

The Sustainability Plan Scenario (SPS)

by Sherman Lewis

The Bay Region has the opportunity to be on the cutting edge of new, systemic ideas that redefine the nature and purposes of human society. The Sustainable Plan Scenario in the Livability Footprint research is a unique opportunity to begin to quantify the benefits of a more coherent and progressive approach.

Background:

The Bay Area Alliance for Sustainable Development (BAA) is composed of business, environmental, equity, and local government interests. It has drafted a Compact for the region to deal with its development, housing, transportation, environmental, social, and related challenges. It has published a list of indicators to better measure the status of the region. It is supporting the Capital for Community Investment Initiative to invest in low income neighborhoods. The BAA, finally, is working on the Regional Livability Footprint Project to study how to accommodate growth on the ground. The research allows different scenarios to be studied. One scenario will certainly be a “Smart Growth” (SG) scenario that will accommodate enough housing development in the region to match all the jobs projected in 2020. This scenario will attempt to increase densities and minimize open space development.

The Regional Agencies (Agencies) of local government, five of them, received funding from EPA for similar research, the SG Strategy, and the BAA is working with them on the SG scenario. While this scenario is well worth studying, many environmentalists feel that it is trying to accommodate too much growth, that it is unlikely to propose development with high enough densities or adequate transit, and in other ways is less than ideal. We propose to study the SPS. The purpose of the SPS is to articulate a much better scenario from all four vantage points—business, environmental, social, and governmental—and to have it studied by the BAA.

An essay on urban sustainability, “From Smart Growth to Sustainability: The Challenge of Multiple Paradigm Change,” provides the rationale for the discussion below, which focuses on the land use and transportation aspects of the SPS, with an illustration for Alameda County. The staff of the Agencies during the spring and summer is conducting workshops and developing a SG scenario for detailed study. The SPS will need definition and support by the end of this period if it is to be studied.

ER and TE

The numbers below often use employed residents (ER) rather than population, in order to see more clearly the balance of jobs (Total Employment, TE) and resident workers. To get households, the figures need to look at workers per household. To get to population, they need to look at additional non-working members of households. Workers per household and household size vary from place to place, making it very difficult to relate to households or to population. Using TE and ER makes it easy to see imbalances.

First Phase: Land Use Projections and Targets

ABAG makes projections of ER and TE, the important ones now being for 2020. The Agencies looked at this data in order to set targets for how much SG to plan for.

The first phase of SG scenario development is assigning ER and TE to geographic areas. ABAG projects the region will grow from **3,538,000** ER in 2000 to **4,438,300** ER by 2020, or 25.5 percent. The Agencies' goal is to plan for a region that balances jobs and housing, that is, to have ER equal TE. They could have lowered ABAG's TE to meet its ER, but instead choose to increase the ER to meet the ABAG projection for TE in for 2020. More ER leads to a corresponding increase in households and population to include workers and their families who ABAG assumes will live outside the region and commute in. Using this approach the increase in regional population will be 1,538,752. As a result ER increases to **4,687,950**, a growth of 32.5 percent, considerably more than ABAG projects.

The Agencies are also at the moment trying to decide how to allocate the extra ER, households, and population to the counties. A side-issue has arisen because they have looked only at allocating the increment and ignored the existing imbalances. The increment can be allocated in the same way the ABAG projections have done, or they can be allocated more by the amount of job increment. Using the job increment is especially problematic. If a high ER county wants to improve its balance, it needs to increase its TE. However, the Agencies will use the increase TE as a reason to increase ER for balance of the increment, and the county winds up back where it started. Similarly, low TE growth in Silicon Valley means it gets little assigned ER, allowing it to persist in its current extreme imbalance. The Agencies are also looking at raw TE/ER balances and ignoring the necessity of imbalances for agglomeration economies and the capacity of transportation infrastructure to deliver workers. Because they are ignoring current imbalances and the role of transportation, the analysis of land use imbalance is flawed.

Motivation for SPS

Many environmentalists, including the Sierra Club, which has set up a task force for the purpose chaired by Dick Schneider, would like to see the Bay Area trend toward sustainability. The Agencies are not doing that at all. They have no reasons justifying the amount of growth they want studied other than projections of past trends. They assume trend is destiny.

We would like to see what the region would look like with lower population growth and a rise in median income. The specific assumptions to implement these and other concepts is the SPS. The increment of population would still be absorbed by SG, even at a higher density SG that the Agencies are likely to look at. Both our scenario and the Agencies will use SG; the difference is in the amount and kind. The Agency SG scenario simply has to accommodate a lot more SG, testing the ability of the region to do so.

It is possible that an even more aggressive SPS could pull people in from some of the sprawl and we could recover some open space. While many of us would like to see that, the SPS as proposed is already far more radical than anything that is remotely politically feasible. In that respect, the short term practical impact of the SPS is less important than its long term educational impact, creating the understandings that can lead to political action in the future.

We would also like to look at a stronger implementation of SG to correct job-housing imbalances and have housing catch up with jobs. We consider both existing imbalances and the role of transportation infrastructure, thus fixing two methodological problems of the Agencies. We have good estimates of the imbalance but more quantitative research could produce more precise measurement (see Research below).

Our approach has other new ideas, like using ethical principles, managing job location externalities, reforming transportation pricing, increasing large scale transit density smart growth, and building some even higher (walking density) smart growth, the Pedestrian Neighborhood. We lack studies the market demand for living in such a neighborhood (see Research below), but we can assume it for scenario testing.

SPS Land Use Targets

Under the SPS the region would grow to **3,988,149** ER by 2020, a growth of 12.7 percent, half the ABAG rate and even less of the Agency rate. The SPS moderates projected regional job growth to have TE equal to ER by 2020. Jobs would grow less, and housing more, in areas with severe job surpluses. Job growth is held down in Silicon Valley and San Francisco while ER increases as projected by ABAG, greatly improving their job-housing balances, commute distances, and transit use. The rationale for this is not just to get a better balance, but to correct for the current costs of job location externalities. It is clear these costs are very great, but research is needed for quantification (see Research below).

Elsewhere, TE is allowed to increase relative to ER growth, also improving job-housing balances, commute distances, and transit use. Some job locations projected by ABAG move within the region and others move to other regions, helping both them and us. All cities get some job growth, and housing catches up to jobs.

Looking at total population, SPS population growth trends toward a stable population. The 1990 population of the Bay Area was about six million; in 2000 it is about seven million. ABAG Projections 2000 expects the 2020 population to be over eight million. Between 2000 and 2020 ABAG projects an increase of 1,096,000 people; the SPS assumes half that, or 548,000 people, to reach a regional total of under 7.5 million.

Under SPS growth does not occur in the greenbelt, but only within the urbanized area. Undeveloped urbanized land zoned for other purposes is freely convertible to neighborhood uses to achieve job housing balances. The SPS emphasizes neighborhood development near High Quality Transit with high density and radically reduced car space and car use. Besides the usual SG, a few car-free transit villages at average four story height would accommodate about 10,000 people on about 100 acres. Moderate to low income households in gentrifying neighborhoods are protected from dislocation.

The County Workshops

There are two processes for getting the SPS considered, the county workshops and the Bay Area Alliance.

The Agencies are planning County workshops for each county, during which there is a further break-out to separate tables for detailed discussions. Critical issues include projections of housing and jobs. Attendees, including many local officials, will be asked how they want to accommodate more growth than projected by ABAG for 2020. They will be given the high Agency figure for growth and asked how they plan to accommodate it. The Agency staff will not help if they want less growth; it has no plan to inform participants of structured, planned, reduced growth projections. If someone wants lower growth, the burden is on them to come up with a rationale justifying it. The workshops will not consider inter-county issues or ethical bases for amount and allocation of growth. They will consider county numbers and not be asked about fundamental regional planning issues.

The Agencies could use the following procedures:

1. **ABAG vs. TE-ER balance:** County workshoppers could first decide if the region should

have more Jobs than Employed Residents.

2. **Increase housing only vs. increase housing and decrease jobs.** They could then decide how to achieve balance regionally.
3. **ABAG vs ABAG Smart Growth vs. SPS.** Then they could decide the basis for planning their county: 1) ABAG projections ($TE > ER$, implying more fringe development and in-commuting) OR 2) ABAG Smart Growth ($TE = ER$, mostly met in urbanized areas), OR 3) SPS (fewer TE and fewer ER, $TE=ER$, all met in urbanized area).

Instead, the Agencies have decided things for the workshops: the region will have $TE = ER$; ER has been increased to catch up with TE; of three major possibilities, they get 2) ABAG Smart Growth.

Should information on sustainability be given to the workshops? We could give each workshop information about lower projections with a smart growth distribution. A worksheet for each county would have ER and TE numbers, urban limit lines, better balances, and smart growth. We could pass out information to workshopers or in some other way make it available to them. If even one person speaks up to ask for a study of sustainability and quotes some numbers from a handout, others are likely to want to see it.

The BAA Livability Footprint Project

The **Bay Area Alliance** has its own plan to study a Livability Footprint, including alternatives defined by stake-holding caucuses. The BAA Environmental Caucus could propose study of the SPS in this Livability Footprint research. The Sierra Club already supports study of an SPS. This procedure offers more assurance of getting studied what we want studied, adding perspective to the SG scenario. Environmentalists should not consider this an either or situation; we can study both.

Modeling the Land Use

The Agencies and BAA will at the end of the workshops agree upon some land use numbers for analysis by ABAG demographic and geographic models. ABAG's model for geographic distribution of projections is called POLIS. It has certain problems for SPS purposes:

1. The POLIS 116 zone system is too gross for testing high density around High Quality Transit. POLIS needs zones of a half mile around High Quality Transit to allow optimization of growth allocation between car-based suburbia and transit-based SG.
2. The non-linear mathematical programming algorithm optimizes with only one trip cost table, which is the time cost of car travel among the 116 zones. It needs another trip cost table for transit, which would allow High Quality Transit zones to compete with car-accessed areas.
3. The output trip table is never cross checked with MTC's trip table. ABAG gives the land use results from POLIS to MTC, which then uses them to model trips. Yet the MTC trip table may be substantially different from the POLIS trip table despite the same land use. No one knows.
4. The "subject to" land use constraints minimize smart growth potential. The land use assumptions, being based on local land use plans, are heavily politicized. POLIS needs to indicate land available for dense development in High Quality Transit zones. Combined with the faster transit travel time for key links in the network, POLIS could optimize for SG.

The POLIS model is complex and sophisticated. Implementing the above ideas may be difficult, but there needs to be a better understanding of the model among those using the results.

Transportation

The second phase (after assigning TE and ER) is seeing how these land uses perform for **transportation** using MTC's land use-transportation model. Transportation planning requires consideration of pricing reforms and infrastructure investment.

The SPS will assume much stronger market **pricing reforms** of auto use and a more cost-effective transit projects than the Agencies. The SPS assumes a Pigovian carbon tax and a balancing tax swap based on locational elasticities (explained elsewhere). Other pricing reforms include congestion charges, cash-out, market parking charges (including BART), neighborhood parking programs on public streets and parking lots, removal of parking requirements from zoning codes, improvement of housing markets for car-free and centrally located households (delinking car and living space costs; LEMs; shared car ownership, improved rentals), and traffic calming (street narrowing, traffic humps, etc.). These pricing incentives combined with SG change the urban system from auto dependency to the new "urbia," the effective form of SG which is an alternative to suburbia.

Concerning **infrastructure investment**, the SPS assumes cost-effective transit (the RAFT plan) and bicycle and pedestrian improvements. Revenue from congestion charges and parking charge is used for transit. SPS assumes improved frequency of transit service, some lower transit fares, "super shuttle"¹ access to transit stations, CalTrain and Fremont-to-San Jose commuter rail upgraded to urban rail, Transbay rebuild, ticketing/route/scheduling coordination, and so on.

Under SPS from 2000 to 2010, due to the combination of land use balance improvements, SG, pricing reforms, and infrastructure investments, the drive-alone mode share should decline very significantly while transit, bike and walk mode shares increase significantly.

Research

Research on the Pedestrian Neighborhood, Job Location Externalities, and ER/TE Balance

The SPS analysis would be strengthened if we had better information on three issues, explained in more detail elsewhere:

- **The Pedestrian Neighborhood:** Based on a "beyond transit" density, ~100 residents per acre on ~ 100 acres, 3 to 5 stories. 1. Sketch design of floor plans, building and street perspectives, area plan; 2. costing, 3. financing pro formas to establish rent and sale prices, and 4. market research to establish demand for planning purposes.
- **Job location externality costs** in housing prices, commutes, and pollution for four severe job surplus superdistricts. Are jobs which create commute trips above the freeway congestion tipping point worth the cost?
- **Defining balance:** A more transparent operational definition of "reasonable commute" and "commute shed" to accommodate cascading commutes and establish size of job surpluses.

Additional phases of planning, which are not currently funded, would look at the cost-effectiveness of infrastructure investments, the equity of their finance, economic efficiency, and income. The **cost-effectiveness** of infrastructure investments is best measured by cost per new

¹Low floor, wide door vehicles, proximity card or barrier-free fare collection, clean powerful motors or trolley bus, raised curb or Curitiba-style stops, improved pavements, reduced car interference/straight pull-through stops, frequent headways, hard-wired meets with rail service, signal preemption or preference, medium length runs through SG neighborhoods to outlying park and ride, central access to office parks, campuses, and industrial areas.

trip, which for transit is cost per new rider. This measure is better than cost per passenger mile, which favors longer trips. Longer trips are inherently less economic and less environmental. The analysis would probably show that new heavy rail in the South Bay is less cost-effective than new service on old rail. It would probably show that I-680 Sunol grade widening is not needed because there is no congestion there with pricing reforms and improved rail service. It would probably show that SG around High Quality Transit supports higher ridership.

The **equity of finance** concerns who pays and who benefits. The Agency process assumes general taxes to pay for infrastructure benefitting a general population and no clear information about redistributive effects, which may go either way. However, transit in moderate to low income areas and denser areas tends to benefit the less affluent, while highways benefit the more affluent. Longer distance transit may have balanced results, but if access is by free parking benefits the affluent.

Economic efficiency concerns how much a good or service is distributed by prices and how much by government. Prices that internalize currently externalized costs give buyers appropriate signals for the cost of their behavior and economize accurately, as well as reducing the imposition on those now bearing the external costs.

Income relates to how well a sustainability plan would improve general income and improves income distribution, as measured by median per capita income, quintile ratios and the Gini coefficient.

Other important topics also fall beyond the scope of study of SPS, the Agencies, or the BAA, but are part of the BAA Compact: 1) Increasing investment in education and training for high tech and other skills shortages to help current residents qualify and compete for jobs; 2) Regional GPI and regional Ecological Footprint for different scenarios; and 3) Fiscal reform to reduce zoning for dollars and to implement local government revenue sharing. There are probably some additional commitments and policies in the BAA Compact that are overlooked. I am not advocating they be studied now, because we don't have the resources to do so, but rather that we keep track of them because they are important.

Sample sustainability worksheet

SUSTAINABILITY FOR ALAMEDA COUNTY

ABAG reports the **current situation** in Alameda County and its five superdistricts:

		ABAG 2000		
	Superdistrict	Employed Residents	Total Employment	Difference
15	Livermore/Pleasanton	93,988	117,602	(23,614)
16	Fremont/Union City	167,213	131,152	36,061
17	Hayward/San Leandro	154,970	160,933	(5,963)
18	Oakland/Alameda	196,116	209,560	(13,444)
19	Berkeley/Albany/Emeryv.	82,315	106,542	(24,227)
Alameda County		694,602	725,789	(31,187)

ABAG shows a net 31,187 workers commuting into the county. Here is the situation ABAG projects for the **year 2020**:

ABAG 2020				
	Superdistrict	Employed Residents	Total Employment	Difference
15	Livermore/Pleasanton	147,291	187,629	(40,338)
16	Fremont/Union City	203,746	177,759	25,987
17	Hayward/San Leandro	185,550	194,013	(8,463)
18	Oakland/Alameda	237,725	261,932	(24,207)
19	Berkeley/Albany/Emeryv.	97,597	124,009	(26,412)
Alameda County		871,909	945,342	(73,433)

ABAG predicts a significant growth of employed residents but with so much growth in employment that workers commuting into the county increase to a net 73,433 in 2020. With ABAG 2020, the job-housing balance gets much worse.

We could manage Alameda County for slower or for less growth. The SPS numbers below are rough estimates. They assume, for the nine counties of the Bay Area, half as much growth of employed residents as ABAG 2020. In Silicon Valley and San Francisco housing growth is the same as ABAG, but employment growth is slowed down to allow housing to partially catch up with the huge surplus of jobs. For the Bay Area, the SPS grows employment at a rate that will equal employed residents by 2020; it achieves a regional job-housing balance. For Alameda County, the Sustainability Plan Scenario, could look like this:

Sustainability Plan Scenario (SPS) 2020				
	Superdistrict	Employed Residents	Total Employment	Difference
15	Livermore/Pleasanton	101,037	123,482	(22,445)
16	Fremont/Union City	180,590	144,267	36,323
17	Hayward/San Leandro	168,917	174,612	(5,695)
18	Oakland/Alameda	215,728	230,516	(14,788)
19	Berkeley/Albany/Emeryv.	90,547	117,196	(26,650)
Alameda County		756,819	790,074	(33,255)

With SPS, despite substantial growth, workers commuting into the county remain about the same as today, a big improvement over ABAG 2020. Here is how the growth rates compare between ABAG 2020 and SPS 2020:

	Superdistrict	Employed Residents % growth		SPS increase in ER 2000 to 2010	Total Employment % growth	
		ABAG 2020	SPS 2020		ABAG 2020	SPS 2020
15	Livermore/Pleasanton	56.71%	7.50%	7,049	59.55%	5.00%
16	Fremont/Union City	21.85%	8.00%	13,377	35.54%	10.00%
17	Hayward/San Leandro	19.73%	9.00%	13,947	20.56%	8.50%
18	Oakland/Alameda	21.22%	10.00%	19,612	24.99%	10.00%
19	Berkeley/Albany/Emeryv.	18.57%	10.00%	8,232	16.39%	10.00%
Alameda County		25.53%	8.96%	62,217	30.25%	8.86%

ABAG projects higher trends than SPS for Alameda County, 26 percent growth for employed residents and 30 percent for total employment. It is a huge amount of growth to plan for and makes the jobs-housing balance worse.

Under SPS, Employed Residents and Total Employment each grow about 9 percent. Under SPS, Alameda County needs to plan for housing 62,200 more employees, as compared to 177,307 according to ABAG.

In SD 15 **Livermore/Pleasanton** the SPS allows for some growth but far less than ABAG. ABAG assumes the job-housing imbalance gets much worse, while the SPS improves it a little.

In SD 16 **Fremont/Union City** the SPS allows for some growth with enough job growth to preserve the present balance.

In SD 17 **Hayward/San Leandro** the SPS allows slightly more growth but holds jobs down a little to keep the present balance, which otherwise gets a little worse.

In these three SDs the growth would be Smart Growth around transit and not in the greenbelt.

In SD 18 **Oakland/Alameda** and SD 19 **Berkeley/Albany/Emeryville**, which are more urban, the SPS has a growth rate lower than ABAG but a little higher than the county average because of the potential for smart growth in the old urban core already served by transit. ABAG assumes the imbalance in SD 18 will get much worse, but the SPS prevents most of that. In SD 19, the imbalance remains steady among all three tables.

The SPS allows all cities to grow in population and jobs, and puts the growth in transit-served smart growth locations. The SPS gives an idea about how a plan could be done. Do you think such a plan should be studied by the Regional Agencies and the Bay Area Alliance?