Climate Change and SMART

White Paper No. 2

We live in a time where every human activity must be considered in relation to energy efficiency and global climate change impacts. SMART's clean, fast trains will reduce greenhouse gas emissions by about 124,000 pounds a day, according to the project's Environmental Impact Report.

But as a catalyst for change in the way we move around Marin and Sonoma counties, SMART has the potential to do much more.

SMART can help change the transportation paradigm of the North Bay by shifting it away from the single-occupant vehicle and toward alternative modes such as walking, biking, riding buses and shuttles and, of course, riding the train. SMART can also help change development patterns, allowing jurisdictions to avoid sprawl by focusing growth in strategic locations.

Like climate change, these shifts won't happen overnight. But they can't even begin to happen until people are offered more alternatives to using their cars. SMART is not merely one of those alternatives, it can also be the impetus for others.

The Challenge

Scientists tell us that our planet's climate is changing significantly due mainly to a steady increase in atmospheric greenhouse gases. This increase has a variety of causes, but a clear, major contributor is the human burning of fossil fuels on a large scale, beginning at the dawn of the industrial era and accelerating in the last several decades.

According to climate models, the effect of this atmospheric change will be a rise in average global temperatures in the current century, with a variety of implications including: melting glacial ice, sea level rise, shifts in precipitation patterns, changing agricultural zones, shifts of habitat leading to species extinction, changed ranges for disease vectors, increased smog formation in urban areas and more extreme weather events.

The burning of fossil fuels for transportation is a major contributor to the rising levels of atmospheric greenhouse gases. In Sonoma County, transportation was the source of about 58% of greenhouse gas emissions in 2005, while in Marin County, transportation accounted for 62% in 2005, according to Sonoma County's Climate Protection Campaign. Meanwhile, the trends in Marin and Sonoma Counties have not been encouraging when it comes to transportation emissions. Greenhouse gas emissions from transportation rose 7% in Marin County from 1990 to 2005, and 10% during the same period in Sonoma County.

Despite having a mild climate and relatively little industrial activity, the two counties have a fairly high combined greenhouse gas footprint. Marin County's per-capita emissions of 12.6 tons of greenhouse gases in the year 2000, for example, were higher than the per-capita emissions of California, the European Union, the U.K. and Japan. Sonoma's were lower at 8.2 tons, but have been on the rise.

A move toward cleaner power sources for automobiles, or at least more efficient use of existing fuels, could have a major impact on greenhouse gas emissions. Unfortunately, average CO_2 emission rates for the U.S. auto fleet have not been improving, although this may change with new regulations or a shift in consumer preferences. However, the total number of vehicle miles travelled (VMT) keeps rising. For Marin and Sonoma, VMT is projected to rise by 16% between 2006 and 2025, according to the Metropolitan Transportation Commission.

The Potential of Mode Shifts

Fortunately, making cars cleaner isn't the only way to address the problem. Another is trying to limit the rise in total automobile use. A shift in trips away from single-occupant vehicles and toward walking, bicycling, transit and ride sharing could make a very big difference.

Interestingly, the desire for more and better transportation alternatives is also very popular. Many wish that they could have more-walkable communities, or ride their bikes in their own neighborhood without risking their lives, or have more and better transit choices. They also increasingly see a connection between the availability of transportation alternatives, quality of life and global concerns like climate change.

A Metropolitan Transportation Commission (MTC) survey published in November 2007 reported that 65% of Bay Area residents said climate change should be *extremely* important in making transportation investment decisions. A full 92% said it was at least somewhat important. In the same survey, when asked to prioritize among certain transportation investments being considered by MTC, respondents rated them as follows:

PRIORITY	High	Medium	Low	Don't Know
Extend rail lines throughout the Bay Area	65%	27%	7	0
Improve freeway performance using new technology	38%	40%	15	7
Increase number of carpool lanes for carpoolers and bus riders	26%	42%	31	1
Allow solo drivers to use HOV lanes if they are willing to pay a fee	20%	29%	50	1

In the Bay Area, people are clearly open to squeezing more efficiency out of our freeways, adding carpool lanes and, to a lesser extent, allowing solo drivers to use HOV lanes if they pay a fee. The survey clearly found, though, that expanding rail service is the highest priority of Bay Area residents by a large margin.

This is not surprising, given that rail can serve as the backbone of an alternative transportation network. It can enhance local bus ridership by creating efficient rail/bus combination trips where a bus-to-bus combo would have taken too long and resulted in a car trip instead. Rail service can make point-to-point shuttle service effective. Rail can encourage bicycle use, given that bicycle facilities will be present at stations, and that bikes will be accommodated on trains. Lastly, rail transit can encourage land use changes like transit-oriented and infill development, which act as antidotes to sprawling development patterns.

SMART's rail and trail project can form the foundation of a vision for shifting North Bay trips to alternative modes, reducing vehicle miles traveled and countering the rise in local greenhouse gas production

As mentioned previously, SMART will directly reduce greenhouse gas emissions by about 124,000 lbs per day by shifting an estimated 5,300 daily trips away from automobiles. While a two-car SMART train would have at least 200 seats, it would produce the CO_2 emissions of only 12 automobiles.

This is only part of the picture, however. The SMART project will also have a number of positive secondary effects on greenhouse gas emissions by shoring up the use of other alternative modes.

Strengthening the Transit Network

SMART is projected to produce a net increase in total bus ridership on both Marin and Sonoma County routes, mainly by boosting local connecting service to stations more than it reduces ridership on inter-county routes. Compared with the Express Bus Alternative evaluated in SMART's EIR, the SMART rail project would result in 1,000 more daily bus transit trips on Sonoma County routes and 4,000 more daily bus trips on Golden Gate and Marin County routes. On the other hand, the EIR found that the Express Bus

Alternative would siphon more heavily from existing inter-county routes, bring fewer riders to connecting routes, and would actually result in a net *increase* of 58,000 lbs per day in greenhouse gas emissions.

To understand how SMART would encourage net new bus ridership, consider the following example. Imagine someone who lives in Petaluma and works in San Rafael at the Marin Academy, a school located approximately 4 blocks from San Rafael City Hall. They could take a 63-minute bus ride to Downtown San Rafael, then transfer and take another 7-minute bus ride to the school. Total time on transit: 70 minutes. With SMART, they could take a 35-minute train trip to San Rafael, then transfer for the same 7-minute bus ride. Total time on transit: 42 minutes. For many people this large time savings could easily make the difference in choosing to take transit; in this case rail *and* bus.

The new bus trips generated by SMART, most of which otherwise would have been made by car, have not been factored into the project's greenhouse gas emission savings. By creating a rapid and convenient service for longer trips, SMART will incentivize use of other existing transit.

SMART has also committed in its Expenditure Plan to funding nine shuttle routes, which are expected to carry 500-600 riders per day from rail stations to major employment centers, schools and shopping destinations. As is the case with new bus trips, the greenhouse gas emissions saved by these shuttles have not been factored into SMART's published greenhouse gas reduction totals.

Altogether, the presence of SMART will strengthen the transit network in Marin and Sonoma Counties, boosting their transit mode shares of trips which are currently among the lowest in the Bay Area, at 3.7% and 1.3% respectively. An even greater potential for reducing greenhouse gas emissions, however, may be found in shifting auto trips to non-motorized modes.

Promoting Bicycle Use

A key component of the SMART project is a multi-million-dollar investment in a north-south pedestrian path and bikeway, mainly in the rail right-of-way. This path is estimated to serve approximately 7,000 bicycle trips each weekday and 10,000 bicycle trips on weekends. Although many of these trips will be recreational, some otherwise would have been made by car. This represents additional savings of greenhouse gas emissions.

This north-south pathway is called for in the Bicycle & Pedestrian Plans of both Marin and Sonoma Counties and will form the spine of a two-county bicycle path network. The Sonoma County Bicycle Master Plan calls for "a linkage from bike paths or designated bicycle lanes to rail stations and bus stops; and a path that follows the

Northwestern Pacific Railroad right-of-way." The Marin County Bicycle Master Plan also calls for the use of the NWP corridor to serve as a critical north-south spine. Both counties are aiming for a much higher bicycle share of trips in the future.

In the Netherlands, nearly 30% of trips are made by bicycle. In Germany, despite having the second highest auto ownership rate per capita in the world, 12% of trips are made by bicycle. Even rugged, mountainous Switzerland has a 10% bicycle mode share. In Marin and Sonoma Counties, it's 1.7% and 0.8% respectively, despite an enviably mild climate.

The prevalence of cycling abroad may be partly a function of different land use patterns with more compact cities and towns. However, it's also the result of a conscious societal investment in bicycle infrastructure and planning.

In 2006, Marin County received a $25 million federal grant for bicycle infrastructure, largely through the efforts of local bicycle advocates. The expressed purpose of this federal Non-Motorized Pilot Project was to see if investments in bicycle transportation could create a tangible mode shift toward bicycle use. To date, projects for these funds have been identified and include local paths, feeder routes to the north-south corridor (including some east-west routes) and projects along the north-south corridor itself.

The SMART project's investment in bicycle infrastructure on its own could be nearly *three times* larger than this federal grant, greatly improving the odds of mode shift success.

Not only would the SMART project create a major bicycle corridor in its right-of-way, but the rail itself would encourage additional bike use. On the Peninsula's Caltrain system, about 6% of the daily riders bring their bicycles on the train to use at their travel destination. This saves many more trips that otherwise would have been made by car.

For those who don't need bicycles at their destinations, SMART will have racks and lockers at all of its stations, and monitored bike facilities in major stations like Santa Rosa and San Rafael. People need not drive to the SMART rail stations – a majority of residents in Marin and Sonoma County live within a reasonable bicycling distance.

The rail-bicycle combination is a powerful one. European rail stations, whether in major cities or remote rural areas, are often crowded with bikes. In Japan, an estimated 3 million bicycles were parked at rail stations each day in the early 1990s, which was five times the volume of bikes present in 1975, and several times greater than the number of commuter cars. Ultimately, the presence of SMART rail can give a major boost to cycling, helping to limit the growth in VMTs and thereby reducing greenhouse gas emissions.

Making Pedestrian-Oriented Communities

SMART also will help encourage walking. A 2002 Surface Transportation Policy Project (STPP) survey of Americans concluded that a majority would prefer to walk more and drive less. When asked to identify their preferred transportation investment, a plurality said "improving public transportation." The second most preferred policy approach was designing communities where people don't drive so much. The third and last place was adding new roads.

In other parts of the world, walking accounts for very large shares of total trips. Sweden has a nearly 40% walk mode share. Most western European nations have mode shares between 15% and 40%. This makes sense because a very large percentage of trips are very short. In the North Bay we are often releasing large amounts of carbon to go very, very small distances, in some cases from one end of the strip mall parking lot to the other.

Making communities more pedestrian friendly is a goal found in many North Bay transportation plans. The addition of paths, sidewalks and crosswalks to the current landscape can certainly be helpful. However, generating substantial walk-mode shares of trips may require a more comprehensive approach. When asked why they did not walk even though they preferred it, respondents to the 2002 STPP survey said that things were too spread out and not designed for walking. Making walking easier might mean modifying the way we build places, by keeping them compact, or allowing quality infill development to add vitality.

A December 2007 paper published by the Brookings Institution noted that, "over the past 15 years, there has been a gradual shift in how Americans have created their built environment, as demonstrated by the success of the many downtown revitalizations, new urbanism, and transit-oriented development." The paper also noted that "rail transit seems to play a significant role in catalyzing walkable urban development." The report concluded that today "walkable communities are as common in suburban areas as they are in cities."

Communities that are more walkable are a natural fit with transit. They help to support ridership, since the number of people who can conveniently access a station isn't limited by the number of parking spaces. Pedestrian friendly communities are also helpful to rail stations as destinations, since riders can avoid having to make transfers and can simply walk to their ultimate destination.

Rail transit is not just aided by pedestrian-friendly development. In turn, it can help to inspire it. SMART is working to develop its property at Railroad Square in Santa Rosa

into a mixed-use, LEED platinum, transit-oriented development that respects the historic street network, contains an active plaza and generally places a premium on encouraging pedestrian activity in the area.

The SMART development in Santa Rosa, along with the presence of a functioning rail station, will catalyze other development and investments in the surrounding area that will ultimately coalesce into a transit-oriented district. Recently, the City of Santa Rosa received a grant from MTC to develop a Station Area Specific Plan for a ½-mile radius around the proposed SMART station at Railroad Square. The Plan envisions a vibrant, pedestrian-oriented urban center. It sees the presence of the SMART station as a tool for helping to realize that vision, noting that the city should "capitalize on the attraction of the new Downtown Station of the SMART system to bring additional people to the area."

Healthy, vibrant, pedestrian-oriented areas with access to different modes of transit are the precise types of environments in which a shift to alternative modes can occur. SMART views itself, and is viewed by many jurisdictions along the line, as a tool for helping to create these types of places.

Conclusion

At a July 2007 hearing, an opponent of the SMART project stood up at a public meeting and quipped, "The point is: Who says we need to get people out of their cars? There's nothing wrong with the car -- it's part of our high standard of living, unless you want to be like China and India where everyone is on bicycles." This quote was published in the Marin Independent Journal.

Truly, there was a time in American history when only a minority could own cars, making them a symbol of wealth and status. That time has long since passed. Today, with only a few exceptions, most everyone in Marin and Sonoma Counties can afford to own an automobile. And, this is increasingly true in China and India, as well.

In the future, people will likely walk, ride bikes, use buses, shuttles, ferries, or take the train not because they are impoverished and have to, but because they choose to. They'll do it to improve the quality of their lives, their communities, their air, their own personal health and the health of their planet.

The SMART project is a key contributor to providing that choice in the North Bay. By directly getting thousands of people out of their cars, by encouraging bus and shuttle use, by building the critical north-south bicycle spine of a two-county bike network, and by creating and catalyzing pedestrian-friendly environments, SMART can stem the growing tide of vehicle miles traveled, and help achieve the North Bay's ambitious greenhouse gas reduction goals.

For more information about the SMART rail and trail project, go to www.sonomamarintrain.org or call SMART's information lines in Marin, 415-419-3510, or Sonoma, 707-583-2323.