Bottom Line Series

Delineates Investment requirements for highways , bridges and transit;

prepared for AASHTO and APTA and;

presented to Congress to support five Surface Transportation Reauthorizations.

OUTLINE

I. PARALLELS TO THE COMMITTEE'S CHARGE
II. WHY A BOTTOM LINE ?
III. BASIC STARTING POINTS
IV. NATIONAL INVESTMENT REQUIREMENTS
V. THE BACKLOG OF REQUIREMENTS
VI. INTEGRATION INTO OVERALL SCOPE

BOTTOM LINE PARALLELS TO COMMITTEE'S CHARGE

- Need for Independent Assessment
- Limited Time and Funding
- Need to Supplement Modeled Products
- Cover areas of Selected Focus
- Consider Demographic, Economic and Technological Trends
- Focus on Specific Interstate and NHS Needs

Why a Bottom Line ?

It serves a different purpose than the C&P report employing many of the FHWA/FTA tools but with extensive supplementary research

C&P Goal

- To respond to Congressionally mandated requirement for objective appraisal of highway, bridge and transit physical conditions, operational performance, and investment effects
- **Indicates scale of need but does not say how big the overall program should be!**

Bottom Line Goal

- Congress looks to AASHTO for sound objective baseline for specific Reauthorization
- Establish States' position on investment requirements
- Maintain consistency with the C&P data and methods
- **Indicates national investment requirements for the legislative period of interest**

Current Bottom Line Era

2003, 2009, 2015

- AASHTO developed its own capability to run FHWA/FTA models with Cambridge Systematics
- Still dependent on annual State data sets
- But defined distinct policy scenarios – broader perspective, differing travel forecasts, focused time periods, higher employment, etc.
- Conducted special supplements and estimates

- AS STANDARD PRACTICE, ALWAYS TRACEABLE BACK TO CONSISTENCY WITH C&P PROCESSES – COULD EXPLAIN TO CONGRESS HOW AND WHY WE DIFFERED

Context in Updating the 2015 Executive Bottom Line

- **Highway VMT growth had trended:**
  - below the 2008 HPMS baseline of 1.8% VMT forecast,
  - below the 2009 BL baseline of 1.4% growth forecast, and
  - below the 1.0% BL policy scenario growth forecast
  - **Since a bottom in 2011 it has grown rapidly (7% from 2011-2015)**

- **Transit growth had trended:**
  - below the 2009 baseline BL forecast of 2.4% and
  - below the 3.5% AASHTO sustainability policy scenario forecast (double transit in 20 years)

- **ARRA one time funding distorted the picture**

- **Construction cost index had declined during the recession, lowering the 2012 project costs for highways, bridges and some transit elements AND STILL LOW TODAY**

THE US – a VERY limited century – so far

WE HAVE LIMITED

- POP GROWTH
- WORKER GROWTH
- VEHICLE GROWTH
- ROADWAY GROWTH
- VMT GROWTH
- SLIGHT GROWTH IN CONGESTED ROADS

- Average travel time to work
  - 2000 25.5 minutes
  - 2011 25.5 minutes

	2000	2015	Change	% chg
Population (millions)	281.4	321.4	40	14.2%
Vehicles (millions)	221.4	260.4	39	17.6%
Road System miles* (millions)	3.936	4.177	0.241	6.1%
Lane Miles (millions)*	8.224	8.766	0.542	6.6%
Vehicle Miles of Travel (trillions)	2.764	3.148	0.384	13.9%
VMT/ lane mile (thousands)	336	359	23	6.8%
Average work travel time (minutes)	25.5	25.9	0.5	1.96%

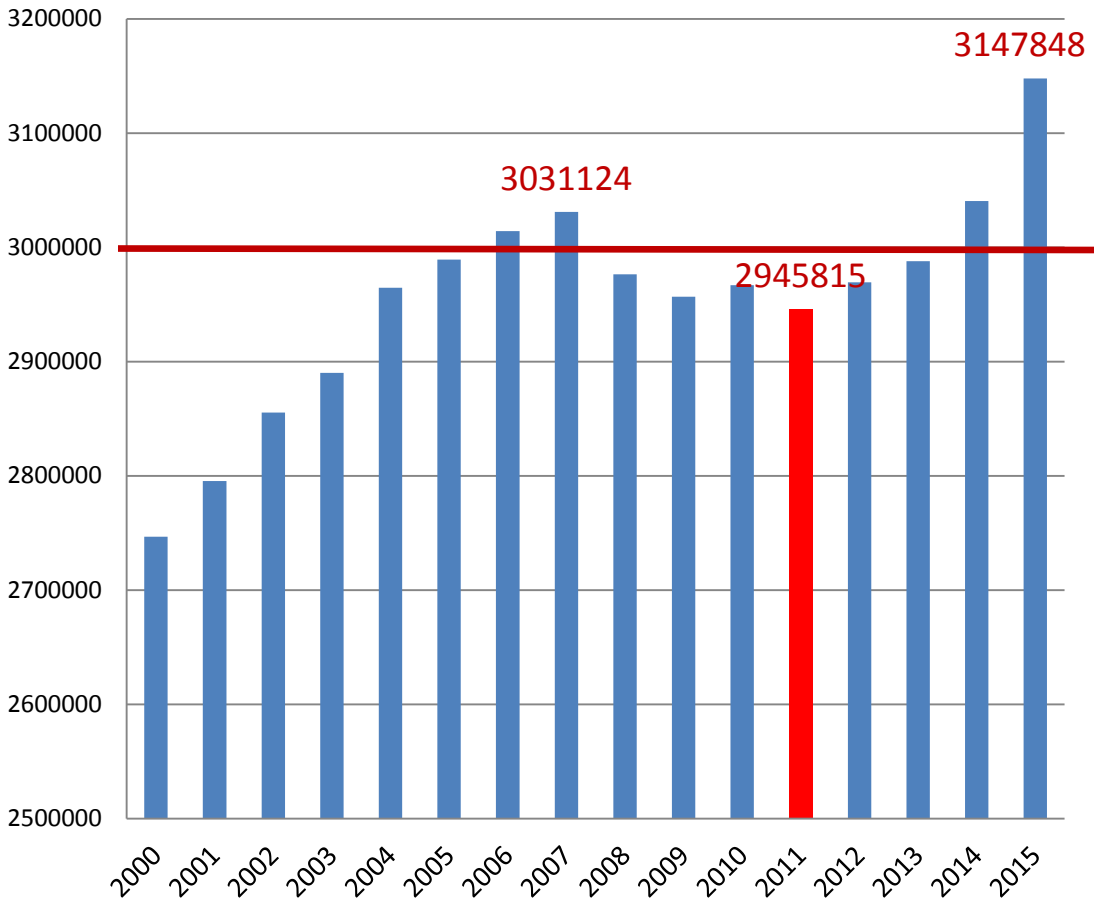
* 2014 data

THE STORY OF HIGHWAY TRAVEL IN THIS CENTURY

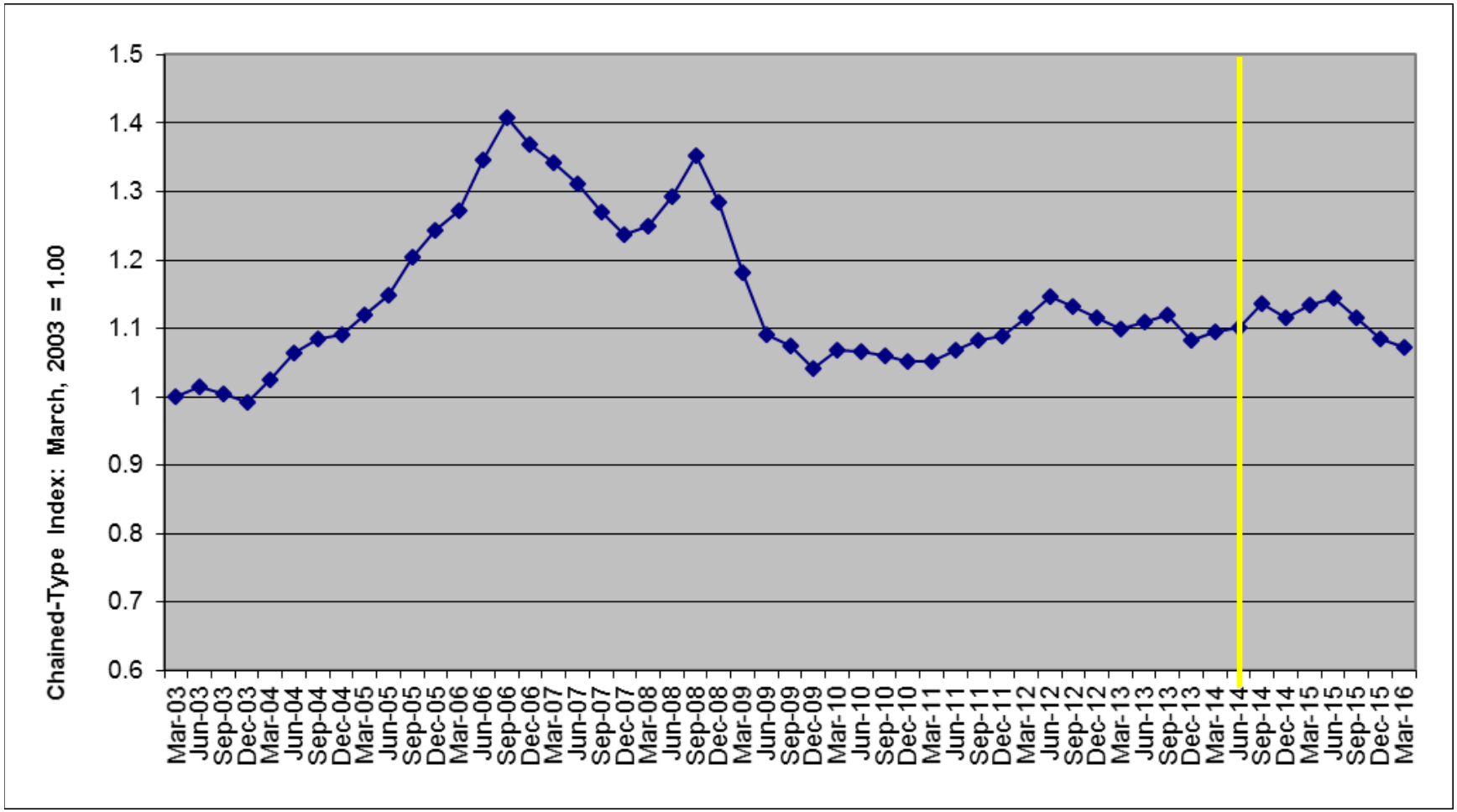
- Range around **3 trillion**
- **Peaked in 2007** Just before the recession
- **Hit bottom in 2011 down less than 2 %** from 3 trillion
- 2015 hit **all time high**
- **Up 5%** over 3 trillion
- **2016 up >3% so far**

Annual VMT range around 3 trillion in this century

(millions)



National Highway Construction Cost Index thru Mar 2016 ----



2015 vs. 2009 Bottom Line
Highway Investment Requirements

MAXIMUM ECONOMIC INVESTMENT SCENARIO ESTIMATES B/C > 1.0	State of Good Repair	2009 BL (Billions of $2006)	2015 BL (Billions of 2012$)
VMT Growth 1.6% (highest growth rate examined)	88.3	Not included	$156.0
VMT Growth 1.4 % (base case in 2009 Bottom Line)	88.3	$166	$144.4
VMT Growth 1.0 % (AASHTO Policy Scenario in 2009 Bottom Line)	88.3	$132	$120.2

Note:

A full employment scenario would increase each 2015 estimate by at least $4 billion

Special Selected Focus Areas in 2015 AASHTO Bottom Line

- Economic Development Implications
- Freight Logistics Demands
- Tourism Implications
- Rural Participation in the Economy

Limited because of short lead time to legislation

Past Special Studies to Assess Further Investment Requirements in the Bottom Line

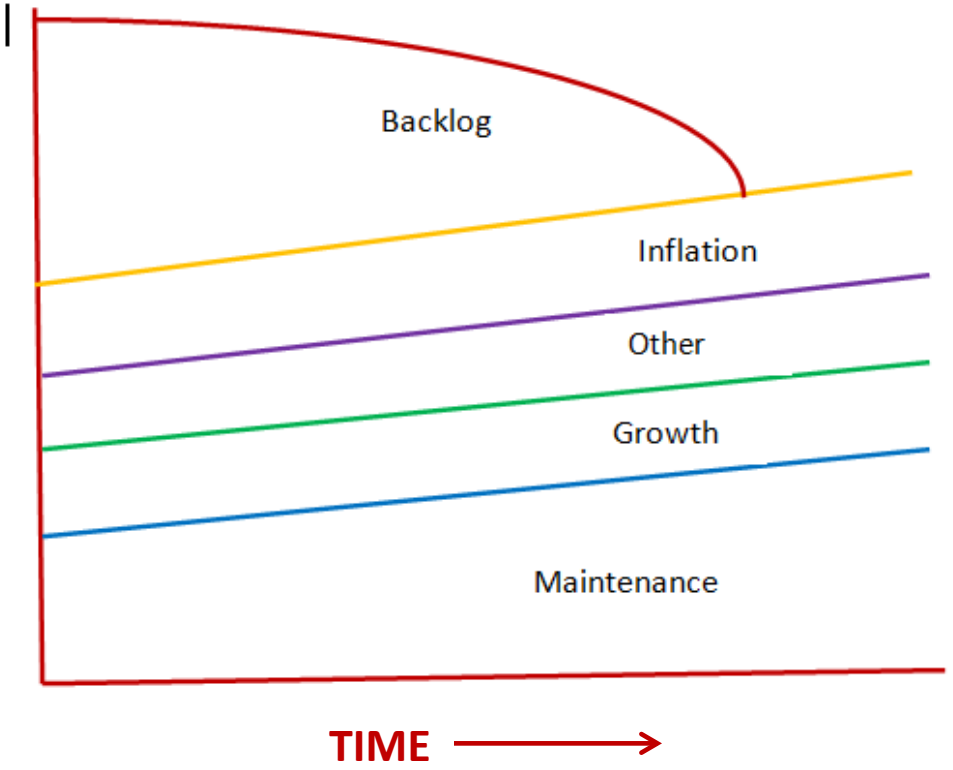
- Environmental Impact Mitigation Costs
- Extended Safety Costs Coverage
- Expanded System Operations Effects
- Security and Emergency Management 9/11
- Infrastructure Reconstruction

These ranged from $7 to $11 billion per year in 2009 – WITHOUT RECONSTRUCTION

Understanding the Nature of Investment Needs

- Future growth has an important effect on investment needs
- Substantial benefits to be obtained from increased highway, bridge, capital investment
- In both the long and near term.
- Even with limited growth, or no growth

Components of Investment Requirements

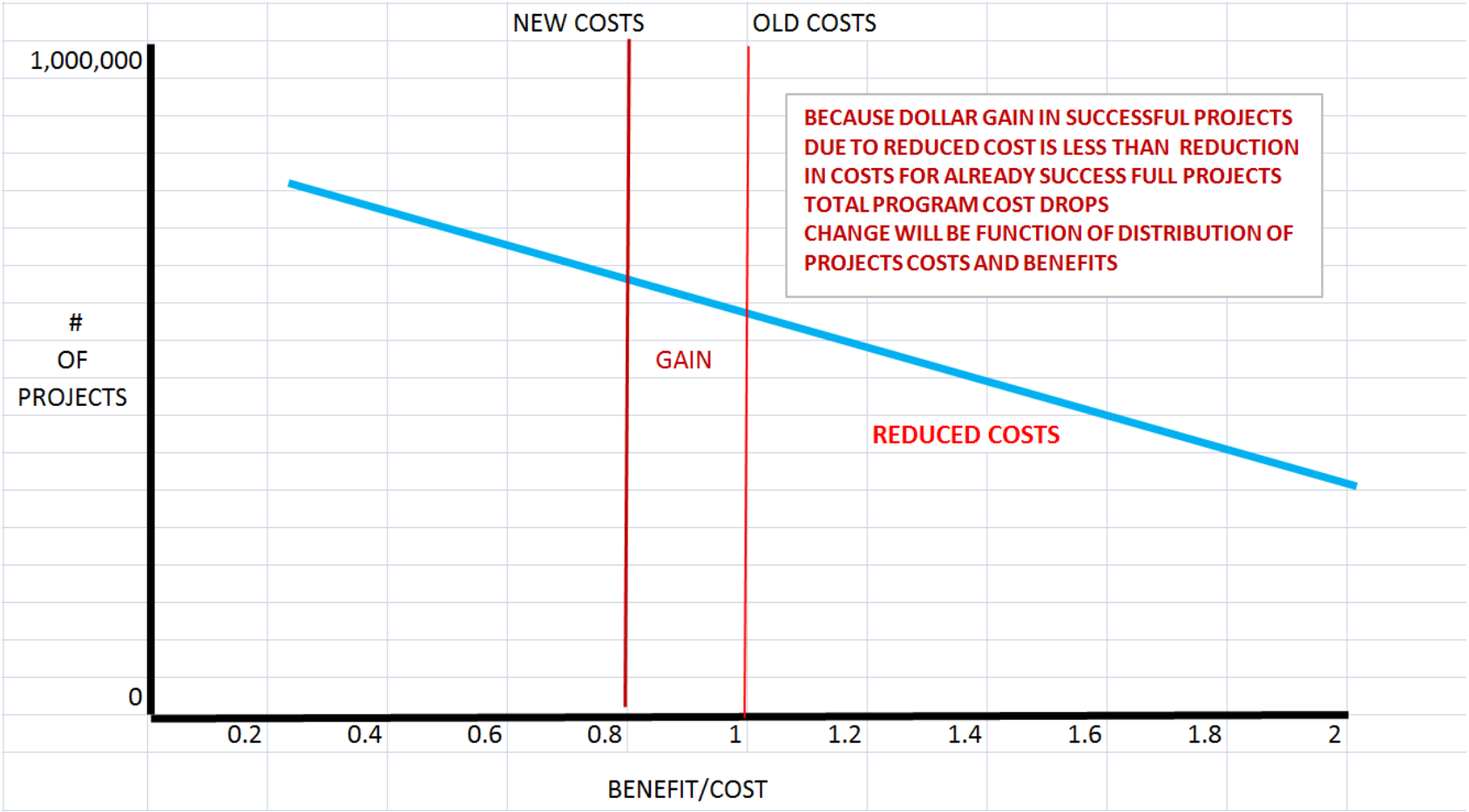


BACKLOG estimates from 2013 C&P employed in 2015 Bottom Line

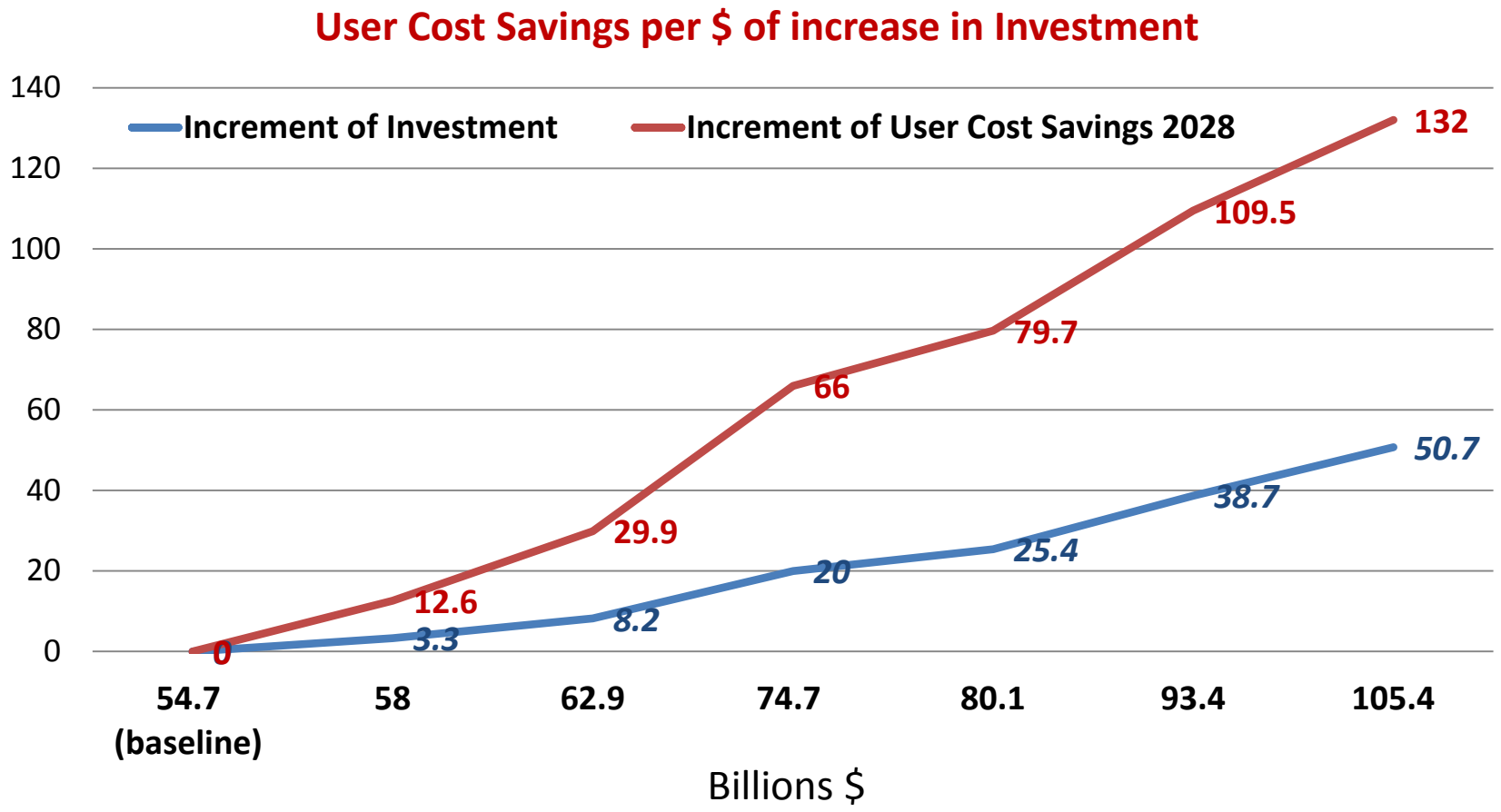
2012 BACKLOG	System Rehabilitation	System Expansion	Total Backlog	*share of Rehabilitation Needs*	*Share of System Expansion Needs*	*Share of Total Backlog*
Interstate Highway System	**62.43**	**90.81**	**153.24**	***15.94%***	***38.23%***	***24.35%***
Remainder of National Highway System	**138.63**	**70.42**	**209.04**	***35.39%***	***29.65%***	***33.22%***
Total National Highway System*	**201.06**	**161.22**	**362.28**	***51.30%***	***67.90%***	***57.60%***
Other Fed-Aid Highways	**107.73**	**41.51**	**149.24**	***27.50%***	***17.50%***	***23.70%***
Non-Fed-Aid Highways	**82.92**	**34.79**	**117.71**	***21.20%***	***14.60%***	***18.70%***
All Roads	**391.71**	**237.53**	**629.23**	***100.00%***	***100.00%***	***100.00%***

*estimated for prospective complete NHS ; effects of ARRA unclear at time of estimate

Reduced costs most likely reduces Backlog



Benefit Growth with Increased Investment



User Cost Impacts of Federal Aid Highways "HERS" Investments as Estimated for the 2010 C&P

Level of Investment as Modeled by HERS (Billions$ Annual)	Increment of Investment	Increment of User Cost Savings 2028	Ratio of 2028 User Cost Savings to Investment
$54.7 (baseline)	0.0	NA	NA
$58.0	$3.3	$12.6	3.8
$62.9	$8.2	$29.9	3.6
$74.7	$20.0	$66.0	3.3
$80.1	$25.4	$79.7	3.1
$93.4	$38.7	$109.5	2.8
$105.4	$50.7	$132.0	2.6

THE BOTTOM LINE PARALLELS AND THE COMMITTEE'S CHARGE

- Provide a Sound, Credible Assessment
- Focus on Specific Interstate and NHS Needs
- Responsive to Congressional Charge
- Recognize Time and Funding Constraints
- Respond to Areas of Selected Focus
- Produce Supplements to Modeled Products
- Incorporate Demographic, Economic and Technological Trends

THE CONTEXT - SHORT VERSION

- Levels of growth out into future are modest by historical standards
- A stable funding capability can probably respond to the ongoing investment requirements
- But, there is a substantial backlog of needs to be overcome, before that steady-state is reached
- The present low-cost operating environment has been the ideal time to spend down the backlog
- Once overcome, the ongoing demands of system growth and maintenance should be quite feasible
- Future full reconstruction needs are unclear

A BROADER VISION

- ALL OF THIS IS OCCURRING IN A DRAMATICALLY CHANGING TECHNOLOGICAL, DEMOGRAPHIC AND POLITICAL ENVIROMENT
- WE ARE IN A CHALLENGED ECONOMY IN WHICH ENHANCED PRODUCTIVITY WILL BE KEY
- A SMALLER LABOR FORCE AGE GROUP WILL NEED THAT ENHANCED PRODUCTIVITY TO SUPPORT A LARGE AND GROWING DEPENDENT POPULATION
- AN IMPROVED INTERSTATE SYSTEM PROVIDING GREATER ACCESS TO WORKERS, TO JOBS, TO RESOURCES, TO CONSUMERS WILL BE A MAJOR CONTRIBUTOR TO THAT ENHANCED PRODUCTIVITY

THANK YOU

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AVAILABLE AS BACKGROUND FOR Q&A

The central fact of the future in the U.S.A.

(and for many other countries)

is the dramatic declines in the work force age group

IN THE FUTURE

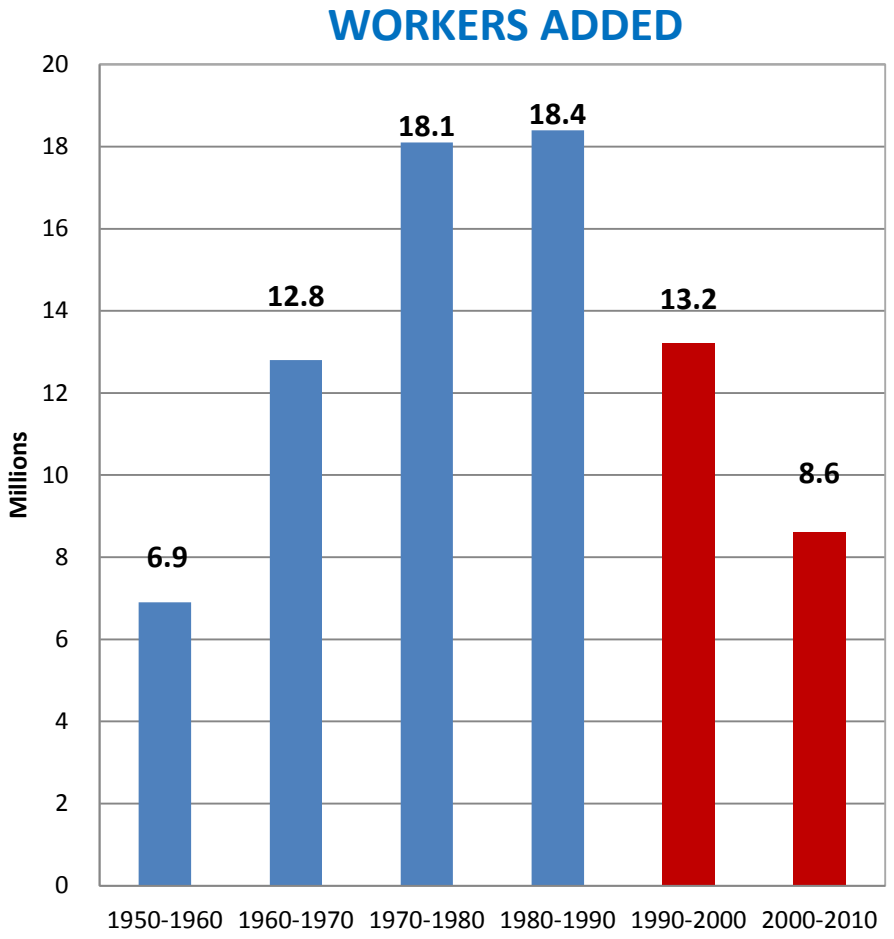
Skilled workers will be at a premium

With higher dependency on them

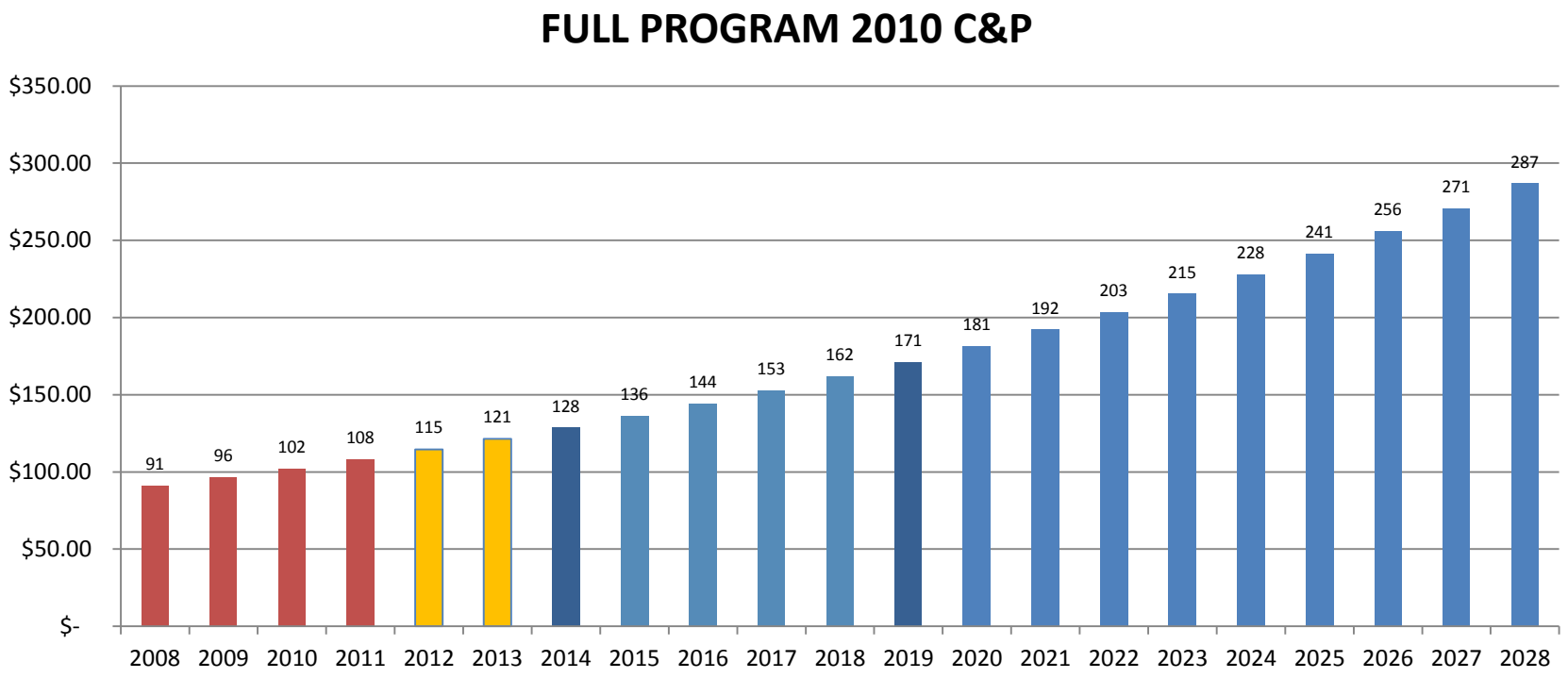
Greater PRODUCTIVITY will be essential

Attracting workers and holding them will be key

Larger "Market Sheds" WIN

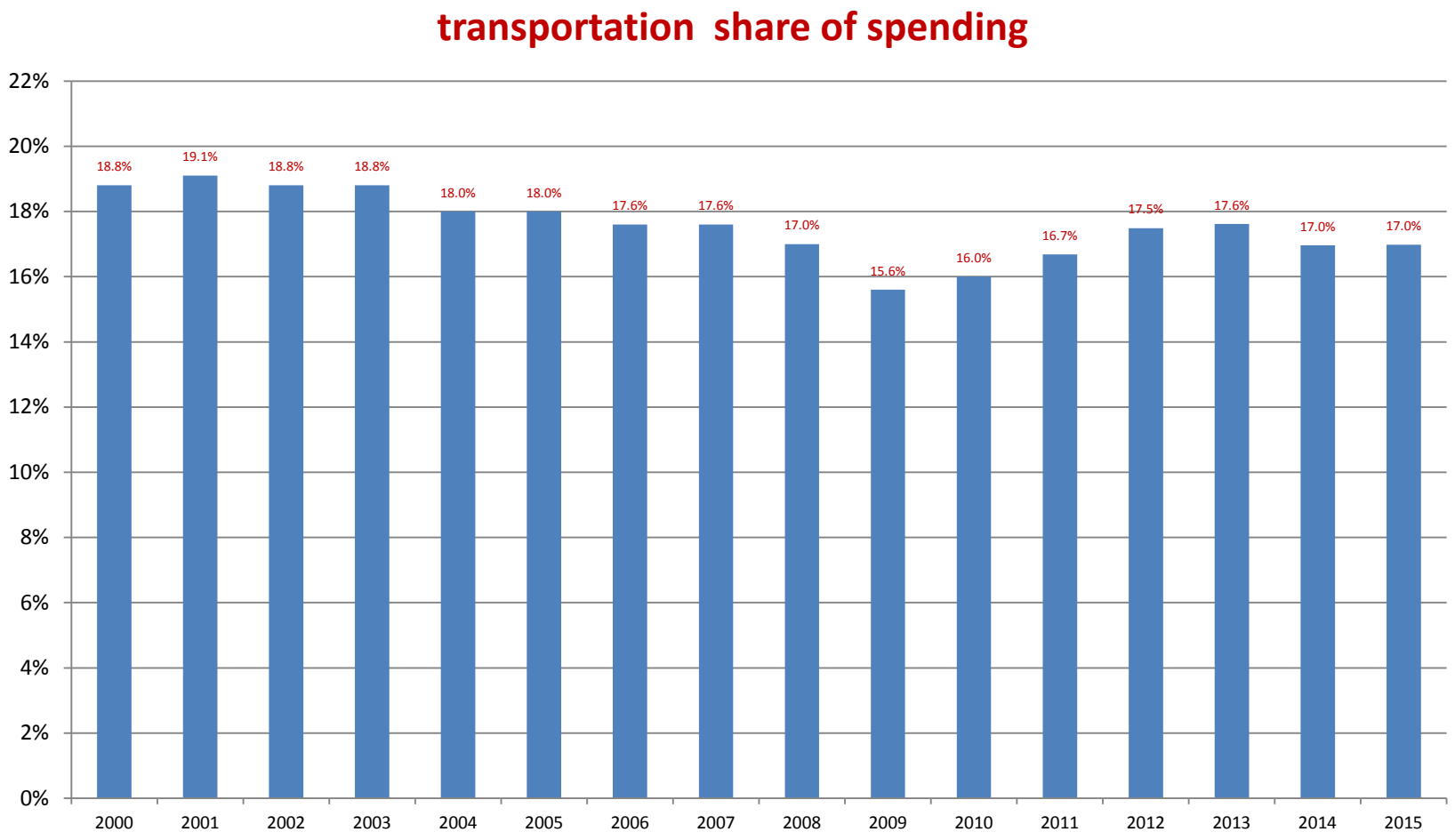


Time period focus



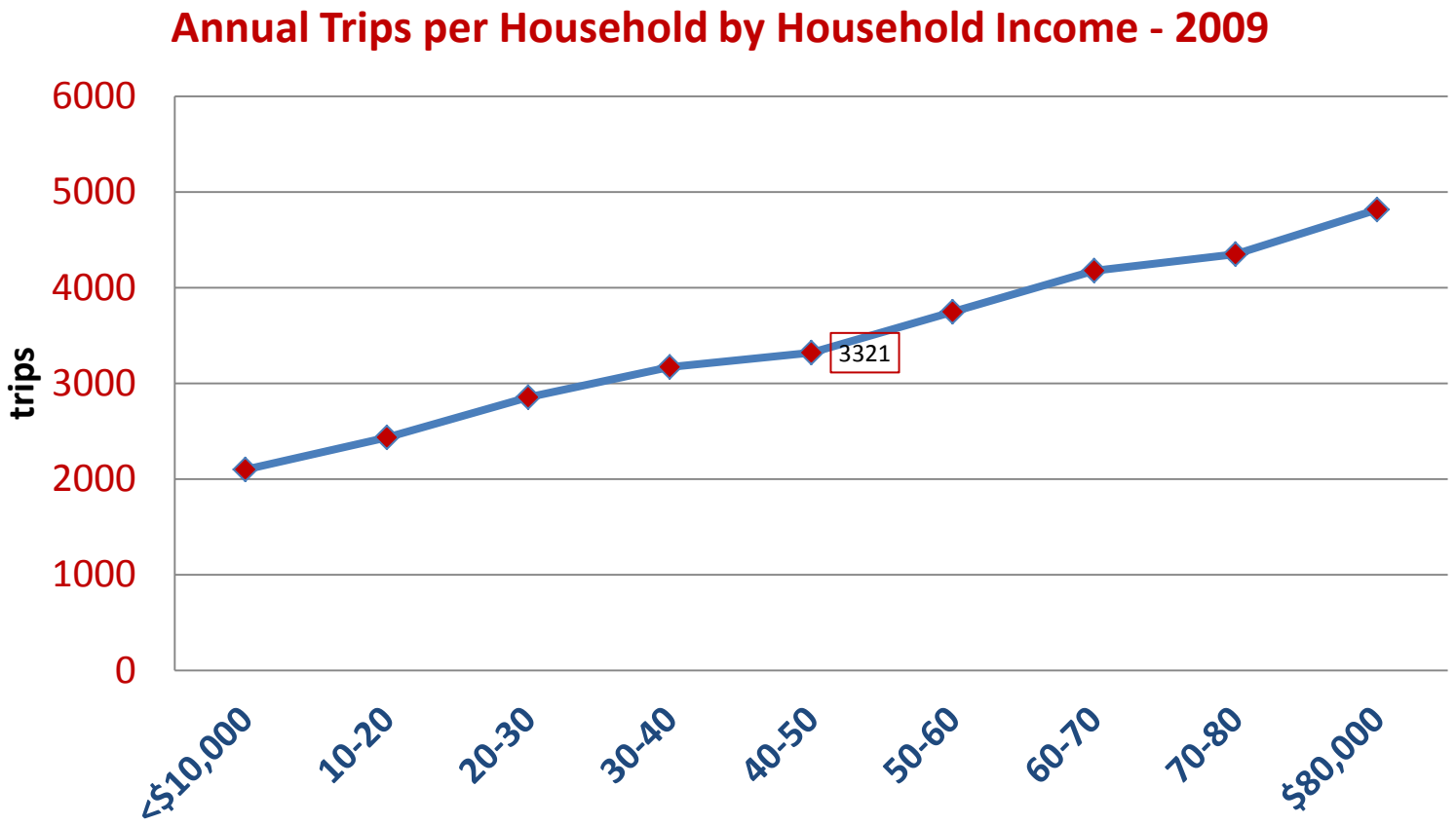
Amber = past w data; orange = past w no data; dk blue = our reauth period; lit blue = remainder of 20 year investment period

LONG TERM TRANSPORTATION SPENDING TREND

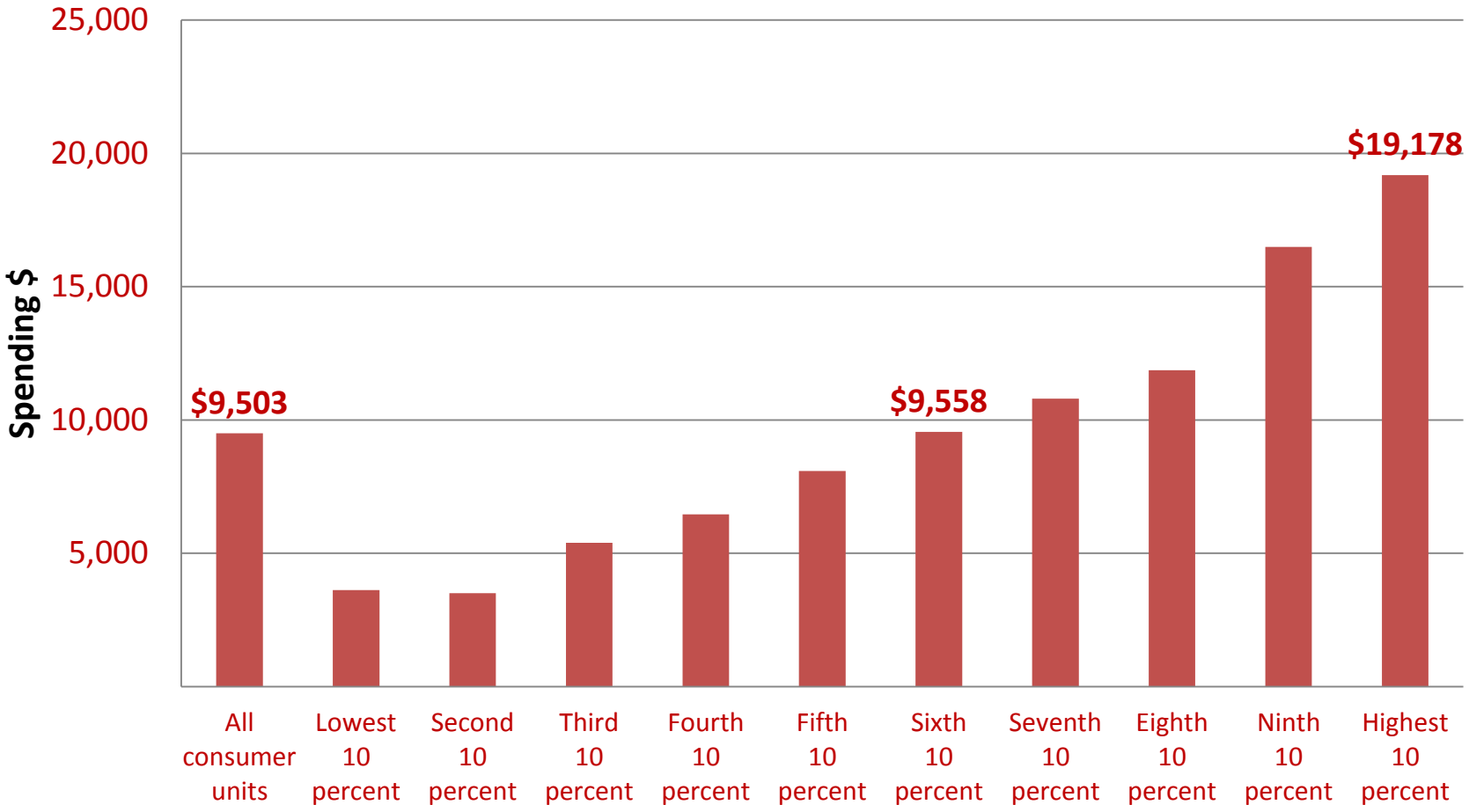


The Influence of Affluence

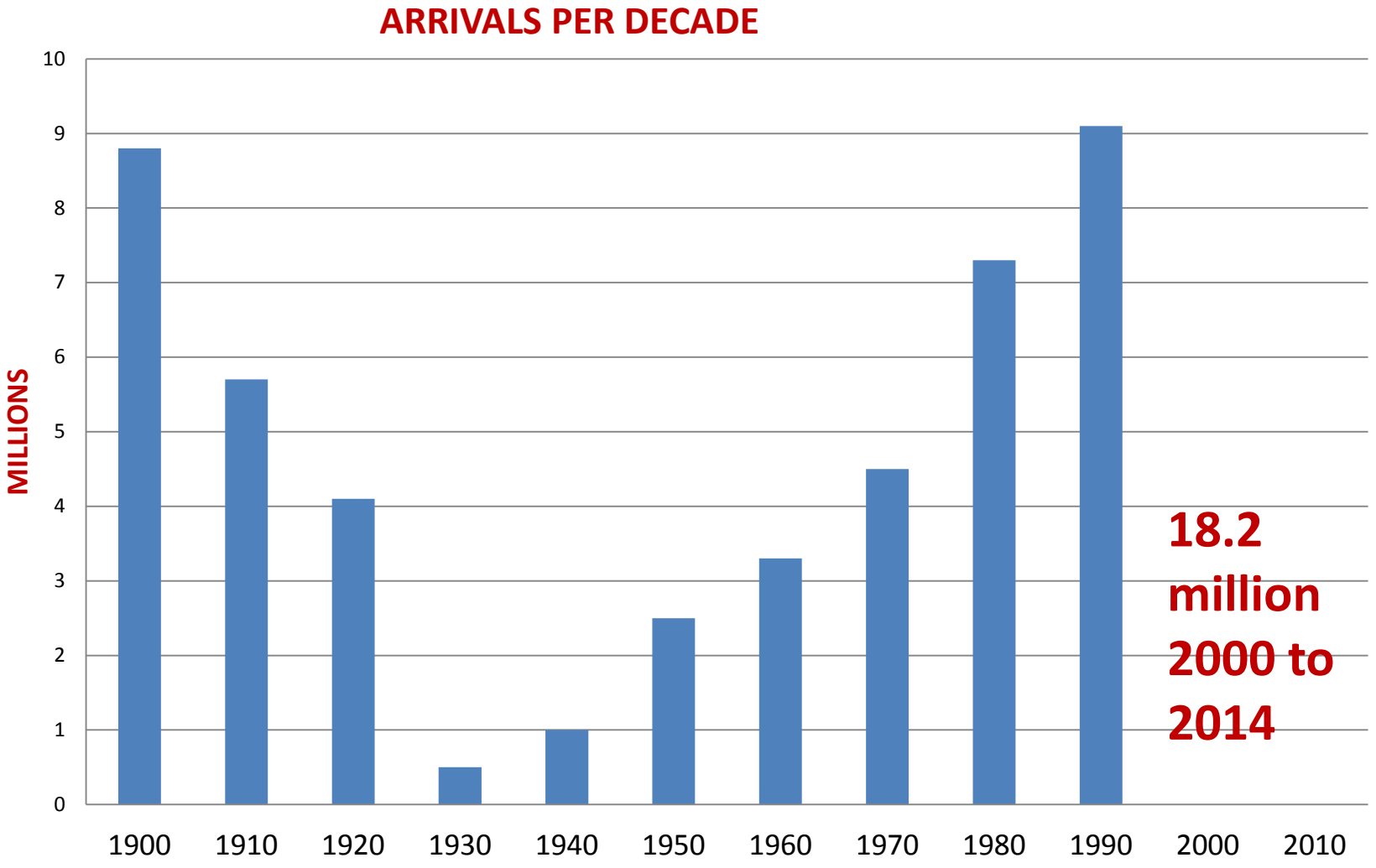
help stamp out affluence – we can do it if with we work together



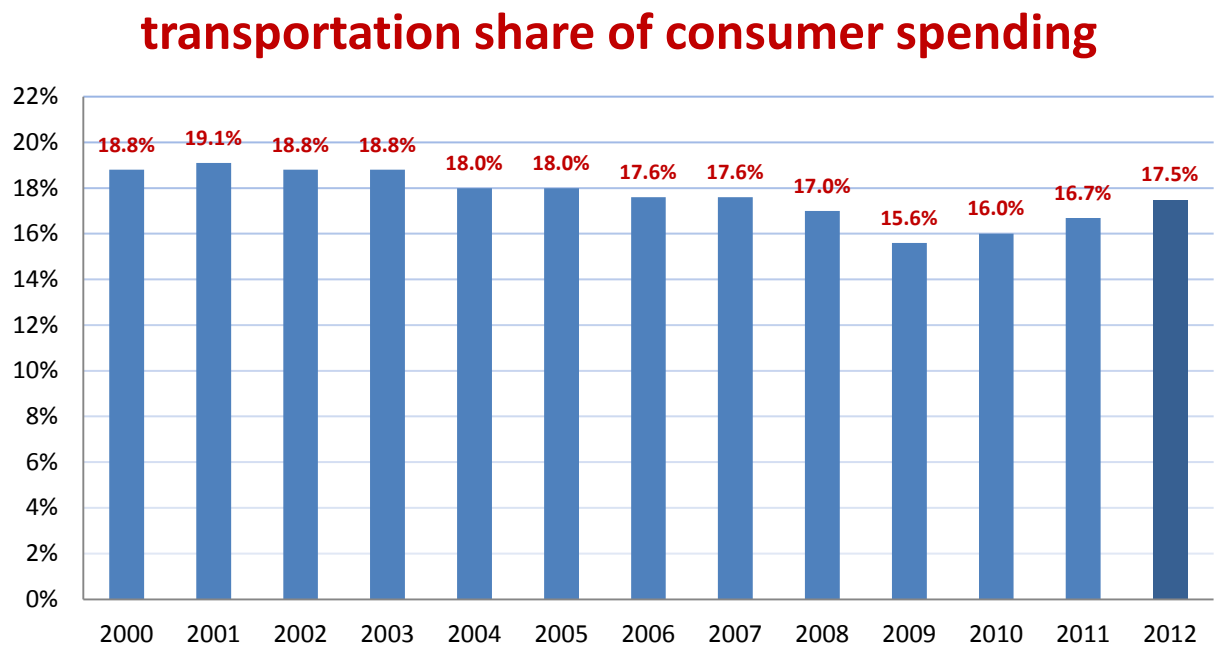
Transportation Spending by Income Decile 2015



A nation of immigrants …..again



“NORMAL” TRANSPORTATION SHARE IS 18-20% - NOT SEEN SINCE 2005

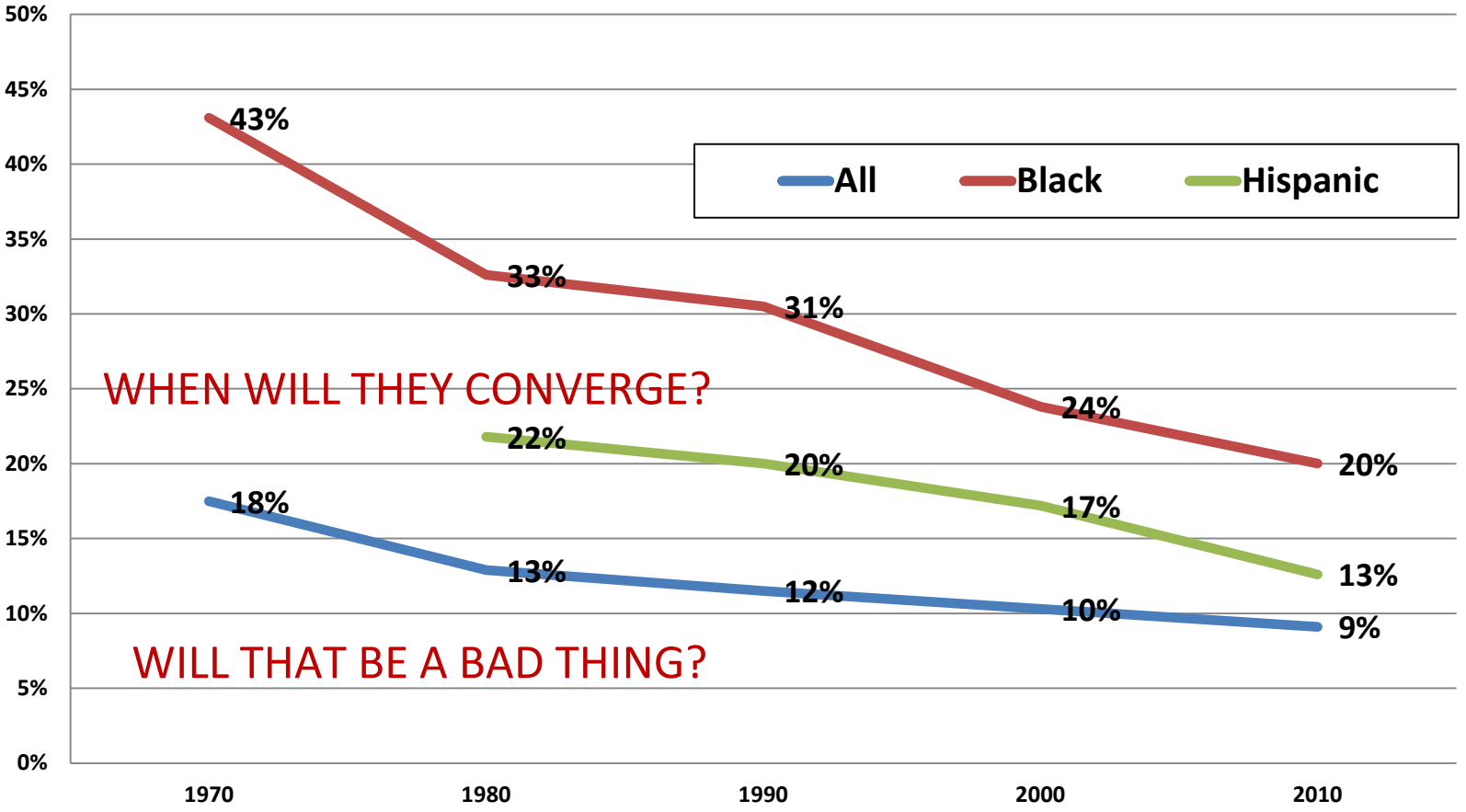


2013 CEX TRANSPORTATION SPENDING RISES TO 17.6%

GAS DOWN; CAR PURCHASES UP

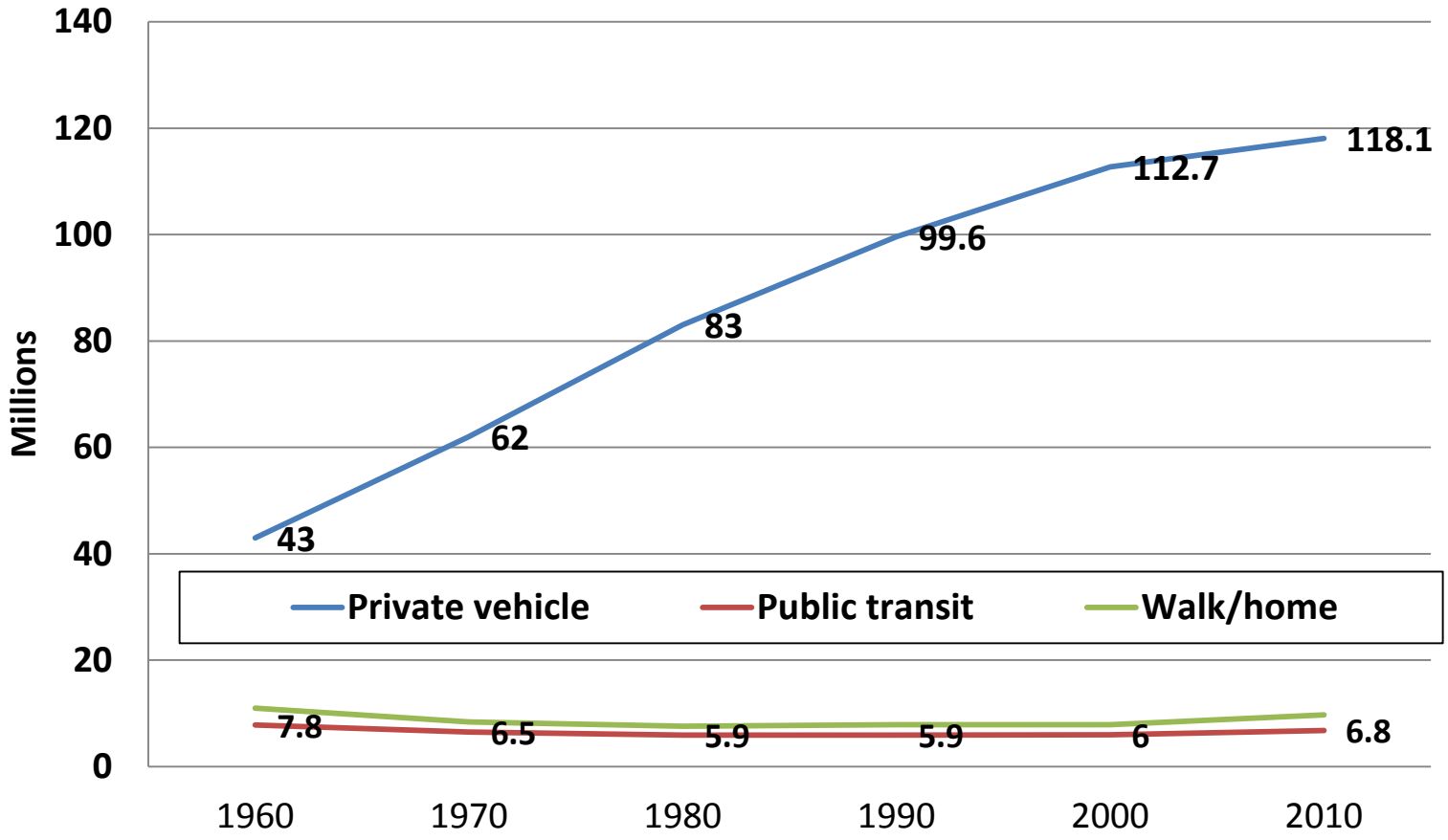
–POP, EARNERS, VEHICLES per HH CONSTANT 2011-2013

Share of households without vehicles is declining



2014 Nat avg 9.1% ; Af-Am 19.9%; Hisp. 11.8%

The long term national trend is clear national commuting patterns by mode



- WE ARE A LARGE METRO NATION

LARGE METRO GROWTH

Share of Pop in Metros

1950 56%

2010 85%

Share of Pop in Metros over a Million

1950 14 areas at 29%

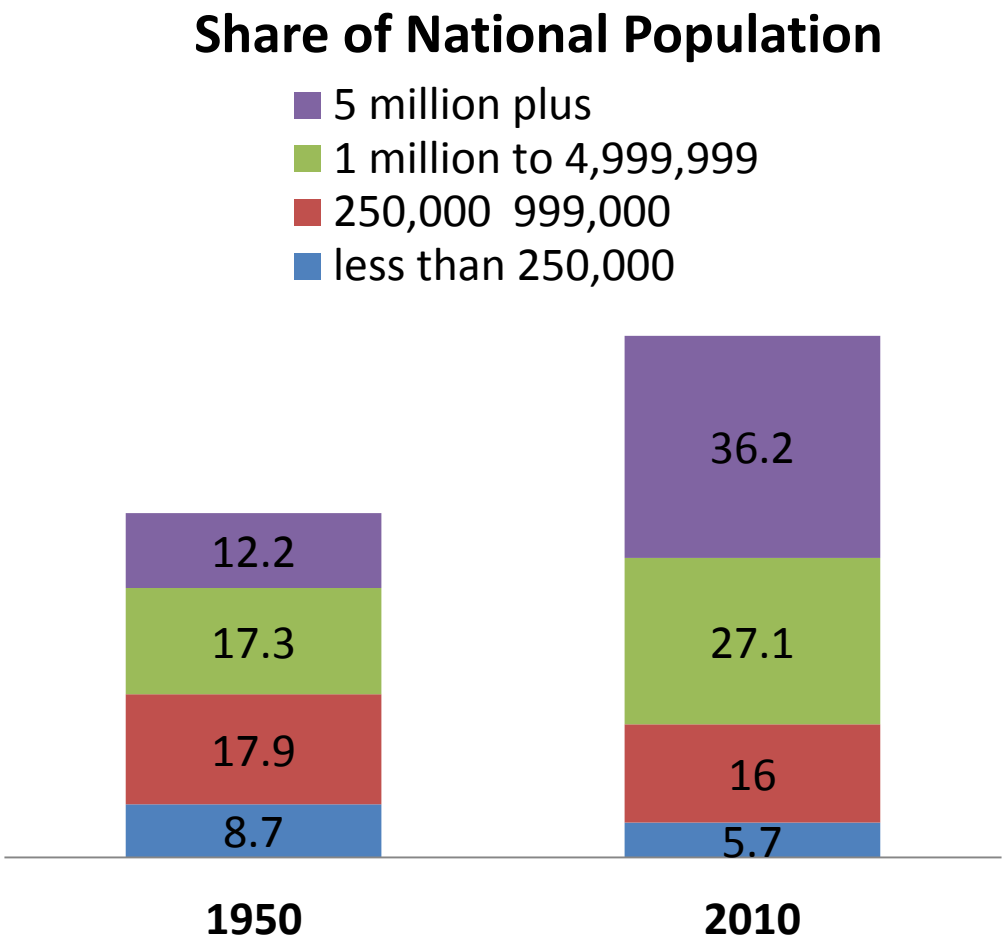
2010 52 areas at 63%

Share of Pop in Metros over 5 million

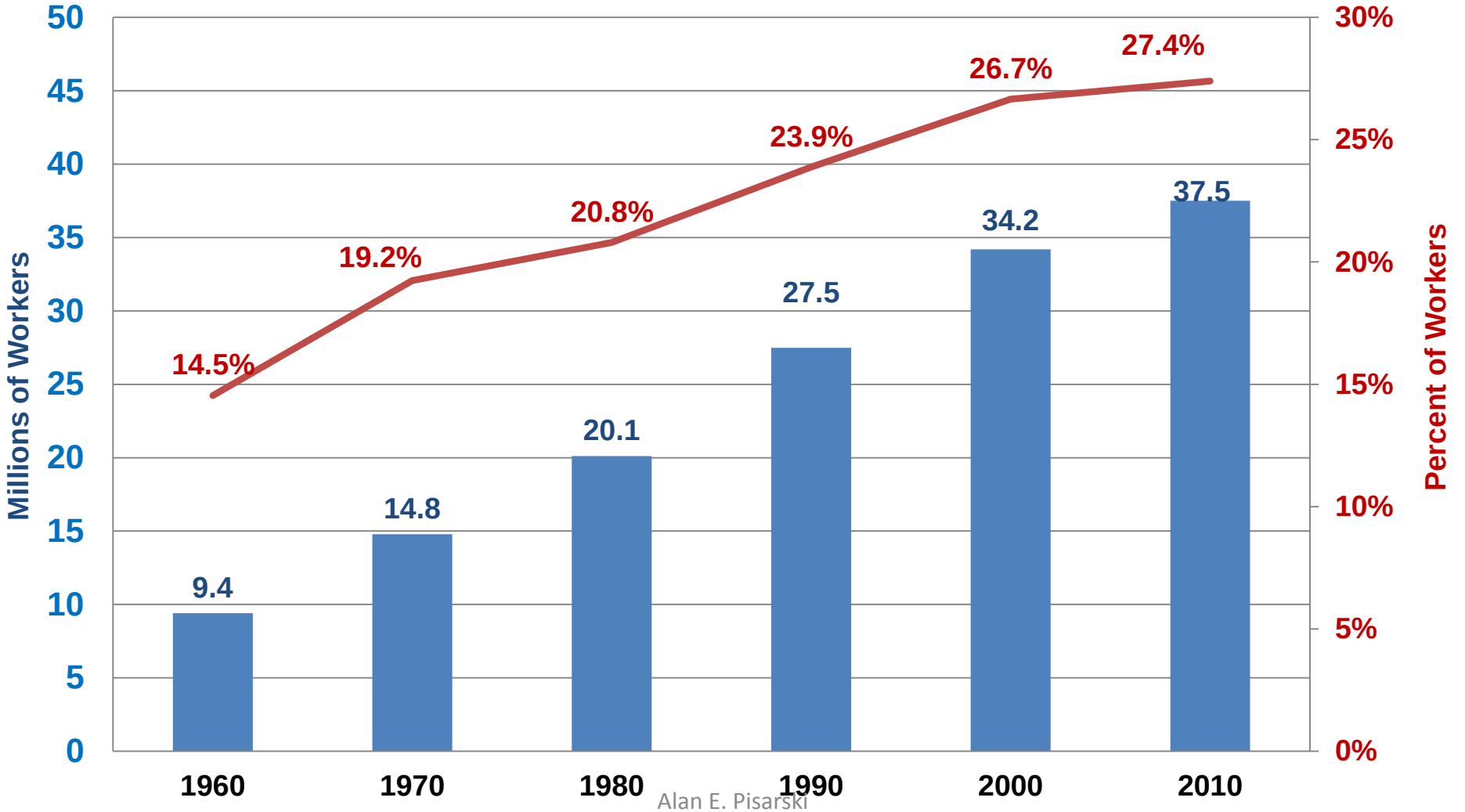
1950 2 areas at 12%

2010 12 areas at 36%

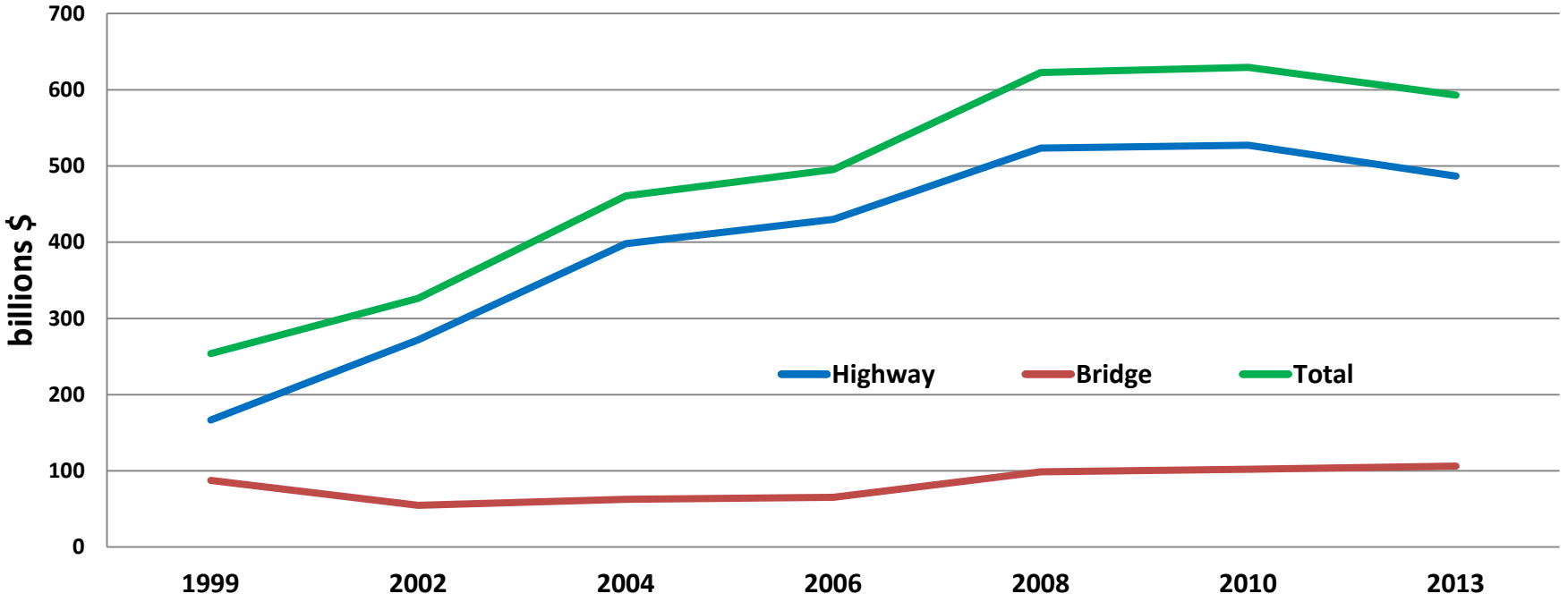
BUT DENSITIES DOWN



Percent of Workers Leaving their Home County to Work USA



Federal-Aid Highway and Bridge Investment Backlog Trend (billions of $) by C&P report year



Continuing Progress in Bridges

In 2015 we were down to 58,791 Structurally Deficient Bridges

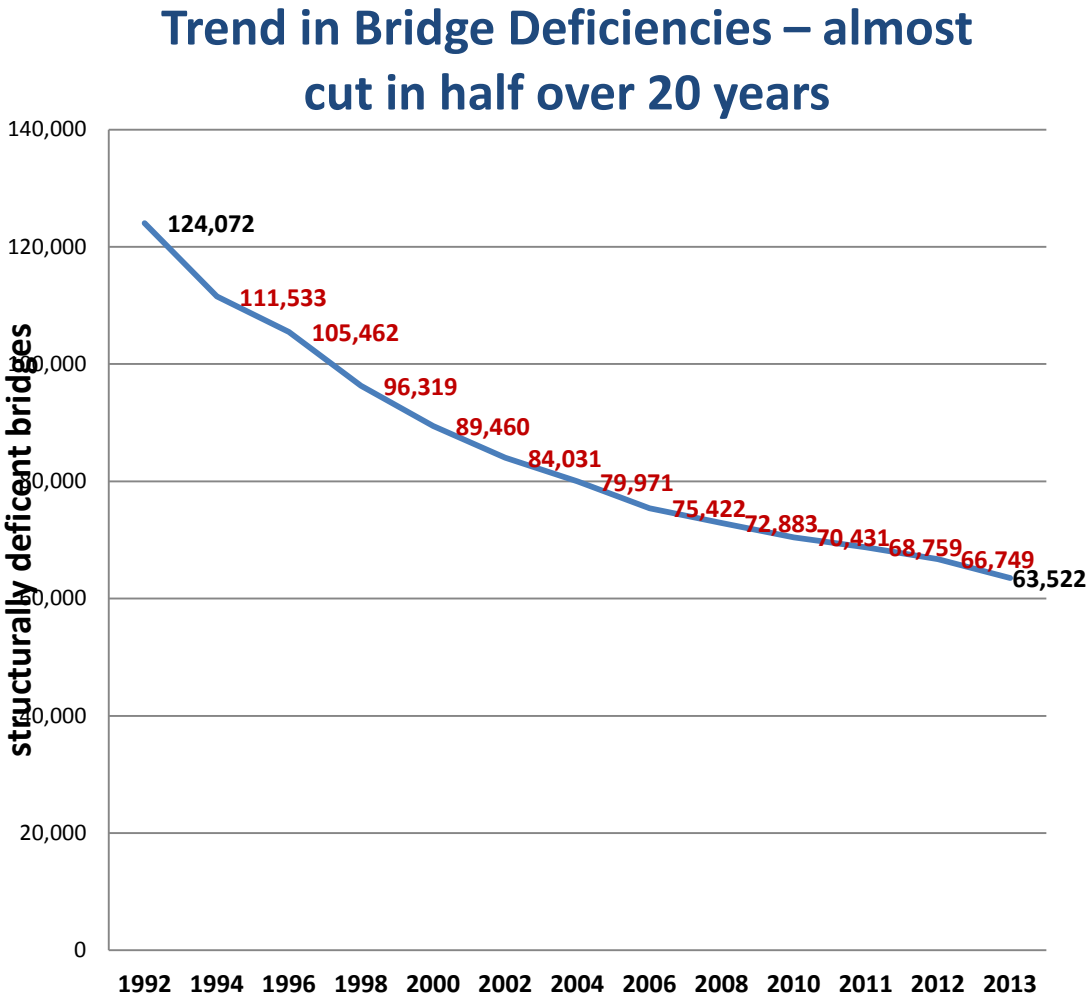
Less than 10% of all bridges

2012-2013 5% reduction

2013-2014 3.4% reduction

2014-2015 4.2% reduction

The 2013 C&P estimated that at a $20 billion per year spending level for all bridges (17.1B$ actual in 2010) the 2012 backlog of about $112 billion would be below $8 billion in 20 years



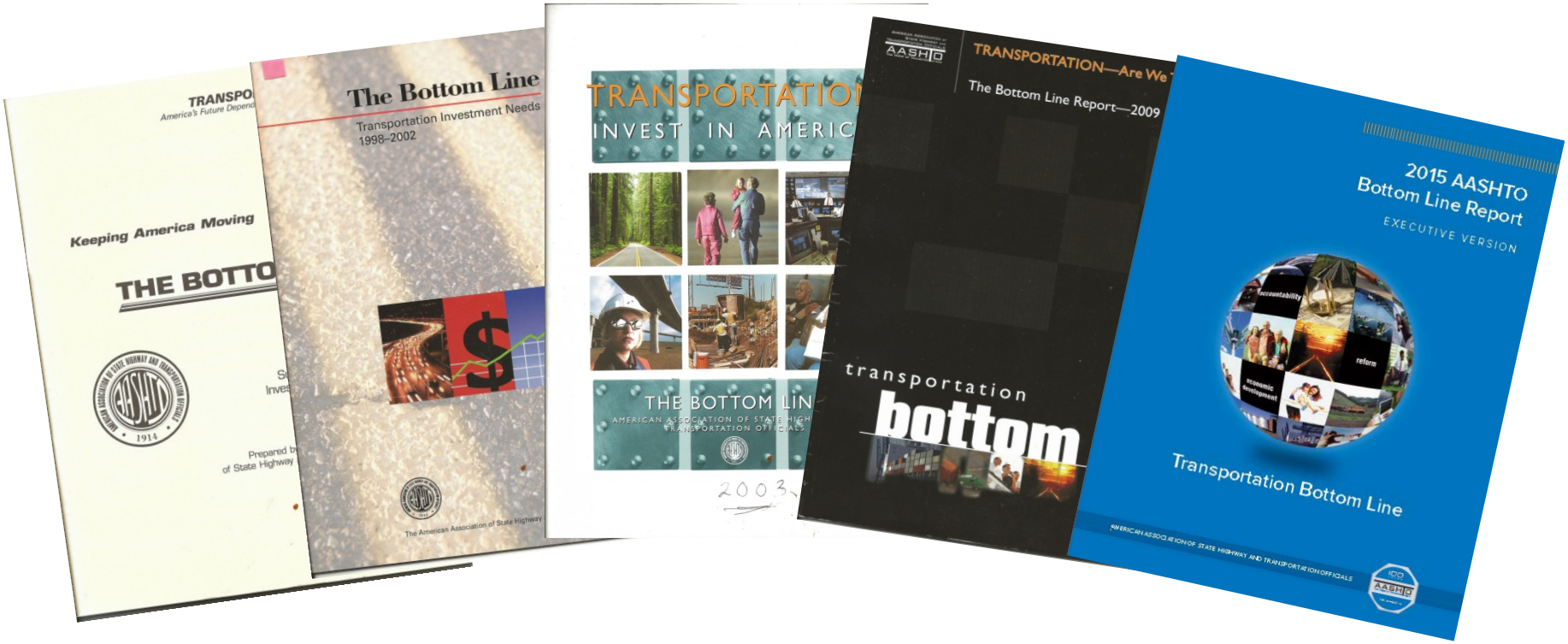
STRENGTHS WEAKNESSES

- INTERSTATE STRONGEST DATA AND MODELED
- NBIAS STRONG ON INTERSTATE
- SOME ERRORS BY COARSE ASSUMPTIONS
- NEW THINGS COMING ONLINE AASHTOWARE SOFTWARE
- HAS RIGOR AND CONSISTENCY IN HISTORY

THE C&P MODELS ARE TOOLS TO AN END

- **THREE KEY FUNCTIONS**
- 1. DESCRIBE AND UNDERSTAND PAST TRENDS AND CURRENT PATTERNS
- 2. ASSESS HOW FUTURE INVESTMENT REQUIREMENTS WOULD CHANGE IN A RELATIVELY STABLE ENVIRONMENT
- 3. HELP ASSESS HOW INVESTMENT REQUIREMENTS COULD CHANGE IN A CHANGED AND CHANGING ENVIRONMENT

2015 Executive Bottom Line



Our Fifth Bottom Line

2015 Executive Bottom Line

because time, data and resources were short the 2015 was an update rather than a full scale analyses

- Updates and reassesses the Bottom Line (BL) estimates for highways, bridges and transit
- Uses sensitivity analysis for Highways, Bridges and Transit rather than new model runs
- Incorporates recent research, with a particular focus on emerging economic development implications
- Assessments of Freight, Tourism and Rural roles
- Recognizes potential additional research needs

2015 Executive Bottom Line Steps

- Embed product in context of the 2010 and 2013 C&P reports, and the 2009 Bottom Line
- Present relevant research emphasizing the economic effects of investment
- Define revised inputs and forecasts and methods for adjusting the needs values
- Finalize estimates and the report to assist in 2015 reauthorization

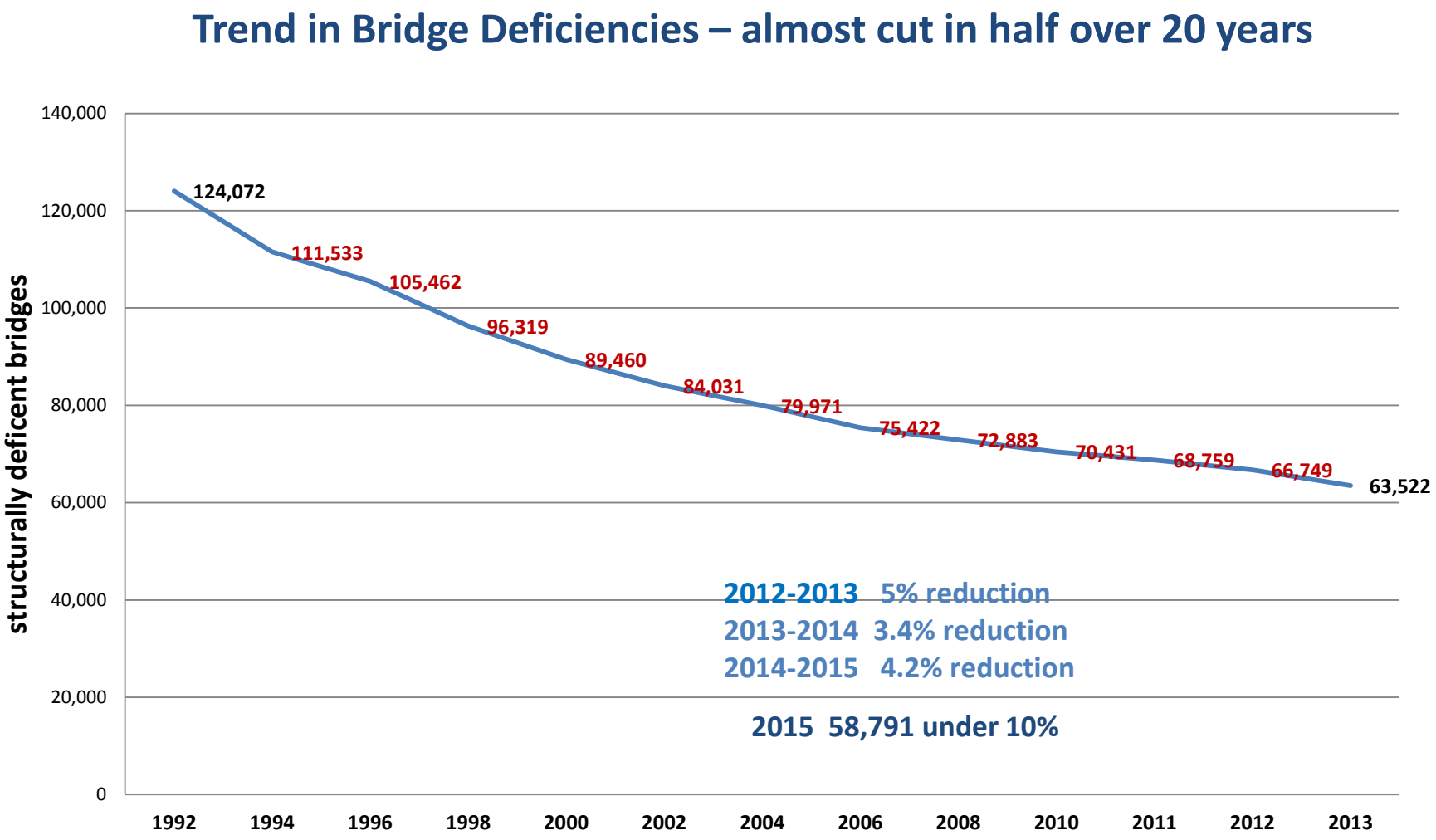
Early Bottom Lines
1988, 1996

- Accepted C&P report as base and adapted it
- Used C&P data and made adjustments
- Therefore, needed release of C&P from OMB to function; if OMB decided to withhold the report (which it often did) then AASHTO was naked
- C&P covers 20 years with no recommendations re needed funds; starting point based on data availability and continuity with past reports
- AASHTO needed explicit estimates for explicit years usually 5 or 6 years keyed to Congressional legislated period

The Backlog ????
Doesn't fit w trend chart

	2009 Bottom Line	2013 Bottom Line
HIGHWAYS		$ 629.1B
BRIDGES		$111.8B
TOTAL HIGHWAYS AND BRIDGES	$490B	$740.9B
TRANSIT	Not included	$77.7B
Note: FHWA's definition of highway backlog changed between 2009 and 2013, so numbers do not show trend		
Note: 2009 and 2013 Highways backlog includes capacity projects which should have already been implemented		
Note: 2013 Transit backlog does not include capacity projects which should have already been implemented		

Continuing Progress in Bridges



Bottom Line New Economic Focus

- New focus by AASHTO, APTA, TRB & others on the economic benefits of highway and transit investments
- The C&P Report demonstrates that increased investment is highly justified on the basis of user cost savings, even before considering broader impacts
- Returns are 2.6 to 3.8 times annual additional costs for the various incremental investment levels

Bottom Line New Economic Focus

- **Major new research for ASCE* :**
- **Costs to average household if current (2010) investments were made in surface transportation versus the "improve scenarios" of the USDOT**
  - **$22,300 per household cumulative 2012 to 2020**
  - **$103,700 per household cumulative 2012 to 2040**

  NOTE: median household income in 2010: $49,800; so the 8 year totals are about half of median income and the 28 year totals are more than twice annual income

(*"Failure To Act: The Impact of Current Infrastructure Investment On America's Economic Future (2013)" by EDRG)

Bottom Line New Economic Focus

- **A 2009 TCRP Report and an update in 2013 on the economic impact of public transportation investment provided an estimate that for every additional billion dollars of annual transit capital investment, total annual net benefits by 2028 would be $3.5 billion dollars per year**

- **Transit and highway scenarios thus both show benefit returns compared to added investment for twenty years of near or over 3 to one for increases over current levels**

("The Economic Impact of Public Transportation Investment" by the Economic Development Research Group and Cambridge Systematics", 2009)

DO FOR I STATE Highway Backlog Estimate 2012 by Fed-Aid Category (Billions of $)

	System Rehabilitation Highway	System Expansion	Total Backlog	Share of Rehabilitation Needs	Share of System Expansion Needs	Share of Total Backlog
Fed-Aid Highways—Rural	60.22	9.25	69.47	15.4%	3.9%	11.0%
Fed-Aid Highways—Urban	248.56	193.38	441.95	63.5%	81.5%	70.2%
Fed-Aid Highways—Total	308.78	202.74	511.52	78.8%	85.4%	81.3%
Non-Fed-Aid Highways	82.92	34.79	117.71	21.2%	14.7%	18.7%
All Roads	391.71	237.53	629.23	100.0%	100.0%	100.0%

NHS requirements are based on current FHWA estimates of system extent

Highway Backlog Estimate 2012

billions of $ P 63 BL

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NHS requirements are based on current FHWA estimates of system extent

Latest data ?

	Percent of NHS VMT on Pavements With Good and Acceptable Ride Quality, 2000–2008				
Calendar Year	**2002**	**2004**	**2006**	**2008**	**2010**
Fiscal Year	**2003**	**2005**	**2007**	**2009**	**2011**
Good (IRI <95)	**50%**	**52%**	**57%**	**57%**	**60%**
Acceptable (IRI<170)	**91%**	**91%**	**93%**	**92%**	**93%**

Bottom Line New Economic Focus

- The 2010 Condition and Performance Report modeled the specific impacts of alternative levels of annual highway investments on future user costs, future delays, and future VMT by pavement quality for the users of the Federal Aid Highway System
- The C&P Report demonstrates that increased investment is highly justified on the basis of user cost savings, even before considering broader impacts
- Returns are 2.6 to 3.8 times annual additional costs for the various incremental investment levels

Bottom Line New Economic Focus

- New focus by AASHTO, APTA, TRB & others on economic benefits of highway and transit investments

- Major new research : **"Failure To Act: The Impact of Current Infrastructure Investment On America's Economic Future (2013**)" for ASCE by EDRG
- Provides new quantitative estimates of the economic impacts of the USDOT's "Improve Scenarios" – the traditional C&P and BL scenarios -compared to "Current Spending Scenarios" for highways and public transportation

Bottom Line New Economic Focus

- **Major new research : "Failure To Act: The Impact of Current Infrastructure Investment On America's Economic Future (2013)" for ASCE by EDRG**
- **Costs to average household if current (2010) investments were made in surface transportation versus the "improve scenarios" of the USDOT**
  - **$22,300 per household cumulative 2012 to 2020**
  - **$103,700 per household cumulative 2012 to 2040**

  NOTE: median household income in 2010: $49,800; so the 8 year totals are about half of median income and the 28 year totals are more than twice annual income

2015 vs. 2009 Bottom Line Highway Investment Needs

MAXIMUM ECONOMIC INVESTMENT SCENARIO ESTIMATES	2009 BL (Billions of $2006)	2015 BL (Billions of 2012$)
VMT Growth 1.6% (highest growth rate examined)	Not included	$156.0
VMT Growth 1.4 % (base case in 2009 Bottom Line)	$166	$144.4
VMT Growth 1.0 % (AASHTO Policy in 2009 Bottom Line)	$132	$120.2

Note:
A full employment scenario would increase each 2015 estimate by at least $4 billion

Highways and Bridges
State of Good Repair Estimate

Growth Rate of VMT per Year	Current Spending	State of Good Repair
All Highway Scenarios	$88.3 billion	$83.1

adjusted using the cost index changes from the C&P report of 2013

Highways and Bridges
State of Good Repair Estimate

Growth Rate of VMT per Year	Current Spending	State of Good Repair
Modal Comparison Scenario -- 1.6 Percent Annual Growth	$88.3 billion	$83.1
Mid Level Scenario – 1.4 Percent Annual Growth	$88.3 billion	$83.1
2009 BL Policy Scenario - 1.0 Percent Annual Growth	$88.3 billion	$83.1

adjusted using the cost index changes from the C&P report of 2013

Bottom Line 2015 Suggested Scenarios

HIGHWAY SCENARIO	GROWTH RATES			
	0.6%	1.0%	1.4%	1.6%
BASE SPENDING ESTIMATED 2012				
BACKLOG/STATE OF GOOD REPAIR				
MAINTAIN CONDITIONS				
IMPROVE CONDITIONS				
FULL EMPLOYMENT LEVEL				

FHWA Estimates of the Highway Needs Effects of Cost Index Changes

Year of C&P	2004	2006	2008	2010
Cost Delta for Example	25%	25%	25%	32.6%
Needs Delta for Example	6.6%	11.2%	6.1%	11.1%
Ratio of the Change % for Needs vs. Costs (* this was used in the 2009 BL)	.264*	.448	.244	.340

2015 vs. 2009 BL Highway Investment Needs (Adjustments to be Based on FHWA Cost Index and Cost Sensitivity Analyses in C&P)

MAXIMUM ECONOMIC INVESTMENT SCENARIO ESTIMATES	2009 BL (Billions of $2006)	2015 BL (Billions of 2012$)
VMT Growth 1.6% (likely to be base case in 2014/2015 C&P)	Not included	$156
VMT Growth 1.4 % (base case in 2009 Bottom Line)	$166	$144.4
VMT Growth 1.0 % (AASHTO Policy in 2009 Bottom Line)	$132	$120.2
VMT Growth 0.6% (Lowest growth analyzed in 2010 C&P)	Not included	$- drop?

FHWA Estimates of the Highway Needs Effects of Cost Index Changes

A change in costs is offset by more or fewer projects passing the b/c test and the sensitivity analyses of the 2010 C&P showed that highway needs changed .34 per 1.00 cost change

Year of C&P	2004	2006	2008	2010
Cost Delta for Example	25%	25%	25%	32.6%
Needs Delta for Example	6.6%	11.2%	6.1%	11.1%
Ratio of the Change % for Needs vs. Costs (* this was used in the 2009 BL)	.264*	.448	.244	.340

Major Considerations in Updating the 2015 Executive Bottom Line

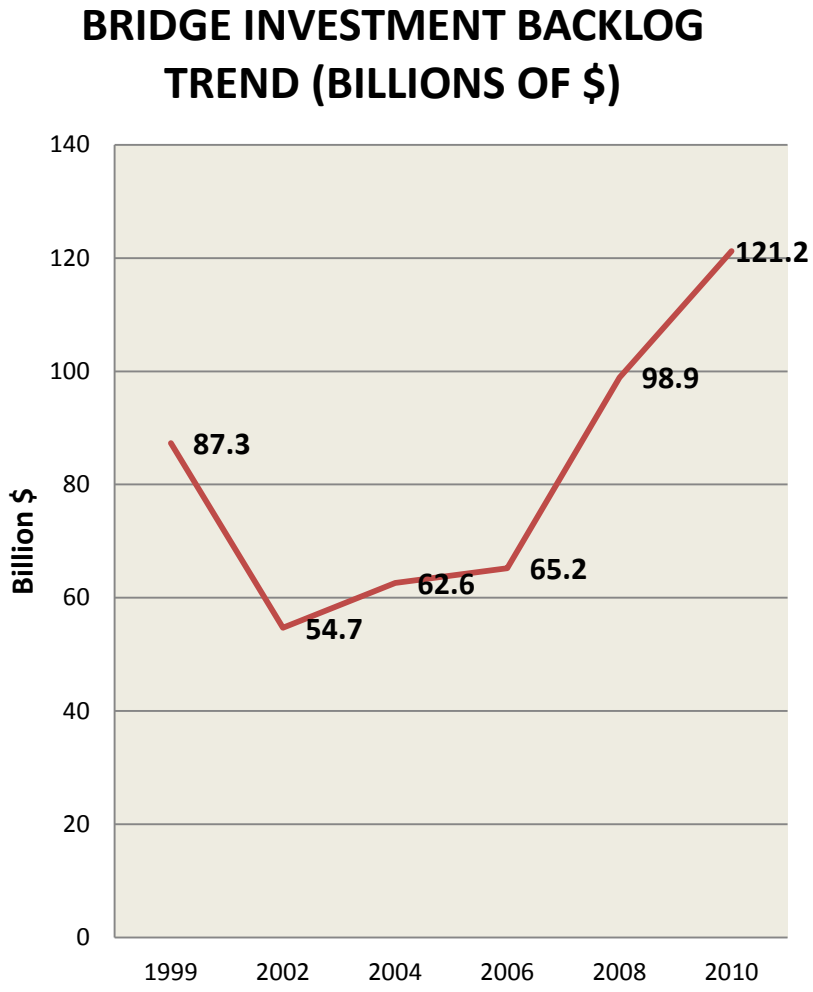
- Highway VMT growth has trended below the 2008 HPMS baseline of 1.8% VMT forecast, below the 2009 BL baseline of 1.4% growth forecast, and below the 1.0% BL policy scenario growth forecast
- Transit growth has trended below the 2009 baseline BL forecast of 2.4% and below the 3.5% AASHTO sustainability policy scenario forecast
- Construction costs have declined since the recession began, lowering the 2012 project costs for highways, bridges and some transit elements
- Base year capital investment levels differ from the 2006 or 2008 base levels used in latest BL or C&P, but a current base level is uncertain
- The highway capital needs for the 2015 Bottom Line use the 2013 C&P highway capital needs for a baseline
- The transit capital needs for the 2015 Bottom Line use the 2009 Bottom Line transit capital needs for a baseline

Bottom Line 2015 Highway Adjustments

- **Adjust for years already elapsed 2008-2012**
- **Adjust for highway cost index changes to 2012 vs. 2010 or 2008**
- **Adjust for needs effect of cost index changes for both losses and gains to needs**
- **Adjust for alternative VMT growth rates**

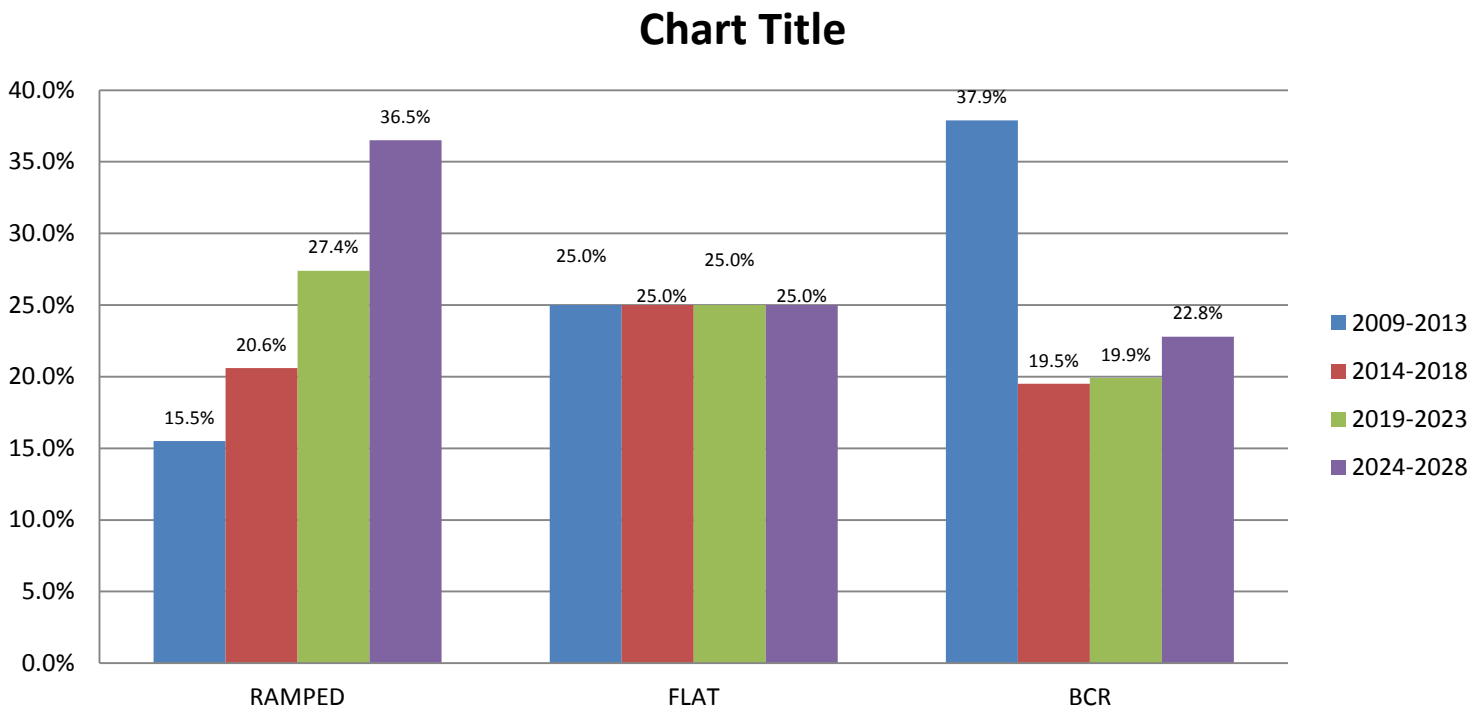
- No adjustment made to base for actual spending in interim period: regular + ARRA + TIGER

BRIDGE BACKLOG YES CONSISTENT W CHART FOR HWY AND BRIDGES



- PRESENT BRIDGE SPENDING LEVELS ARE REDUCING STRUCTURALLY DEFICIENT AND FUNCTIONALLY OBSOLETE BRIDGES (SLOWLY)
- BACKLOG SHOULD BE DECLINING
- POLICY QUESTION WILL BE WHAT RATE OF SPENDING DOWN THE BACKLOG SHOULD BE CHOSEN ?

3 approaches in C&P to spendout

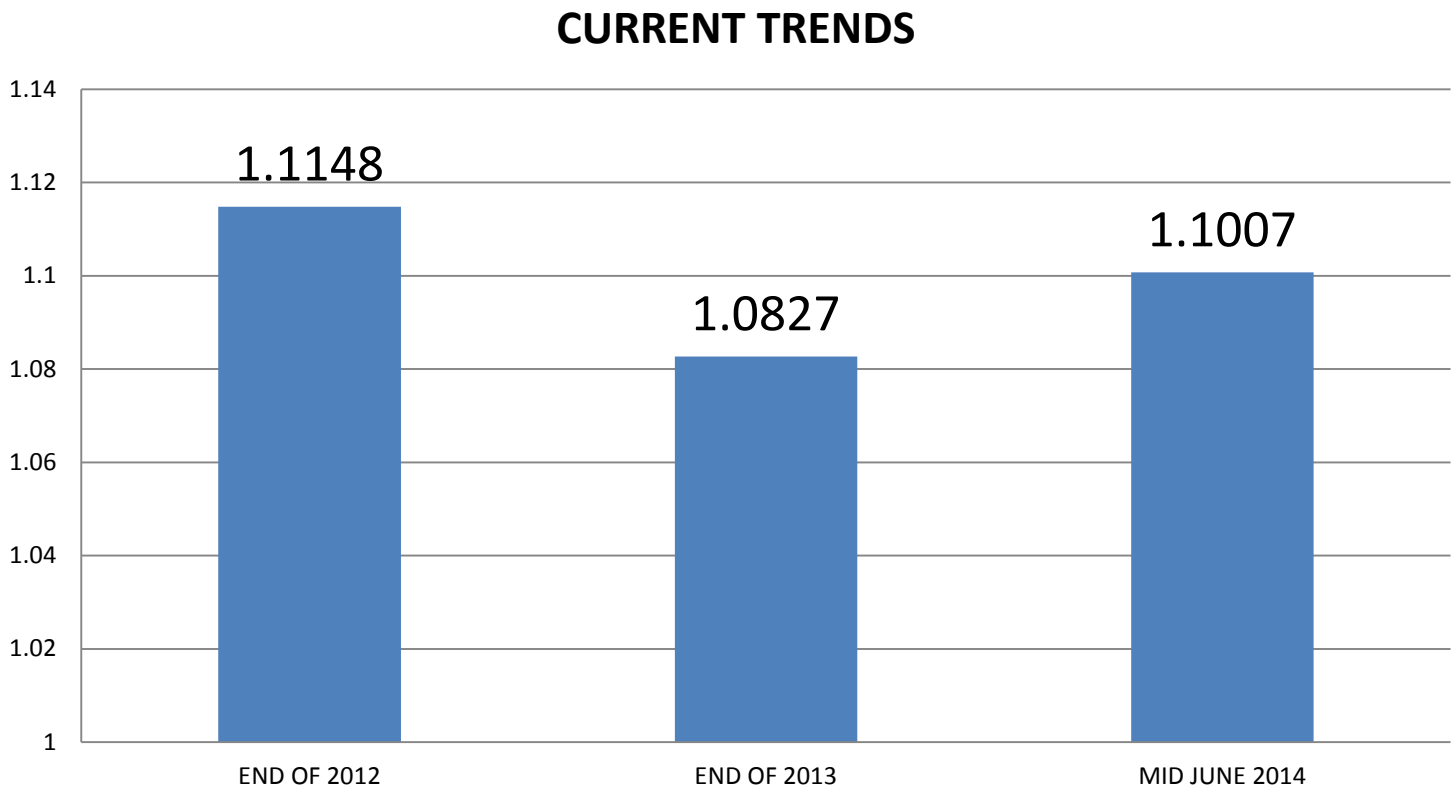


ramped fits a scenario of high growth

flat fits a scenario w constant needs

BCR fits a scenario with large back log = our case

NATIONAL HIGHWAY CONSTRUCTION COST INDEX

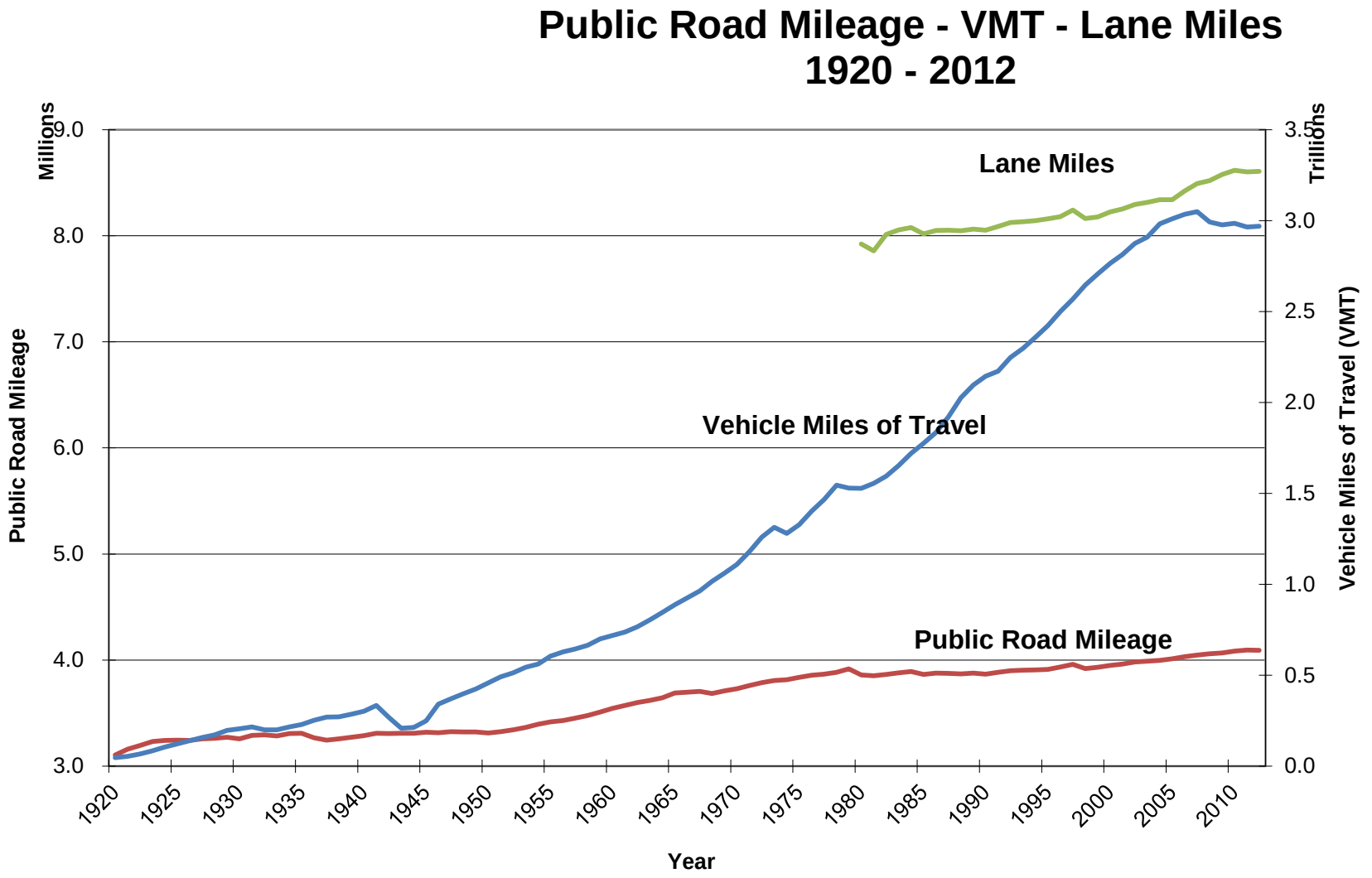


Looked at HS tables and LM increase was all in Urban areas; declines in Rural

ADJUST FOR FULL EMPLOYMENT = NO LOSS IN VMT USE NEW DATA 2000-2012 OR 13 FROM ADC?

	2005	2012	% CHG
LANE MILES	**8,338,821**	**8,606,003**	**103%**
VMT	**3,049,027**	**2,968,815**	**97%**
VMT/LM/DAY	**989**	**945**	**96%**

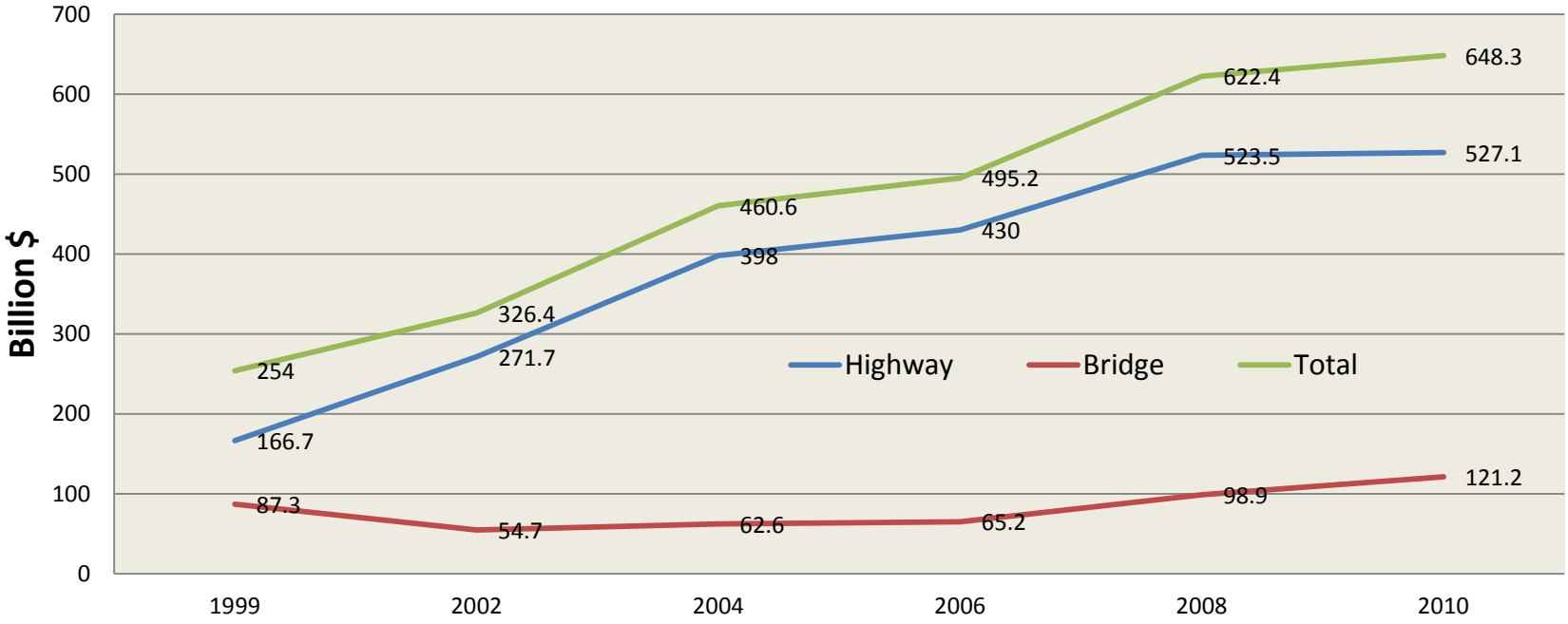
Need to validate this w FHWA still!



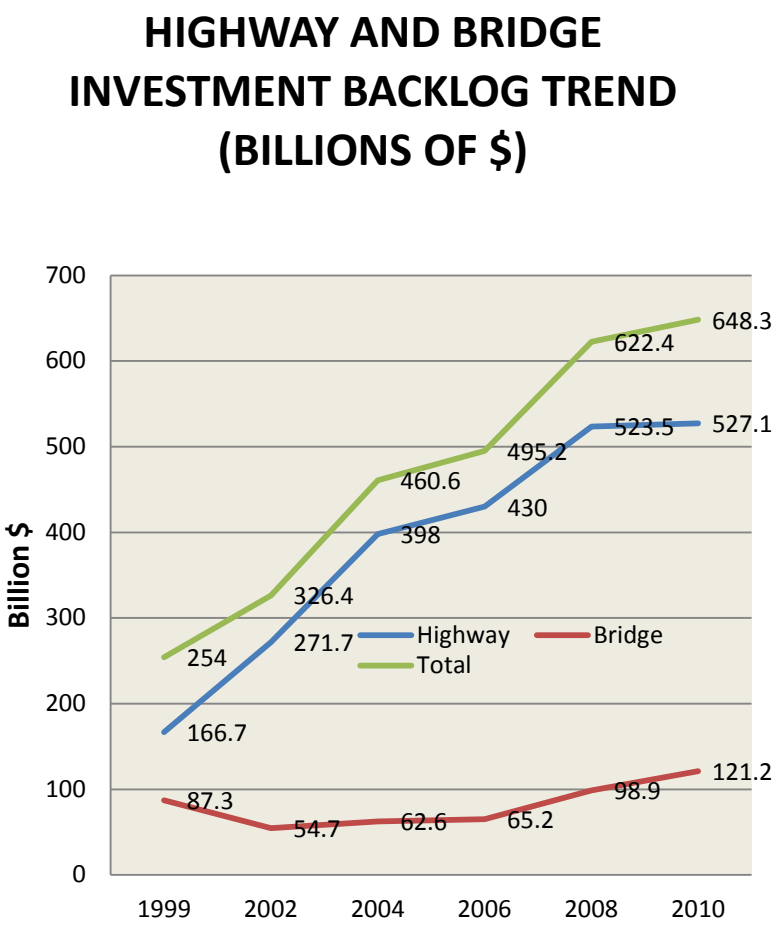
HIGHWAY AND BRIDGE BACKLOG TREND

HIGHWAY AND BRIDGE INVESTMENT BACKLOG TREND (BILLIONS $)

don't use **Bottom Line has revised values g et the figure**



REVISE Bridges – good data shape for description – needs approach update ?



- Update – have data
- Yrbuilt 1906 to 2011?
- Bridge count x owner and by condition 2012
- Bridge count x constr type x condition
- Have tunnel inventory x state 366 !
- How Update needs?
- Run download model?

- Bridge backlog needs update pg 66
- Bottom Line has 111.8 for 2012 contrasted to 2010 C&P of 106.4 shows 2013 = Report year
- Redo fed hwy and bridge blog to match fig pg 62 of Bottom Line
- Use table detail from pg 63 pg has type 629.23 is correct not .13
- SUMMARY SLDIES
- ADD WORKERS 2000 – 2012
- **Need bridge needs vs chart ???**

Major Considerations in Updating the 2015 Executive Bottom Line

- Base year capital investment levels differ from the base levels used in latest BL or C&P, but a current base level is uncertain
- The highway capital needs for the 2015 Bottom Line use the 2013 C&P highway capital needs for a baseline
- The transit capital needs for the 2015 Bottom Line use the 2009 Bottom Line transit capital needs for a baseline

2015 AASHTO Bottom Line Report

EXECUTIVE VERSION

Transportation Bottom Line

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS

SOME POSITIVE SIGNS

THE VARIATION AROUND 3 TRILLION VMT FROM 2004 TO 2014 IS REALLY MINOR = 1-1½% SHIFTS

MAY - JUNE UP 1.4%; **JULY 1.5%**

IF WE FINISH THE YEAR AT THAT RATE

TOTAL VMT WILL BE BACK TO HIGH OF 2007 –POSSIBLE? (**AUG WEAKER**)

EXPECTED GROWTH RATES OUT TO THE FUTURE (WITHOUT AUTONOMOUS VEHICLES) circa 1.0%-1.4%

ROUGHLY, CONSTANT VMT/CAPITA

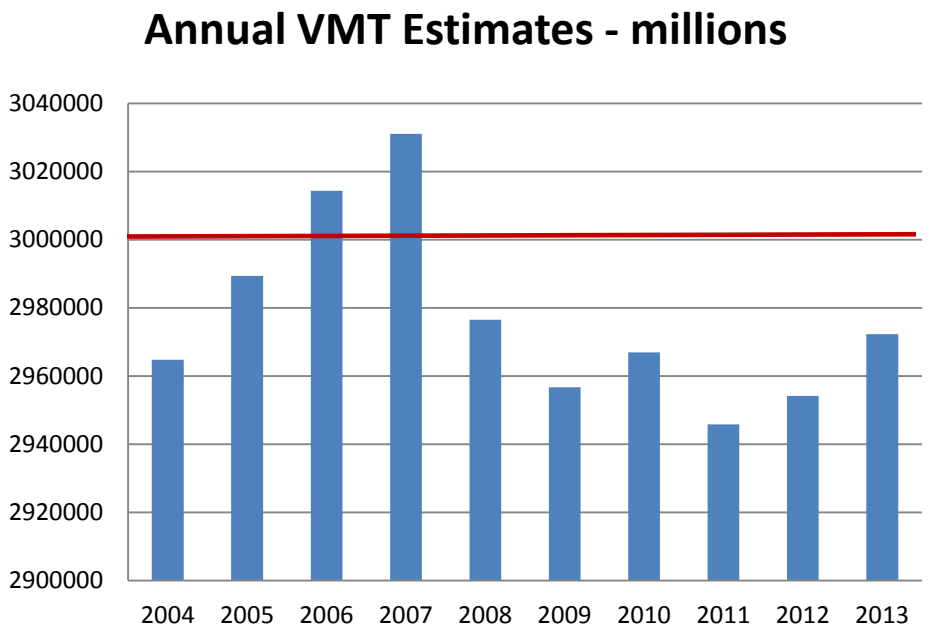
VMT/WORKER IS MAIN FACTOR

IF WE HAD THE SAME SHARE OF WORKERS PER POP AS IN 2007 WE ARE BACK AT 2007 VMT

KEEP ASKING –

IS IT CYCLICAL OR STRUCTURAL?

= a long slow miserable economic recovery or a new normal?



Highway Backlog Estimate 2012 by System (Billions of $)

	System Rehabilitation Highway	System Expansion	Total Backlog	Share of Rehabilitation Needs	Share of System Expansion Needs	Share of Total Backlog
Interstate Highway System	62.43	90.81	153.24			
NHS Remainder	138.63	70.42	209.04			
Total National Highway System*	201.06	161.22	362.28	51.3%	67.9%	57.6%
Other Fed-Aid Highways	107.73	41.51	149.24	27.5%	17.5%	23.7%
Non-Fed-Aid Highways	82.92	34.79	117.71	21.2%	14.6%	18.7%
All Roads	391.71	237.53	629.23	100.0%	100.0%	100.0%

*NHS requirements are based on current FHWA estimates of system extent

Bridge Backlog - 2012
by Fed-Aid Category (Billions of $)

ROAD SYSTEM	BACKLOG	%
Fed-Aid Rural Highways	29.9	26.7%
Fed-Aid Urban Highways	61.5	55.0%
Non-Federal Aid Highways	20.6	18.4%
All Roads	111.8	100.0%
Interstate Highway System Share	32.0	28.6%
Overall National Highway System Share	62.2	55.6%

MORE BRIDGES

- USE SD UPDATE TO 2015
- BRIDGE BACKLOG FROM US OR C&P

Summary Table of Key Factors

MOD THIS W NEWER A Very Limited Century For Change So Far

THIS CENTURY

WE HAVE LIMITED

- POP GROWTH
- WORKER GROWTH
- VEHICLE GROWTH
- ROADWAY GROWTH
- VMT GROWTH
- SLIGHT GROWTH IN CONGESTED ROADS

- Average travel time to work
  - 2000 25.5 minutes
  - 2011 25.5 minutes

	2000	2012	Change	% chg
Population (millions)	281.4	313.9	32.5	11.6%
Workers (millions)	128.3	140.9	12.6	9.8%
Vehicles (millions)	221.4	245.2	23.7	10.7%
Road System miles (millions)	3.936	4.092	.156	4.0%
Lane Miles (millions)	8.224	8.606	.381	4.6%
Vehicle Miles of Travel (trillions)	2.764	2.968	.204	7.4%
VMT/ lane mile (thousands)	336	345	8.8	2.6%

2014 HIGHWAY VMT IS BACK AT 3 TRILLION FIRST TIME SINCE 2007

Updates of the Inputs – VMT/PMT

- **Trends in Highway Vehicle Miles of Travel (VMT)**
  Annual Growth through 2011
  - 20 Year 1.64 %
  - 10 Year 0.72 %
  - 6 Year 0.00%

  - 2013 0.7%
  - 2014 1.25% prelim est

- **Trends in Transit Passenger Miles of Travel (PMT)**
  Annual Growth through 2011
  - 20 Year 1.62%
  - 10 Year 1.34%
  - 6 Year 2.04%

  - 2013 1.09%
  - 2014 0.91% prelim est