

Comments on Plan Bay Area by Randal O'Toole, Cato Institute

Executive Summary

Implementation of Plan Bay Area will require the demolition of more than 169,000 single-family detached homes, or one out of every nine such homes in the region, according to table 2.3-2 of the draft environmental impact report. Any earthquake or other natural event that resulted in this much destruction would be counted as the greatest natural catastrophe in American history.

Planners say this reflects a change in demand and in 2040 only 39 percent of Bay Area households will want to live in single-family detached homes. In fact, most Americans, now and in the future, do and will prefer single-family homes. For Plan Bay Area to work without expanding the region's "urban footprint," these 169,000 homes must be replaced by 870,000 townhouses and multi-family dwellings. Though the plan admits that only about a fifth of the region's land has been developed, planners did not even consider the option of making housing more affordable by developing more land.

Instead, planners' goal is to reduce greenhouse gas emissions by concentrating new housing along transit corridors and boosting rail transit service by more than 35 percent. This, they predict, will increase per capita transit ridership by 50 percent and reduce per capita driving by 6 percent. These predictions are highly optimistic considering that previous densification of the region and expansion of rail transit resulted in a 36 percent decline in per capita transit ridership and a 30 percent increase in per capita driving since 1982.

Even if planners' optimistic projections prove correct, data in the plan reveals that the twin policies of densification and rail transit will do little to meet state mandates to reduce greenhouse gas emissions and provide more affordable housing. A careful analysis of data in the draft environmental impact report reveals that these policies will reduce greenhouse gas emissions by less than 1 percent. Moreover, the plan itself admits that it will make housing less, not more, affordable.

These failings are the result of a shoddy planning process in which the prescriptions were determined in advance of any analysis of whether they would be either effective or cost-effective at meeting the plan's goals. Although planners developed five alternatives, all of them contained some version of these same prescriptions, giving readers and decision makers little choice but to accept those prescriptions.

The two most important prescriptions predetermined for the plan were to *target selected neighborhoods for densification* and *expand the capacity of the region's rail transit system*. Every alternative except No Project targets selected neighborhoods for densification, and even No Project would densify the region without targeting specific neighborhoods. Every alternative except No Project increases rail transit capacities by more than 35 percent, which is more than any alternative would increase bus or highway capacities, and even No Project increases rail capacities by 20 percent.

When the prescriptions in a plan are determined in advance, without regard to their cost-effectiveness, trade-offs, or the personal preferences of current and future residents of the region, the result is not planning but tyranny. To avoid this tyranny, Plan Bay Area should be scrapped and the entire planning process replaced by one that devolves planning decisions to as a local a level as possible.

Four Decades of Failed Plans

After World War II, the San Francisco Bay Area was one of the fastest-growing regions in the country. Between 1950 and 1970, the combined San Francisco-Oakland-San Jose urbanized areas grew twice as fast as the average large U.S. urban area (those with more than a million people in 1950), and faster than every other such urban area except Los Angeles and Washington, DC. The San Jose urbanized area alone was by far the nation's fastest-growing urbanized area, as its population nearly hexupled in two decades.

This rapid growth led to alarms in the 1960s about the costs of sprawl. Due to these concerns, most of the cities and counties in the Bay Area adopted urban-growth boundaries in the early 1970s. Outside the boundaries, development was heavily restricted; inside the boundaries, many cities passed zoning ordinances that limited increases in density.

These combined restrictions led to a rapid rise in the cost of developable land and housing. As of 1969, Bay Area housing was still very affordable, with median housing prices in the San Francisco-Oakland urban area less than 2.3 times median family incomes and in the San Jose urban area less than 2.2 times incomes. When a home is twice someone's income, they can dedicate 25 percent of their income to a mortgage and pay it off in less than 15 years.¹

With the adoption of growth boundaries and other land-use restrictions, by 1979, median home prices in San Francisco-Oakland and San Jose were both more than 4.0 times median family incomes. Someone buying a home that costs four times their income would have to dedicate considerably more than 25 percent of their income to a mortgage to pay it off in 30 years.

By 1989, Bay Area price-to-income ratios were 5.4 in San Jose and 6.7 in San Francisco-Oakland; by 2006, they were 8.9 to 10.9. Even with the recent fall in median housing prices, they were still 6.3 to 7.1 times median family incomes in 2011. If someone buying a home that costs six or more times their income dedicated half their income to a mortgage at a 2.5 percent interest rate, they still would not be able to pay it off in 30 years.

It is doubtful that many who supported the urban-growth boundaries when they were first drawn in the 1970s intended or expected median housing prices to rise to 6 to 11 times median family incomes. This was an unintended consequence of the plans. Since residents who already owned their own homes benefitted from this rise in prices, there was little political pressure to fix the problem.

Land-use regulation not only made housing unaffordable, it made housing prices far more volatile. While housing prices in unregulated areas closely mirror median incomes, the above numbers show that Bay Area prices swing wildly, and the region has suffered at least three housing bubbles—one in the late 1970s, one in the late 1980s, and one in the mid-2000s—since imposing growth boundaries.

One reason for volatility is the lengthy permitting process imposed by cities that know developers have few alternative places to develop. This lengthy process means that developers are unable to meet demand when it increases, but can finally bring homes to the market about the time that demand declines. Volatility is good if you are lucky enough to buy low and sell high, but many people do not have a choice about when they buy and sell, which greatly increases the risk of homeownership.

While we have better data for housing than for other types of development, these same forces apply to retail, commercial, and other forms of development as well as housing. In combination, they make the Bay Area one of the least business-friendly regions of the country.

The Bay Area has a reputation of being a hotbed of innovation and business start-ups. Yet the reality is that the combination of growth boundaries, a glacial permitting process, and resistance to density within the boundaries slowed Bay Area growth; forced low- and even moderate-income people to move out; and discouraged businesses from moving to or expanding in the region. Yet Plan Bay Area would only make these problems worse by tightening urban-growth boundaries despite a projected 30 percent increase in population between 2010 and 2040.

At the same time as the Bay Area was making housing unaffordable, it was building a network of rail transit, including the BART system, Muni and VTA light rail, Caltrain, and the Altamont Commuter Express. Elsewhere, I estimate that the total capital costs for these rail lines was more than \$15 billion, yet they did little to improve the region's transportation system.²

In fact, Federal Transit Administration data reveal that, since at least 1982, the region's transit ridership has dramatically declined. Bay Area transit agencies carried more than 530 million trips in 1982, not counting what were probably around 6 million trips carried on Southern Pacific commuter trains (later taken over by CalTrain) as they weren't included in data published by the Federal Transit Administration. By 2011, they carried only 461 million trips.

An agency-by-agency comparison of ridership in 1982 and 2011 shows what happened. BART ridership increased by 52 million trips during this time. San Francisco light rail grew by 7 million trips and San Jose light rail carried 10 million trips in 2011 but none in 1982. In addition, CalTrain probably gained about 6 million trips over what Southern Pacific carried in 1982. The Altamont Commuter Express carries less than a million trips per year, for a total gain in rail ridership of about 76 million annual trips.

During the same period, however, Muni lost 79 million bus trips; A-C Transit lost 63 million bus trips (about 10 million of which were picked up by other agencies such as Central Contra Costa Transit); SamTrans lost 9 million trips; Santa Clara transit lost 6 million bus trips; and Golden Gate transit lost 4 million trips, for a total of 162 million lost trips. While a few bus agencies gained ridership, the net effect is a decline of about 75 million trips, depending on how many trips Southern Pacific carried in 1982. The apparent reason for the decline is that MTC has invested in BART and other rail transit at the expense of maintaining and improving the region's bus systems, a policy that led one critic to call BART a "vampire [that] sucks the lifeblood out of every transit agency with which it comes in contact."³

When taking the region's population growth into account, per capita transit trips declined from 100 in 1982 to 64 in 2011. Moreover, transit's share of commuting has also declined. The 1980 census found that 11.6 percent of Bay Area commuters took transit to work. In 1990 and 2000, it was only 10.1 percent. The 2010 census found a slight recovery to 10.6 percent. But between 1980 and 2010, the share of commuters who drive to work increased from 80.7 percent to 82.1 percent. At the same time, according to the Texas Transportation Institute, the cost of congestion more than octupled between 1982 and 2007. While the cost declined somewhat after 2007, that was only because of the recession, not to transit, whose ridership declined between 2007 and 2011.⁴

A 36 percent decline in per capita ridership and a loss of market share of commuters, transit's core market, has to be regarded as a huge failure. Yet Plan Bay Area blithely proposes to continue the same policy of expanding high-cost rail service at the expense of buses and highways.

Plan Bay Area: A Continuation of Failure

As described in Table 3.1-1 of the draft environmental impact report (DEIR), to prepare Plan Bay Area, planners identified more than two dozen policies that could vary among the alternatives. These include:

- Zoning policies including existing, PDA focused, and TPP focused zoning;
- Growth boundaries including existing and stricter;
- Subsidies, including subsidies to PDAs, urban cores, and TPPs;
- Land-use incentives including OneBayArea grants, CEQA streamlining, and TPP redevelopment incentives;
- Road plans including the committed road network only, preferred network, preferred with reduces express lanes, and preferred with no high expansion;
- Transit plans including committed only, preferred, more funds for BART and AC transit, and more funds for all agencies except BART, Muni, and Caltrain;
- Fee policies including fees on high VMT areas, increased peak tolls on the Bay Bridge, and a VMT tax;
- Parking policies including no change and reducing minimum parking requirements;
- Climate initiatives, including public chargers for electric vehicles, electric vehicle purchase incentives, car sharing, vanpool incentives, clean vehicles feebates, smart driving strategy, and commuter benefits ordinance.

Planners' biases are revealed by several important policies that were not even considered. For example, although "existing" and "stricter" growth boundaries were considered, the option of less-restrictive boundaries was not. Although the options of MTC's preferred road network or less-extensive networks were considered, a more-extensive road network was not. Although 35 percent or more improvements to rail service were considered, the alternative of making similarly large improvements to bus service was not.

The next appropriate step in the planning process would be to estimate the cost of each of these policies and each policy's effects on greenhouse gas emissions, housing affordability, and other planning goals. Plan Bay Area planners, however, either skipped this step or failed to document it in the DEIR.

Instead, as described on pages ES-7 and ES-8 of the DEIR, they then combined these policies, almost at random, into five alternatives:

1. "No Project," meaning no changes in land-use patterns and no transportation improvements other than those already approved by May 1, 2011;
2. "Proposed Plan," which puts most housing and job growth in priority development areas (PDAs) and spends nearly 60 percent of funds available for transportation improvements on transit;
3. "Transit Priority Focus," which puts most housing and job growth in "transit priority project (TPP) areas" and spends even more on transit;
4. "Enhanced Network of Communities," in which "development is still generally focused around PDAs" and Bay Bridge tolls are increased to provide more money for transit;

5. "Environment, Equity, and Jobs" would emphasize development in both PDAs and in "jobs-rich, high- opportunity TPPs not currently identified as PDAs" and charge vehicle-mile fees to provide more money for transit.⁵

While this might at first glance appear to be a wide range of alternatives, in fact, it is not.

- Table 3.1-1 shows that all alternatives except No Project make urban-growth boundaries even more restrictive than they are today and meet housing demand by targeting numerous neighborhoods for densification. They differ only in which neighborhoods they target. (No Project densifies within existing urban-growth boundaries but does not target specific neighborhoods.)
- According to table 3.1-7, all of the alternatives except No Project increase rail service by more than 35 percent (No Project is 20 percent), while the most any alternative increases bus service is 24 percent even though planners anticipate a 30 percent growth in the region's population.
- Also according to table 3.1-7, and in spite of the projected 30 percent growth in population, none of the alternatives contemplate more than a 3.3 percent increase in the region's road network (counting freeways, expressways, arterials, and collectors), or more than a 10 percent increase in the region's freeway lane miles.

Densification and rail transit are needed, planners say, to reduce greenhouse gas emissions. Not only is this highly debatable, the reality is that planners' biases towards densification and transit long preceded the issue of greenhouse gases.

Plan Bay Area Is Biased Towards Density

Numerous surveys have shown that most Americans aspire to low-density housing and lifestyles.⁶ Yet for decades, urban planners have believed that higher-density housing is somehow superior. Urban Land Institute researcher Douglas Porter describes this as a "gap between the daily mode of living desired by most Americans and the mode that most city planners . . . believe is most appropriate." While most Americans, Porter admits, "want a house on a large lot," planners believe such low densities are "expensive in terms of public and private infrastructure costs, quality of life, and environmental damage." The question Porter asked was: how do planners convince people to live the way planners think they should live? Porter's answer was regional plans like Plan Bay Area.⁷

Density is a solution in search of a problem. Before climate change was a concern, planners supported densification in order to improve people's sense of community; save energy; reduce air pollution; improve health and reduce obesity; protect farms and open space; and reduce traffic congestion. In fact, the correlation between density and any of these factors is weak and, in some cases, exactly the opposite of what planners think it is. Yet this hasn't changed planners' goal of increasing population densities.

Ironically, thanks to infill development since the establishment of urban-growth boundaries, San Francisco-Oakland is already the second-densest urban area in the country. According to the 2010 census, the densest is Los Angeles-Long Beach-Anaheim, at 7,000 people per square mile. San Francisco-Oakland is 6,266 people per square mile. San Jose, at 5,820 people per square mile, is third. New York-Newark, at 5,320 people per square mile, is only number five.⁸ While New York City may be denser than San Francisco, the Bay Area has denser suburbs.

The 2010 density of all urban areas in the Bay Area is 4,743 people per square mile. This is almost exactly twice the average density of all U.S. urban areas (areas of more than

2,500 people).⁹ The nation's largest urbanized areas that have maintained housing affordability, including Dallas-Ft. Worth, Houston, and San Antonio, have densities approaching 3,000 people per square mile. Some have lower densities, but densities above 3,000 people per square mile seem to be associated with unaffordable housing: in 2010, no urbanized area (areas of more than 50,000 people) denser than 3,000 people per square mile had median home prices less than 2.5 times median family incomes.¹⁰

Despite existing densities, Plan Bay Area calls for densifying the region still further. Under the plan, all non-agricultural development will take place "within the urban footprint (existing urban development and urban growth boundaries)."¹¹ Since the plan is projecting 30 percent more people by 2040, virtually all of whom will live in urban areas, 2040 urban densities will grow by about 30 percent.¹²

To accommodate 30 percent more people without increasing the area of developed land, table 2.3-2 of the DEIR indicates that, by 2040, there will be 169,100 fewer single-family detached homes, 380,000 more townhouses, and 489,100 more multi-family dwellings. In other words, one out of every nine single-family detached homes will be demolished and replaced with an average of 5.1 attached or multi-family homes.

Plan Bay Area also calls for 77 percent of new housing to locate in "priority development areas" (PDAs) located along major transit corridors. These PDAs occupy just 5 percent of the region's land area, but are also expected to provide 63 percent of new jobs.¹³ To accommodate 77 percent of new residents, the PDAs would have to have average population densities of 4,700 people per square mile on top of whatever population they have today.

Plan Bay Area claims that the planned reduction of single-family detached homes from 56 percent to just 39 percent of the region's housing stock reflects changes in housing preferences. Supposedly, large numbers of retiring baby boomers and young households with no children will prefer to live in high-density, mixed-use areas rather than low-density suburbs. In support of this idea, they cite work by University of Utah planner Arthur Nelson.¹⁴

Nelson's work, however, is not credible. As described in a 2006 article on future housing preferences in the *Journal of the American Planning Association*, he based his projections of future demand "on interpretations of surveys" reported in a paper by urban planners Dowell Myers and Elizabeth Gearin¹⁵ In the same issue of the *Journal*, an article by University of North Carolina professor of urban planning Emil Malizia critiqued Nelson's claims.

Malizia pointed out that the surveys on which Nelson based his work "may not be terribly reliable" because the samples "are self selected rather than random" and may be "heavily influenced by the data collection method."¹⁶ The surveys asked questions such as whether people would "approve of having townhouses built in their neighborhoods" and whether they might want to live in one. A mere 17 percent said they might to live in one, but since that was more than the share of Americans already living in townhouses, Nelson concluded there was a shortage of this type of housing.

Malizia also observed that Nelson advocated "financial incentives and concessions" to persuade developers to build high-density housing, a concept included in Plan Bay Area. Yet, Malizia pointed out, "If it is true that consumers prefer and can afford new forms of development, real estate developers and investors will respond; these markets are not that inefficient."¹⁷

In other words, if it is true that there is a growing demand for high-density housing, then one way to meet that demand would be to reduce regulation and allow builders to build for the market. Plan Bay Area instead would mandate and subsidize construction of high-density housing whether there is a market for it or not.

Table 2.3-2 uses the term “demand” to imply that, by 2040, people won’t want those 169,000 single-family detached homes. This, however, betrays planners’ lack of understanding of fundamental economic concepts such as demand. Demand is not a point and cannot be expressed as a single number such as 1,365,900 (the number of single-family detached homes that the DEIR says Bay Area residents will “demand” in 2040). Demand is a line that shows the various quantities of something that people would buy at various prices. If the government artificially makes something very expensive, then the quantity that people will demand at that price will be low. But this doesn’t mean, as the DEIR and Arthur Nelson imply, that public preferences for single-family detached homes have changed.

Japan is one of the most crowded countries in the world, and also has an aging population that Nelson would predict would prefer living in multi-family housing. Yet 55 percent of Japanese households live in single-family detached homes.¹⁸ In order to fit 30 percent more people inside of more restrictive urban-growth boundaries, Plan Bay Area planners know they have to reduce the share of Bay Area households living in single-family detached homes to just 39 percent, or 16 percent less than Japan. So they use the subterfuge of “demand” as an excuse to do so.

The reality is that, if housing were more affordable, a far greater share of Bay Area residents would prefer single-family detached homes. The fact that Plan Bay Area proposes to subsidize densification of PDAs shows that planners understand that, even at the Bay Area’s unaffordable housing prices, the demand for high-density housing is not sufficient to support the densification required by the plan.

Plan Bay Area’s policy of targeted densification was pioneered by planners in the Portland, Oregon, area. Like the Bay Area, Portland-area planners drew an urban-growth boundary in the 1970s. Unlike the Bay Area, Portland has a strong regional government, known as Metro, which in the mid-1990s gave population targets to each of 27 municipalities in the region and specifically targeted several dozen neighborhoods and numerous corridors for redevelopment at higher densities.¹⁹

Bay Area planners may believe that such targeted densification will help relieve the region’s housing affordability problems. After all, Portland housing is less unaffordable than the Bay Area’s: At the height of the recent housing bubble, Portland-area median home prices were about 4.5 times median family incomes, instead of 9 to 11 times as they were in the Bay Area.

A closer look suggests that Portland’s relative affordability has little to do with its densification policies. For one thing, the Portland urbanized area has only about 3,500 people per square mile—well under the Bay Area’s average of more than 4,700 people per square mile. Second, Portland’s densification programs started only recently, since the late 1970s Portland has always been more affordable than the Bay Area, so densification is probably less important than other factors.

The most important other factor is that Portland has “safety valves” in the form of less-regulated areas located nearby where Portland-area workers could buy homes at affordable prices. Clark County (Vancouver), Washington has far less land-use

regulation, and between 1990 and 2010 its population grew almost twice as fast as counties on the Oregon side of the Portland-Vancouver metro area. Salem, Oregon—45 miles south of Portland—has an urban-growth boundary but was never as strict as Portland, so its population also grew rapidly between 1990 and 2010, overtaking Eugene as Oregon's second-largest city.

By contrast, the Bay Area's "safety valves" are located in Modesto, Stockton, and other Central Valley cities some 80 to 90 miles away from most Bay Area employment centers. While these areas rapidly grew during the housing boom of the early 2000s, their distance from Bay Area jobs and the land-use regulation that they imposed on local developers meant that they had little effect on Bay Area housing prices. In short, there is little reason to believe that targeted densification will make Bay Area housing more affordable.

Plan Bay Area argues that one advantage of multi-family homes is that they use less energy than single-family. "Multi-family residential units, when compared to single family residential units, are 44 percent more efficient on a per unit basis in terms of consumption of electricity and 35 percent more efficient with natural gas consumption."²⁰ What the plan doesn't say, however, is that this is solely because multi-family units are smaller than single-family homes.

According to the U.S. Department of Energy, single-family detached homes use 30 percent *less* energy per square foot than multi-family homes. This is actually an underestimate because it doesn't count the energy needed to light, heat, and air condition hallways, lobbies, and other common areas in multi-family structures. In addition, household sizes in single-family homes average about 26 percent more than in multi-family, which on a per-person basis offsets most of the energy savings claimed by Plan Bay Area per household.²¹

Plan Bay Area's bias towards density is also based on an assumption that people living in higher densities drive less. Most studies of the relationship between driving and density measure the number of trips or vehicle miles of travel by household in areas of different densities. But households in higher density areas tend to be smaller, so differences in per capita driving among areas of differing densities are smaller than differences in per household driving.

Most of these studies also fail to take into account the self-selection problem, which is that people who prefer to drive less tend to live in higher density areas. This does not mean that increasing densities will lead other people to drive less.

In reviewing the literature of the relationship between the "built environment" and driving, economist David Brownstone of the University of California at Irvine found that most studies "make no attempt to control for self-selection." The ones that did typically found that the relationship between density and driving was small. Overall, "There is evidence that there is a statistically significant link between aspects of the built environment correlated with density and VMT," Brownstone concluded, but "the size of this link is too small to be useful" in saving energy or reducing greenhouse gas emissions.²²

Plan Bay Area Is Biased Towards Transit

Plan Bay Area would dedicate 62 percent of transportation funds to transit and 38 percent to roads even though transit carries only 3.5 percent of the region's passenger

travel and less than 11 percent of the region's commuters to work. The assumptions behind this split are that spending more money on transit will get people to take transit instead of driving and that transit emits significantly less greenhouse gases than cars. Neither assumption is true.

The DEIR projects 40 to 60 percent increases in per capita transit ridership under all alternatives except No Project, and even No Project projects a 25 percent increase.²³ Based on past performance, however, such increases are unlikely. As shown above, despite billions of dollars spent on transit over the past several decades, per capita transit ridership has declined by 36 percent since 1982.

Even if Plan Bay Area could increase per capita transit ridership, doing so is not likely to significantly reduce greenhouse gas emissions. While transit emits slightly less greenhouse gases than driving today, under the Pavley standards, cars will soon be greener than transit.

The Federal Transit Administration's National Transit Database indicates that transit operations consumed an average of 3,443 BTUs per passenger mile in 2010.²⁴ For the same year, the Department of Energy says that the average car consumed 3,447 BTUs per passenger mile.²⁵ The 0.12 percent difference between the two is less than the sampling error for these two numbers. Cars and transit also both emit about 250 grams of carbon-dioxide-equivalent greenhouse gases per passenger mile.

Light trucks consumed more energy, about 4,200 BTUs per passenger mile, which is about 300 grams of greenhouse gases per passenger mile. But there are several reasons to believe that both cars and light trucks will soon be more efficient and cleaner than transit.

First, while rail transit uses less energy per passenger mile than buses, the total lifecycle costs of rail transit are much larger, relative to the operational costs, than for highway transportation. According to an analysis by researchers at the University of California at Berkeley, "total life-cycle energy inputs and greenhouse gas emissions contribute an additional 63% for on road, 155% for rail, and 31% for air systems over vehicle tailpipe operation."²⁶ In other words, the full environmental costs of rail are 155 percent greater than the operational costs while the full environmental costs of highway transport are only 63 percent greater than the operational costs.

In 2010, rail transit operations, including light rail, heavy rail, and commuter rail, used 2,676 BTUs per passenger mile. This means the full, life-cycle energy costs of rail transit are more than 6,600 BTUs per passenger mile, while the full, life-cycle costs of driving a car are 5,600 BTUs per passenger mile. Rail transit still beats light trucks, but barely, as the latter consume 6,800 BTUs per passenger mile.

The second factor that must be considered is that cars and light trucks are rapidly becoming greener, while transit is improving slowly, if at all. Average auto fuel economy has improved by 40 percent in the last 40 years, while transit's fuel economy has actually gotten worse.²⁷

Based on the DEIR's projections of miles of driving in table 3.1-8 and greenhouse gas emissions in table 3.1-28, the Pavley standards will reduce average per-mile emissions by 26 to 28 percent, which is roughly the same as improving fossil fuel economy by the same amount. This suggests the average automobile on the road in 2040, including both cars and light trucks will use only about 2,700 BTUs and emit about 190 grams per

passenger mile. Adding 63 percent to get the total life-cycle costs means that autos will use about 4,400 BTUs and emit about 310 grams of carbon dioxide per passenger mile, both of which are less than transit today.

While bus transit fuel economy might improve slightly between now and 2025, rail transit is not likely to get any better. This is because rail systems have long lifespans and, once a technology is selected, it is very expensive to replace with something that is more fuel-efficient. "Autos and buses have relatively short life cycles, modest capital costs and have autonomous vehicles independent from the guideway; thus, they can enable relatively rapid integration of state-of-the-art technologies," says University of South Florida transit expert Steve Polzin. "Modes where the vehicle and guideways are integrated systems may be far more difficult or expensive to upgrade to newer, more efficient technologies."²⁸

Plan Bay Area Is Not Cost Effective

If reducing greenhouse gas emissions is really the high priority that SB 375 and the plan say it is, then it is equally critical to find the most cost-effective ways of achieving that goal. Any money spent on a less-than-cost-effective means of reducing emissions means less money available to reduce them using more cost-effective tools.

Plan Bay Area pays lip service to developing a "cost-effective" transportation system.²⁹ Yet there is nothing cost-effective about the current or proposed Bay Area transportation network. The high cost of rail is revealed by Plan Bay Area's proposal to spend \$159 billion on transit maintenance and only \$94 million on road maintenance.³⁰ In 2010, about two-thirds of Bay Area transit maintenance spending was on rail transit, which suggests that about \$106 billion of transit maintenance is needed for rail systems.³¹ The Bay Area has less than 700 directional route miles of rail lines but more than 20,000 lane miles of freeways, expressways, arterials, and collectors.³² Yet Plan Bay Area proposes to spend less maintaining those 20,000 lane miles of roads than some 700 miles of track.

Thus, even if expanding the Bay Area's transit systems could save a small amount of energy and slightly reduce greenhouse gas emissions, the high cost of doing so would not be worth it. A 2007 report from McKinsey & Company suggests that programs to abate greenhouse gas emissions are worthwhile only if they cost less than \$50 per ton of abated carbon dioxide.³³ Spending more money on transit, if it reduces greenhouse gas emissions at all, would do so at a cost of thousands of dollars per ton. Yet Plan Bay Area calls for spending \$21 billion on transit improvements compared with just \$15 billion on highway improvements.³⁴

The McKinsey report suggests a variety of ways of cost-effectively reducing greenhouse gas emissions, yet none are contemplated in Plan Bay Area. My own analysis of densification and rail transit, the two central features of Plan Bay Area, are that they would cost thousands of dollars per ton, many times more than McKinsey's \$50-per-ton cost-effectiveness threshold.³⁵

A close analysis of table 3.1-29 in the DEIR reveals that Plan Bay Area is far from cost effective in reducing greenhouse gas emissions or meeting any other goal. This compares greenhouse gas emissions in 2010 with emissions in 2040 under each of the alternatives. Emissions are broken down by land-use and transportation sources.

According to the table, the California Air Resources Board's (ARB) 2008 scoping plan will reduce land-use related emissions by 9.6 billion tons per year under all the

alternatives. By comparison, the densification required by Plan Bay Area will reduce emissions by only 131 million tons. This doesn’t mean the ARB’s scoping plan is necessarily cost effective, but it is certainly far more effective than densification.

On the transportation side, improved fuel efficiency of cars, trucks, and buses is expected to reduce greenhouse gas emissions by 2.7 billion tons per year. (Emissions from “other vehicles,” including trains and ferries, are expected to increase.) Full implementation of MTC’s climate policy initiative is projected to reduce emissions by 1.6 billion tons. By comparison, Plan Bay Area’s efforts to get people to drive less reduces emissions by only about 330 million tons. Again, this doesn’t mean that all parts of MTC’s climate policy initiative are necessarily cost effective, but the initiative is more than twice as effective as Plan Bay Area’s densification and transit strategies at what is likely a far lower cost.

The No-Project alternative, which assumes implementation of the ARB scoping plan, improved auto fuel economy, and only partial implementation of MTC’s climate policy initiative, reduces greenhouse gas emissions by 12.2 percent. Adding full implementation of MTC’s climate policy initiative would reduce greenhouse gas emissions by a total of 14.4 percent. Adding Plan Bay Area’s densification strategy reduces emissions by only 0.3 percent more. Adding Plan Bay Area’s efforts to get people to drive less reduces emissions by 0.7 percent more.

Table One
Effectiveness of Greenhouse Gas Emissions Strategies

Strategy	Billions of Tons	Change from 2010
2010 baseline	48,846	
No Project in 2040	42,895	-12.2%
No Project plus full MTC Climate Initiative	41,813	-14.4%
Plan Bay Area Land-Use Strategies	41,682	-14.7%
Plan Bay Area Transportation Strategies	41,344	-15.4%

In other words, although Plan Bay Area’s preferred alternative reduces emissions by 15.4 percent below their 2010 levels, only 1 percent of that reduction is due to Plan Bay Area itself. To be fair, some of reduction in driving may be due to Plan Bay Area’s densification strategy, but that only means that Plan Bay Area’s transit investments are projected to be even less effective at reducing greenhouse gas emissions.

All of these numbers are projections, of course, and there is little reason to suspect that they will be accurate. All of the alternatives except No Project project a 40 to 60 percent increase in per capita transit ridership, and even No Project projects a 25 percent increase. Yet past efforts by MTC and ABAG have failed to increase per capita transit ridership, reduce per capita driving, or increase transit’s share of travel.

It is entirely possible that Plan Bay Area could lead to greater emissions than a do-nothing alternative, rather than less. For example, concentrating 77 percent of new development in 5 percent of the region’s land area is likely to significantly increase traffic congestion in the PDAs. Such increased congestion will waste fuel and produce more greenhouse gas emissions. Moreover, the emissions figures in table 3.1-29 only include the operational costs of transportation. As previously noted, the full life-cycle costs of rail transport are much greater than the operating costs, so table 3.1-29 underestimates the effects of rail expansions relative to highway expansions.

Incidentally, Plan Bay Area's claim that the No Project alternative does not meet the state mandate for a 15 percent reduction in per capita car and light truck emissions is simply wrong. According to table 4 of Plan Bay Area, No Project reduces per capita auto emissions by 8 percent, while the preferred alternative reduces them by 18 percent. However, as described in table 3.1-28 of the DEIR, this conclusion was reached assuming that the Pavley fuel standards did not exist.

Table 3.1-29, which takes the Pavley standards into account, shows that per capita passenger vehicle emissions will fall by at least 37 percent under No Project and 41 percent under the preferred alternative. MTC's climate policy initiative will reduce vehicle emissions even further, though it isn't possible to assess how much of that reduction is due to passenger vehicles. But it is clear that all alternatives meet the state mandate. In any case, the main difference in emissions between the No Project alternative and the other four is that the No Project alternative only partially implements MTC's climate policy initiative, while most of the others fully implement it. Plan Bay Area's other land-use and transportation policies have relatively little effect on per capita greenhouse gas emissions.

Plan Bay Area Fails to Make Housing Affordable

Thanks to previous land-use planning efforts, the Bay Area is one of the least affordable housing markets in the world.³⁶ Though Plan Bay Area sets adequate housing as one of two mandatory targets, it fails to do more than tinker at the edges of the region's housing affordability problem.

The plan sets a target of reducing "by 10 percentage points (to 56 percent, from 66 percent) the share of low-income and lower-middle income residents' household income consumed by transportation and housing."³⁷ But it admits that it not only fails to reach this target, it "moves in the wrong direction" with the share of income needed to cover transportation and housing rising to 69 percent for low- and lower-middle-income residents.³⁸

The plan's main tools to address this issue are targets for communities in the region to accept new housing and subsidies to low-income housing. But housing affordability is not just a problem for low- and lower-middle income families. At \$156,000, Palo Alto had the highest median family income of any city in the Bay Area in 2011, yet it also had median housing prices of more than \$1 million, or well over 6 times family incomes.³⁹

Subsidies for low-income housing are not going to solve the region's housing problems. In fact, many subsidies and affordability mandates actually make those problems worse by driving up the overall cost of housing. For example, numerous Bay Area communities have imposed housing mandates requiring builders to sell or rent a specified portion of new housing for "affordable" rates. The result is less overall construction and higher prices for the non-affordable units that are built. When the affordability mandates push up the prices of new homes, the prices of used homes follow making housing less affordable for almost everyone.⁴⁰

High-density housing won't solve the problem either. While some people, mainly young singles and childless couples—though not necessarily a majority of those—are attracted to dense, mixed-use developments, they are a small minority. For most new Bay Area residents, such high-density developments will be second-class housing: smaller, with less privacy, more noise, no room for expansion as families grow, and more subject to crime. This means they will continue to aspire to live in single-family homes that

planners have made unaffordable to most residents who are not fortunate enough to already own one.

While Plan Bay Area claims to meet the state mandate that 100 percent of residents can be housed within the region, this is just a numeric exercise of assigning density targets to each city in the region. Whether those targets can be reached is another matter entirely, especially if fewer than 538,000 households—the plan's target for PDAs—are willing to live in such high-density areas.⁴¹

Plan Bay Area Ignores Trade-Offs

Bay Area residents have a wide range of needs, preferences, and priorities, and Plan Bay Area considers only a few of them. By failing to fully evaluate the more than two dozen policies being considered in the plan, Plan Bay Area ignores the trade offs between these policies, some of which may be more important to residents than they realize.

For example, Plan Bay Area takes it for granted that roughly 80 percent of land in the nine-county area should be preserved as open space. Currently, the plan says, only about 18 percent of the nine-county area is developed, and the plan calls for all new non-agricultural development to remain within this area.⁴² The 2010 census found that 21 percent of the nine-county area is "urbanized"; the difference may be parks included in the Census Bureau's definition of urbanized.⁴³

The trade off of keeping all new development in a minimal area is that this policy has produced one of the world's least affordable housing markets. If the region's population density had been allowed to remain at 3,000 people per square mile—the density at which major urban areas still have affordable housing—the amount of developed land would have increased from Census Bureau's 21 percent to just 33 percent. Even with population growth through 2040, densities could remain this low while still allowing well over half the region to remain as open space.

Plan Bay Area claims that adequate housing is a "mandatory" target while open space preservation is a "voluntary" target. But in fact it treats open space as mandatory and trades off affordable housing in order to preserve that open space, failing to meet its target that low- to moderate-income people are able to reduce the shares of their income going for housing and transportation costs. This is unfair both to future homebuyers and the owners of land that is excluded from development.

Plan Bay Area also ignores the trade offs between high-density housing and public safety. Contrary to popular belief, density itself does not lead to higher crime, but the design features associated with higher densities often can. Architect Oscar Newman's 1973 book, *Defensible Space*, first identified the design features that make developments more susceptible to crime. He found that the most important factor in reducing property crime was to reduce what he called "permeability," that is, the ability of strangers to enter properties.⁴⁴

For example, a high-rise luxury apartment building with one entrance staffed by a security guard would have low permeability. But mid- and high-rise apartments built for low- or middle-income families often have multiple entrances and no security guards, making them very permeable. A neighborhood of homes with private backyards would be less permeable than one with alleys behind the homes, offering potential burglars more access points to the home. Mixed-use developments and developments with lots of common areas are more permeable than single-use developments with

mainly private property because it is not always easy to tell if a stranger in a mixed-use development or common area has a legitimate purpose in being there or not.

Unfortunately, most of the things planners want to build into PDAs and transit-oriented developments—such as mixed uses, alleys, and common areas—increase permeability and make those developments more subject to crime. A study of a “New Urban” development in Britain found that it had five times as much crime and cost police departments three times as much to keep secure as a development designed to minimize permeability.⁴⁵

Crime is only one of many issues that influence people’s housing decisions. Others are the quality of schools; proximity to friends and relatives; access to transportation; and other neighborhood amenities. Ironically, considering that planners would prefer that everyone lived close to work, close proximity to work is *not* a major factor in people’s housing decisions. In fact, studies by University of California (Davis) researchers have found that people prefer to live some distance from work so they can adjust to a work or home mindset as they commute.⁴⁶

By focusing mainly on planners’ desire to reduce per capita driving, Plan Bay Area oversimplifies the complexity of real life and the wide range of people’s personal tastes and preferences. The result is a plan that is intrusive and authoritarian without any redeeming values.

Conclusions

Plan Bay Area considers more than two-dozen policies aimed at reducing greenhouse gas emissions and making housing more affordable. Yet the policies it adopts are not cost-effective at reducing emissions and are not effective at all in making housing affordable. Other policies that might have been more effective weren’t even considered. These failings can be traced directly to inadequacies in the planning process.

In a rational planning process, planners should identify, without prejudice, a wide range of policies that might contribute to the goals of the plan. They should then estimate the cost of each of the policies and their effects on emissions, affordability, and other issues. This would allow them to develop a plan by selecting a blend of the policies that are most cost-effective at meeting the key goals of the plan.

Instead, planners started out by assuming that the plan would adopt certain policies, including densification and a 35 percent increase in rail transit service, that may not contribute to the goals at all and are certainly unlikely to be cost-effective ways of reducing greenhouse gas emissions.

Although planners failed to do a cost-effectiveness analysis of these policies, it is possible to estimate from table 3.1-29 that densification and improved transit service together will reduce greenhouse gas emissions by less than 1 percent. The Plan also admits that it fails to make housing more affordable for low- and lower-middle-income people, which almost certainly means housing will be less affordable for everyone who does not already own a home.

How can planners justify an enormously expensive plan that disrupts numerous neighborhoods in the region in order to reduce greenhouse gases by 1 percent? The answer is that they cite a state law requiring a 15 percent reduction in per capita

emissions from automobiles—but then ignore another state law that mandates improvements in fuel economy that, by itself, will more than meet this goal.

This means Plan Bay Area is not only poorly planned; it is dishonest. The entire plan should be scrapped and restarted, preferably at the local level rather than the regional level.

Notes

1. Median home values from *1970 Census of Housing: Part 1-United States Summary* (Washington: Census Bureau, 1972), table 14; median family incomes from 1970 Census Supplementary Report 63, "Per Capita Income, Median Family Income, and Low Income Status in 1969 for States, Standard Metropolitan Statistical Areas, and Counties: 1970," Census Bureau. Data for later years are from similar tables and reports for the 1980 and later censuses.
2. Randal O'Toole, "Defining Success: The Case Against Rail Transit," Cato Institute Policy Analysis no. 663, March 24, 2010, p. 22.
3. Belinda Griswold, "Tunnel Vision," San Francisco Bay Guardian, November 5, 1997.
4. David Schrank, Bill Eisele, and Tim Lomax, "2012 Urban Mobility Report," Texas Transportation Institute, College Station, Texas, "complete data" spreadsheet.
5. Plan Bay Area DEIR p. 3.1-7–3.1-8.
6. Dowell Myers and Elizabeth Gearin, "Current Preferences and Future Demand for Denser Residential Developments," *Housing Policy Debate* 12, no. 4 (2001): 633–59, tinyurl.com/2skfah.
7. Douglas Porter, "Regional Governance of Metropolitan Form: The Missing Link in Relating Land Use and Transportation," in *Transportation, Urban Form, and the Environment* (Washington, DC: Transportation Research Board, 1991), p. 65.
8. "2010 Census Urban Area Facts: Most Densely Populated Urbanized Areas," Bureau of the Census, 2012, tinyurl.com/ctypsu2.
9. Calculations based on "Urban and Rural in 2010 by State and County," Bureau of the Census, 2012, tinyurl.com/cn7st9j.
10. 2010 urbanized area densities from "List of 2010 Urbanized Areas," Census Bureau, tinyurl.com/d5jo3gf; 2010 median home values and median family incomes from 2011 American Community Survey table B25077, Median Home Values, and B19113, Median Family Income.
11. Plan Bay Area, p. 19.
12. Plan Bay Area, p. 6.
13. Plan Bay Area DEIR, page 1.2-25.
14. DEIR page 2.3-5.
15. Arthur C. Nelson, "Leadership in a New Era," *Journal of the American Planning Association*, volume 72, number 4 (2006), p. 397.
16. Emil Malizia, "Comment on 'Planning Leadership in a New Era,'" *Journal of the American Planning Association*, Autumn, 2006, volume 72, no. 4, p. 407.
17. *Ibid.*, p. 408.
18. *Japan Statistical Yearbook 2013* (Tokyo: Ministry of Internal Affairs and Communications, 2013), table 18-3, tinyurl.com/avsu5sr.
19. *Regional Framework Plan* (Portland, OR: Metro, December, 1997).
20. Plan Bay Area Draft EIR p. 2.4-20.
21. *2011 Building Energy Data Book* (Washington: U.S. Department of Energy, 2012), p. 2-5.
22. David Brownstone, "Key Relationships Between the Build Environment and VMT," paper prepared for the Transportation Research Board, 2008, pp. 2, 7, tinyurl.com/c97n7v6.
23. Calculated from DEIR table 3.1-8.
24. Calculated from the 2010 National Transit Database, "energy" and "service" spreadsheets
25. *Transportation Energy Data Book, Edition 31* (Oak Ridge, TN: Department of Energy, 2012), table 2-13. Based on the National Household Transportation Survey, occupancy rate for cars is assumed to average 1.6 and for light trucks assumed to be 1.72.
26. Mikhail V. Chester and Arpad Horvath, "Environmental assessment of passenger transportation should include infrastructure and supply chains," *Environ. Res. Lett.* 4 (2009) 024008 (8pp), tinyurl.com/czclacq.

27. *Transportation Energy Data Book, Edition 31*, tables 2-13 and 2-14.
28. Steve Polzin, "Energy Crisis Solved!" *Urban Transportation Monitor*, July 11, 2008, p. 8.
29. Plan Bay Area, p. 77.
30. Plan Bay Area, p. 65.
31. *2010 National Transit Database*, "capital use" spreadsheet.
32. *2011 National Transit Database*, "transit way mileage" spreadsheet; *Highway Statistics 2008*, table HM-72.
33. Jon Creyts, Anton Derkach, Scott Nyquist, Ken Ostrowski, and Jack Stephenson, "Reducing U.S. Greenhouse Gas Emissions: How Much at What Cost?" McKinsey & Company, 2007, p. ix, tinyurl.com/cq28fr5.
34. Plan Bay Area, p. 65.
35. Randal O'Toole, "The Myth of the Compact City: Why Compact Development Is Not the Way to Reduce Carbon Dioxide Emissions," Cato Institute Policy Analysis no. 653, November 18, 2009, pp. 10, 17.
36. Wendell Cox, "9th Annual Demographia International Housing Affordability Survey: 2013," Demographia.com, pp. 36-37, demographia.com/dhi.pdf.
37. Plan Bay Area, p. 19.
38. Plan Bay Area, p. 102.
39. American Community Survey table B25077, Median Home Values, and B19113, Median Family Income. It is a measure of just how unaffordable the Bay Area is that the Census Bureau never contemplated that median home prices could exceed \$1 million, so did not allow for such large numbers to appear in its data tables, yet numerous California places have medians more than \$1 million in 2011, including Los Altos, Menlo Park, Palo Alto, and Sunnyvale, and many more did in the mid-2000s before the recent collapse of housing prices.
40. Tom Means, Edward Stringham, and Edward Lopez, "Below-Market Housing Mandates as Takings: Measuring the Impact," Independent Institute policy report, November, 2007, tinyurl.com/4xyxgux.
41. Plan Bay Area DEIR, table 3.1-5.
42. DEIS p. ES-5.
43. Calculations based on "Urban and Rural in 2010 by State and County," Bureau of the Census, 2012, tinyurl.com/cn7st9j.
44. Oscar Newman, *Defensible Space: Crime Prevention through Urban Design* (New York: Collier, 1973).
45. Peter Knowles, "Designing Out Crime: The Cost of Policing New Urbanism," tinyurl.com/cajuees.
46. Patricia Mokhtarian and Ilam Salomon, "Travel for the Fun of It," *Access* 15 (Fall 1999): 27.