

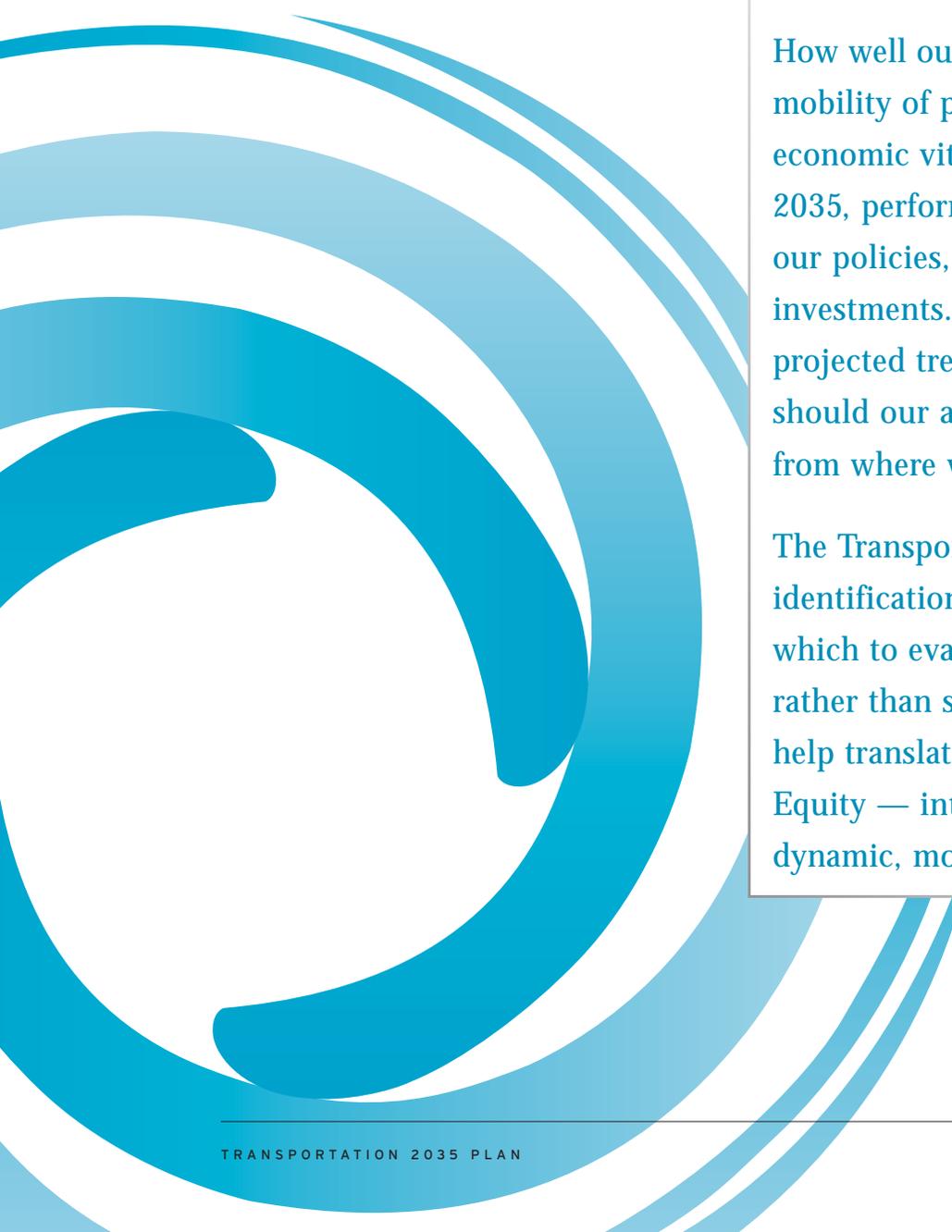
Trends and Performance 2

CHANGE IN MOTION

“Trend is not destiny.”

LEWIS MUMFORD





Trends and Performance

How well our transportation system performs directly affects the day-to-day mobility of people and goods, and on a macro scale, shapes the Bay Area's economic vitality, growth patterns and quality of life. For Transportation 2035, performance is the driving force for change in the way we formulate our policies, define our priorities, and decide on our transportation investments. Using performance metrics allows us to assess current and projected trends, and affords us the opportunity to change our course should our analyses foretell trends that take us in the opposite direction from where we want to be in 2035.

The Transportation 2035 Plan embraces performance, beginning with the identification of a set of highly specific performance objectives against which to evaluate prospective investments. Though they are planning goals rather than strict legal mandates, the performance objectives nonetheless help translate the plan's Three E principles — Economy, Environment and Equity — into an integrated set of policy choices to make our region more dynamic, more livable and more sustainable.

Snapshot of the Bay Area in 2035

Before we determine whether the Bay Area can meet the plan's aggressive performance objectives, we must look first at our existing growth and travel conditions, and then use the latest planning assumptions to forecast what future growth and travel trends might look like in 2035. This helps us to establish future baseline conditions if no new investments are made and no new policies adopted. These trends, which are based on past performance, show us what our future might look like if we do not take action to change our direction. Highlights of the key 2035 trends, absent any interventions, are discussed in the following pages. (See chart on page 23 for a comparative look at many of those trends).



Currently under construction, the new East Span of the San Francisco-Oakland Bay Bridge will open to traffic in 2013.

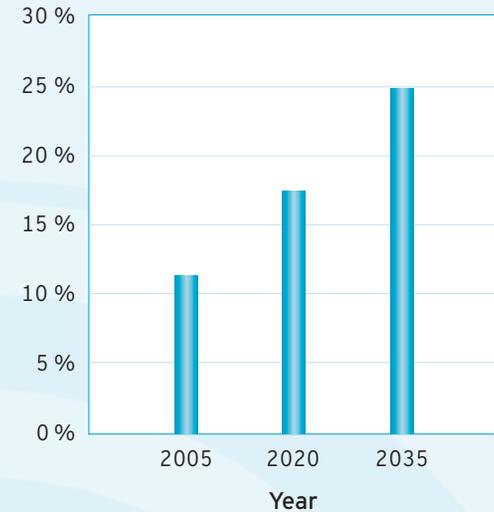
More People, More Jobs

Today, the Bay Area is home to just over 7 million people, and supplies nearly 3.5 million jobs — making our region California's second-largest population and economic center. Between now and 2035, job growth will increase nearly 1.7 percent a year, outpacing the rate of population growth over the same period. The Bay Area will grow to 9 million people by 2035, a 26 percent increase from 2006, or an average of 0.9 percent growth a year. Employment will grow to 5.2 million jobs by 2035, a 50 percent increase from 2006. With more people and more jobs in the region, our local roads, highways and transit systems will face unprecedented demand in the years ahead.

Population Grows Older

The Bay Area population also is growing older. In 2005, about 11 percent of Bay Area residents were age 65 or older. But by 2035, 25 percent of the population will be 65 or older (see chart above right). Furthermore, the number of people over age 85 will nearly triple by 2035. More members of the older population will be active in the workforce in 2035, and more are likely to be living in urban areas, where services are clustered and public transportation is available. As the population ages, there will be greater demand for paratransit and specialized mobility services.

Share of Bay Area Population Age 65 or Older



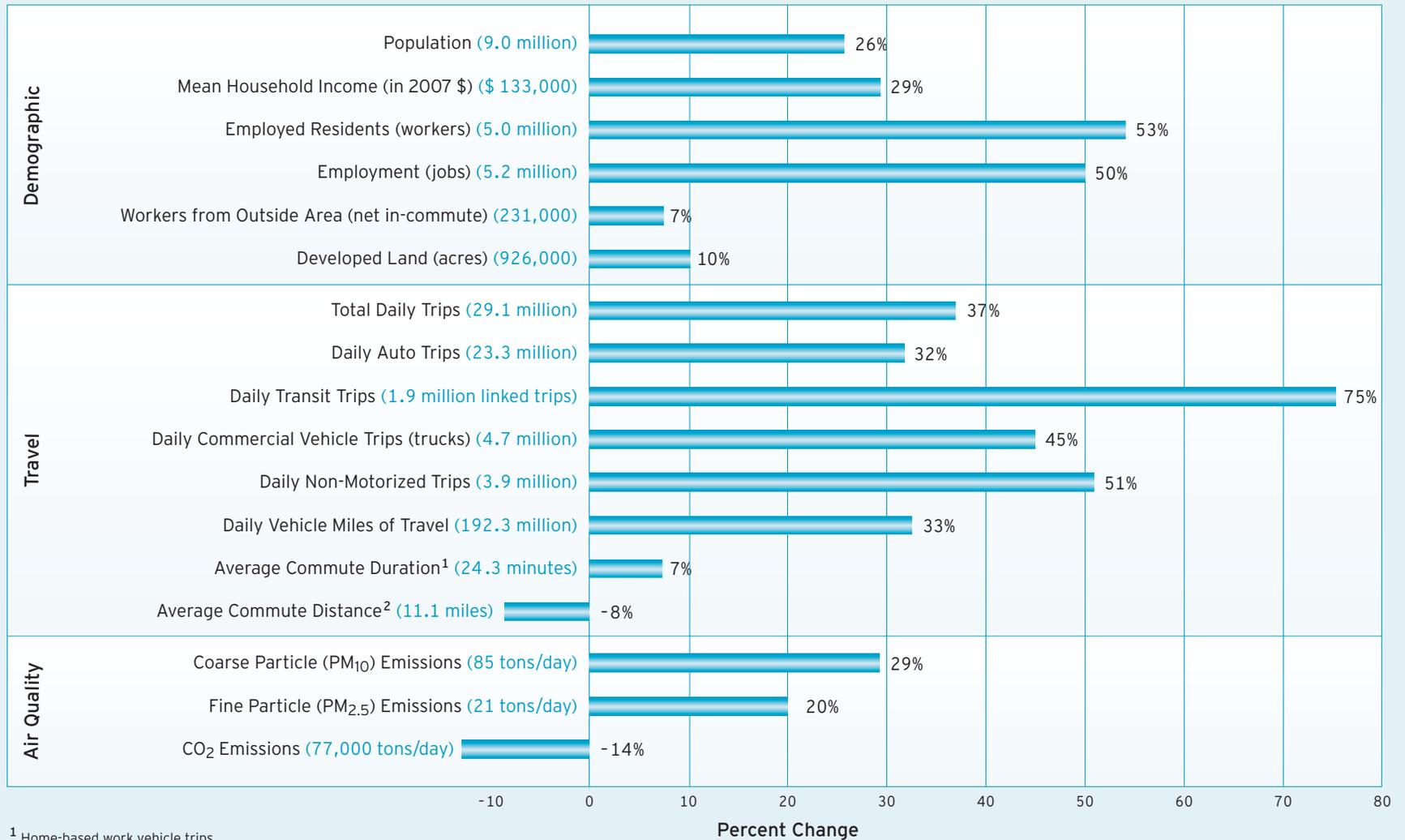
Source: ABAG, Projections 2007

Transportation Affordability Favors Urban Residents

Average household income in the Bay Area will rise in real terms from \$103,000 in 2006 to \$133,000 in 2035, a 29 percent increase. However, transportation affordability for low- and moderately low-income households will remain unchanged in 2035. Transportation costs as a share of income for low- and moderately low-income households will decrease slightly by 2035, from 22 percent to 21.5 percent. This may be more the result of incomes rising than

Regional Demographic, Travel and Air Quality Indicators

Bay Area Total in 2035 (future conditions, without Transportation 2035 Plan) and Percent Change From 2006



¹ Home-based work vehicle trips

² Home-based work vehicle driver miles

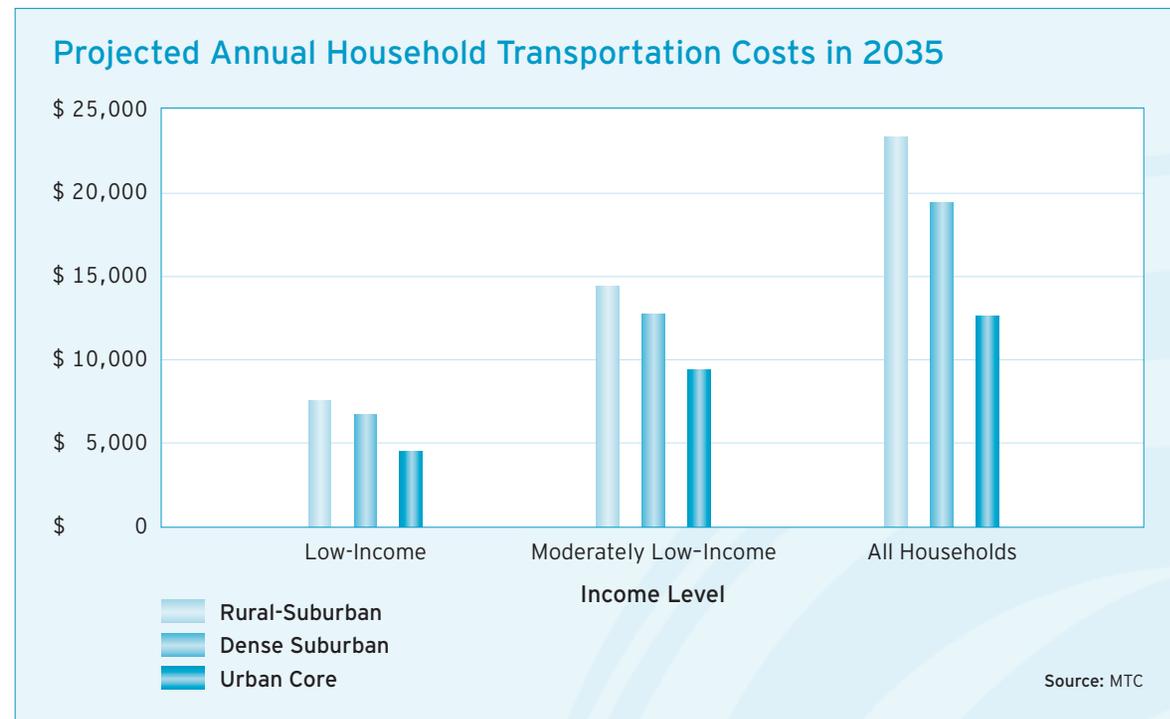
Sources: MTC; ABAG, Projections 2007

transportation costs decreasing. Also contributing to lower transportation costs is a predicted drop in the number of vehicles per household from 1.4 today to 1.3 in 2035.

Land use exerts a powerful influence on the affordability of transportation. Total annual transportation costs for all households will be lower for those closer to the urban core (as shown in the chart to the right). This is true for all income levels, including the low-income and moderately low-income segments of the population (as shown). By living close to jobs and essential services, households can significantly reduce their annual transportation costs, demonstrating the economic benefits of more compact growth patterns.

More Travel, More Congestion

Travel activity as reflected by daily auto trips would increase by 32 percent and the amount of vehicle miles traveled would grow by 33 percent. Both are slightly higher than the rate of population increase, but lower than the expected rate of employment growth. Daily hours of vehicle delay would increase by 135 percent, which would boost average daily delay per vehicle to 4.6 minutes (from 2.7 minutes today). Daily transit trips would grow by 75 percent, reflecting assumptions that new population and employment growth will be more focused in the urban core and along transit corridors (see chart on page 23).



A Mixed Forecast for Air Quality

Air quality conditions will change in the future — ground-level ozone and greenhouse gas emissions will decrease, but particulate matter will increase by 2035. Emissions of the precursors to ozone — reactive organic gases and nitrogen oxides — will decrease by 71 percent and 79 percent, respectively, due largely to cleaner vehicle engines and fuels and reduced emissions from industrial and commercial sources.

Carbon dioxide emissions are projected to decrease by 14 percent as vehicle and fuel technologies improve due to stricter state and federal mandates, as older fleets turn over, and as individual attitudes and travel behaviors change (see chart on page 23). However, as population grows and miles driven increases, particulate matter emissions from tailpipes and road dust also will rise, with a 20 percent increase for finer particles (PM_{2.5}) and a 29 percent increase from coarser particles (PM₁₀) in the forecast.

Projecting Regional Growth

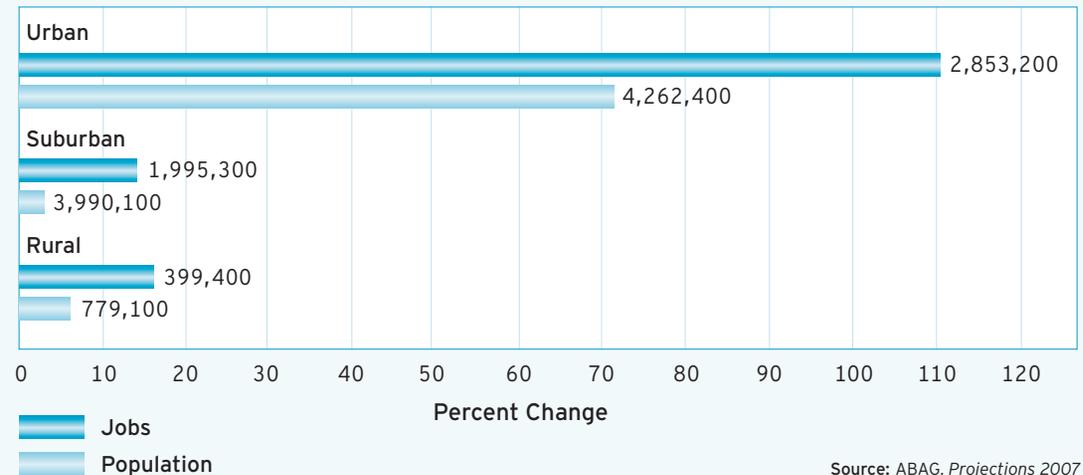
As with past long-range transportation plans, the Transportation 2035 Plan uses the economic-demographic forecasts produced by the Association of Bay Area Governments (ABAG). The forecast current at the time of development of this plan was ABAG's *Projections 2007*.

Projections 2007 was designed to be a realistic assessment of growth in the region, recognizing emerging trends in markets, demographics and local policies that promote more compact infill development and transit-oriented development. Areas at rail and ferry terminals and along select transportation corridors are expected to see an increasing proportion of the region's growth, a trend that will start slowly but will build over time.

The emphasis on performance in the Transportation 2035 Plan has influenced how future long-range growth forecasts will be prepared. Already, in its *Projections 2009* forecast (adopted in spring 2009), ABAG has identified performance metrics, similar to the ones adopted in this plan, and tested development scenarios to gauge the magnitude of change required to achieve regional targets. Future long-range forecasts and demographic projections will build on this approach.

Jobs and Population Forecasts by Geographical Area

Bay Area Total in 2035 and Percent Change From 2005



Source: ABAG, *Projections 2007*



Transportation 2035 Performance Objectives

Three Es

Economy

Reduce per-capita delay by 20 percent from today by 2035

Improve Maintenance

- Maintain pavement condition index (PCI) of 75 or greater for local streets and roads
- Distressed pavement condition lane-miles not to exceed 10 percent of total state highway system
- Achieve an average age for all transit asset types that is no more than 50 percent of their useful life
- Increase the average number of miles between service calls for transit service in the region to 8,000 miles

Reduce Collisions/Fatalities

- Reduce fatalities from motor vehicle collisions by 15 percent from today by 2035
- Reduce bicycle and pedestrian *fatalities* attributed to motor vehicle collisions by 25 percent (each) from 2000 by 2035
- Reduce bicycle and pedestrian *injuries* attributed to motor vehicle collisions by 25 percent (each) from 2000 by 2035

Improve Regional Transportation Emergency Preparedness

- Conduct regional transportation exercise that tests emergency response and coordination capabilities for special needs populations
- Improve the seismic safety of high-priority transportation facilities

- Increase the number of transportation agency employees trained in security/emergency awareness protocols

Reduce Vulnerability to Transportation Security Threats

- Increase the number of transportation agency employees trained in security/emergency awareness protocols
- Enhance or install critical infrastructure detection equipment on high-priority transportation facilities

Environment

Reduce daily per-capita vehicle miles traveled (VMT) by 10 percent from today by 2035

Reduce Emissions

- Reduce emissions of fine particulates (PM_{2.5}) by 10 percent from today by 2035
- Reduce emissions of coarse particulates (PM₁₀) by 45 percent from today by 2035
- Reduce carbon dioxide (CO₂) emissions to 40 percent below 1990 levels by 2035

Equity

Decrease by 10 percent the combined share of low-income and lower-middle-income residents' household income consumed by transportation and housing

Making Performance The Objective

These trends sketch a statistical picture of the Bay Area in the year 2035. It is not a complete picture, but it does offer a baseline against which to assess how the policies, investments and planning decisions made in this plan may affect the future. In this vein, the Transportation 2035 Plan explicitly employs a performance-based approach, one that focuses on measurable outcomes of potential investments and the degree to which they support stated policies. In early 2008, the Commission adopted a comprehensive set of performance objectives for the plan (see page 26).

So how will investments embodied in the Transportation 2035 Plan — \$218 billion worth — improve the performance of the transportation network for Bay Area travelers? To answer this question, MTC planners conducted a three-part performance assessment to help inform and evaluate investment decisions. During the fall 2007 visioning phase of plan development, we used performance metrics to test “what if” scenarios consisting of two distinct sets of strategies: 1) a set of three infrastructure packages; and 2) aggressive pricing and land-use policies which, if adopted without modification, would dramatically raise the cost of operating a private

vehicle and would concentrate most future population growth near transit and in already-developed parts of the region. In spring 2008, we then conducted a project-level assessment of over 700 candidate projects to ascertain how they measured up in terms of cost-effectiveness and goals achievement. As a final step in fall 2008, we evaluated how the plan’s investment decisions (detailed in Chapter 4 and listed as projects in Appendix 1) would meet the Transportation 2035 performance objectives. The results of this final test are presented in the following section. (See the *Performance Assessment Report*, listed in Appendix 2, for complete information about the performance evaluations and results.)

Putting the Plan to the Test

In testing the performance of the Transportation 2035 Plan, we must ask two key questions:

- 1) How far does the plan advance the region toward meeting its ambitious targets?
- 2) How big are the remaining performance gaps that we must fill?

MTC planners tested the plan investments as a group by means of a computer model, then compared results to the long-term trends projected for given measures of performance (such as greenhouse gas emissions), and to other Transportation 2035 performance objectives.

For illustrative purposes, we present here results of how the Transportation 2035 Plan performed against several key performance objectives:

- reduce per-capita delay
- improve maintenance for transit and local roadways
- reduce fine particulate emissions
- reduce carbon dioxide emissions
- reduce vehicle miles traveled

Strategic Investments Help Reduce Congestion

The Transportation 2035 Plan will help reduce freeway delay per person from a projected 72 hours a year to 47 hours a year. This is largely a result of the plan’s investment in the Freeway Performance Initiative (FPI). FPI strategies such as freeway ramp metering, changeable freeway message signs and coordination of traffic signals along adjacent arterials can significantly reduce delay. The planned Bay Area Express Lane Network and new transit capacity also will play a role. Yet the impressive reduction in delay that these investments achieve still falls short of the performance objective to reduce congestion to 31 hours per person per year (see chart top left on page 29).

Local Roadway Investment Maintains Status Quo, Slows Downward Slide

The performance objective chosen for local roadway maintenance — to reduce to 13 percent the share of local roadways in poor or failed condition — represents a practical target to improve the condition of our roads over the next 25 years. While it does not represent an optimal state of good repair for the region's roadways, the objective was deemed achievable as an interim step. Faced with competing needs for available revenues, the Commission elected to direct \$7 billion in discretionary funds to local roadways (see Chapter 4 for details). This amount will only allow us to maintain the current state of repair, at which about 22 percent of local roadways are in poor or failed condition (see page 29, top center).

Transit Investment Fails to Hold the Line Against Aging Assets

The Bay Area's transit assets include transit vehicles, railway tracks, stations and maintenance facilities. The current average age of these assets is estimated to be 74 percent of useful life. If all assets were replaced on schedule at the end of their useful lives, over time the average age of all assets would fall to 50 percent of useful life. Therefore, the 74 percent figure means that the region is not replacing its assets fast enough, and assets remain in service well after they should be replaced.

The Commission committed \$6.4 billion in discretionary funds to the transit maintenance program, which will allow the region to replace all of its transit vehicles on time, but is not sufficient to replace other types of transit assets on schedule (see Chapter 4 for details). Replacement of assets such as stations, maintenance facilities and service vehicles will be deferred, requiring increasingly expensive maintenance and repairs, and potentially reducing system reliability and performance. The average age of all of the region's assets combined will continue to increase, reaching an estimated 100 percent of useful life by 2035. This is an improvement over the prevailing trend (see page 29, top right), but the result falls far short of the Transportation 2035 performance objective.

Particulate Emissions Remain High

Of all the Transportation 2035 performance objectives, the reduction of particulate emissions will be the most difficult to achieve. Particulate levels are a direct function of the amount of driving, with road dust kicked up by moving vehicles accounting for 60 to 80 percent of particulate emissions from mobile sources. Under the current trend, fine particulate (PM_{2.5}) emissions will grow to 21 tons per day by 2035 from 17 tons per day in 2006. Given a quarter-century of continued population growth, infrastructure investments will not decrease total miles driven enough to make a significant dent in particulate emissions. The

Transportation 2035 Plan reduces PM_{2.5} by about one ton per day, resulting in one-fifth of the reduction needed to reach the target (see page 29, bottom left).

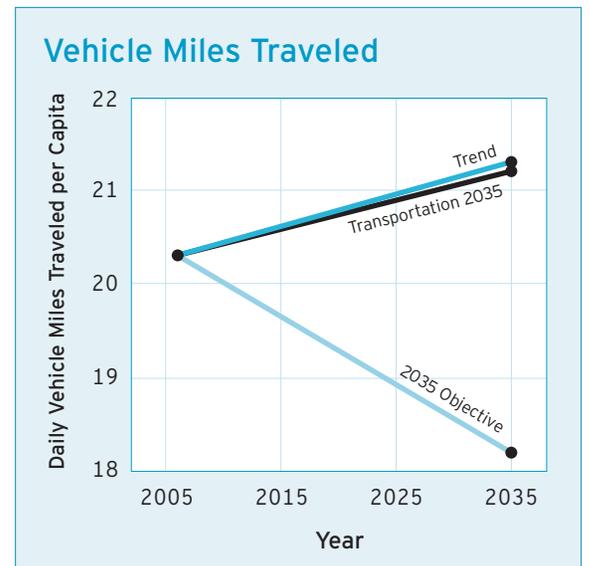
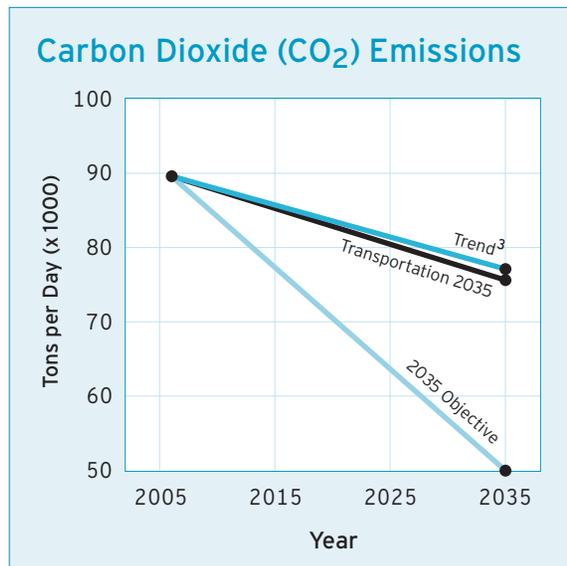
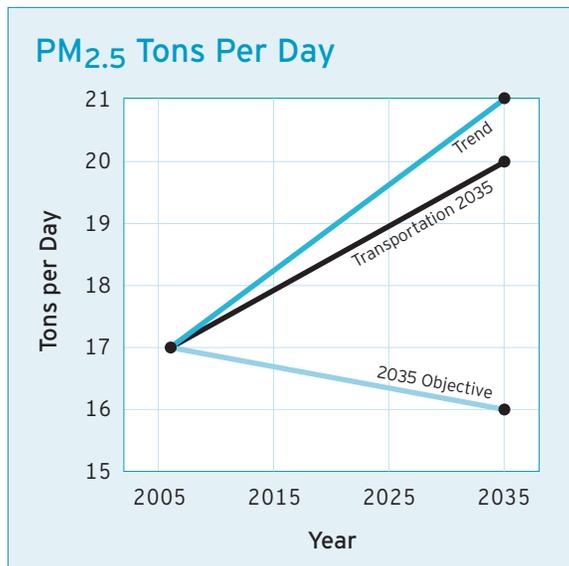
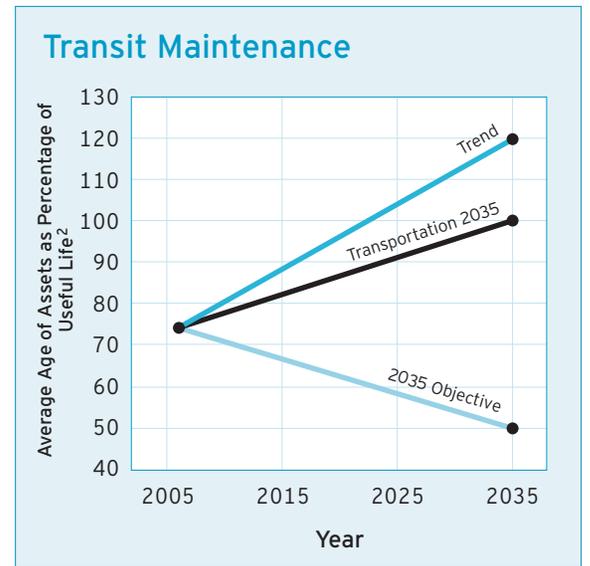
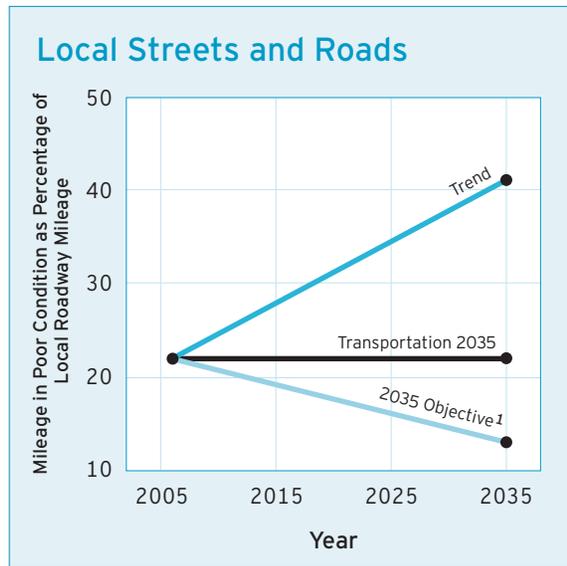
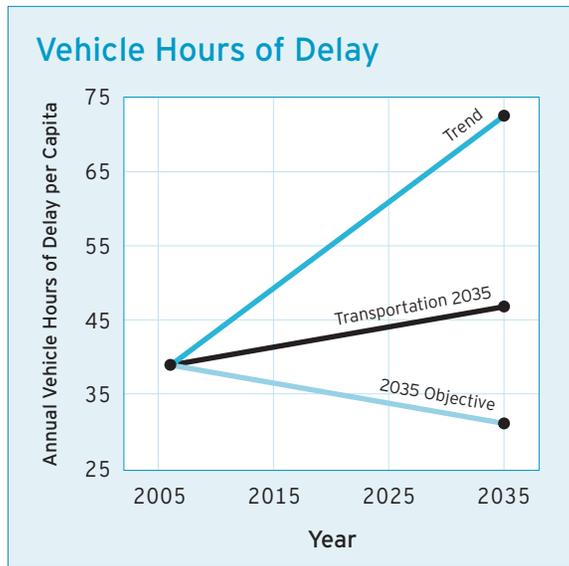
Plan Nudges Carbon Dioxide Emissions in Right Direction

The future trend for transportation-related carbon dioxide emissions is expected to move in the right direction, though largely due to advances in vehicle technologies and fuels mandated by state laws rather than infrastructure investments. For its part, the Transportation 2035 Plan is projected to decrease daily carbon dioxide emissions from 77,000 tons per day to 76,000 tons per day — just a 2 percent reduction compared to the prevailing trend (see page 29, bottom center). This small reduction is due largely to the fact that 81 percent of all resources in the plan are devoted to operating and maintaining the existing transportation network — which neither worsens nor improves the Bay Area's carbon footprint. The bottom line is the Transportation 2035 Plan falls well short of the 35 percent reduction that would be needed to reach the objective of 50,000 tons per day.

Plan Barely Makes a Dent in Reducing Miles Driven

The Bay Area's very dynamism, as measured by projected growth in both population and jobs, poses a daunting challenge when it comes to

Putting the Plan to the Test



Source: MTC

¹ Decrease mileage in poor condition to no more than 13 percent. This is equivalent to the adopted objective to increase the average pavement condition index to 76.

² Includes all asset types.

³ Trend line from 2006 to 2035 is simplified. Passenger and light-duty vehicle fuel economy improvements required by AB 32 are phased in between 2009 and 2020. CO₂ will continue to increase until about 2010, with a gradual decrease to 2035 as AB 1493 standards phase in and the existing vehicle fleet turns over with cleaner vehicles.

reducing the number of miles driven by vehicles in the region. As shown in the bottom right chart on page 29, the Transportation 2035 Plan makes only a negligible difference in this area, reducing daily vehicle miles traveled per person from 21.3 to 21.2. This is not within the reach of the objective of 18.2 vehicle miles per person. This result would seem to show the limitations of infrastructure improvements as a means to attain this particular objective.

Results Show No Easy Answers

Assessing the performance objectives in light of future baseline conditions in 2035 and the palette of Transportation 2035 investment and policy strategies, we see that the challenges before us are sobering. While the targets call for dramatic improvements over the status quo, most of the trend lines indicate conditions will worsen significantly over the next 25 years. And while large-scale infrastructure investment and aggressive policy choices can move the Bay Area closer to some of the plan's long-term goals, others remain stubbornly out of reach.

But where earlier plans sought merely to slow the rate of our transportation network's deterioration, the Transportation 2035 Plan does dare to imagine actually reversing these trends.

Within the constraints of this Transportation 2035 Plan, the Commission does indeed begin

to take a number of bold steps towards change. These include doubling the Transportation for Livable Communities program that will support focused growth, and building the Bay Area Express Lane Network as a way to introduce road pricing at a regional scale. To reduce delay and traffic congestion, MTC, Caltrans and other partners will implement a new Freeway Performance Initiative. To encourage more walking, bicycling and transit use, the Commission reaffirms its commitment to deliver the Resolution 3434 Regional Transit Expansion Program and the Regional Bikeway Network. Perhaps no investment recognizes the need for a multifaceted effort better than the multiagency Transportation Climate Action Campaign, which encourages behavior changes and funds innovative projects such as the Safe Routes to Schools and the Safe Routes to Transit programs.

As we move to implement these Transportation 2035 programs — and as we strive to fashion new initiatives in the years ahead — we must keep in mind the results of the comprehensive performance assessment work conducted for this plan. The lessons learned from this analysis are as follows:

Limits of Infrastructure

Infrastructure improvements alone, whether substantial investments in transit or roadways, will not move the region significantly closer to the goals.

Power of Pricing and Land Use

Policy approaches, such as the pricing and land-use alternatives tested initially, have a much bigger effect and will be critical to advancing toward the objectives. But while pricing strategies (though likely at lower price levels than those assumed in our analysis) could be implemented in the near term, aggressive land-use policies would likely take longer to win local approval. And the benefits of land-use changes would not be realized until some years after implementation.

Need for Technology and Behavior Change

Yet even the combination of infrastructure investment and aggressive policy choices would be insufficient to meet many of the region's long-term goals, particularly those involving greenhouse gas and particulate emissions. To reach all the objectives, additional strategies will be necessary in most cases. These could include technology advances to improve fuel economy, incentives or regulations to increase telecommuting, and other steps to reduce overall driving. The Bay Area certainly will have to forge new patterns of growth, embrace new ways of traveling, and discard many old assumptions if we are to sustain the region's economic vitality, maintain our mobility and preserve our quality of life. Our analysis clearly demonstrates that while change is healthy, it can be painful too.