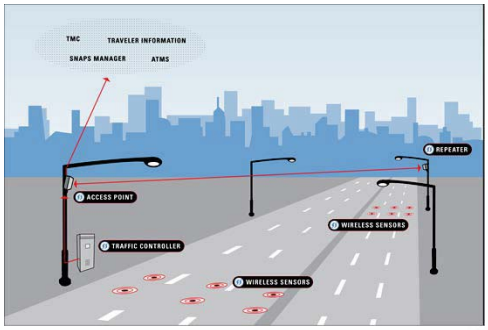
Connected Corridors

Data Is The Key To Success of the Pilot!

22







Leveraging Hybrid Traffic Data

23

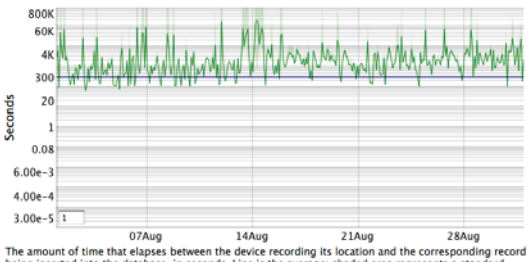
The Connected Corridor Consortium will use novel types of data

- Unprocessed data ("dust", "raw") probe data
- Data can be used to enhance traffic estimates on freeways
- Data will be used for places with no detectors (arterials)
- Data will be integrated into decision support tool

Leveraging Hybrid Traffic Data

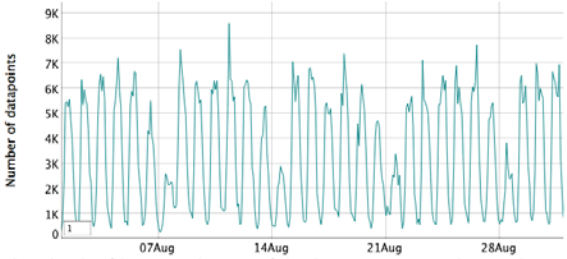
24

Transmission delay

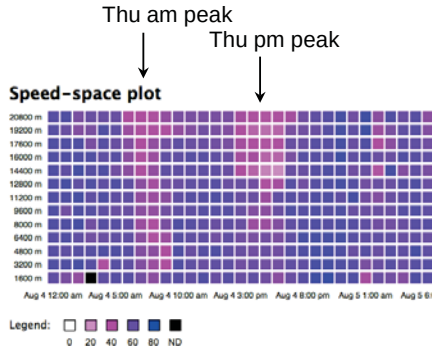


The amount of time that elapses between the device recording its location and the corresponding record being inserted into the database, in seconds. Line is the average; shaded area represents a standard deviation on either side of the average. Data aggregated every two hours.

Time coverage



The total number of data points at the time specified on the *x*-axis. Data aggregated every two hours.



Speed
–Thursday rush hour peaks clearly visible
–Friday am peak much less pronounced

Time coverage
–As expected, data volumes drop at night
–Midday drop in data volumes on weekends due to fleet data sources
–Sundays particularly low on data (Aug 7, 14, etc)

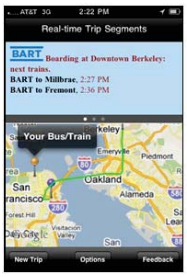
CC of the future: collaborative commuting

25

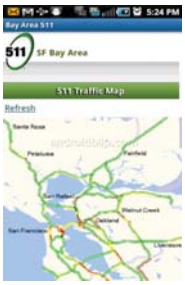
The difference between previous approaches and the future includes

- Massive use of connected devices for traffic / demand management
- Apps will be built on existing services (Google maps. etc.)
- Apps will contain specific functionality
  - Travel info, advisories, parking etc.
  - Reroutes and incentivization
  - Diary system,…

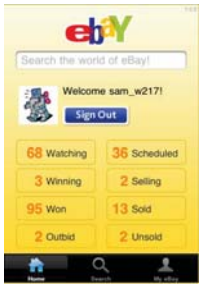
Routing



Transit info



Traffic info



Incentive cashing

Personal tracker

Social interactions

Leveraging social networks

26

The Connected Corridor Consortium will rely on social networks

- Partnerships with major players in the ecosystem (e.g. Waze)
- Use of novel types of data (contextual, text based)
- Use of incentivization (not only through information)
- Behavioral response analysis

CC of the future: cloud based backend system

27

Corridor specific hardware interface

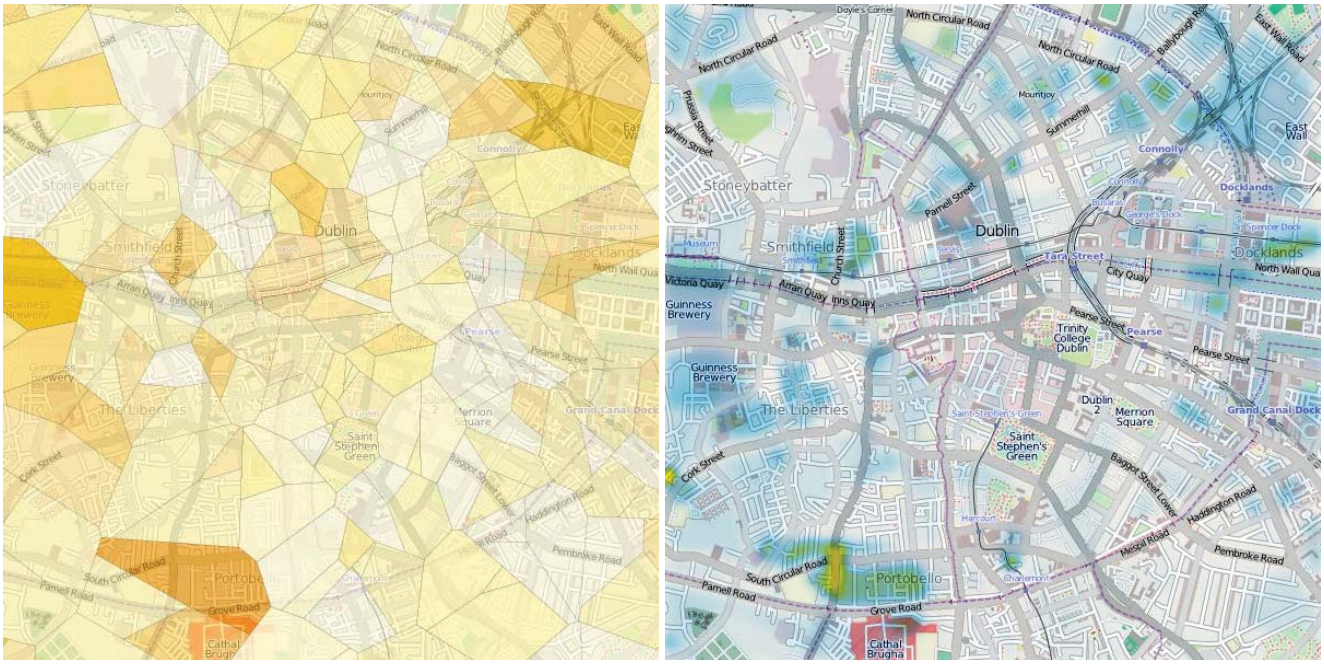
- Data warehouse, databases
- Simulation, estimation, forecast, control engines
- Platform support (hardware, phone and web apps)
- Process monitoring
- Feeds, outputs, visualization

Cell Tower Data

28

- Alex to Add

Population density



10:00 am

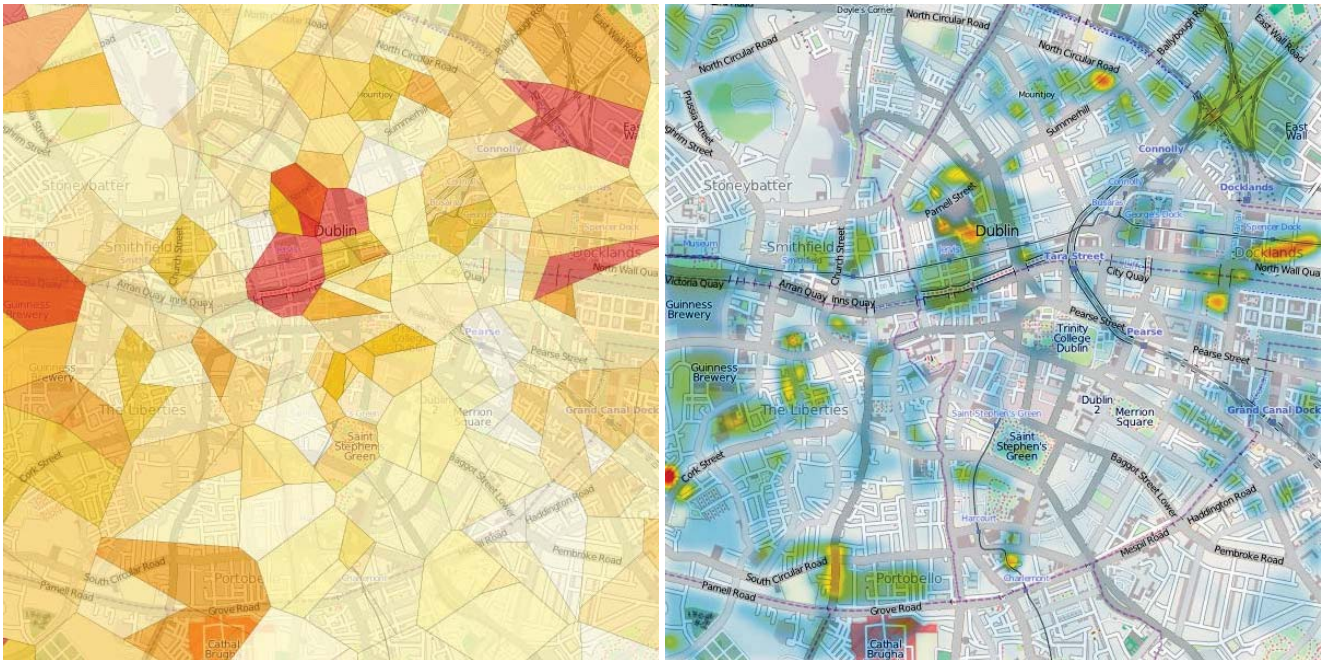
[Kaiser & Pozdnoukhov, 2012]

Population density

11:00 am

[Kaiser & Pozdnoukhov, 2012]

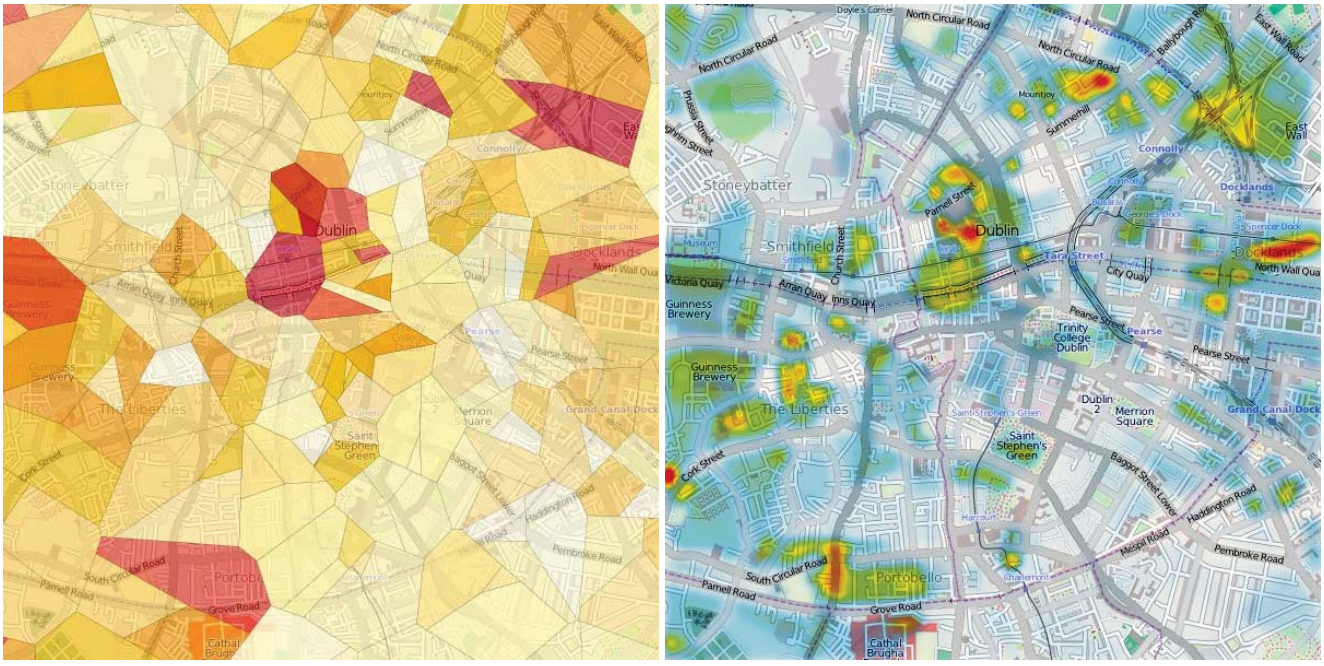
Population density



12:00 am

[Kaiser & Pozdnoukhov, 2012]

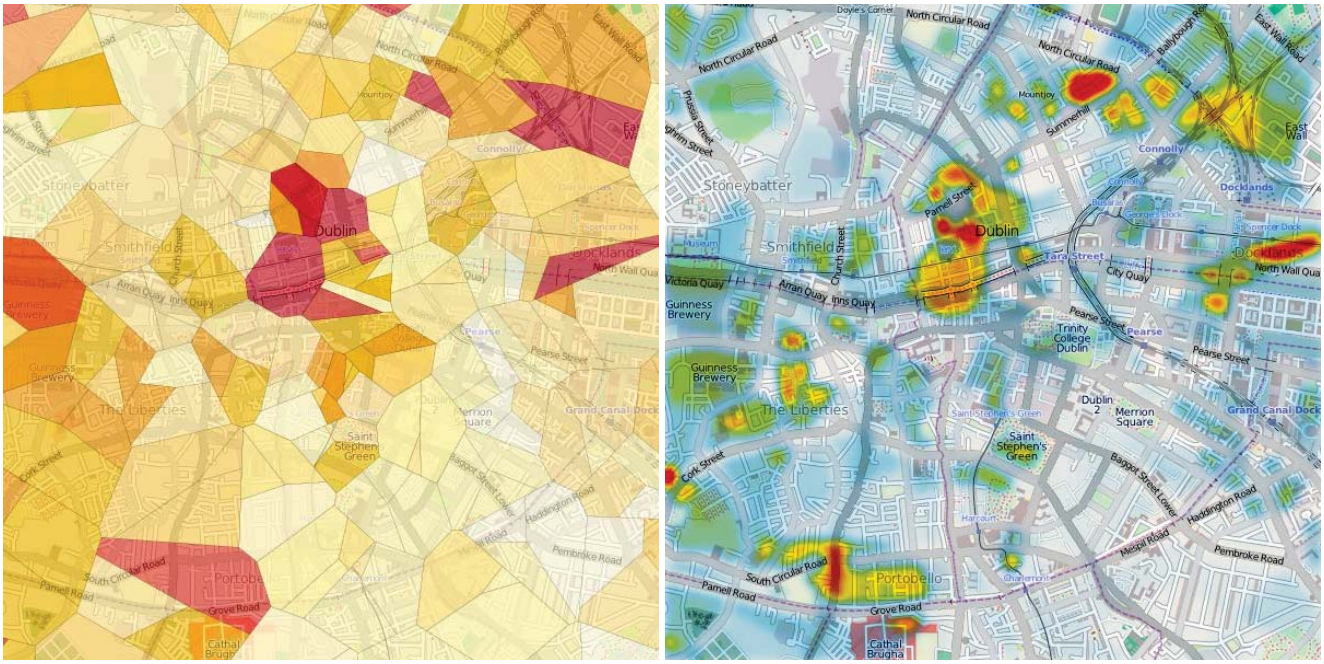
Population density



1:00 pm

[Kaiser & Pozdnoukhov, 2012]

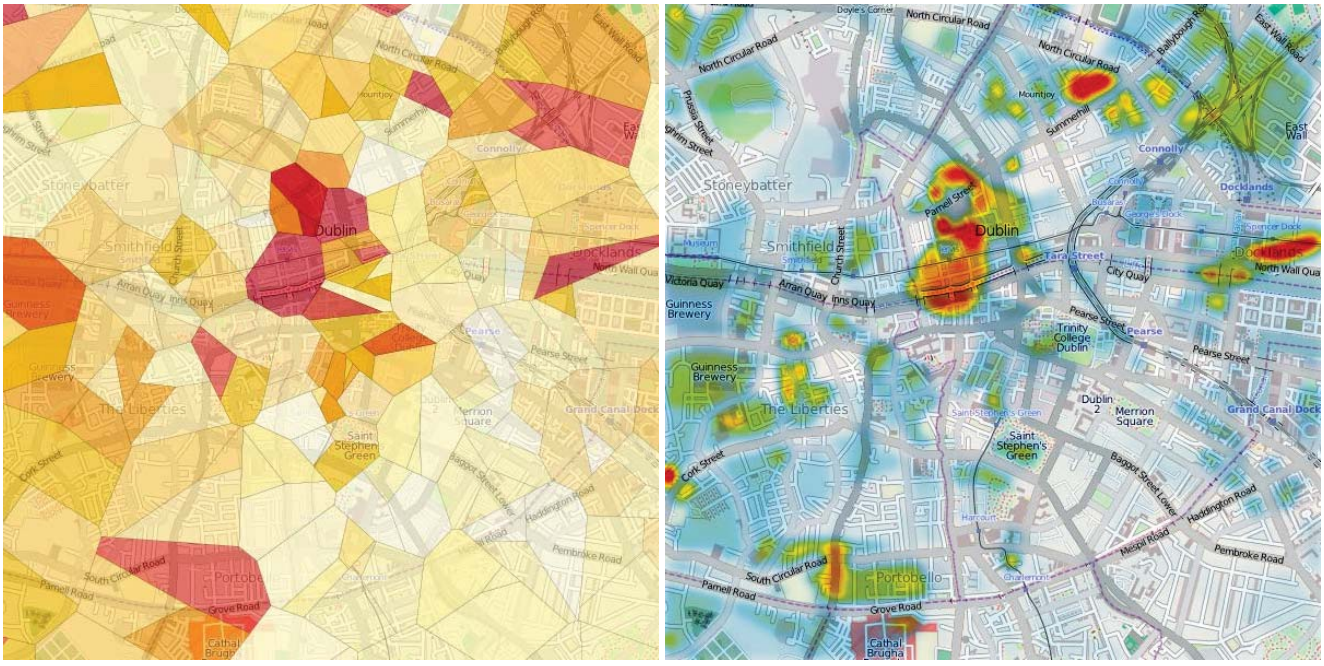
Population density



2:00 pm

[Kaiser & Pozdnoukhov, 2012]

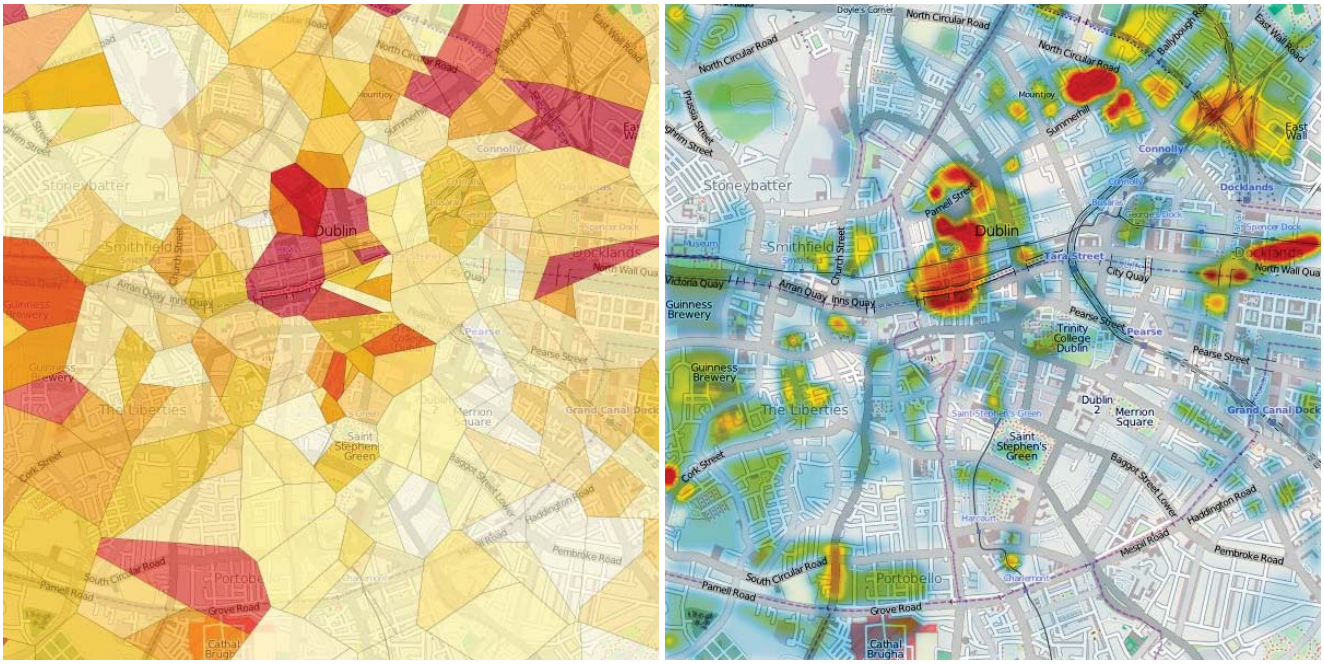
Population density



3:00 pm

[Kaiser & Pozdnoukhov, 2012]

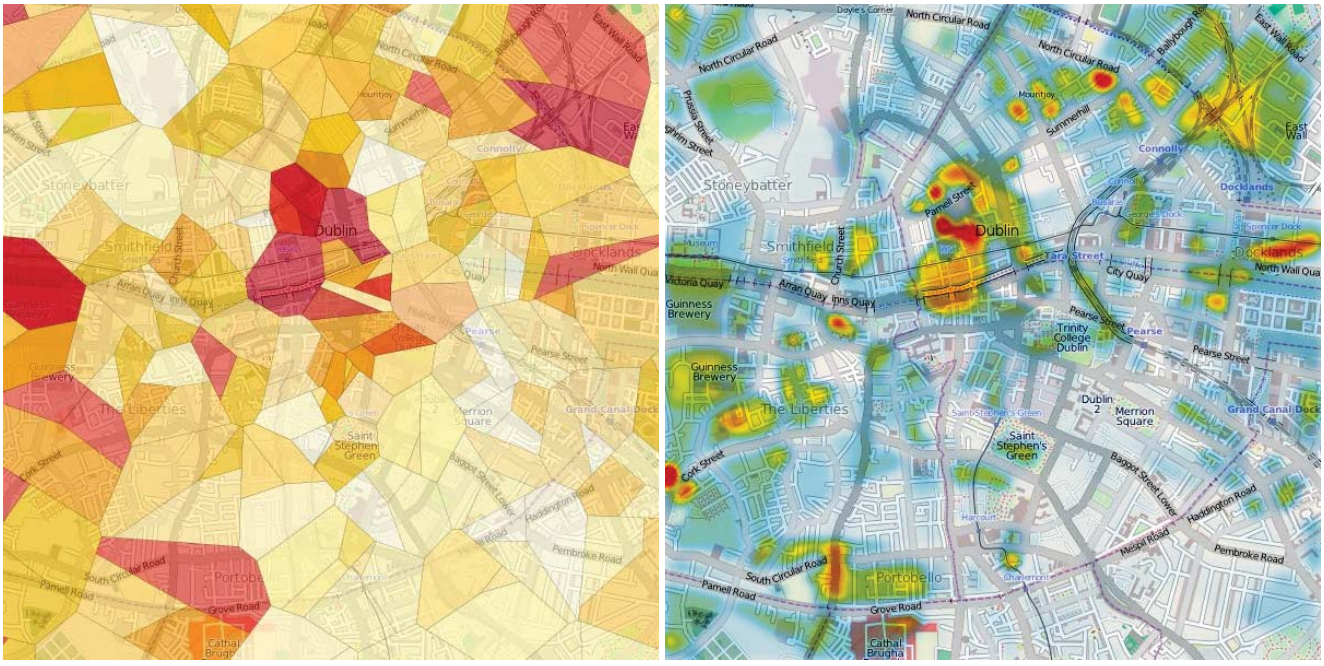
Population density



4:00 pm

[Kaiser & Pozdnoukhov, 2012]

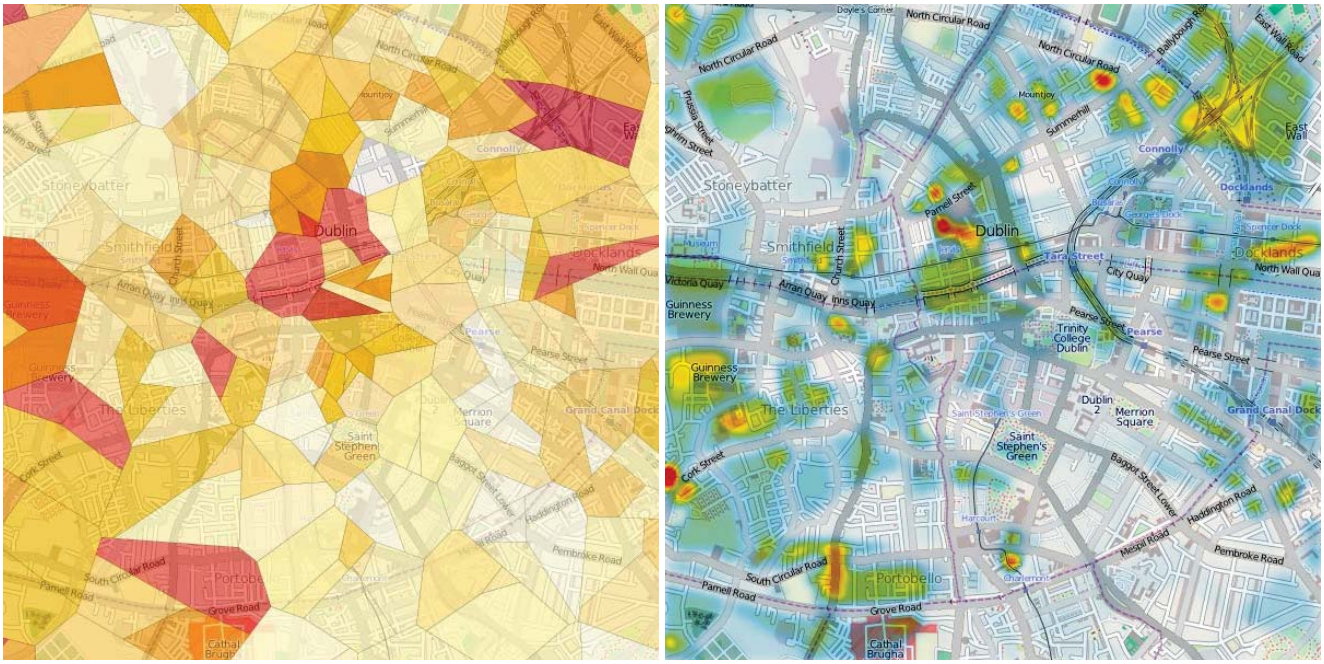
Population density



5:00 pm

[Kaiser & Pozdnoukhov, 2012]

Population density



6:00 pm

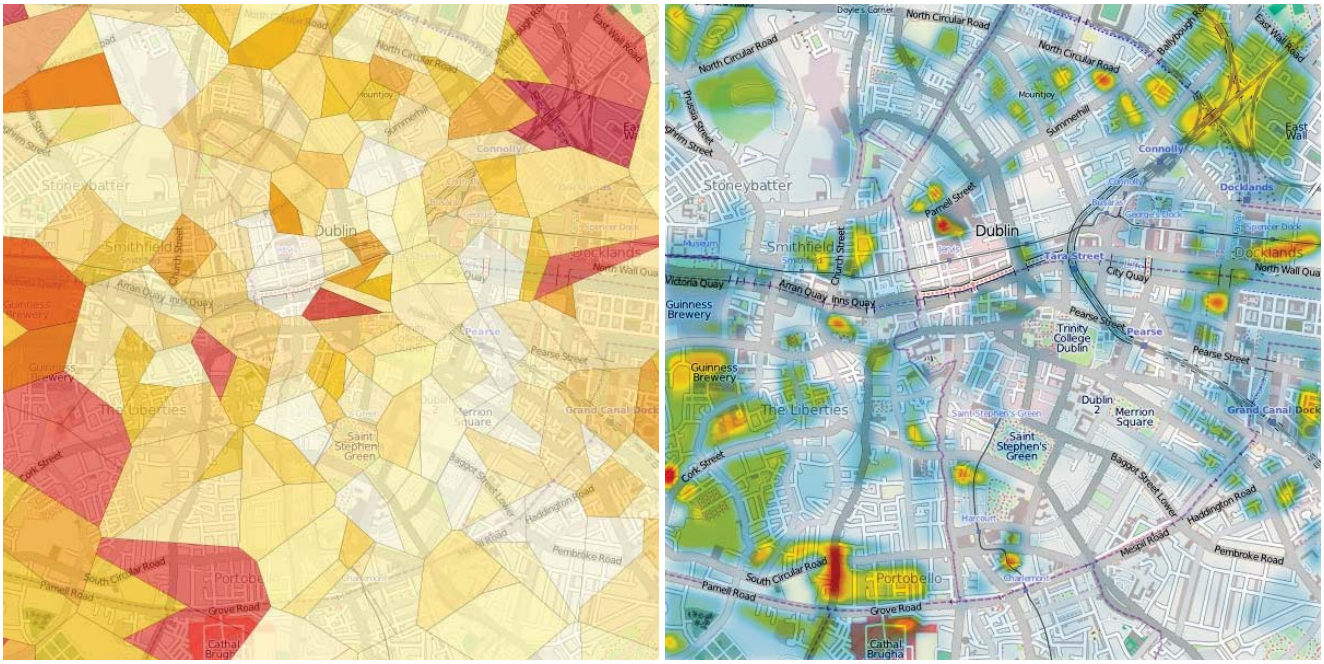
[Kaiser & Pozdnoukhov, 2012]

Population density

7:00 pm

[Kaiser & Pozdnoukhov, 2012]

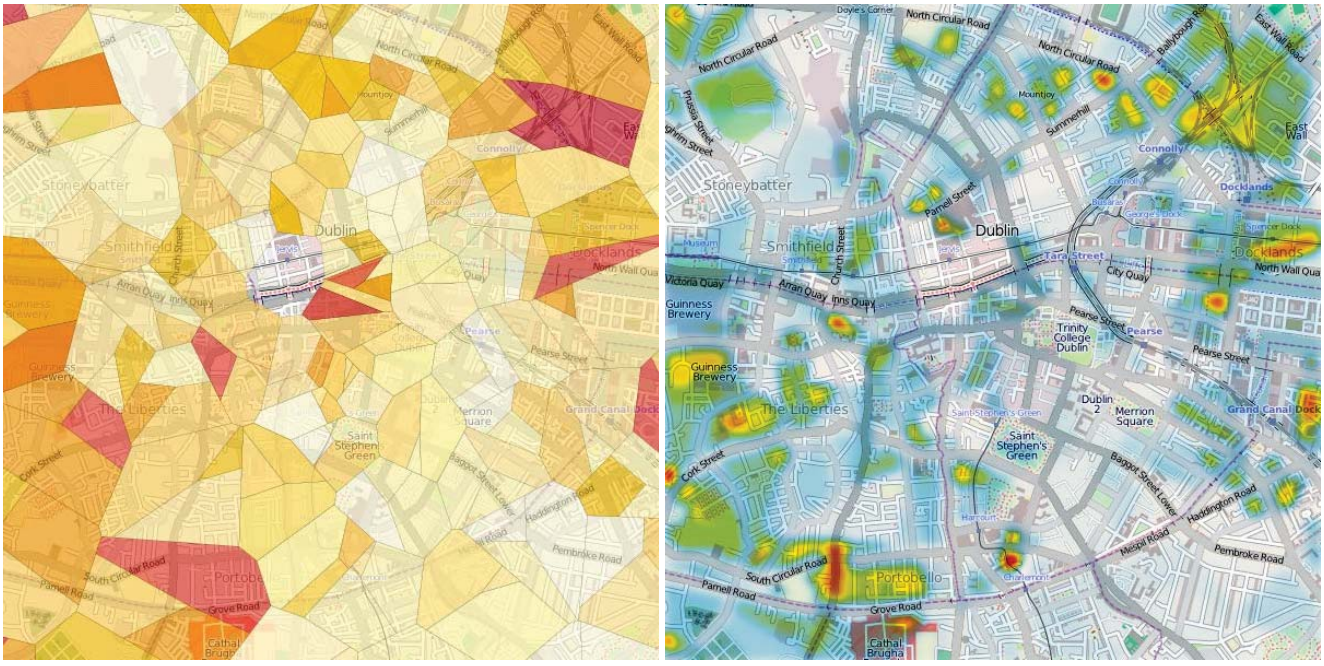
Population density



8:00 pm

[Kaiser & Pozdnoukhov, 2012]

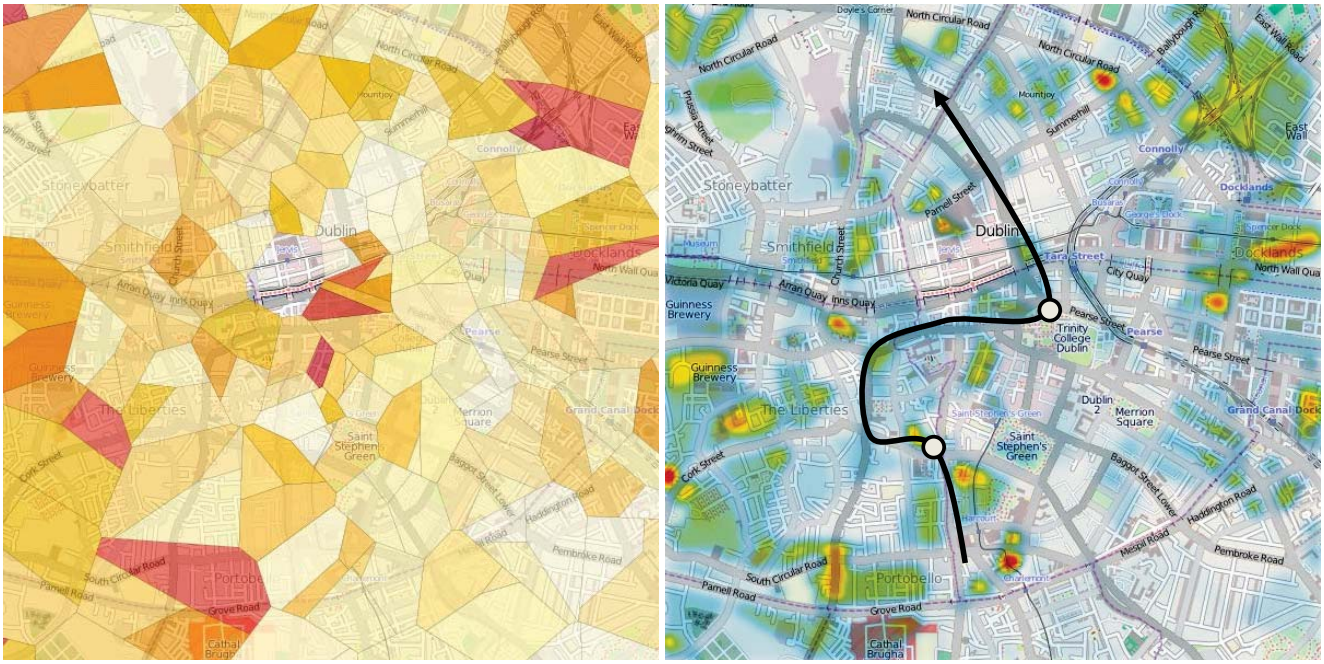
Population density



9:00 pm

[Kaiser & Pozdnoukhov, 2012]

Population density



10:00 pm

[Kaiser & Pozdnoukhov, 2012]

In Conclusion

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Dynamic Content Comes of Age

Data Drives Improved Transportation Services

Evolution & Revolution

here

Data and the Transportation Network

What Works

- TMC
- 511
- ICM

What's Next

- CV Pilot Deployment
- Full Connectivity/Automation

The Connected Traveler

- Automotive
- Transit
- Traveler

Delivery Consideration

- O&M (Funding?)
- TDaaS (SaaS Data?)
- Center of Excellence (Best Practices)

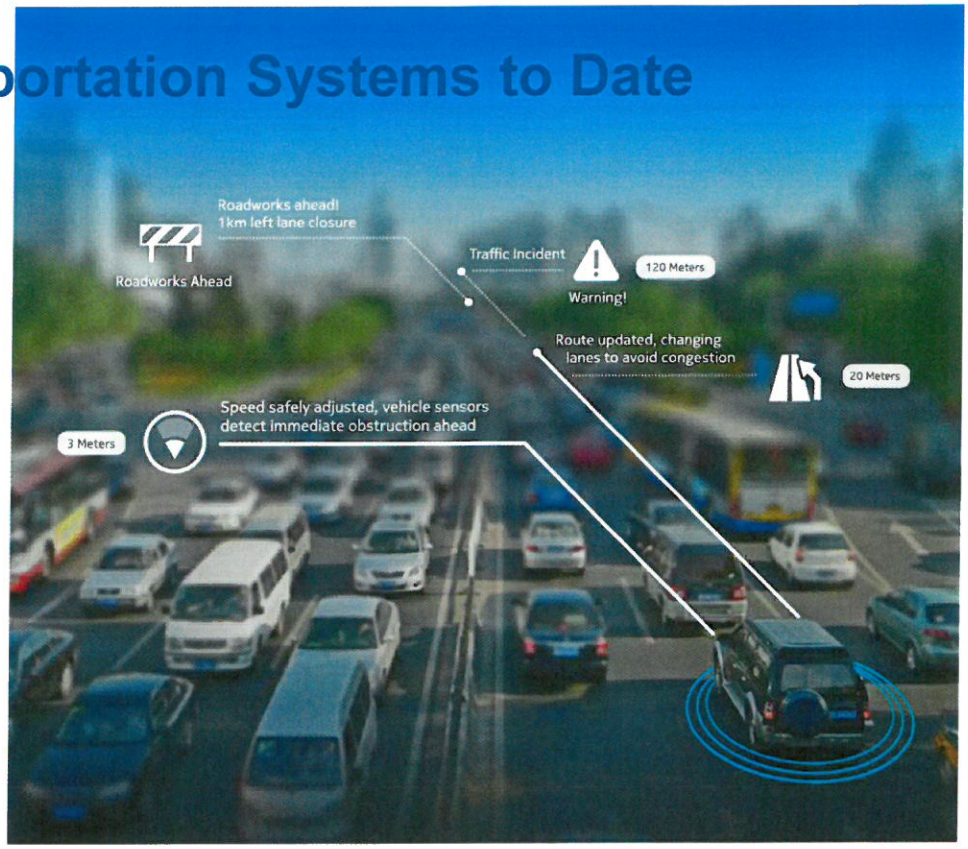
1

Intelligent Transportation Systems to Date

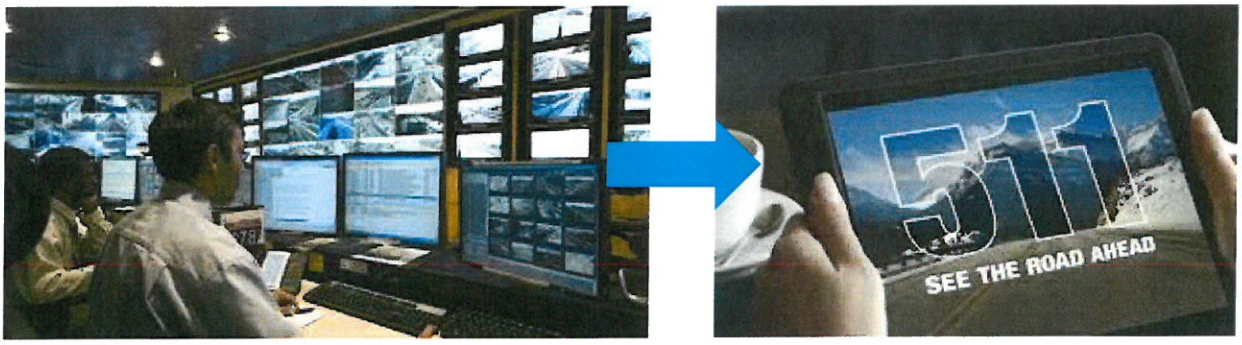
Transforming mobility

Meaningful partnerships with industry leaders and transport authorities

Partner to bring the vision of intelligent services to life



Transportation Management



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Mobility in urban spaces faces considerable challenges and barriers to growth

$231B

50% rise in pollution cost by 2030

CO2

road congestion increases fuel consumption by 300%

3,500

deaths every day in road crashes

will rise to 1.9M each year by 2020 if no measures are taken

3.5-14 min

time drivers spent searching for a space every time they park

major contributor to urban congestion

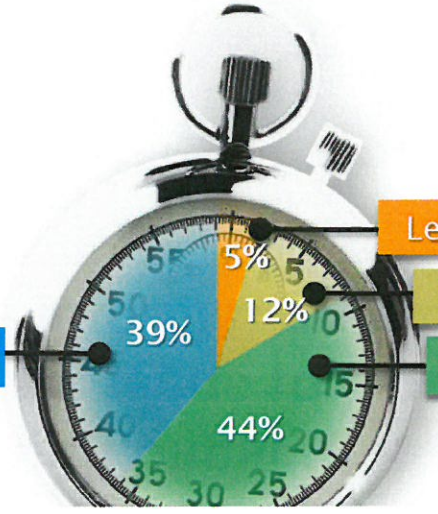
4 Source: Association for Safe International Road Travel 2013

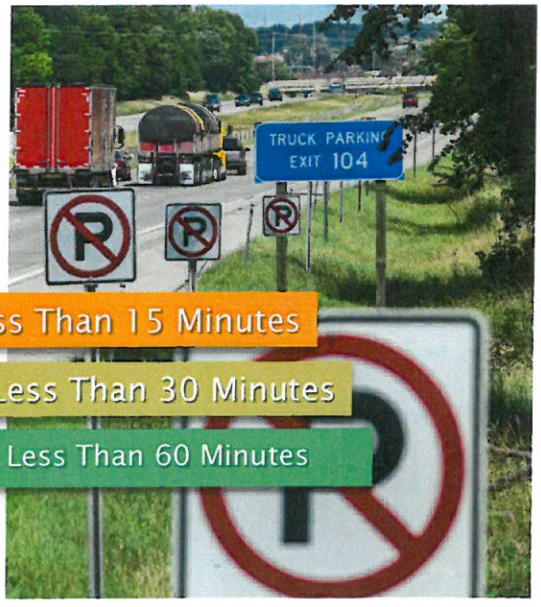
here

Lack of real time information about availability of spaces is a serious issue for the trucking industry and for the traveling public.

Time Truckers Spend Looking for Parking on the Highways.

1 HOUR OR LONGER





5

Today 23 million cars on the road globally are connected

6

In 5 years it will be almost 200 million

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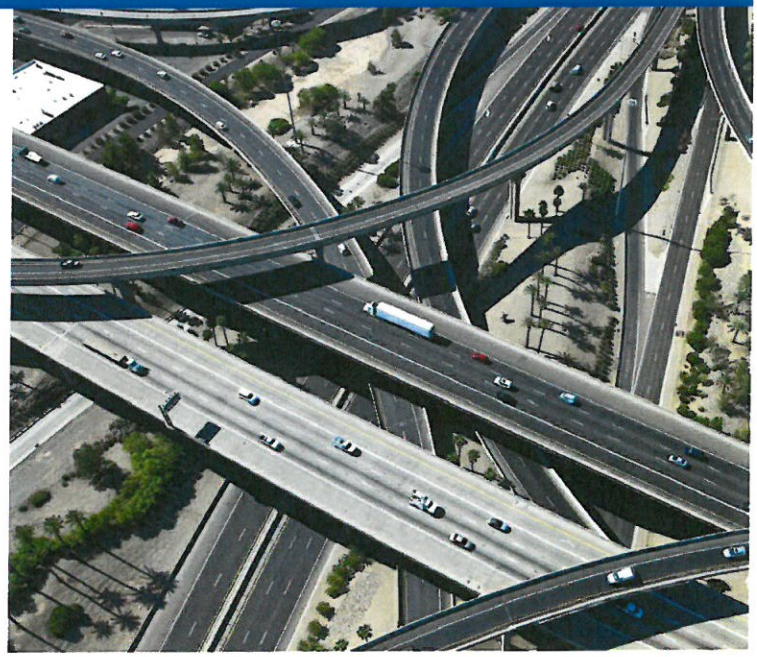
Data enables powerful solutions for transportation management

- Automotive and Mobile Navigation
- Traveler Information Applications
- Performance & Operations Management
- Enterprise and Fleet Optimization



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All About the Data

HERE Processed

>650 billion probe points

in real time in 2014

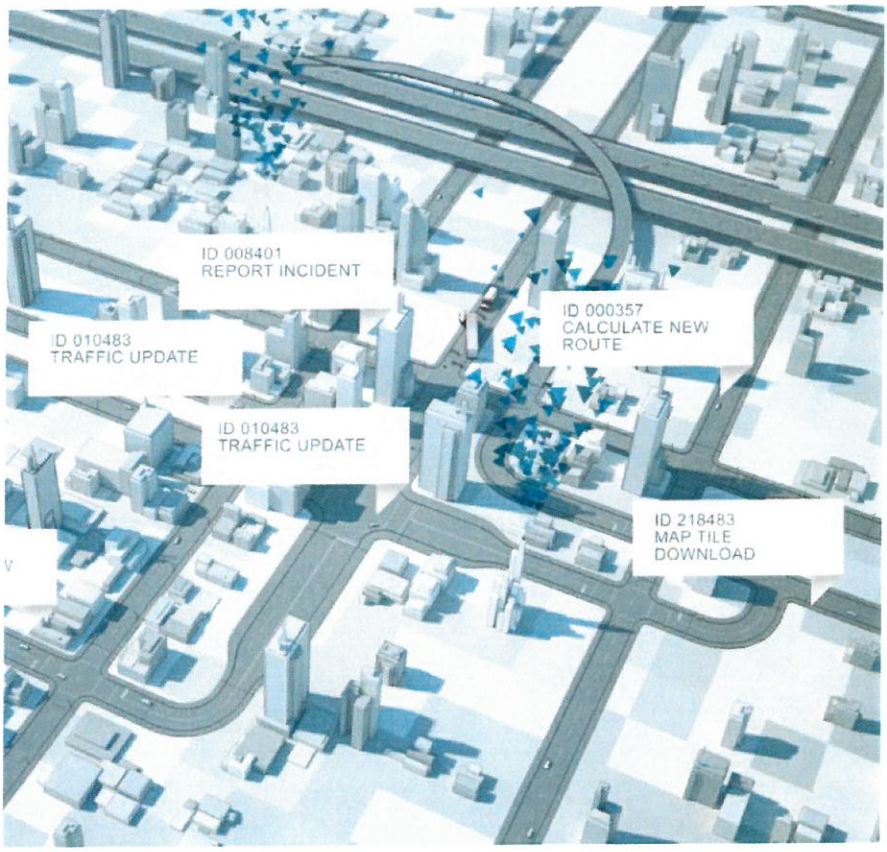
Where does it all come from?

- Sensors
- Commercial Fleet
- Portable Navigation
- Mobile Devices
- Connected Cars

Exponential growth continues

9

The connected vehicle will enable us to solve major challenges of urbanization and smart city discussion



Sources: AASHTO (2014); Markets&Markets (2014); FutureStructure (2014)

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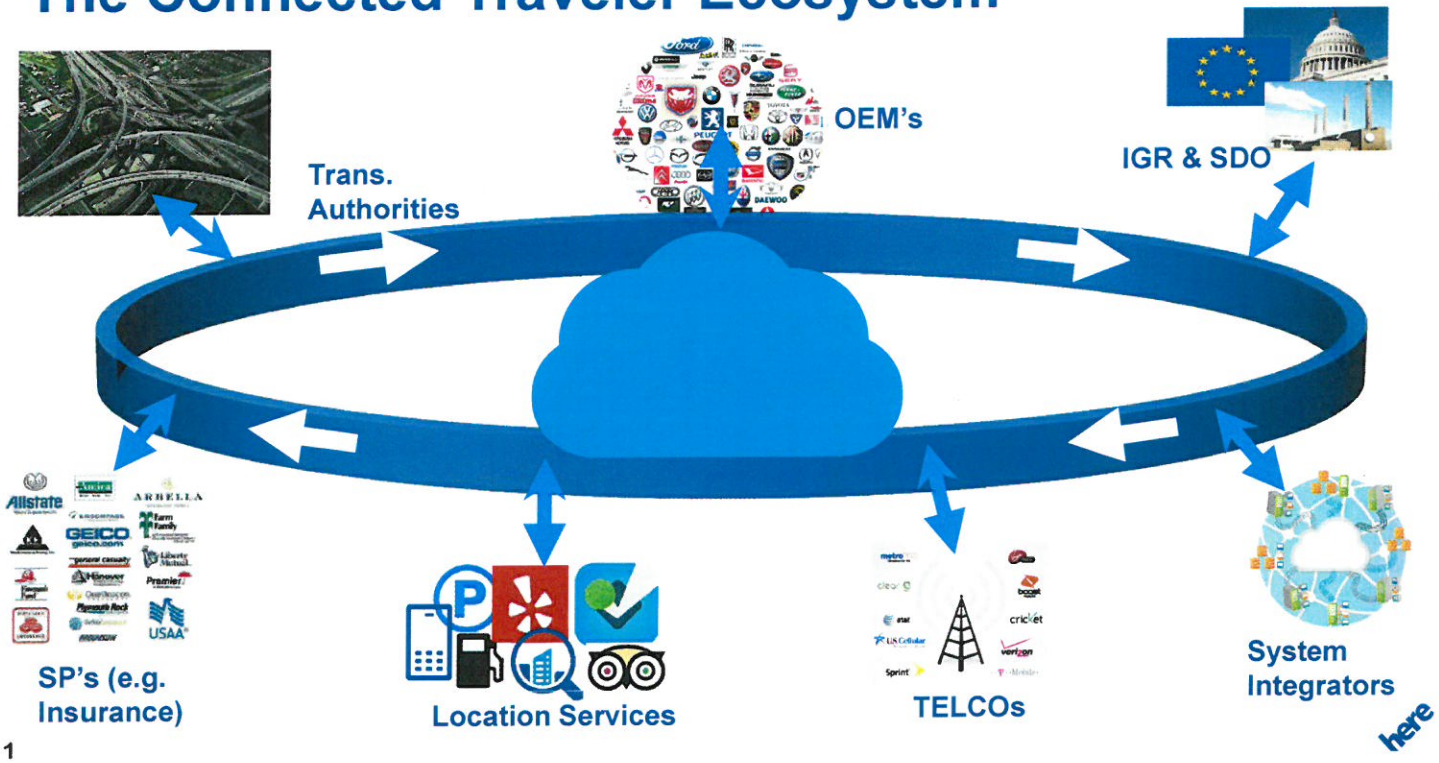
The Connected Traveler Ecosystem



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The Connected Traveler

Multi-modal traveler applications for driving, public transit, pedestrian

HERE both creates applications and powers 3rd party applications for in-vehicle, PND, mobile devices and across operating platforms

here

What's Next

TECHNOLOGY

- Cloud Computing
- Big Data
- Data Analytics
- Connectivity
- Automated Vehicles

CONTENT

- Internet of Cars
- Internet of Travelers
- Connected Transportation Appliances

here

Connected Travelers, Vehicles, & Infrastructure

Provide cloud-based data management and analytics for smart/connected infrastructure and transportation solutions enhancing safety, mobility, environmental and economic efficiency

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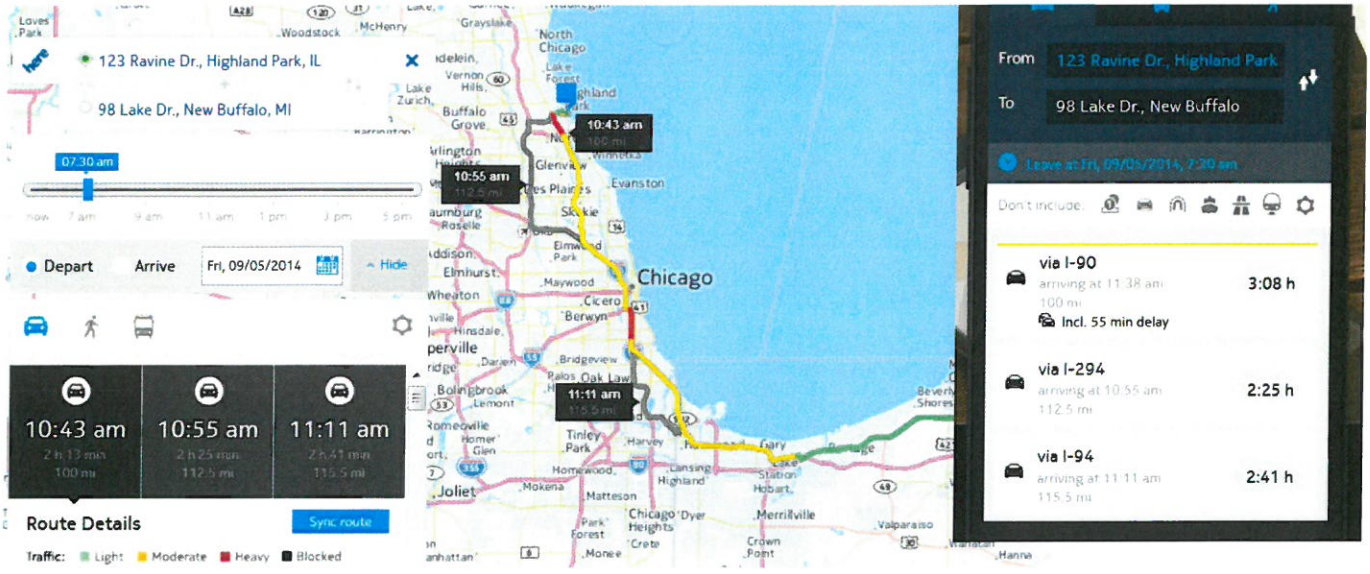
Real-Time Predictive Traffic

Smart Guidance

Plan ahead, adjust in real-time to anticipate when to leave and how to get there



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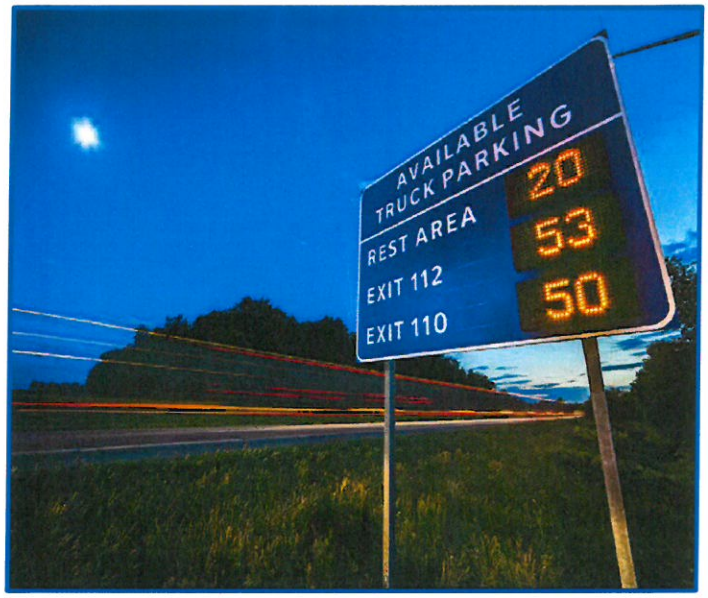
Freight Mobility and Safety Improvements Via Smart Truck Parking



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Connected Traffic Signals

Connected Infrastructure

- The use of Signal Phase and Timing (SPaT) data along with HERE to deliver enhanced traffic flow, prediction accuracy and real time mobility status
- For road authorities the combination can improve congestion management, vehicle efficiency and reduce carbon emissions.
- Demonstrated at ITS World Congress in Detroit

21ST WORLD CONGRESS
DETROIT 2014
INTELLIGENT TRANSPORT SYSTEMS

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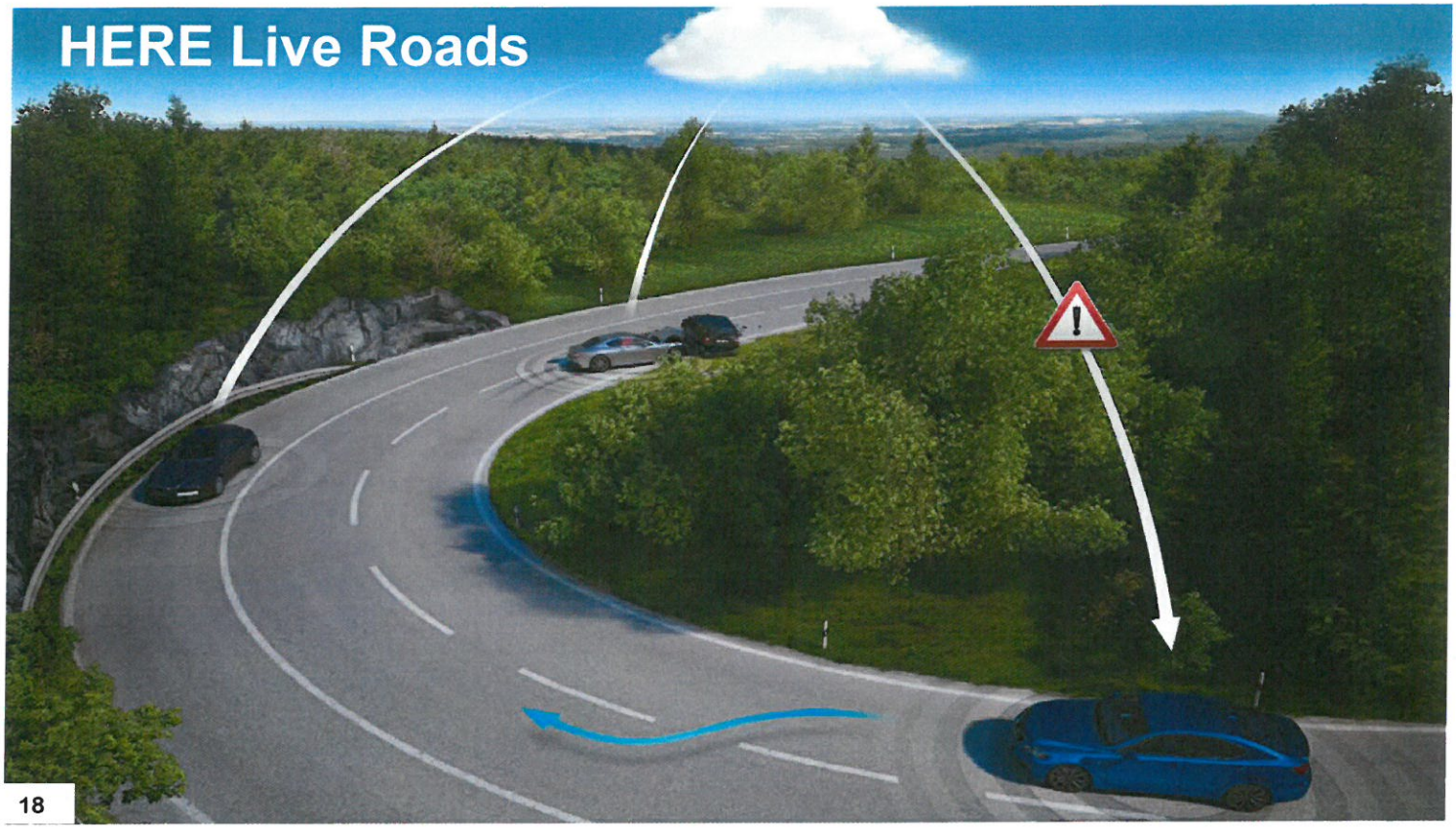

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Live V2X Demonstrations Combining ITS-G5 and LTE/ Liquid Apps

V2-Pedestrian (ITS-G5)

Driver is alerted to not-yet visible pedestrian. Vehicle automatically brakes in time.



V2-Bicycle (ITS-G5)

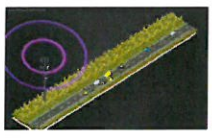
Driver is alerted to not-yet visible bicyclist. Vehicle automatically brakes in time.



Lane Hazard Avoidance and Auto Lane Change (LTE+ ITS-G5)

Driver is alerted to stopped vehicle ahead via DSRC. Hazard image sent via LTE from HERE Cloud. Driver initiates automated lane change.







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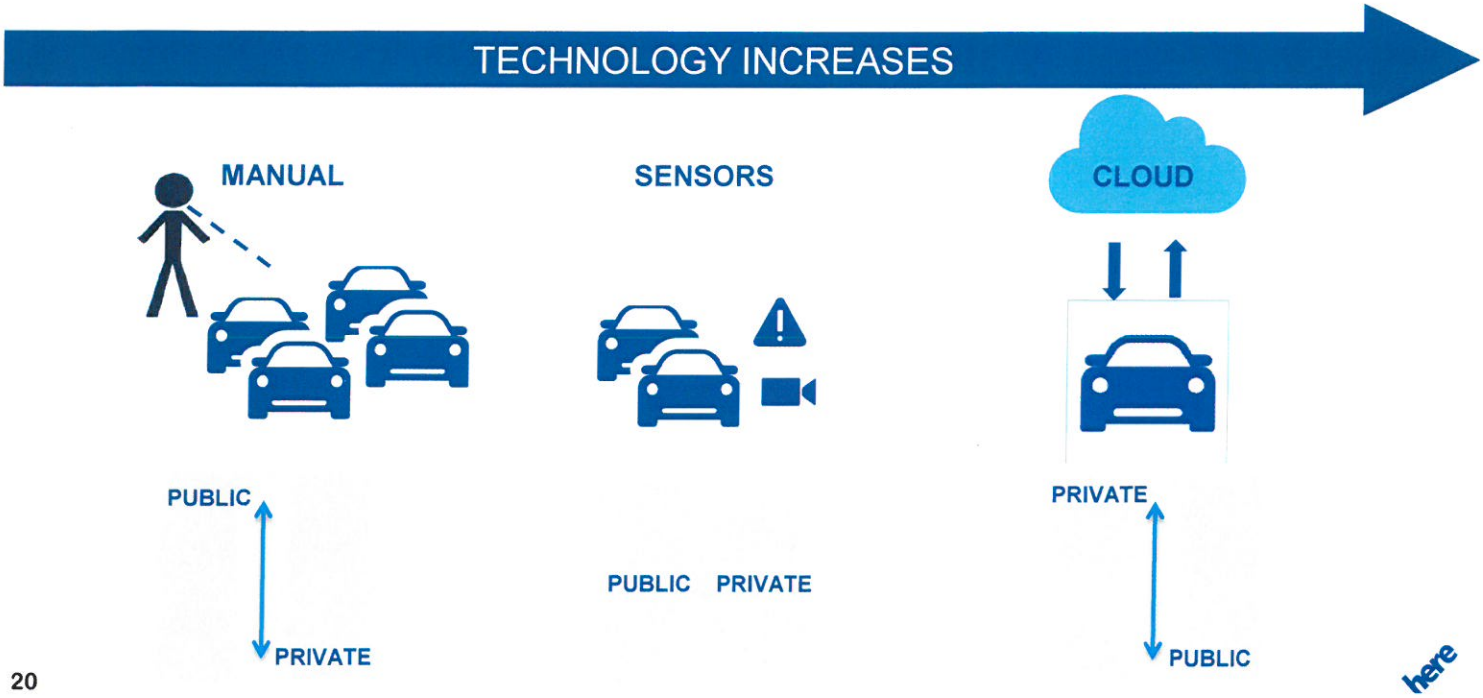
Evolution of Connected Vehicles



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Observations

- O&M
- TDaaS
- Center of Excellence

Who manages the network?

How much of the management will be automated?

here

ITS Infrastructure Video

Thank you!