For Smart Growth Network’s National Conversation

Making Suburbs Sustainable

New land use patterns, mobility options and business practices to increase walking and reduce gasoline consumption

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How can land use and transportation be coordinated in order to make suburbs more sustainable? The strategy that dominates the conversation – and planning practice – is essentially to urbanize certain parts or even whole districts of suburban communities.

Building TODs, increasing residential density, creating compact mixed use centers, improving and expanding public transit service, adding pedestrian amenities and redesigning streetscapes in transit priority areas are the basic elements. While this strategy can be compelling to propose, especially because of its success in the early 20th Century, today it is hard to implement and may fit fewer contexts than its advocates believe.

Transit systems are expensive to improve or expand and do not always capture significant mode share, density is not politically feasible everywhere and, in the end, the strategy cannot possibly be deployed on the scale needed to pull all suburbs into the 21st Century.

This paper is proposing a new strategy for the national dialogue – one that shares the goals of Smart Growth but employs different means determined by the context - and one that is affordable, politically feasible, and has components implementable in years not decades.

The core idea is to use all means available to re-organize spatially so that most destinations are closer to more residents while introducing new mobility options, especially range-limited zero emission vehicles just entering the market.

This strategy for Sustainable Suburbs has 3 components; (1) gradual changes to the built environment that make commercial centers more distributed, small and compact (referred to as Neighborhood Oriented Development – NOD); (2) mobility initiatives that aggressively promote alternatives such as zero emission local use vehicles (LUV); and (3) organizations that are less centralized and more distributed consistent with changes to the built environment.

This Strategy has been developed through empirical research and partially tested through demonstration projects in the South Bay Sub-region of Los Angeles County – an area of 1 million people in built-out, relatively dense, transit-poor suburban cities. Similar conditions dominate much of Southern California and can be found throughout the nation.

The developmental research and subsequent demonstrations that established proof of concept and extended the strategy have been sponsored by the South Bay Cities Council of Governments (SBCCOG), one of 16 sub-regional joint powers authorities in Southern California.
Context – Mature Suburban Sprawl

Most suburbs are organized around a grid street pattern of major arterials at one mile intervals in both directions. In mature suburbs, like the South Bay, the edges of those arterials usually contain low density commercial strips, optimally located for access by large volumes of personal vehicles passing by.

Residential tracts, mostly single family, are located inside the grid, resulting in horizontal mixed-use neighborhoods although usually without centers, boundaries or self-awareness.

The private automobile dominates. For example, there are 600,000 vehicles in the South Bay as there is little rail transit currently and not much more anticipated by 2030. Transit mode share is around 3% and, according to Metro, not expected to increase by 2030. We estimate that residents consume around 400 million gallons of gasoline annually at a cost of over $1.6 billion.

The South Bay has no green fields so all development will involve replacement of existing structures. Many of the residential and commercial structures were built in the 1950s and 60s. The electorate has little tolerance for adding residential density – existing density (4.1 DU/A) is 1/3 greater than in the City of Portland (3.1DU/A).

What can the South Bay cities and others like them do to reduce gasoline consumption, criteria pollutants and GHG emissions and foster a healthy lifestyle? A new strategy tailored to suburban communities, can combine land use, mobility, and distributed organizations in ways that form an innovative application of Smart Growth principles.

Neighborhood Oriented Development

The research upon which the strategy is based documented two key facts about suburban travel, at least in the South Bay. Neighborhoods with a compact commercial center laid out in geometries focused inward supported more walking and less driving. Controlling for other factors, persons drove 33% less in those centers. Concentrations of neighborhood oriented businesses were also associated with more walking and less driving. See references (1), (2) and (3). The grid pattern of the South Bay, and much of suburbia, with long arterials that disperse businesses linearly, is more conducive to auto travel than to walking. Neighborhood Oriented Development (NOD) is a strategy for reshaping linear corridors into centered neighborhoods.

NOD involves 1) creating a series of compact mixed commercial centers at the intersections of major arterials scaled to serve the adjacent residential walking neighborhoods and other neighborhoods within 3 to 4 miles, a distance consistent with the range of local use vehicles; 2) migrating the existing commercial businesses from
the strip into the neighborhood center; and 3) replacing commercial strips with housing at densities consistent with the adjacent neighborhood. Average residential densities will not increase and space is freed up for developing housing to meet the requirements of California’s regional housing needs assessment (RHNA).

NOD should dramatically increase the mode share of walking – our research found that neighborhoods with commercial centers were associated with walking rates three to five times greater than those seen along linear corridors. Proximity to destinations is arguably the most important factor in the decision to walk. The short distances inherent to NOD are critical for “walkable” environments becoming “walk-actual” without large investments in pedestrian amenities.

Our research discovered that a destination’s “capture rate” – the fraction of trips that are strictly within the neighborhood -- increases as a function of the number and variety of businesses present in the commercial center. This means that travel demand can be reduced if organizations – retailers, service providers and employers – adopt a smaller physical presence and appear in more places rather than locating in a single large central facility. This factor was more important than residential density.

In addition:

- Commercial renewal through NOD should also stimulate private investment in affordable housing preservation and rehabilitation.
- NOD does not rely on population growth since its focus is on clustering commercial destinations not increasing residential densities. NOD can proceed independent of population growth through normal replacement in the building life cycle. Many of the commercial strips in the South Bay are 40 to 60 years old.
- NOD is relatively low cost to plan and implement. Large public investments in infrastructure are not required and most implementation costs for both land development and mobility are paid by private business or individuals.

Our economic analysis discovered that no neighborhood center can be sustained solely by the residents within the half-mile walking distance. Nor can all the needs of those residents be satisfied by their local neighborhood center. This means that circulation between the centers is crucial to the economic and functional success of the strategy. A new development pattern must be accompanied by an affordable mobility strategy.

**Mobility**

The horizontal mixed-use neighborhoods in mature suburbs produce a surprising travel pattern – most non-work trips are relatively short. In the South Bay, those trips vary between .25 to 4 miles, with most less than 2 miles. There is, in effect, a missing mode.
Travel in the South Bay, as in virtually all of mature suburbia, is either by walking or by car. Yet most trips are in a middle range – too long for walking, yet short enough that auto travel (the dominant mode) is an inefficient choice. A mode is needed that is lighter on infrastructure and the environment, while facilitating on-demand travel for trips of a few miles or more.

In order to validate the mobility strategy, the SBCCOG is completing a demonstration and evaluation of neighborhood electric vehicles running on normal, mixed mode streets in regular suburban neighborhoods – the first demonstration of its kind in the world.

Findings to date have shown that these short range, slow speed, zero emission vehicles can carry about 25% of a household’s trips and reduce GHG emissions and gasoline consumption by about 22%. Looking forward, a new family of “personal transportation devices” such as the Geely McCar, Streetcarver, Centaur and Honda U3-X electric mono wheel, to name just a few, are being prepared for market. Electric bikes and Segways are available today.

Zero emission LUVs are not the only mobility options. Full speed, range-limited battery electric vehicles and hybrid vehicles are also entering the market. This fragmentation of the vehicle market into range limited vehicles means that if households make right sized vehicle decisions and destinations are increasingly nearby, gasoline consumption will decline dramatically.

Public transit can and should also play a role. Service innovations such as a local circulator with short headways running between the neighborhood centers should increase the 2.8% mode share forecast by Metro.

Finally, transit service will be needed to connect each cluster of neighborhoods to the regional transit network. One or more neighborhood centers should be designated as a “multi-mobility hub” (MMH) which would provide the primary access point to long haul transit service, serve as the center of the neighborhood circulator, host station cars, taxi stands, bike sharing, shared work center, and so forth. The multi-mobility hub would also be where transit oriented development (TOD) and NOD would intersect.

Distributed Organizations

The traditional policy focus on the built environment leaves out the most dynamic force that determines travel demand – the occupants of the built environment. A building does not require the work force to report to it daily; nor customers to physically shop there. Those reflect the business practices of the occupants (not the building itself), and there are options using IT that require less travel by both employees and customers.
In the future, compact neighborhood centers will require compact retailers. Retailers that commonly use large floor plates will need to reduce their physical presence to neighborhood scale. This trend is underway as Fresh & Easy is re-inventing the neighborhood grocery, and Target is reducing scale in order to squeeze into urban spaces. Planners need to offer incentives for retailers to shrink further into neighborhood centers.

Cost per transaction must decrease in order for small sized markets to support the services that will make neighborhood centers robust. This will inevitably require some form of telepresence. Services that are present virtually rather than physically simply cost less. ATMs have become ubiquitous because the transactions they support are more cost-effective than in a branch bank.

Employers will need to adopt arrangements for their employees to work at home or within a few miles from home in one of the neighborhood centers a couple of days a week. Satellite offices, shared work centers and “network access centers” (such as the Blue Line TeleVillage in Compton or the Riverdale e-Village south of Chicago) are options. Success will depend on leadership backed by appropriate incentives.

**Primary Publications**

(1) “Retrofitting the Suburbs to Increase Walking,” *Access*, Number 39, Fall 2011; Boarnet, Joh, Siembab, et. al.


(3) “Sustainable South Bay: An Integrated Land Use and Transportation Strategy,” Siembab and Boarnet; available at [www.southbaycities.org](http://www.southbaycities.org)

(4) “Neighborhood Electric Vehicles in Mature Suburbs: Demonstration and Preliminary Evaluation” (July, 2011) Siembab&Magarian @ [www.southbaycities.org](http://www.southbaycities.org)

**Research needed** – Developing the means for making the new mobility options affordable to low income families requires more attention. Car sharing is currently being evaluated. A new arrangement for auto financing has promise. Several other projects have been funded -- an economic study of NOD is underway and will be completed by early 2013; work on a Plug-in EV Readiness Plan for the South Bay will begin in August; a 2-year demonstration of full speed Battery Electric Vehicles will begin in September.

**Means to “engage community”** -- Two idea have been discussed. The first is a competition to design the mini-mall (or neighborhood center) of the future. The second is a series of neighborhood “transportation charrettes” which teach households to assess their transportation needs, learn how to right size their mode choices, and evaluate their own neighborhoods and adjacent ones as trip destinations.