REAL SOLUTIONS FOR CLIMATE CHANGE

MPO Analysis of GHG Emissions and Reduction Strategies

NOVEMBER 4, 2010

JANE HAYSE, Atlanta Regional Commission

RON KIRBY, Metropolitan Washington Council of Governments

DOUG KIMSEY, San Francisco Metropolitan Transportation Commission

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U.S. Department of Transportation Federal Highway Administration

Questions for the Presenters

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During the webinar, please e-mail your questions to **melvinj@pbworld.com**.

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Taking the Temperature:
Transportation Impacts on Greenhouse Gas Emissions

NOVEMBER 4, 2010

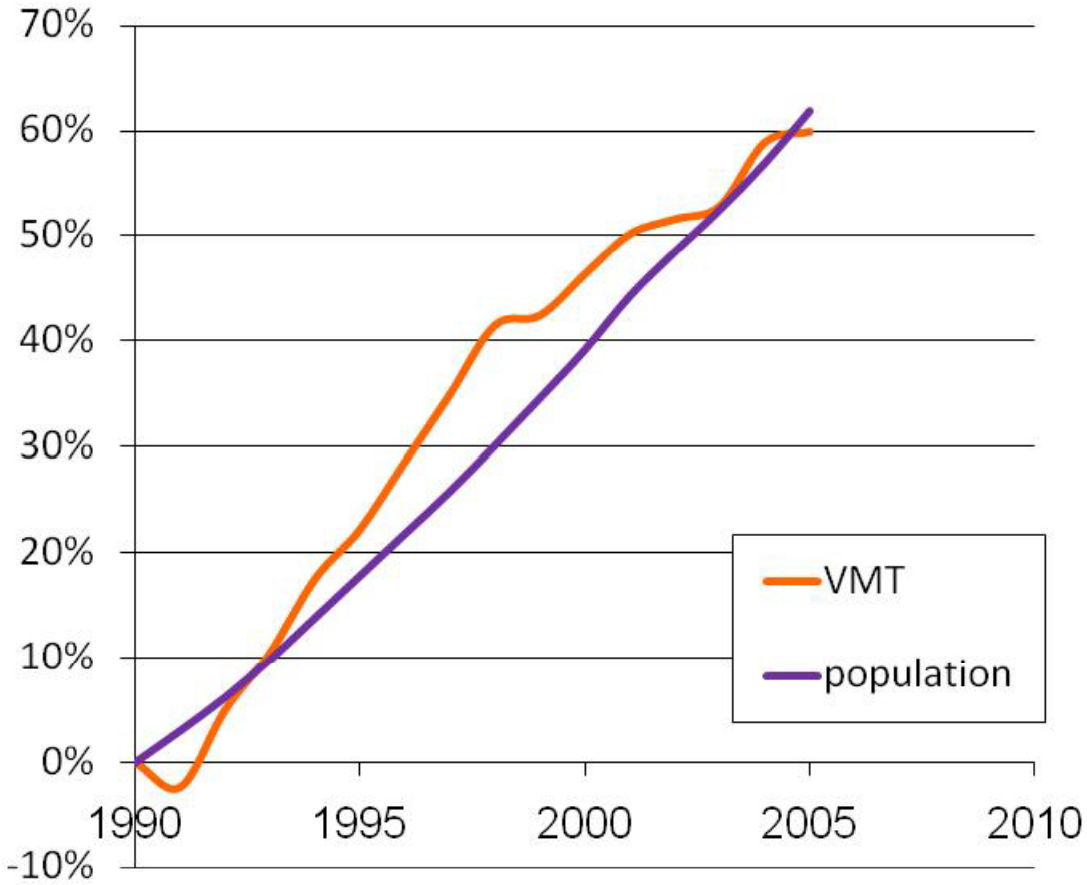
Presented by:

Jane Hayse
Transportation Department Division Chief
Atlanta Regional Commission

Overview

- Challenges faced by the Atlanta Region
- Scenario testing of land use and transit alternatives
- *Plan 2040*
- Where do we go from here?

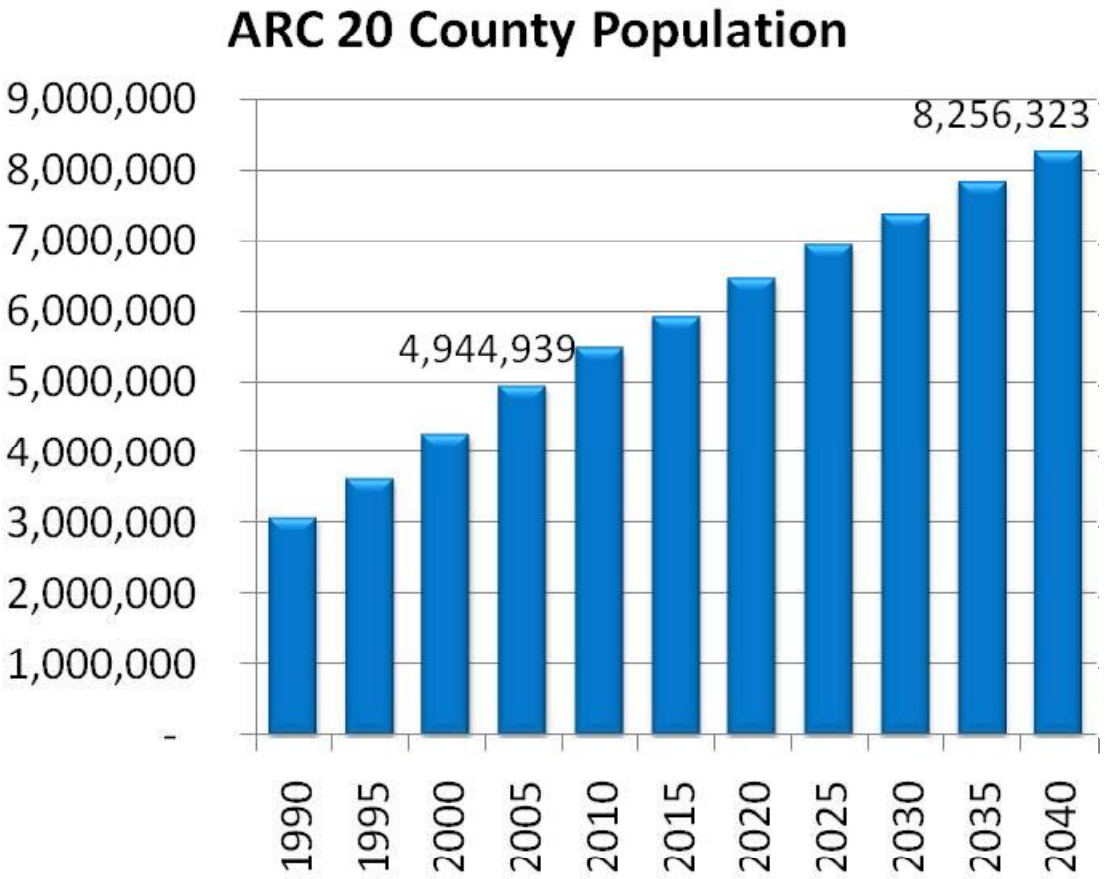
Challenge 1 – Increase in VMT



Source: GDOT, ARC

- Region has experienced rapid population growth
- Growth has led to increase in VMT and emissions

Challenge 1 – Increase in VMT



- Region ***will continue*** to experience rapid population growth
- CO_2 emissions analysis based on an earlier population forecast for the year 2030

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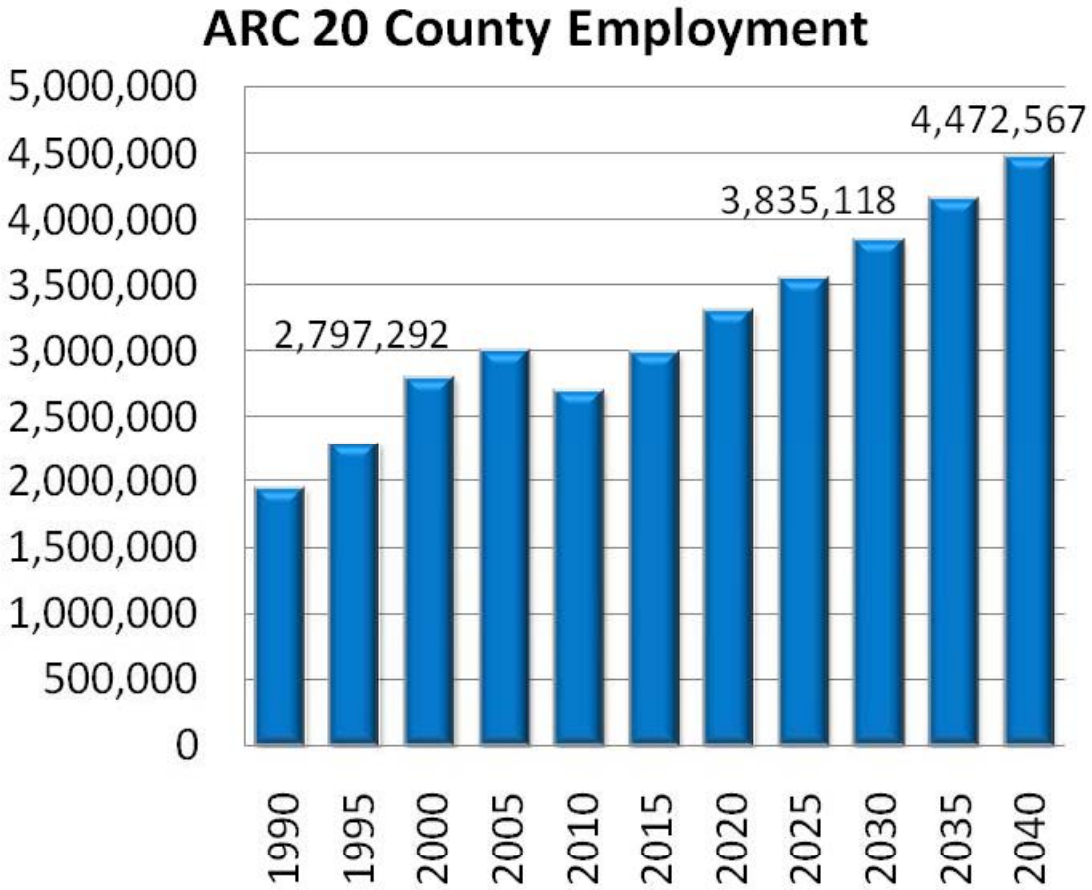
Challenge 1 – Increase in VMT



- Region will see a slow recovery to the recent recession
- Lower future ratio of jobs to population

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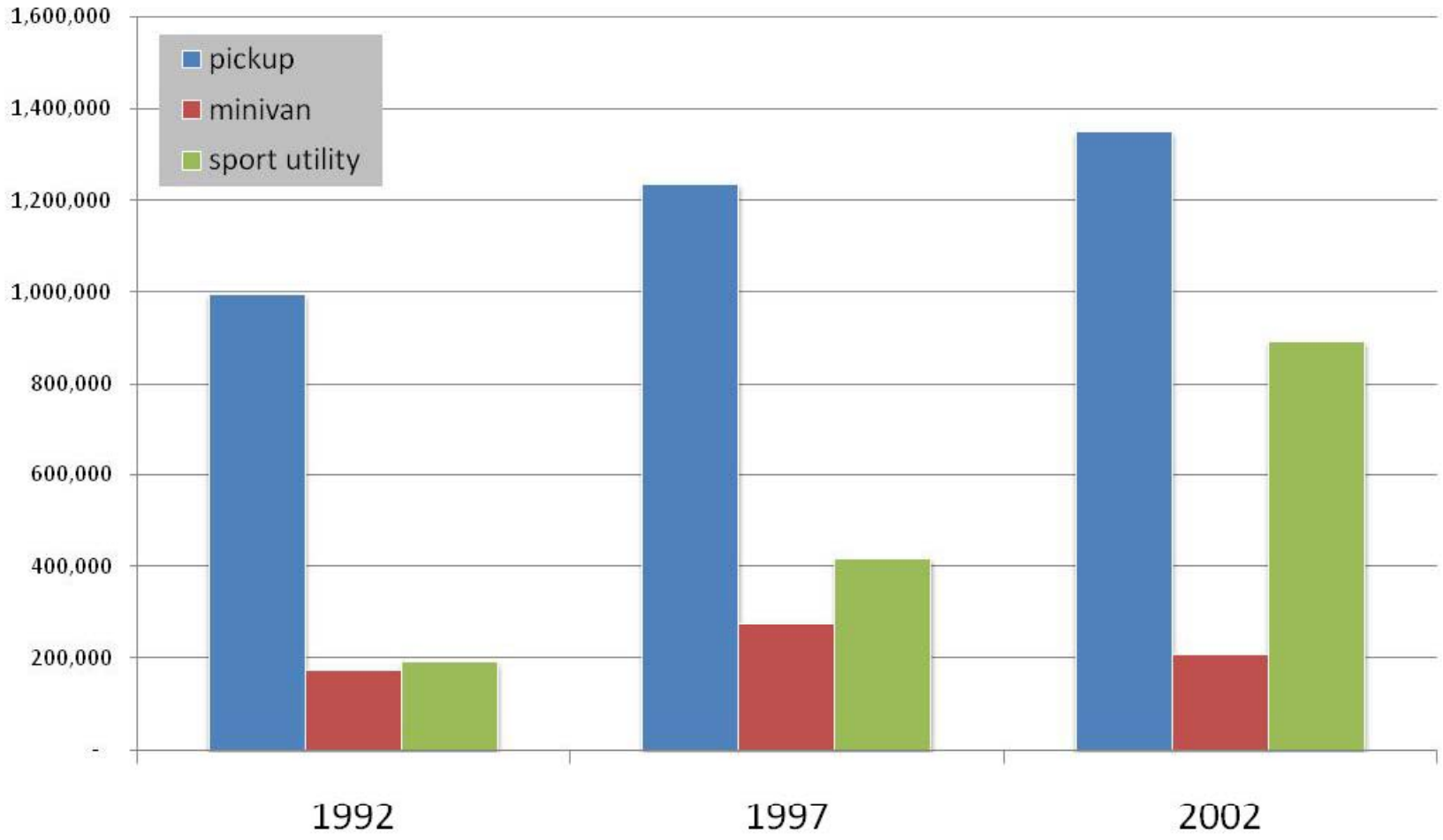
Challenge 2 – Georgia's Fleet Inefficiency



Source: US Census Bureau, 2002 Economic Census

Challenge 3 – On Road Freight Traffic

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- Trucks account for 84% of the region's freight movement
- 55% increase in VMT between 2005 and 2030
- Heavy-duty diesel engines are a primary source of CO_2 emissions

ARC, *Envision6*

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Challenge 4 - Congestion

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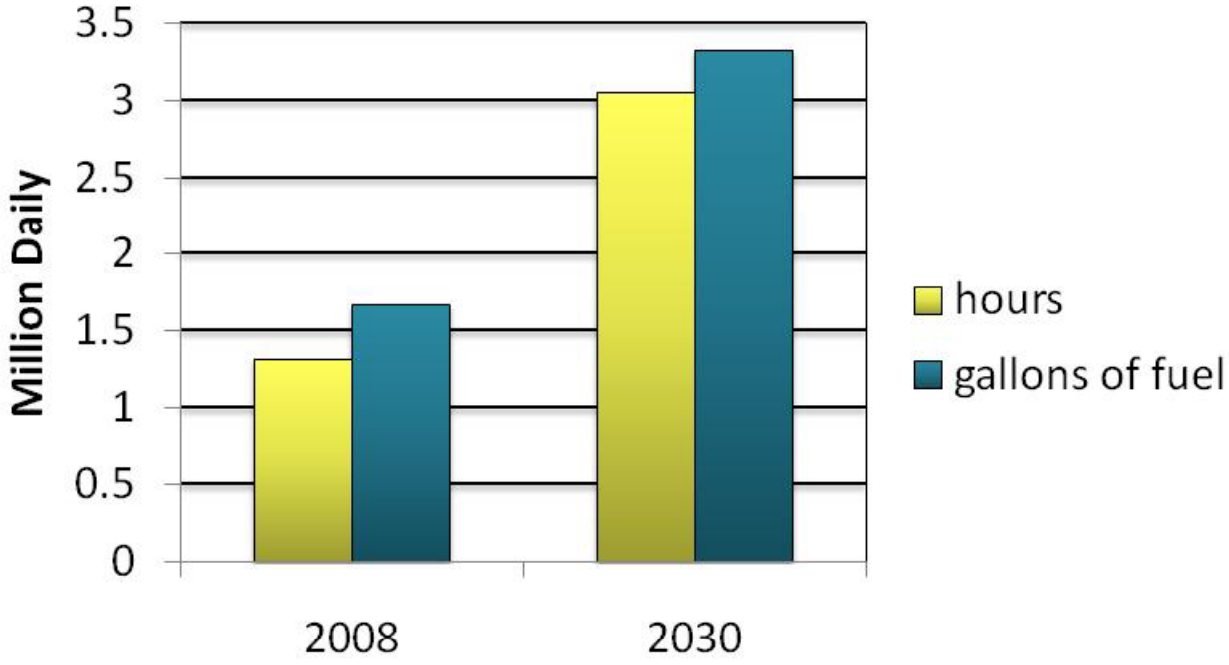
- Low travel speeds and idling
- 1.35 TTI in 2007 → 1.64 by 2030.



ARC, *Envision6*

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Scenario Testing – Methodology

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Land Use

- Changed land use to match scenario goals and objectives for each run
- Used 1990 and 2005 as baseline years to match Kyoto Protocol and provide a near term year

Travel Demand Model (TDM)

- Normal TDM model run with modified land use inputs

MOBILE6

- Altered fuel efficiencies by scenario
- Calculates total CO_2 produced by network

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Scenario Testing – Envision6 RTP

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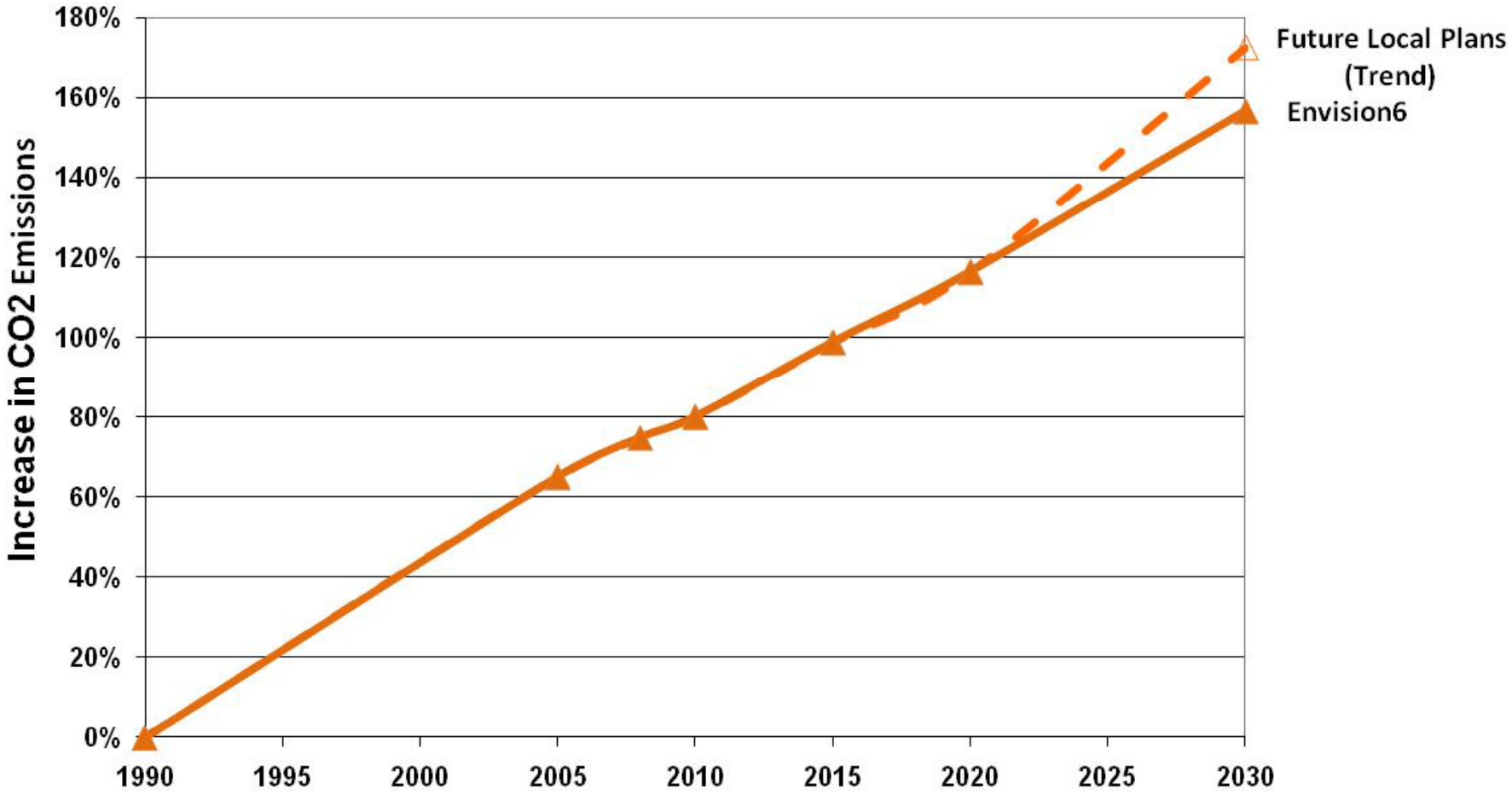

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Scenario Testing – Envision6 RTP and EISA

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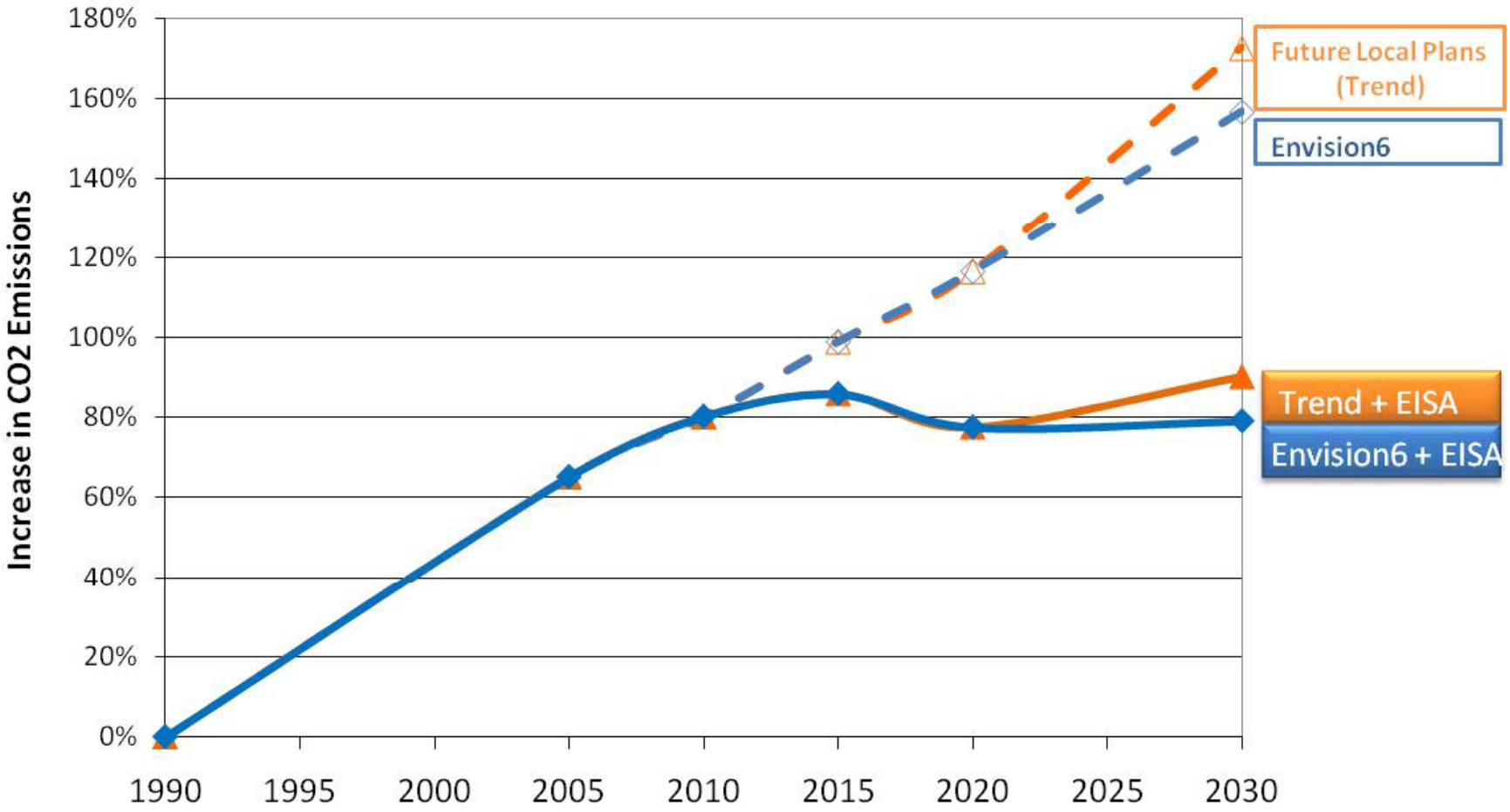

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Scenario Testing – Denser Land Use

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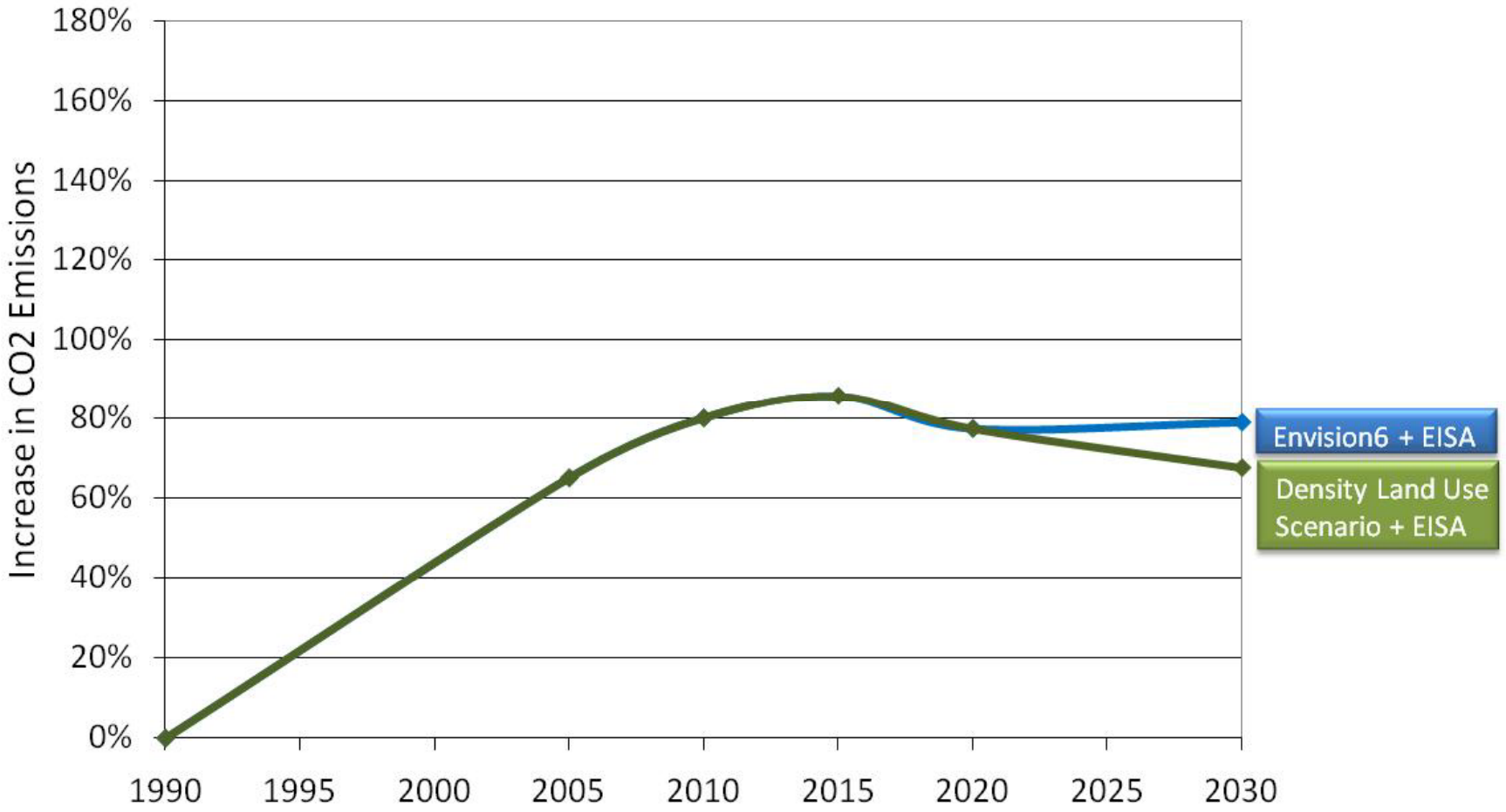

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Scenario Testing – Transit Oriented Growth

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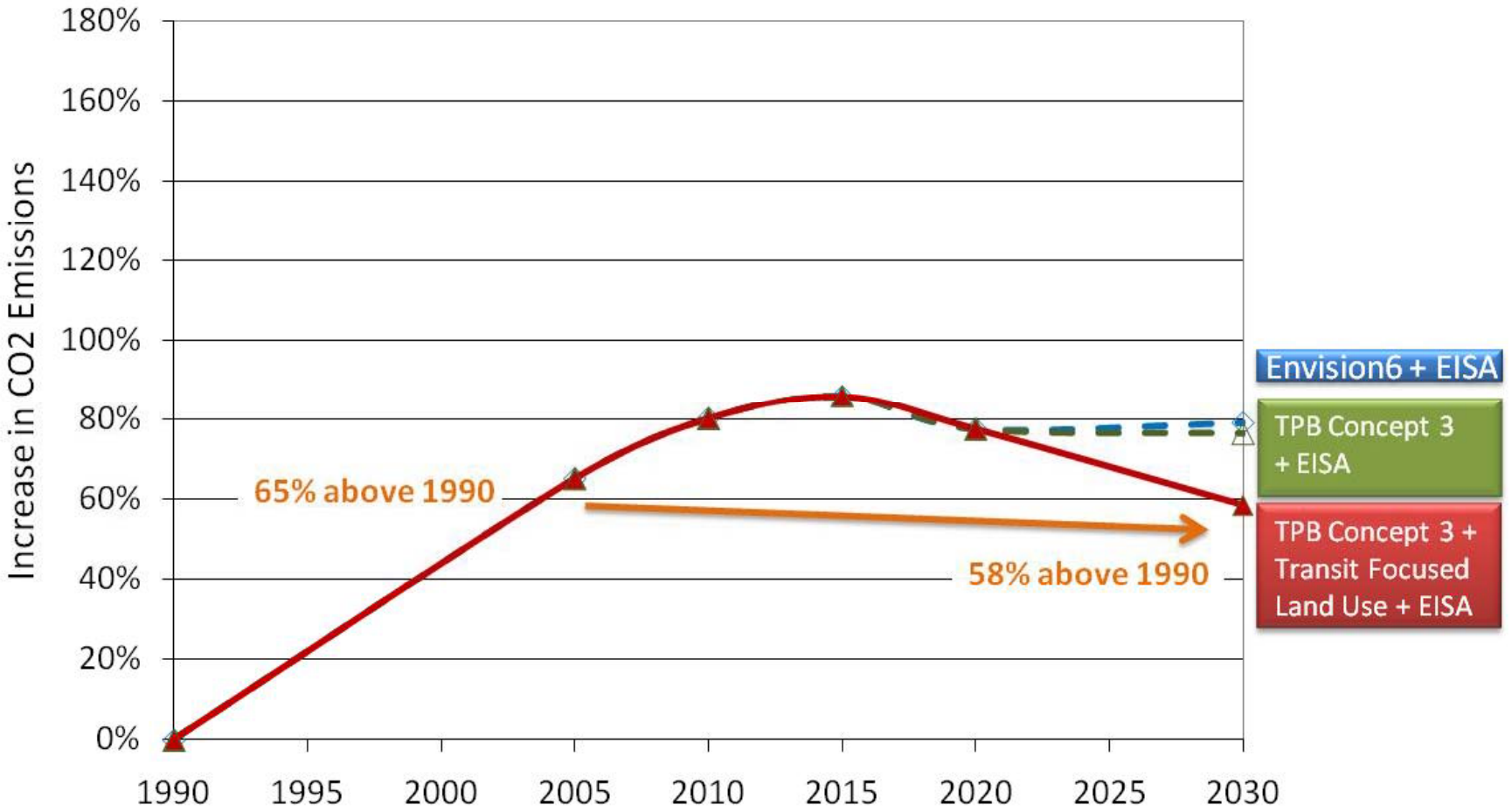

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Scenario Testing - Composite

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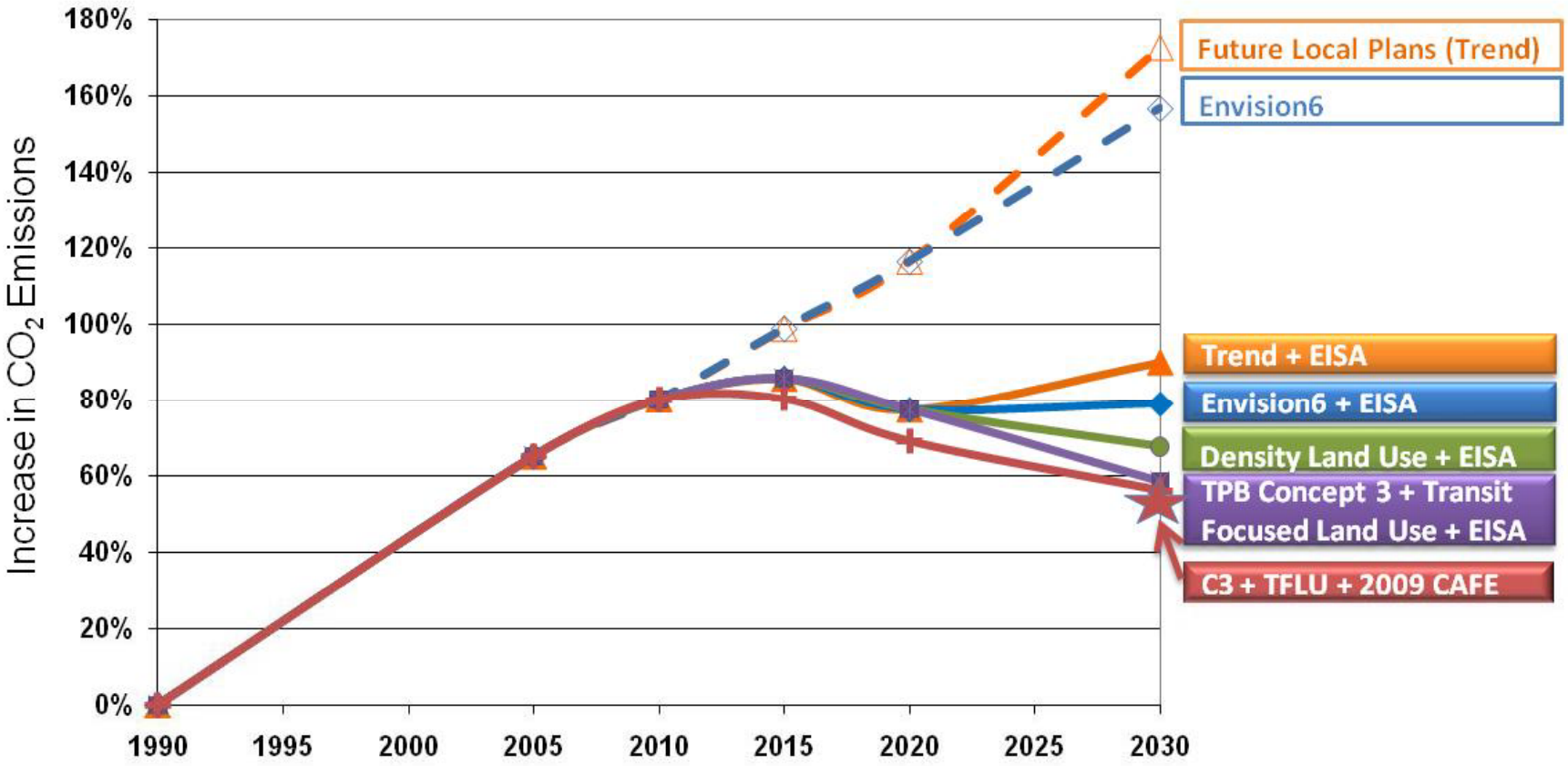

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Scenario Testing – Per Capita Composite

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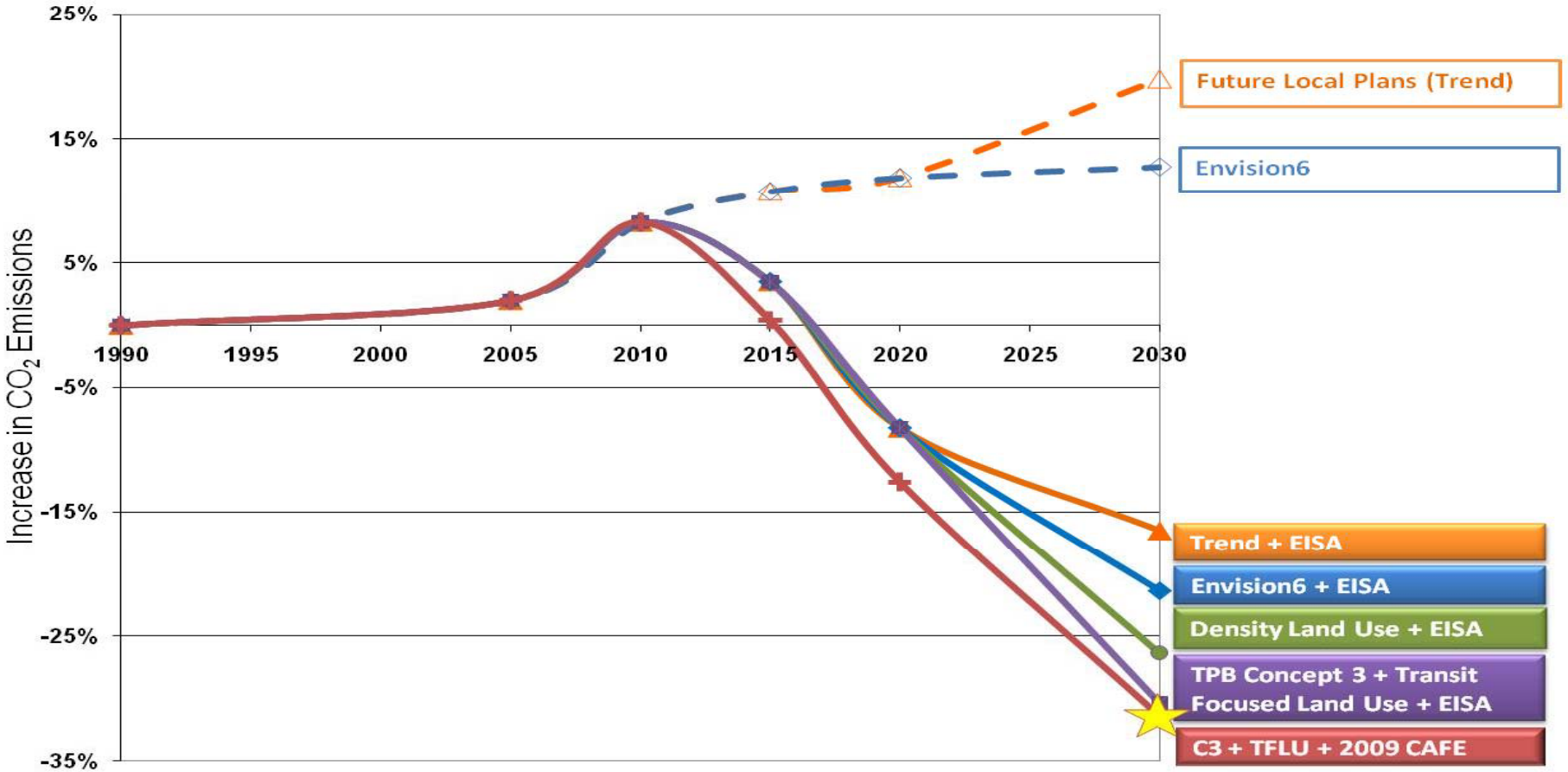

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Scenario Testing – Advice

- Develop a technique that is easily replicable
- A model is only as good as the info you feed it
  - How reliable are my land use assumptions?
  - How reliable is my travel demand model?
  - How reliable is my emissions calculator?
- Establish realistic goals and objectives

Plan 2040

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- Environmental sustainability is a key plan goal
- ARC/FHWA joint climate change scenario planning workshop
- Added CO_2 as a criterion for benefit cost analysis
  - Assigned a price per ton of emission
  - Forced some projects into negative B/C ratios

Where do we go from here?

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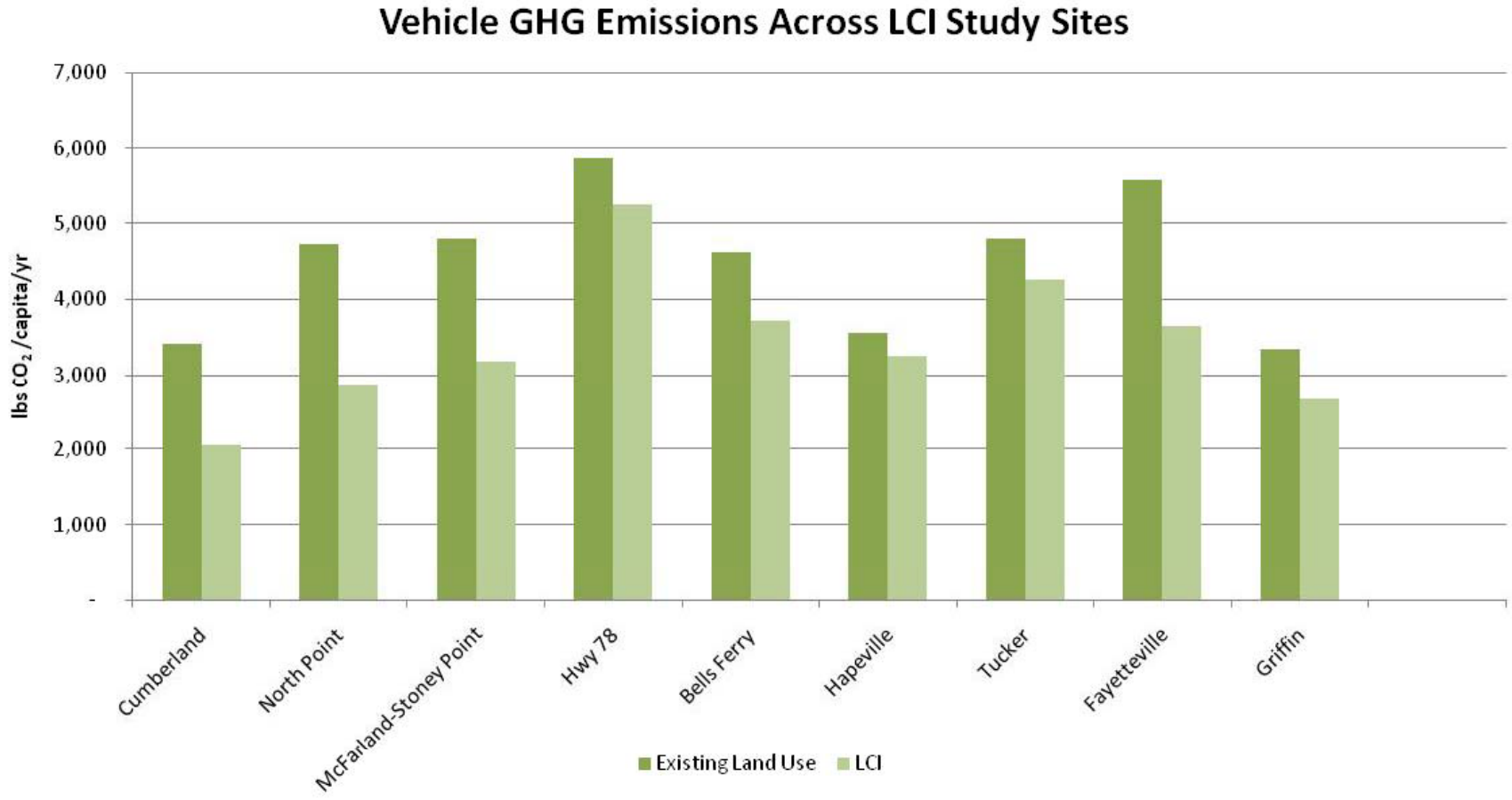
- Goal 1: Promote sustainable development through integrated land use and transportation strategies
- Goal 2: Reduce VMT by supporting alternative modes and implementing transportation pricing measures
- Goal 3: Support the use of cleaner and more fuel-efficient vehicles and alternative fuels
- Goal 4: Work with stakeholders to set meaningful and realistic emission reduction targets
- Goal 5: Consider adaptation strategies

Where do we go from here?

REAL SOLUTIONS FOR CLIMATE CHANGE



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Where do we go from here?

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Atlanta Regional Commission
Green Communities
Leading the Way to Sustainable Living

Livable Centers Initiative

FIFTY FORWARD

ATLANTA REGION
PLAN 2040

Envision6
planning for a region of 8 million

RideSmart

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Meeting Transportation Greenhouse Gas Reduction Goals in the National Capital Region:
A "What Would it Take" Scenario

NOVEMBER 4, 2010

Presented by:

Ronald F. Kirby
Director of Transportation Planning
National Capital Region Transportation Planning Board (TPB)

What is the Transportation Planning Board (TPB)?

- *Federally Mandated Role:* Responsible for coordinating planning and funding for the region's transportation system.
- *Members:* Include representatives of local governments; state transportation agencies; state and DC legislatures; and WMATA.
- *Relationship with COG:* The TPB is staffed by the Department of Transportation Planning at COG. As a body, the TPB is independent from the board of COG.

TPB Planning Area

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- Approximately 3,000 square miles
- Includes over 5 million people and 3 million jobs

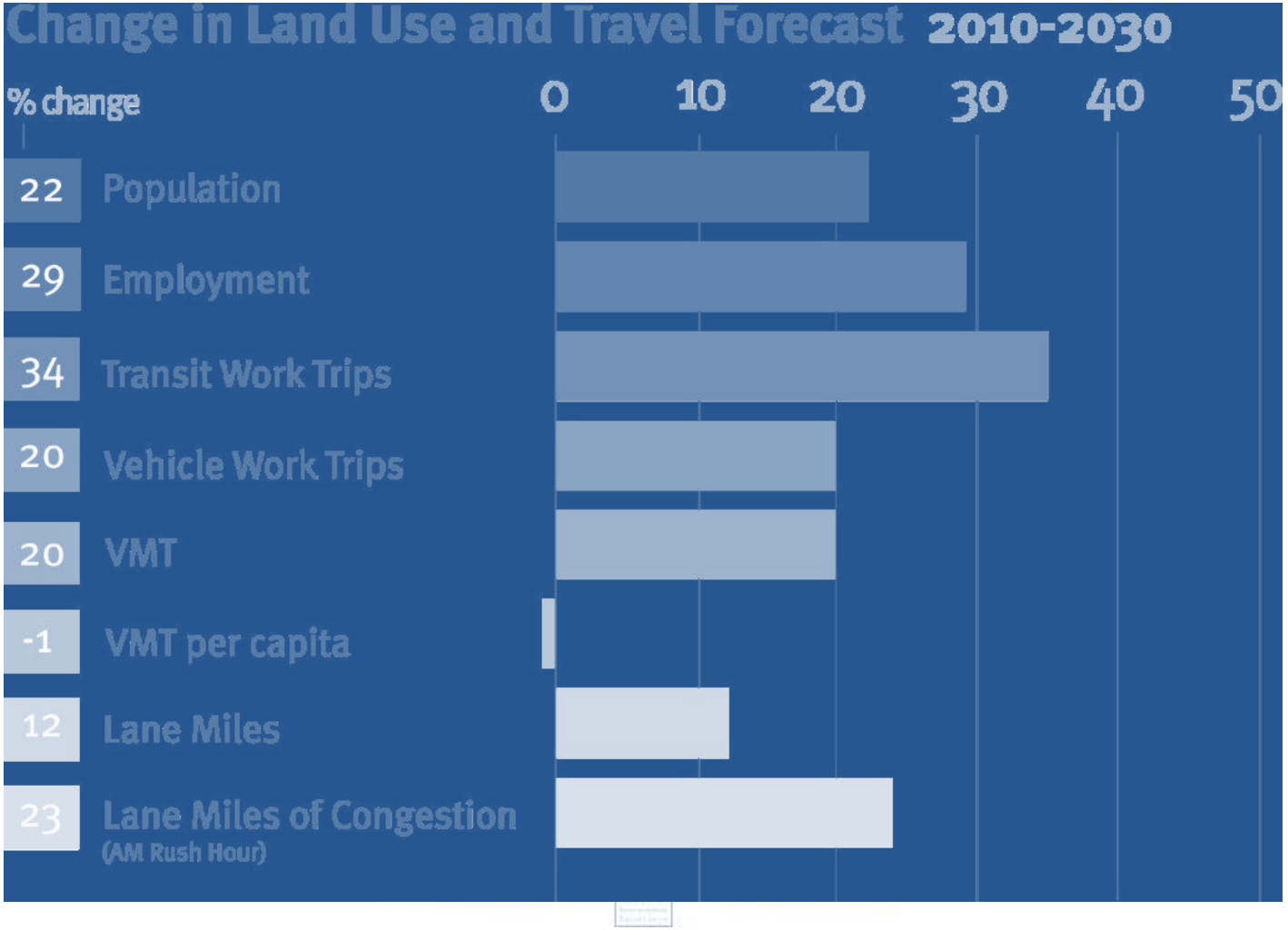
Context

- Currently there is no federal requirement for MPOs to develop GHG inventories.
- Because of interest from TPB members, an extensive study on GHG forecasting and mitigation strategies was conducted. The next step is to study TPB's possible role in adaptation.
- Currently, states and local governments in the region are working on their own climate change studies

Why “What Would it Take (WWIT)?”

- Build off of regional goals in the COG Climate Change Report (November 2008).
  - 80% reduction goal from 2005 baseline levels by 2050 for all sectors (based on international goals)
  - “What Would it Take” to achieve this percentage reduction in the transportation sector?
- Support local jurisdictions by identifying **effective and feasible** strategies.
- Determine the **type and scale of transportation strategies** necessary to meet regional goals.

Regional Growth Forecasts



Outline

- Discussion of the methodologies and results of the WWIT Scenario study
- Current regional initiatives to address climate change mitigation
- Future work in studying TPB's possible role in climate change adaptation planning activities

Analysis Strategy

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- CO_2 inventories and rates were developed using Mobile6 and an offline spreadsheet to estimate the reductions from CAFE standards
  - Local vehicle fleet information from decoded VIN data
- VMT reduction strategies were analyzed using travel forecasting procedures and sketch planning methods
- Traffic flow improvements were analyzed using CO_2 emissions changes by speed developed by UC Riverside

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Regional GHG Reduction Goals

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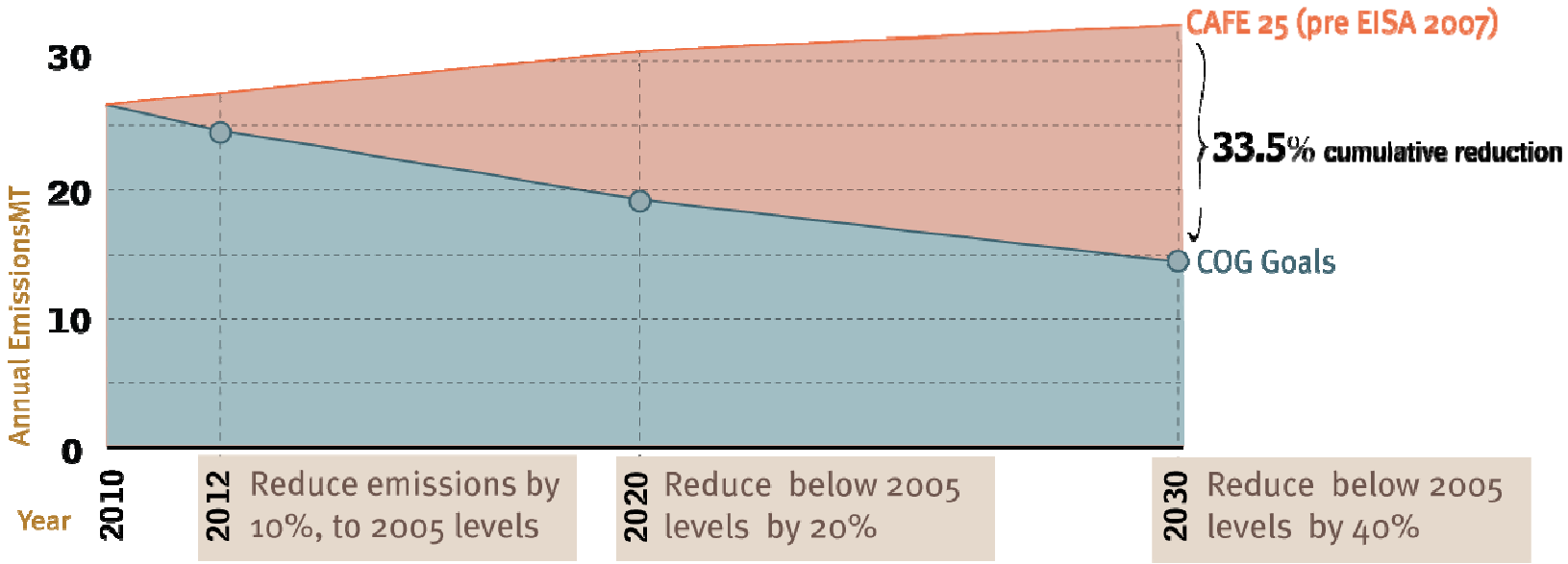
What if we had to meet these regional goals in the transportation sector? What would we need to accomplish by our current planning horizon of 2030?



What is our GHG baseline?

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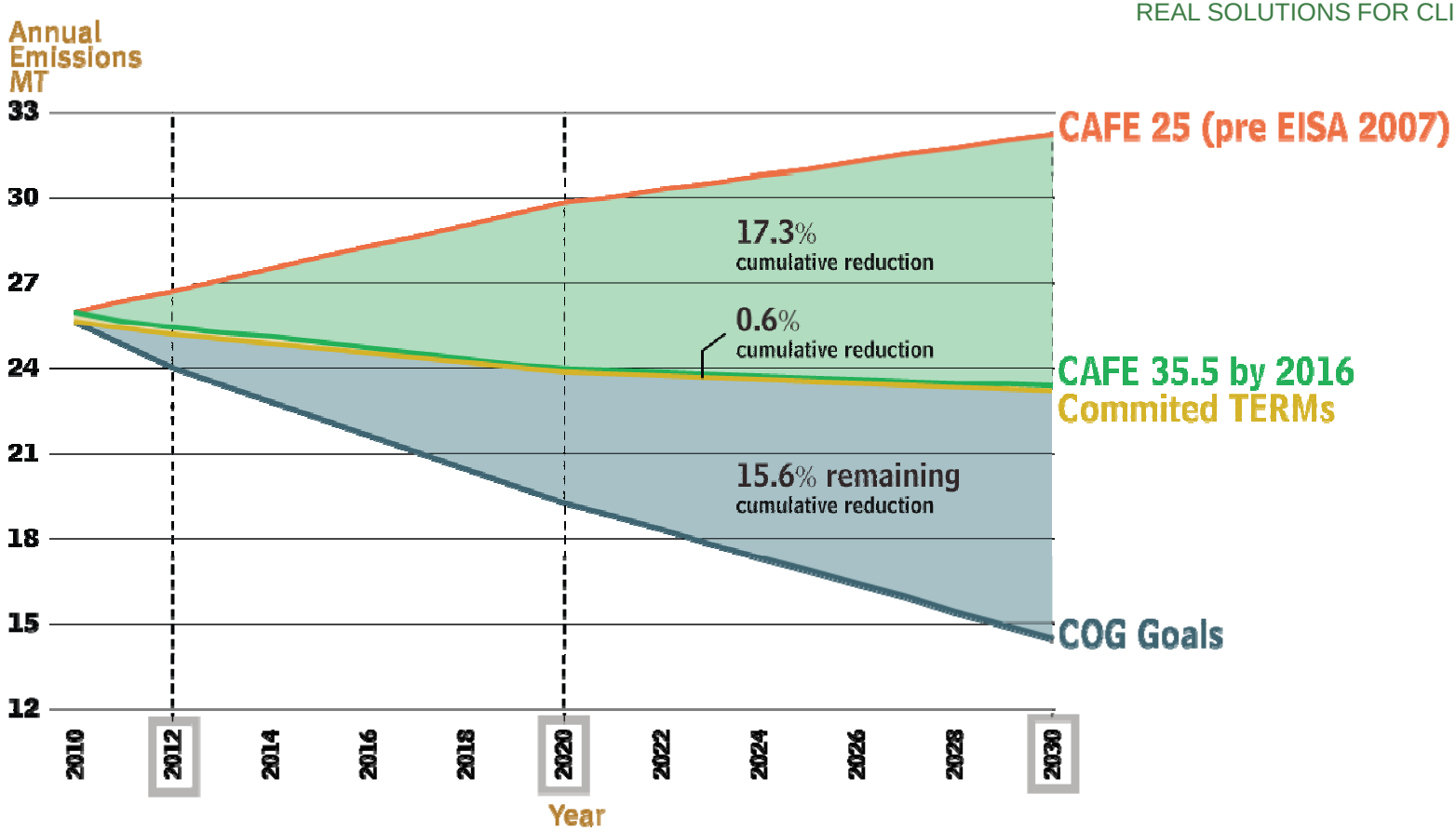

Committed TERMs (Transportation Emissions Reduction Measures) include: Access and service improvements to transit, bike/ped projects, rideshare assistance programs, telecommute programs, traffic improvements, engine technology programs

How can we reduce CO_2?

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1
fuel efficiency

Enhanced CAFE
HDV CAFE
Local tax incentives
Cash for Clunkers

2
alternative fuel

DOE Forecasts:
Current regulation
High price case

3
travel efficiency

Telecommuting
Bike/ped facilities
Improved transit
Bike and Car-sharing
Car and Vanpooling
Pricing
Eco-driving
Incident Management
Signal optimization

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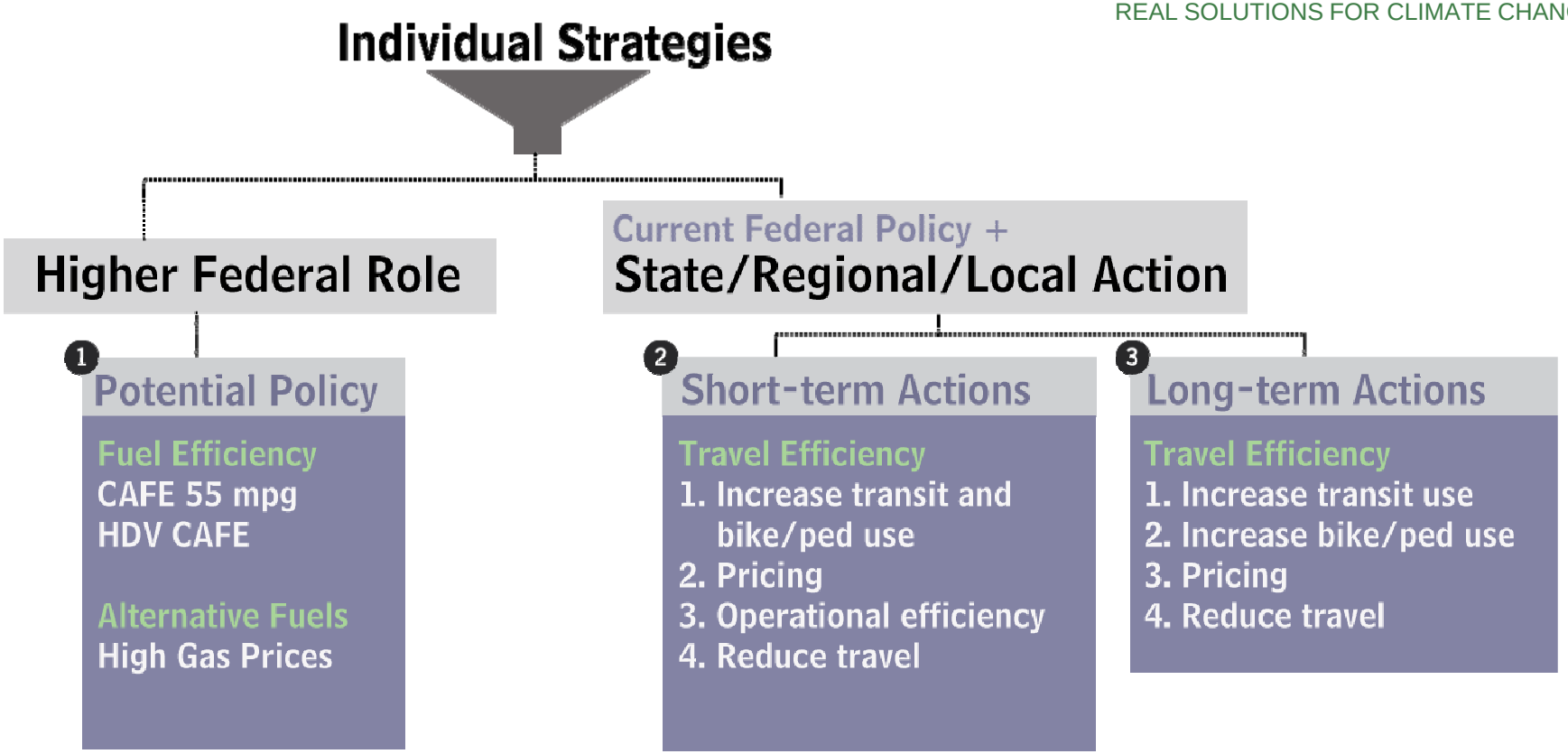
Categories of Strategies



Higher Federal Role

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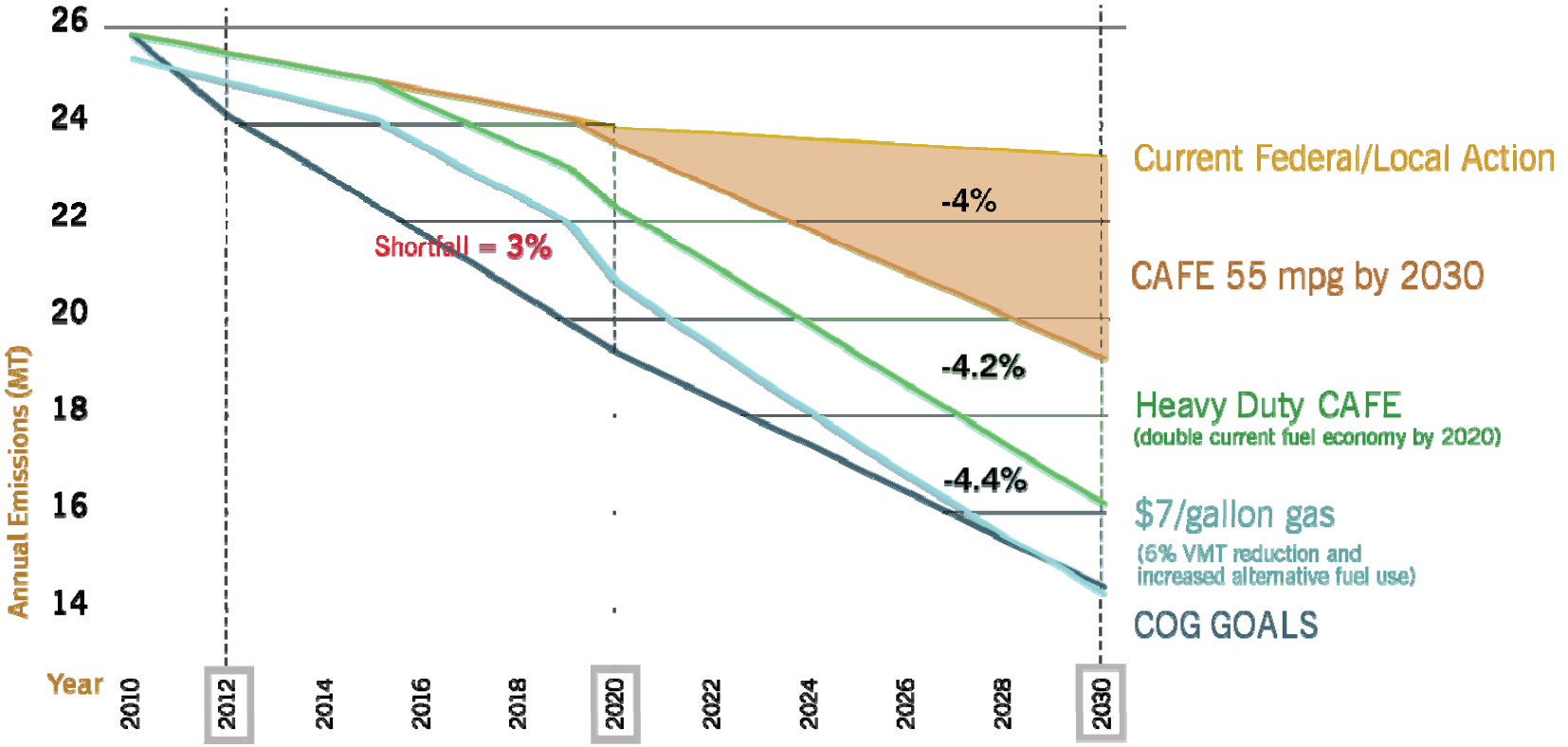
Aggressive federal measures would *almost* get us there.



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Current Federal Policy

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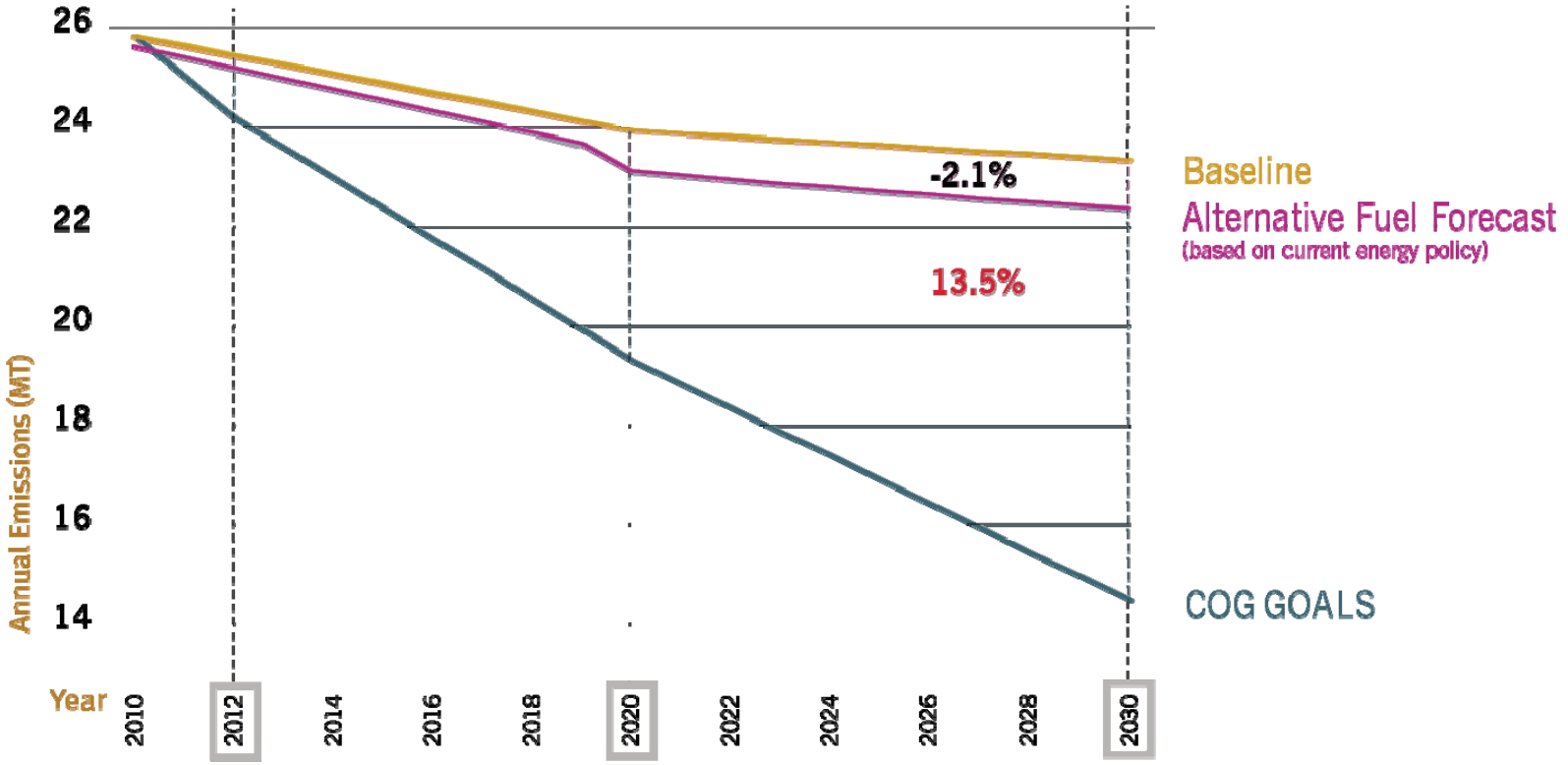
We still have a long way to go based on current federal policy.



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Current Federal Policy + Short-term Actions

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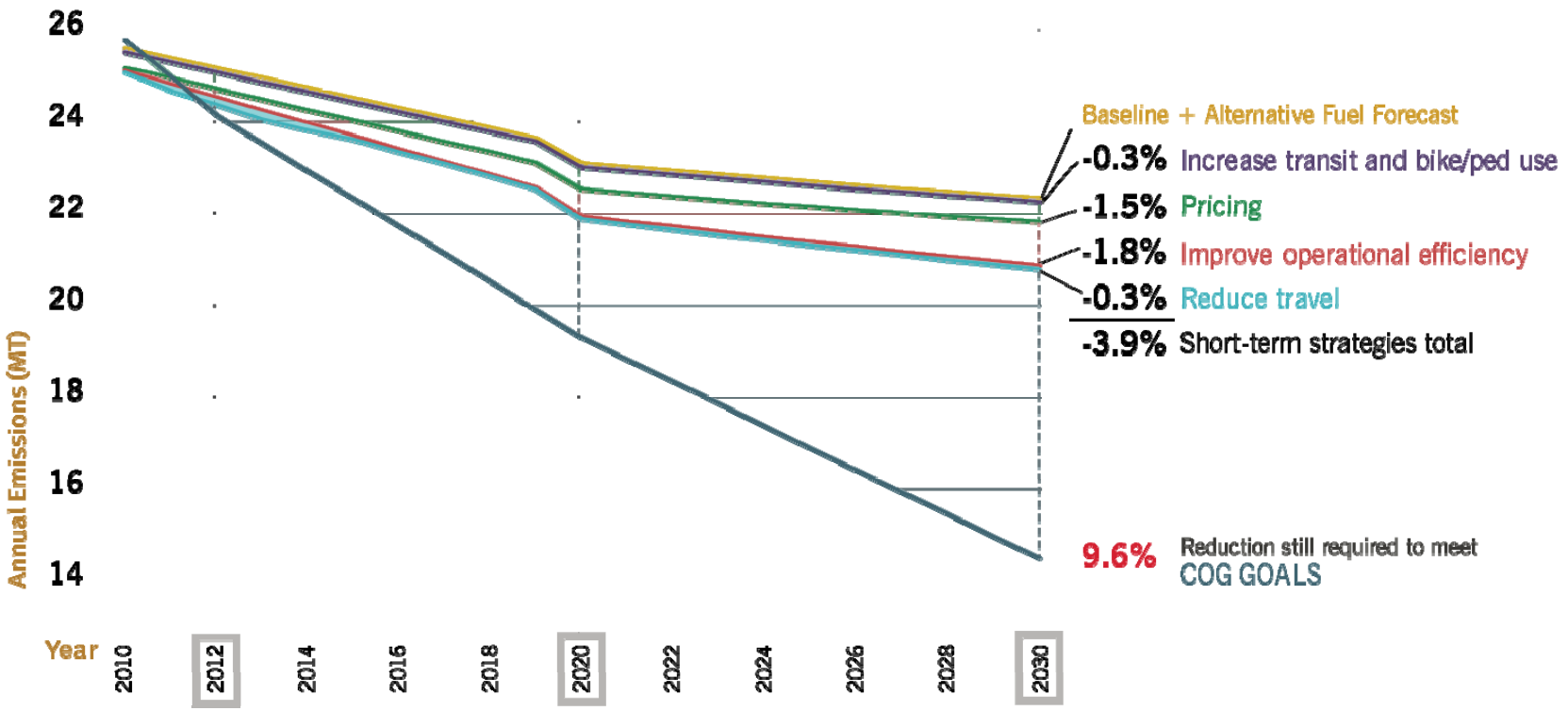
Many strategies can be done soon, almost meeting early goals.



Current Federal Policy + Long-term Actions

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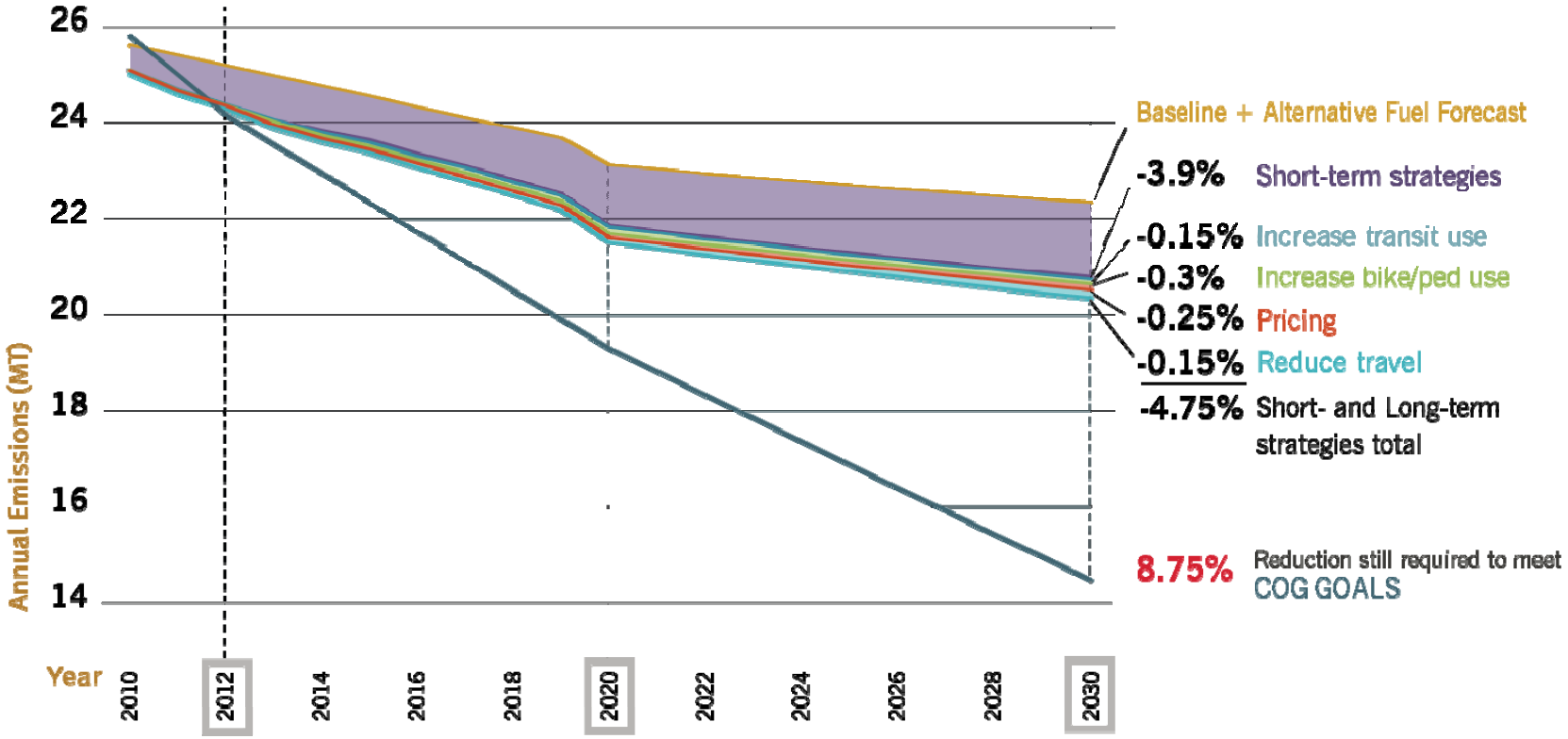
A longer study timeframe for long-term impacts would help.



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Meeting the Goals

Can we combine the aggressive federal strategies with the regional strategies and meet the goals?

1. Danger of double-counting if VMT-reducing strategies are combined with the High Gas Price strategy, which results in a 6% VMT reduction.
2. The effectiveness of travel efficiency strategies is diminished if the fleet is cleaner.
3. If operations measures (incident management, signal optimization, hybrid buses, eco-driving, and idling reduction) are adjusted and added to the high federal role grouping, the 3% shortfall is reduced to 1.6%.

Cost-effectiveness

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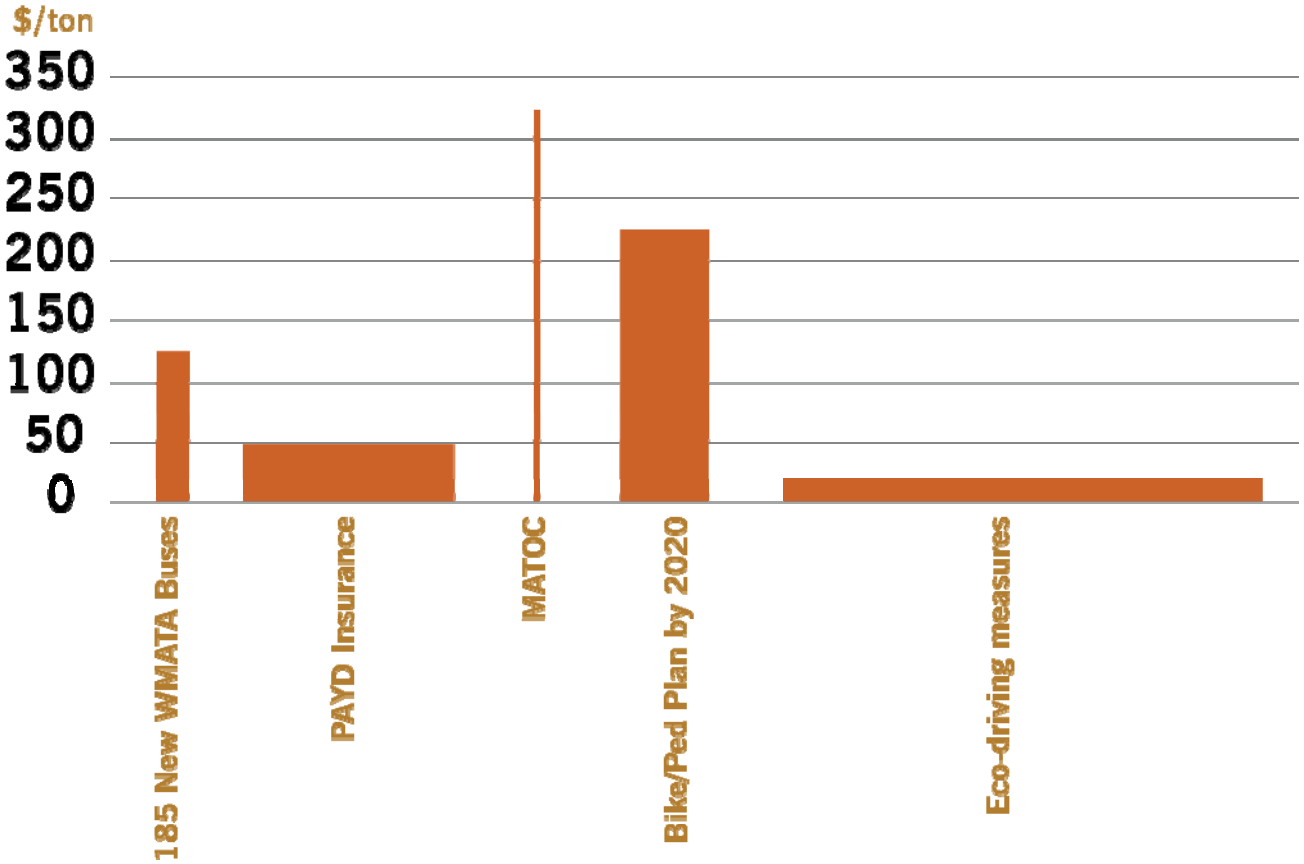

1 million tons of cumulative reduction 2010-2030

(width of bar indicates 20 year CO_2 reduction effectiveness)

Assumes current federal/local action

USG assumes the Social Cost of CO_2 to be $21 in 2010 rising to $45 in 2050.

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Benefit Cost Analysis

EXAMPLE

Bike-sharing

Modest CO_2 benefits are a contributing factor to large overall benefits.

Costs	**$231,000,000**
Capital	$16,000,000
Operating	$75,000,000
Increased Accidents	$145,000,000
Benefits	**$625,500,000**
User Cost Savings	$197,000,000
Travel Time Savings	$378,000,000
Reduced Accidents (from reduced VMT)	$1,300,000
Public Health	$2,000,000
Increased Access	$38,000,000
Congestion Reduction	$3,500,000
Environmental Benefits	$5,700,000
CO_2	**66,000 tons**

All numbers over 20 year horizon from 2010-2030

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What have we learned?

- Benefit cost analysis is more appropriate for analyzing potential GHG reduction strategies than cost-effectiveness calculation.
- Other factors that were not considered (such as bundling of measures and second order demand effects) should be considered in future work, along with updated emissions models like MOVES.
- There are **immediate effective actions** that local governments can take to work towards meeting short term reduction goals.

What next?

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TPB can begin designing some actions that the region could consider for the near-term

1. Expand **pay-as-you drive insurance** to the whole region
2. Accelerate the **TPB Bike/Ped Plan** completion
3. Begin an **eco-driving** public education campaign (potentially through Commuter Connections)
4. Promote state/local incentives to accelerate the use of **fuel efficient/alternative fuel vehicles** for both public fleets and private use
5. Strengthen long-term focus on **mixed use activity centers** and **transit oriented development**

What is Adaptation?

Measures that *reduce or avoid climate change impacts* or create opportunities when changes are positive (ICLEI)

- Different than mitigation, which is any measure taken to reduce GHG emissions
- Adaptation strategies can include, but are not limited to infrastructural, service, planning, or freight changes, among others

TPB is starting to research our possible role in adaptation planning

Why do we need to adapt?

- CO_2 remains in the atmosphere for centuries. Emissions of the past and present will impact the future for centuries.
- Impacts will largely be felt at the local and regional levels.
- The cost of waiting to react to climate changes rather than proactively planning is high.

Some Impacts in the Washington Region

- More very hot days (90 degrees+)
  - Meeting federal air quality standards will likely be more difficult
- Flooding from sea level rise
  - Will require increased maintenance, retrofits, and possible relocation of infrastructure
- More intense downpours (coupled with increased drought)
  - Will require greater stormwater and erosion control measures

What are the Major Considerations?

- We cannot plan in a sector-specific vacuum
  - There will be cascading impacts eventually affecting transportation that are not immediately obvious without multi-sector planning (e.g. stormwater, erosion)
- Linkage of adaptation with mitigation
  - Emissions of adaptation strategies (e.g. sea wall construction)
  - Adaptation needs of mitigation strategies (e.g. protecting rail bridges from flooding)
- Major uncertainty
  - Long range planning process must be adaptable as information changes.

Four Possible Roles for MPOs

1. Coordination of state and local maintenance, capital, and operating priorities into long-range planning
   - Example: With high heat, commuter rail service capacities may be limited, requiring integrated planning with other transit and highway operations
2. Adapting long-range planning to handle uncertainty of future climate change impacts
   - This will be a major change, since current planning processes do not include potential climate changes

Four Possible Roles for MPOs

3. Coordination of multi-sector planning
   - Stress importance of coordinating transportation with other sectors (health, public safety, water) as is currently done for evacuation plans and weather emergency plans
4. Modeling of transportation demand, service, and air quality impacts
   - Modeling can be used to assess indirect impacts of climate change on service levels, travel, and emissions

CARB Overview

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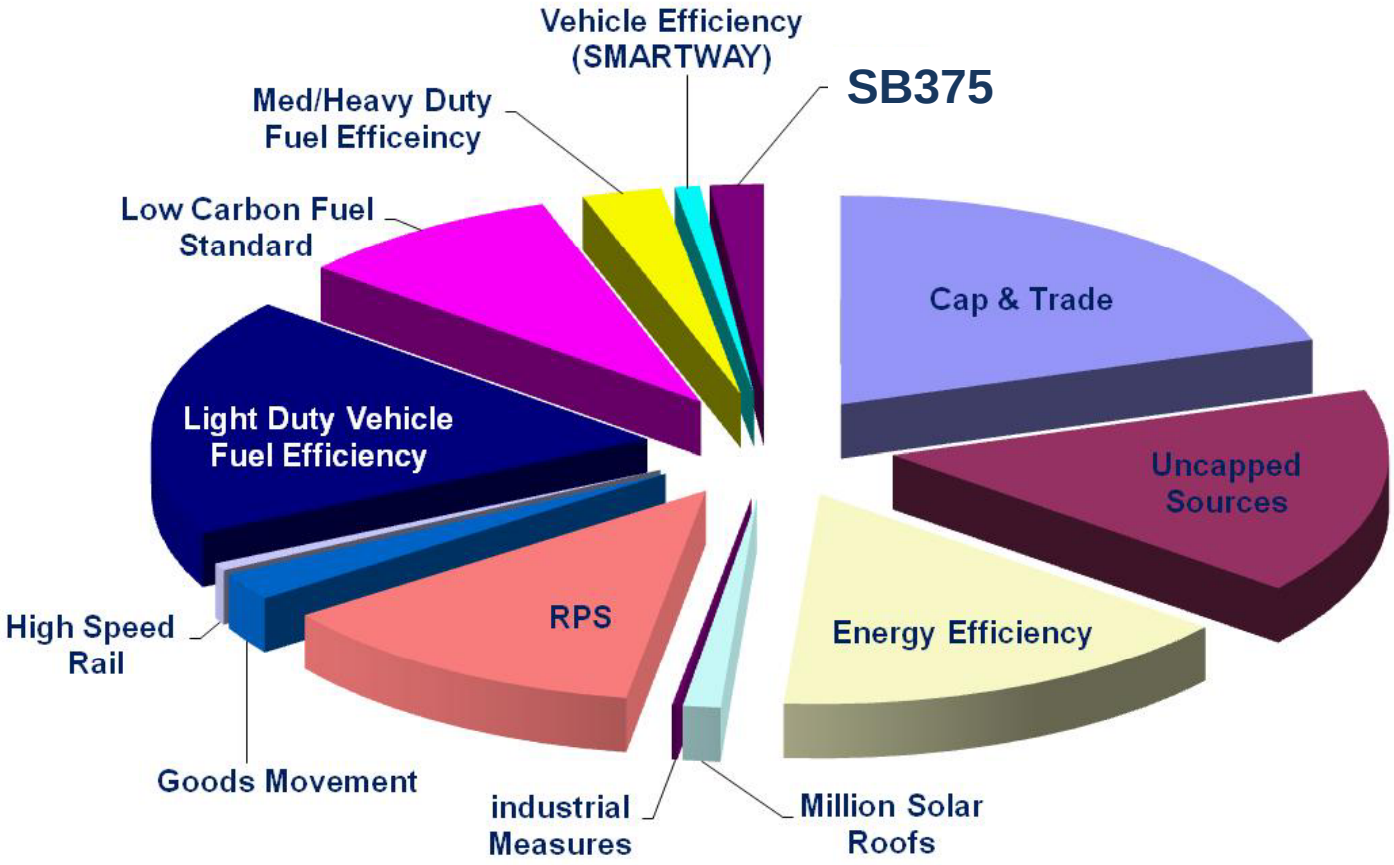

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Climate & Transportation: Change is Coming

NOVEMBER 4, 2010

Presented by:

DOUG KIMSEY
Planning Director, San Francisco Metropolitan Transportation Commission

AB 32 Global Warming Solutions Act of 2006

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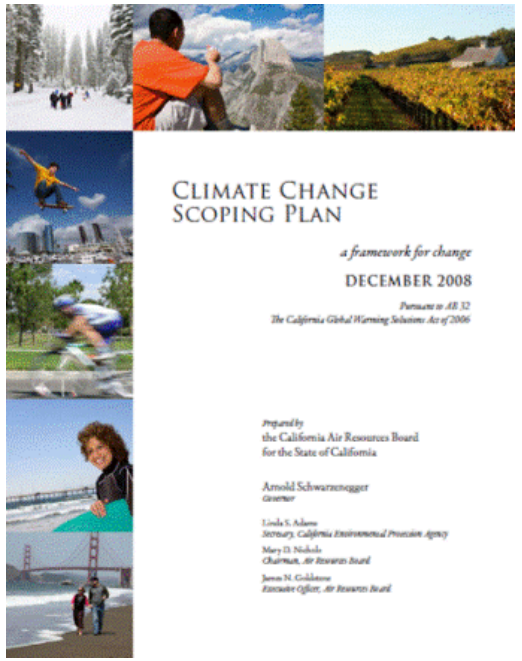
- AB 32 establishes the first comprehensive program of regulatory and market mechanisms in the nation to achieve GHG emissions reductions
- AB 32 sets GHG emissions limit for 2020 at 1990 level (30% reduction from business as usual)
  - Acknowledges that 2020 is not the endpoint
  - Points way towards 80% reduction by 2050
- California Air Resources Board (CARB) adopted a Scoping Plan to achieve AB 32's GHG emissions reduction target



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SB 375 Basics: Sustainable Communities and Climate Protection Act of 2008

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- Directs ARB to develop passenger vehicle GHG reduction targets for CA's 18 MPOs for 2020 and 2035
- Adds Sustainable Communities Strategy as new land use element of the RTPs
- Requires separate Alternative Planning Strategy if GHG targets not met
- Provides CEQA streamlining incentives for projects consistent with SCS/APS
- Coordinates state-mandated housing allocation process (Regional Housing Need Allocation) with the regional transportation planning process

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California's Three Pronged Approach to Reducing Transportation Greenhouse Gases
(with AB 32 Scoping Plan estimates for GHG reductions in 2020)

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- Cleaner vehicles (Pavley, AB 32) - 38 mmtons/yr
- Cleaner fuels (Low-Carbon Fuel Standard) - 15 mmtons/yr
- More sustainable communities (SB 375) - 5 mmtons/yr
  - Placeholder estimate – defers to SB 375 to establish target
  - CARB estimates adopted SB 375 targets result in 3 mmtons/yr in 2020 and 15 mmtons in 2035

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Sustainable Communities Strategy, A Study in Dynamic Tension

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SCS Must –

- Accommodate all growth in regional housing demand – no net growth in incommuting
- Achieve CO_2 reduction targets established by ARB

But SCS Must Not –

- Undermine Federal planning requirement for realistic demographic and revenue assumptions
- Interfere with local land use authority

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How Has the Process Changed Under SB 375?

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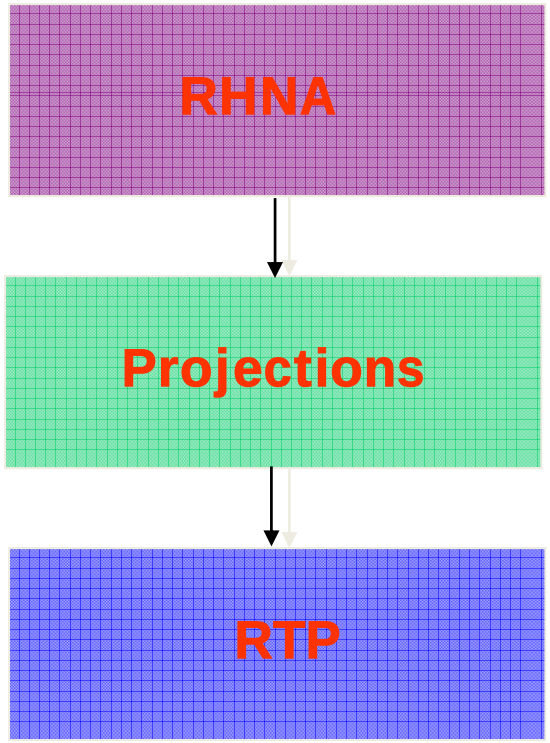
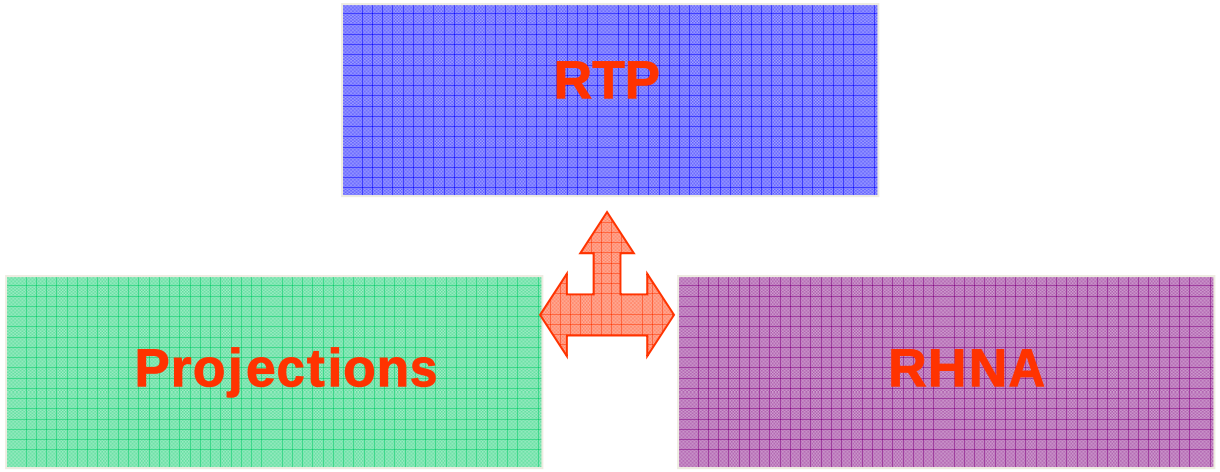
Old – Sequential



SB 375 - Integrated



Key Regional Targets Advisory Committee Recommendations

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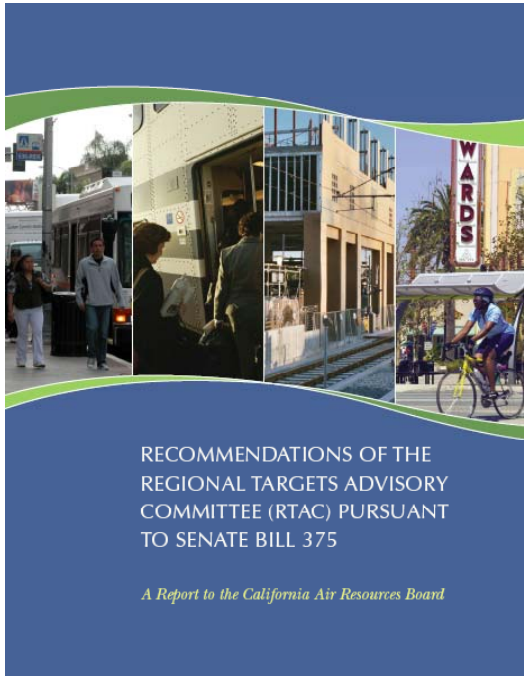
- Called for ARB to implement a consistent target setting process statewide
  - Collaborate and exchange data with MPO
  - Identify an initial statewide target
  - Adjust initial target for particular regions, if needed
  - Set draft and then final targets
- Target metric: percent per-capita GHG emissions reduction from 2005



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What Targets are CA's "Big Four" MPOs to Achieve? (per capita GHG reduction compared to 2005)

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MPO	2020	2035
SanDAG	7%	13%
SCAG	8%	13%
SACOG	7%	16%
MTC	7%	15%

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Bay Area GHG Scenario Assessment (% per capita - 2005 vs 2035)

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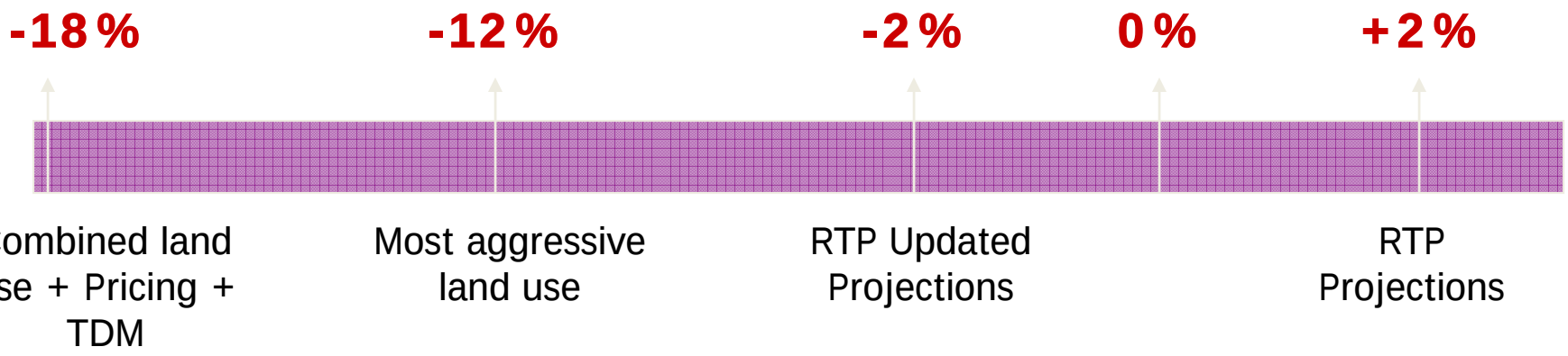
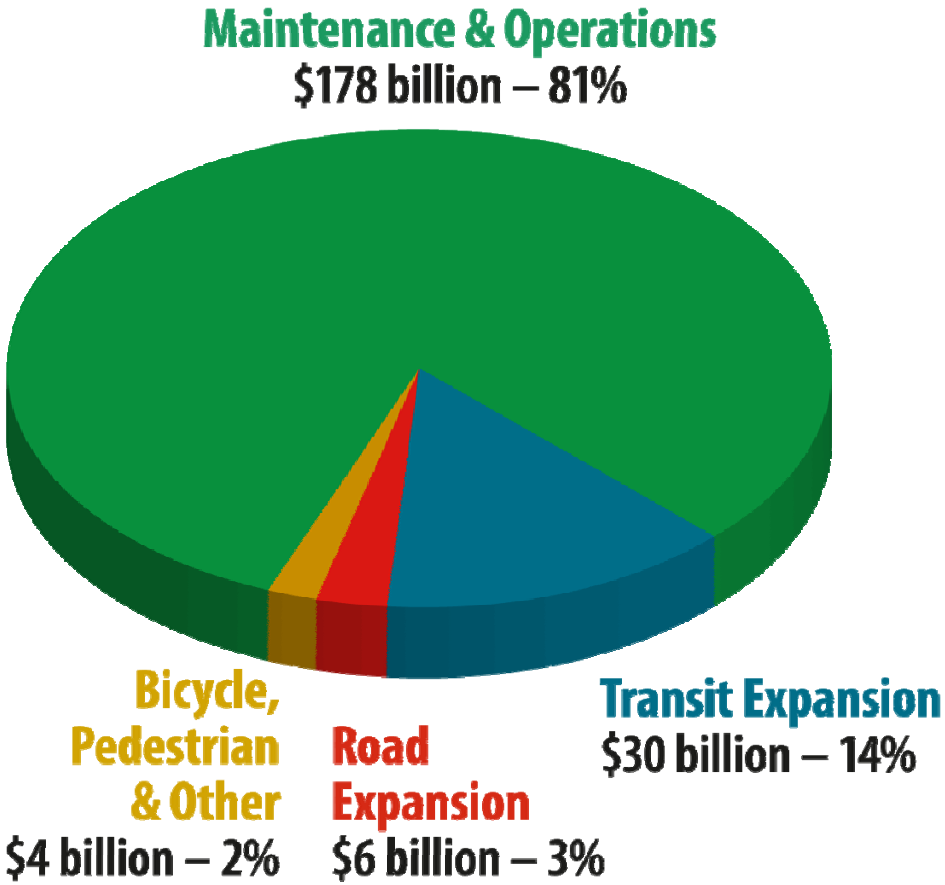


Existing operations and maintenance obligations limit funding flexibility



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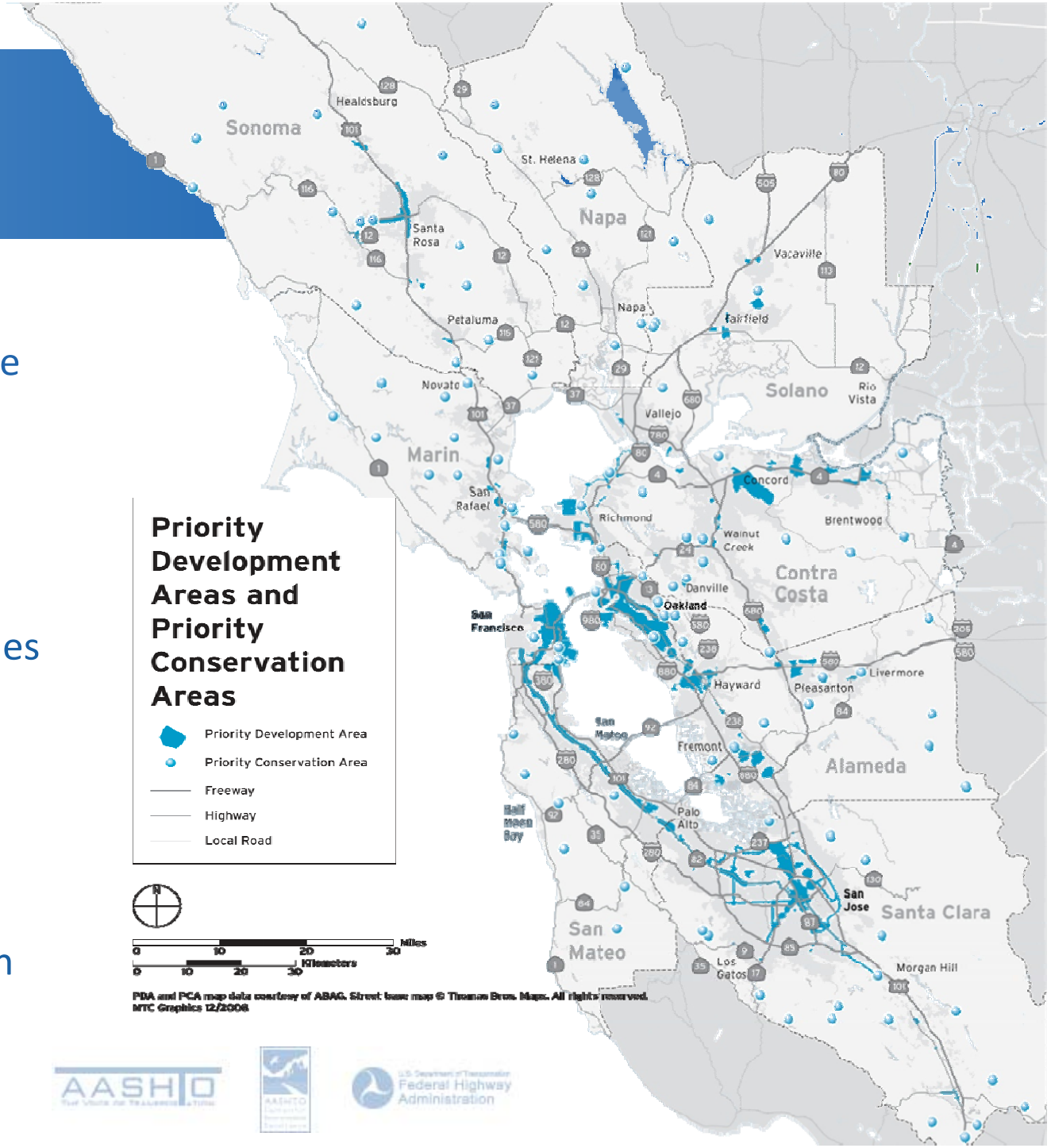
FOCUS

Where do We Grow?
Where can we preserve open space?

<u>Priority Development Areas (PDAs):</u>

- Locally nominated
- Existing Communities
- Near Transit
- Planned for more housing
- 5% of region's land area – can accommodate 50% of projected growth



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Land Use Impacts

County	Population			Percent Change	
	2005	2035 RTP Projection	2035 Focused Growth	2005 to 2035 RTP Projections	2035 RTP Projections to 2035 Focused Growth
San Francisco	795,800	969,000	1,008,500	22%	**4%**
San Mateo	721,900	893,000	896,300	24%	>1%
Santa Clara	1,763,000	2,431,400	2,587,000	38%	**6%**
Alameda	1,505,300	1,966,300	2,062,100	31%	**5%**
Contra Costa	1,023,400	1,322,900	1,373,400	29%	**4%**
Solano	421,600	506,500	497,600	20%	**-2%**
Napa	133,700	148,800	147,200	11%	**-1%**
Sonoma	479,200	561,500	564,500	17%	1%
Marin	252,600	274,300	278,800	9%	2%
Total	*7,096,500*	*9,073,700*	*9,412,200*	*28%*	*4%*

Land Use Impacts

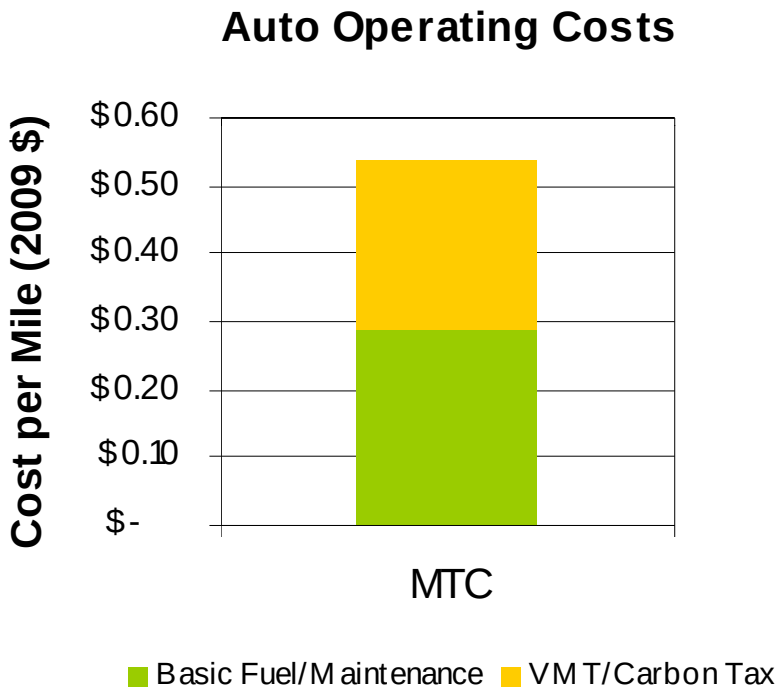
1. "Ideal" Land Use Scenario = -9%/capita GHG reduction

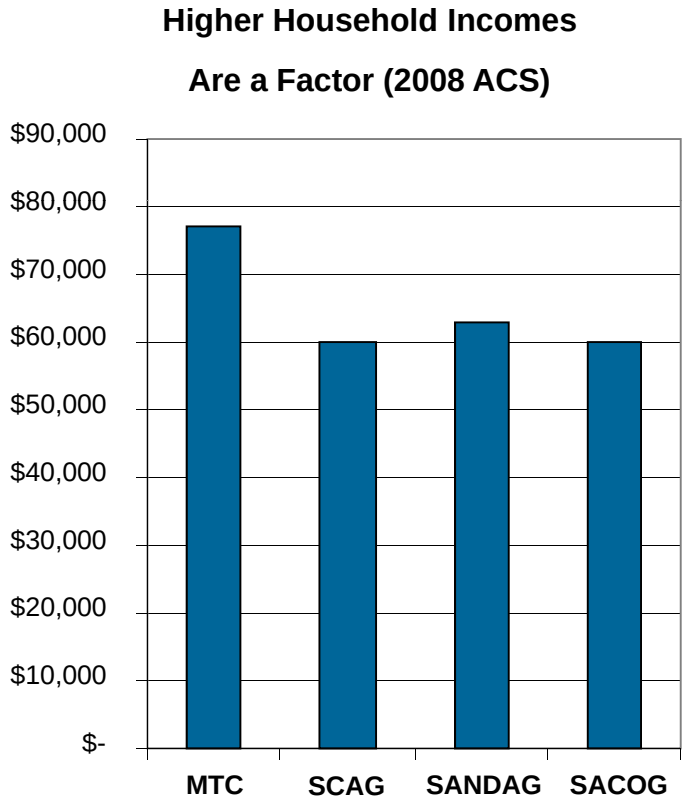
Re-located the RTP projected households in "ideal" locations
- High job concentrations
- Housing near high frequency transit

2. "Ideal" with No New Incommuting = -12%/capita GHG reduction

Began with "Ideal" distribution, and located 115,000 additional households (the expected new "in-commuters") in "ideal" locations.

What is Assumed in the Bay Area's Road Pricing Scenario?





MTC Planning Committee Direction:

REAL SOLUTIONS FOR CLIMATE CHANGE

Examine 2035 target with land use/pricing variations at 10%, 12% and 15% per capita GHG reduction

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SF, Oakland, San Jose Population Increase for each Per Capita GHG Reduction (2035)

REAL SOLUTIONS FOR CLIMATE CHANGE

City	2035 RTP compared to 2005	10%/capita reduction compared to 2035 RTP	12%/capita reduction compared to 2035 RTP	15%/capita reduction compared to 2035 RTP	18%/capita reduction compared to 2035 RTP
SF	+173,000	+23,000	+29,000	+37,000	+45,000
Oak	+151,000	+34,000	+42,000	+54,000	+63,000
SJ	+433,000	+38,000	+47,000	+61,000	+71,000

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VMT Charge per Mile for Each Per Capita Reduction Scenario (2035)

% per capita reduction	VMT charge/mi	Total Drive Cost/mi*
10%	$0.08	$0.38
12%	$0.10	$0.40
15%	$0.15	$0.45
18%	$0.25	$0.55

*Base drive cost = $0.30/mi (fuel = $0.19/mile; maint = $0.11/mile)

Other GHG Emission Reduction Strategies (avg. weekday pounds in 2035)

REAL SOLUTIONS FOR CLIMATE CHANGE

- **TDM** – assumes additional 5% of workers with incomes above $75,000/yr telecommute daily (compares to 5% of all Bay Area workers that currently work at home) - 3% per capita reduction

Other TDM/TSM strategies quantified but not counted:

- Accelerate ZEV share in passenger vehicle fleet:
  247,000 add'l vehicles @ $10 billion = 5% per capita reduction
- Install plug-in converter kits for privately purchased hybrids
  325,000 add'l kits @ $1.5 billion = 5% per capita reduction
- Reduce freeway speed limit to 55 mph:
  5% per capita reduction (2020)

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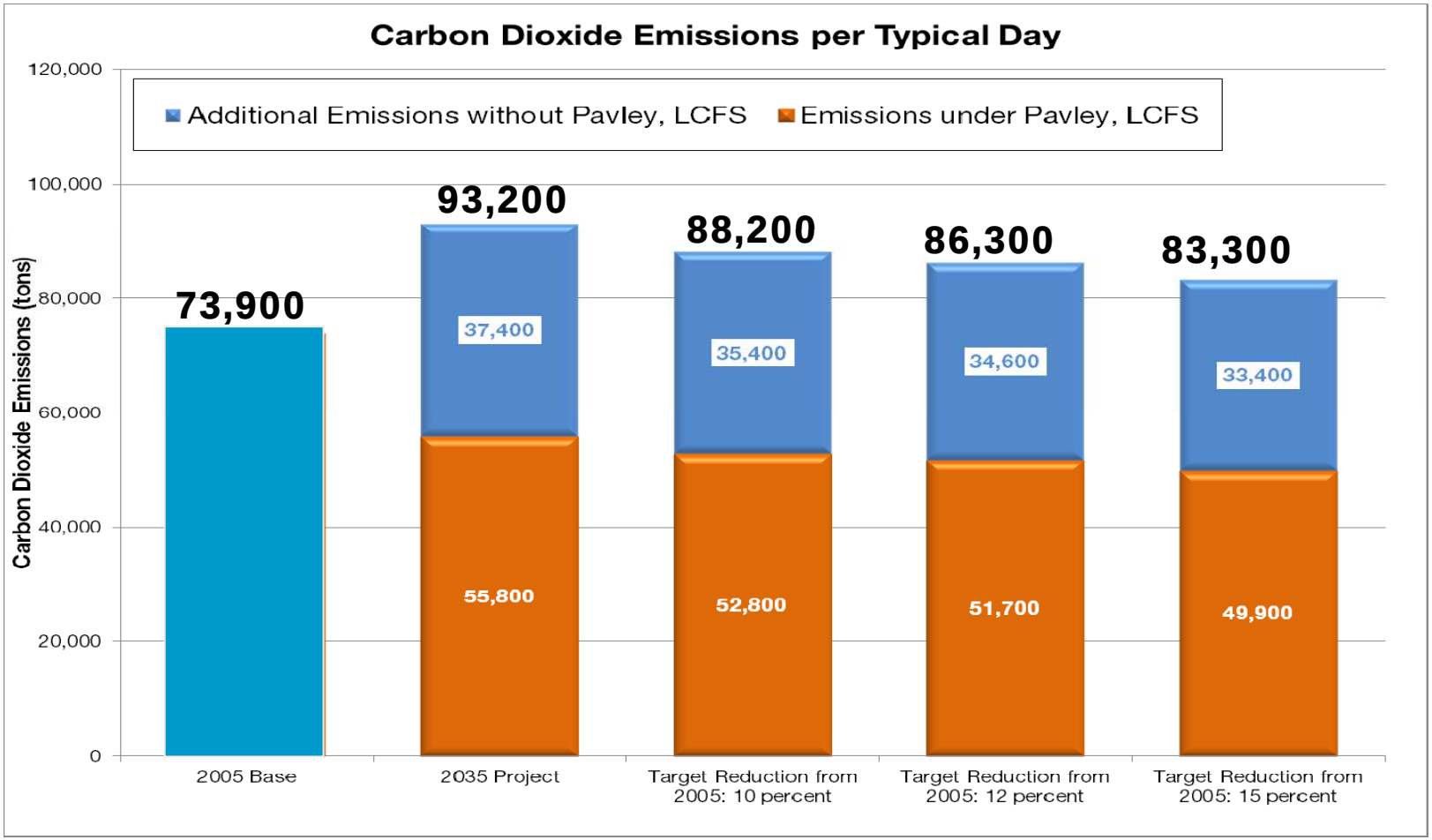
Emissions on a Typical Day Under Four Scenarios

REAL SOLUTIONS FOR CLIMATE CHANGE



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Conclusions: 2035 GHG Target

- Bay Area already is embarked on a fairly aggressive focused growth strategy.
- Region is less advanced in pursuing road pricing, employer trip reduction, or “smart driving” programs.
- GHG per capita reduction target in 10-12% range might be achieved primarily through more focused growth.
- To get to the 15% range probably will require some reliance on road pricing and other strategies as well.

For copies of these slides and webinar recording, go to AASHTO's website:
http://environment.transportation.org/center/products_programs/climate_change_webinars.aspx

These materials will also be available on AASHTO's climate change website, where you can also find more information on climate change:
http://climatechange.transportation.org/webinars/

Thank you!

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