



Final Report: Transforming Office Parks into Transit Villages Sept 20, 2009

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Title: **Transforming Office Parks into Transit Villages**

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RFA: [Collaborative Science & Technology Network for Sustainability \(2004\)](#)

Research Category: [Pollution Prevention/Sustainable Development](#)

Objective

San Francisco Bay Area office parks, like most around the country, are segregated from nearby residential communities and retail centers. They are single-use, auto-dominated and isolated. The workers employed in them have poor commute mode splits (78% drive alone, 16% shared ride, 3% transit) and rely heavily on cars for mid-day trips as well. Community needs for in-fill housing, green space, and services cannot be accommodated in these areas because the non-office space is taken up by parking lots. A groundbreaking study of Palo Alto's Stanford Research Park identified a new concept to significantly reduce driving, provide non-auto transportation to workers and the community, reclaim 50 acres of parking for critically needed housing, and connect the 20,000 workers with the surrounding community. The new concept includes elevated personal rapid transit and "comprehensive new mobility."

Duplicate the study methodology for Stanford Research Park at another Bay Area office park, Pleasanton's Hacienda Business Park. Compare outcomes and issues, create an inventory of similar Bay Area sites, and create a guidebook for similar analyses based on the two original studies.

Expected Results:

In the long term, success is cumulative decreases in air, water and soil contamination from auto use, deferment of road and parking infrastructure increases, a better jobs/housing balance within local sub-county areas with more proximate commutes by foot, bike, and transit, job creation and increased mid-day business for merchants near office parks, and more socially dynamic, pedestrian-friendly communities. In the short term, success is a validated model for analyzing and planning the transformation of one office park at a time.

Project results, lessons learned and the how-to-guide will be shared regionally and nationally through a combination of website publication, regional workshops, and national conferences. Groups representing key audiences (planners, local governments, MPOs, transit agencies) will be used to disseminate information to their members.

Long-term beneficiaries include employers, employees and management groups at office parks, persons needing affordable housing close to jobs, local governments, and all members of the local communities via better transportation options and access to goods and services. For aging office parks with 25-year-old buildings, innovations help a) keep the real-estate competitive, avoiding extinction and b) create better, more economically competitive places offering higher efficiency and lower costs. Short term beneficiaries include office park investors, local governments and in-fill developers seeking new approaches to reduce auto impacts and re-use reclaimable land.

Science and engineering involved include location-tracking wireless cellular applications for commute-alternative support, GIS 'commute shed' map, stated preference demand analysis surveys, and innovative transportation design with excellent inter-modal connections.



Study tasks:

1. conduct GIS journey to work analysis

Outputs/results:

Commute to Hacienda Biz Park, commute mode split:

SOV: 83.67%

Carpool: 11.11%

Bus: 0.72%

Rail: 0.96%

Bike/Ped: 1.65%

CTPP3 census tract journey to work map, 1.5MB, 6K x 7K resolution:

<http://www.cities21.org/BABPC/HBPtractShed.png>

2. design "advanced corridor sweep" service

This concept is called variously: "iPooling," "instant ridesharing," and "flexpooling."

Outputs/results:

Flexpooling map & explanation: <http://www.cities21.org/FlexPool.pdf>

Flexpooling is described in: *Major Activity Center PRT Circulator Design: Hacienda Business Park*. Transportation Research Record #2006 (TRB 1/07). http://www.cities21.org/TRB_PRT_HBP.pdf

2A. Project: instant ridesharing / iPooling

With traditional carpools, members are selected and then the carpool proceeds most weekdays for months without change. With dynamic ridesharing (DRS), one-time carpools are arranged within 3 days of the trip. With new GPS cellphone technology (Apple iPhone & Google Android T-Mobile phones), "instant ridesharing" (IRS) is enabled, where one-time rides are arranged within minutes of the start of the trip. With IRS, a person may carpool every day, but with the flexibility of a different departure time and group of people each day.

Outputs / results

- Developed a new iPooling concept, San Francisco to Silicon Valley Instant Ridesharing with San Bruno Transfer Hub. Think of it as an extension of the Bay Bridge Casual Carpooling concept. Details: http://www.cities21.org/TRB_SFtoSJ_iPooling_with_Hub.pdf
 - Submitted academic paper for Transportation Research Board 2010 Conference
 - Submitted the project concept in the Intelligent Transportation Society of America "\$50,000 Congestion Challenge." This project was rejected.
- Submitted an "Instant Rideharing Pilot" grant proposal, in partnership with Santa Barbara Community Environmental Council. The grant proposal was rejected.
- Teamed with South Florida Commute Services and the national Center for Urban Transportation Research, submitted a Miami instant ridesharing project as a research topic for the National Center for Transit Research. This proposal was not adopted.

3. create automated shuttle alignment

Outputs/results:

Proposed is a 47-station, 15 mile one-way guideway PRT system for Pleasanton's Hacienda Business Park (HBP) major activity center and surrounding area:



Very high resolution version: 25MB, 8K x 10K resolution: http://www.cities21.org/HBP08_360dpi_24x30.jpg

4. refine portions of the previous Stanford Research Park Solution

4A. \$2 Daily Workplace Parking Charge + \$4 Cashout.

In the previous Stanford Research Park (SRP) study, “paid, automated smart parking for a large office park” was explored. Within this EPA study, the SRP concept was refined by in-depth study:

This complicated driving reduction pricing proposal offers large VMT reduction and is less draconian than other measures that are currently being promoted. If business/voters reject/dilute the current batch of conceptually simpler pricing proposals: carbon tax, cap and trade, congestion pricing, large gas tax increase, and substantial parking charges, then this policy may arise as a more palatable alternative.

Past efforts to convert free workplace parking to charged or cashout have not flourished. This new scheme begins with \$0.25/day charge and \$1/day cashout. Charges/cashout increase over time to \$2/\$4 as other companies adopt the scheme, addressing the previous recruiting/retention objection. Trust-based, self-reporting enables very low-cost implementation, addressing the previous cost objection. The scheme is marketed to workers as a climate-protecting measure. Potential U.S. commute VMT savings is 23%, reducing 51.7M tons CO₂/year. Compared to past efforts, this scheme uses a) collective, phased action to overcome the Tragedy of the Commons, b) simultaneous charge and cashout, c) trust-based reporting, and d) monetization of saved parking spaces. A company that voluntarily implements this scheme risks productivity-reducing internal employee strife between climate protectors and climate skeptics. To address this objection, a “good cop, bad



cop" strategy is proposed. A state threatens a more draconian policy. In the face of a more draconian solution, stakeholders grudgingly adopt this scheme.

This policy research is informed by behavioral psychologists, listserv sounding boards including transp-tdm, and advocacy to nine large Silicon Valley employers. A web-based employee survey was developed to understand qualitative issues associated with the scheme. The survey presented the scheme as a policy debate, with pros and cons, asking respondents for short essay responses. The 55 responses: a) identified special cases in need of clarification and b) provided colorful and useful comments from the extreme ends of the response spectrum.

Details: http://www.cities21.org/TRB_Paid_Parking2.pdf

Outputs/results:

- Developed new finding: \$4 per day parking cashout at suburban job sites is not cost-effective.
- Developed first "breakeven" calculation for adjusting charge and cashout level to be revenue neutral to employers.
- Shared results with "climate / transportation pricing" experts at: CA State Climate Action Team LUSCAT (Land Use Subgroup of the Climate Action Team), SB 375 Regional Targets Advisory Committee, Environmental Defense, Natural Resources Defense Council, CA State Senator Simitian's staff, State Senate Transportation Committee Staff, Bay Area Metropolitan Transportation Commission, TransformCA, Silicon Valley Transportation Authority, and Silicon Valley Leadership Group.
- Unsuccessfully advocated the corporate first-mover (bottom up) strategy to Apple, eBay, Google, Yahoo, HP, and Genentech.
- Submitted the policy as a research topic for the National Center for Transit Research. This proposal was not adopted.
- Submitted the policy in the Intelligent Transportation Society of America "\$50,000 Congestion Challenge." This policy was rejected.

4A.1) Overcoming the Tragedy of the Commons via Persuasive, Educational Surveys

With the Tragedy of the Commons, the self-interested majority favors a climate-harming policy because of perverse individual incentives. "If only I change, I'm worse off; if we all change, we're all better off ... hence, I won't change." A self-interested U.S. voting majority favors free suburban workplace parking to subsidize solo commuting over green commute alternatives. A persuasive survey provides a "fair" set of pro/con policy arguments (where "fair" follows political science "dual competing frames" theory). The pro-climate arguments are based on a richer set of facts, but the main argument is an explanation of the Tragedy, followed by an appeal for long-term over short-term optimization. The survey was sufficiently persuasive to "change belief" to bring about a pro-climate voting majority.

For complex Tragedy of the Commons issues, Walter Lippmann's 1922 critique is accurate: citizens are ill-informed and hold oversimplified policy views.

Three parking facts within the parking survey are "new" to respondents and are persuasive:

- Driving has to be reduced to meet climate protection objectives.
- Commute/parking behavior is radically different in San Francisco versus Silicon Valley, because of parking pricing
- Free suburban office parking represents a perverse \$7.59 per day subsidy for harmful single occupant vehicle commuting.

Details towards the bottom of: http://www.cities21.org/TRB_Paid_Parking2.pdf

Outputs/results:

- A new contribution to the field of political science regarding overcoming the Tragedy of the Commons.



4B. Carbon Reducing Housing Preference (CRHP) or Traffic Reducing Housing (TRH)

Office parks have an opportunity to add housing with efficient policies. Some existing suburban job centers with housing include: HBP, Tysons Corner (VA), Denver Tech Center, and Perimeter Center. There is interest in ensuring that this housing will serve office park workers, resulting in minimized vehicle mileage. A policy to prioritize local housing for workers was first explored in the previous SRP study report's Local Workforce Housing Preference Appendix. The study team relied on the stature of the EPA to convene local and national housing experts in a series of roundtable discussions at EPA facilities. Thus, the CNS program has been instrumental in furthering this policy concept. Additional interview research within specific local policy contexts has helped to "debug" this policy approach.

For new apartments and condos, Carbon Reducing Housing Preference (CRHP) selects residents with fewer cars who will drive less. CRHP is the most cost-effective residential auto trip reduction policy and results in the largest commute mode shift change away from solo commuting. The first application was at Palo Alto's Stanford West Apartments. Commute driving at Stanford West is a tiny fraction of the average Palo Alto resident. CRHP saves 3 tons of CO₂ per home per year. Thanks to Cities21, Redwood City has recently pioneered this policy for the 800-condo market rate Peninsula Park project (the project has not received environmental approvals yet). Peninsula Park proposes four housing preference tiers:

- Households that have no adult members who commute.
- Incoming households where all employed adults agree to commute to work via commute alternatives 80% of the time.
- Incoming households where one employed adult agrees to commute to work via commute alternatives 80% of the time.
- Incoming households with one adult member with a 4.0 mile or shorter commute.

Without such housing preference, South Bay Area transit-oriented development (TOD) dramatically underperforms compared to East Bay TOD. Housing in cities such as Palo Alto is so desirable that high driving commuters "crowd out" green commuters in the battle to reside next to Caltrain. Per Travel Characteristics of TOD in California (Caltrans funded research authored by Lund, Cervero, and Willson), residential TOD by East Bay BART stations produces 40% transit commute mode share (and 50% auto share). Residential TOD by South Bay Caltrain commuter rail stations produces only 17% transit mode share (and 80% auto share). Thus, South Bay TOD, while outperforming adjacent non-TOD (5% or less transit mode share), is still very auto-centered. CRHP can leapfrog Palo Alto TOD commute market share beyond East Bay TOD. Further, CRHP encourages all forms of green commuting, including biking and carpooling.

Many Bay Area cities already have preferences (or have considered preferences) for teachers, public safety officers, and/or public employees, but none of these programs provides significant traffic reduction compared to CRHP. These cities include Cupertino, Larkspur, Los Altos, Menlo Park, Milpitas, Mountain View, Oakland, San Anselmo, San Carlos, San Jose, San Francisco, San Rafael, Sunnyvale, Tiburon, and Walnut Creek.

Three pioneering CRHP examples: Stanford, Santa Barbara, Redwood City

A) Stanford West: 628 apartments

Stanford provides priority to local workers with very short commutes, saving 2.6 million annual vehicle miles traveled and 2.6 million annual pounds of CO₂. Stanford West residents with green commutes receive a 10 percent monthly rent discount. Stanford provides a top-notch shuttle bus system and an extensive dedicated bike path network. Stanford charges \$51 per month for employees to park on campus, and that parking isn't very convenient.

B) Santa Barbara's Casa de Las Fuentes

For 42 affordable downtown apartments with excellent access to jobs, shops, recreation, and transit, Santa Barbara adopted green commute housing preferences:

Cities21



- First priority: for residents who work downtown who do not own a vehicle and agree to not own one during their occupancy. Rent is \$50 per month less for residents who do not park a car. All employed household members must work only in the downtown area.
- Second priority: for residents who work downtown

The 42 unit development has only TWENTY CARS!

C) Redwood City's Peninsula Park - 800 condos

This project is still seeking delicate environmental approvals, but represents the U.S.'s first proposal to apply CRHP to market rate condos. Redwood City has a vibrant mixed-use downtown with a Caltrain commuter rail station. There are 85,000 jobs within 3 miles of the project site. The Peninsula Park project will feature a 0.8 mile bike path to downtown and a 1.4 mile shuttle bus route to downtown. The developer's banker has already approved CRHP - that's an important occurrence that should be noted. Innovations such as these are not readily supported by the real-estate lending community.

Details: <http://www.cities21.org/workerHsng.htm>

Outcomes / Results

- Cities21's results sharing the Loma Prieta Sierra Club Transportation and Land Use Committee meeting persuaded the 800-condo market rate Peninsula Park residential project to adopt CRHP.
- Shared results with the Bay Area Metropolitan Transportation Commission

4C. Low Miles Community

In the Stanford Research Park (SRP) study that preceded this study, two concepts were introduced: a) a "neighborhood commute community" and b) a "web-based commuting community." Within this EPA study, these two concepts were expanded into "The Low Miles Community" concept:

The Low Miles Community (LMC) concept seeks to create and sustain low driving, green communities. 100% of residents in large residential complexes will pledge to reduce vehicle trips by using alternative modes of transportation, such as carpooling, vanpooling, bicycling, walking, telecommuting, or taking transit. The residents' efforts will be electronically monitored to measure the impact of behavioral changes related to transportation. LMCs will use online groupware technology, social marketing, and neighborhood gatherings to facilitate the evolution of a dual physical/cyber culture within these communities. This culture will provide positive social reinforcement and place a high value on a green lifestyle not centered on the private automobile. Each community will develop innovative auto-reducing solutions and will share these solutions with other LMCs.

LMC behavior change begins with meaningful pledges that are visible/known to the local peer group, changing individual self-perception. Peer pressure further reinforces behavior change and ensures that behavioral norms change permanently. The use of effective sociological persuasion techniques contrasts with on-line behavior change pledges such as <http://www.climateprotect.org/pledge>, <http://green.yahoo.com/pledge/create>, <http://mcp.editme.com/makeapledge>, and <http://www.ospirgstudents.org/action/climate/cascade-climate-pledge>. Sociological research has shown that these on-line pledges are soon forgotten and do not lead to lasting behavior change - human behavior change is much more complicated.

The LMC concept has potential to: a) expand to cover more than one million homes over ten years, b) increase real-estate development profits by reducing parking costs, c) generate about \$0.10 per auto mile reduced via "pay for performance" transportation infrastructure reduction (a la Houston), and d) generate Cap And Trade carbon reduction revenue.

Details: <http://www.cities21.org/LMC/>

Outputs/results:



Efforts to bring about a pilot LMC have been unsuccessful. In developing pilot proposals, Cities21 partnered with two university research centers that offer unique expertise. The University of South Florida's Center for Urban Transportation Research, is the world's top transportation demand management (TDM - reducing auto trips) research center. In the UK, the University of Surrey's RESOLVE program "is a new and exciting collaboration involving four internationally acclaimed departments: the Centre for Environmental Strategy, the Surrey Energy Economics Centre, the Environmental Psychology Research Group and the Department of Sociology." RESOLVE emphasizes green behavior change centered around: a) long term lifestyle change, b) changing identity and self-concept, c) understanding what role can communities and social norms play in negotiating the transition to a sustainable energy economy, d) change brought about through collective action grounded in social processes / people's identification with place.

In the US, the LMC proposal was submitted to Google.org, Yahoo's green team, Omidyar Network (social networking portal created by one of eBay's founders), Charles Brewer (founder of new urbanist developer Green Street Properties in Atlanta), Toll Brothers (one of the top 10 U.S. residential real-estate developers), and Forest City Enterprises (another large U.S. developer).

In the UK, the study team attempted to locate two new residential communities near Surrey, to serve as LMC pilots where RESOLVE grad students could live within the community. Contacted were: the regional government (GOSE), the national eco-towns program, and the UK Minister for Housing and Planning. Long-term UK national policy is favorably disposed towards LMCs. RESOLVE researchers claim:

"The UK Government's 'Community Action 2020 – Together We Can' that was announced in the Sustainable Development Strategy has the stated aim of re-energizing action in communities across England "to achieve a step change in the delivery of sustainable development...by promoting new and existing opportunities to enable, encourage, engage and exemplify community action to increase sustainability" (HM Government, 2005: 29). This approach highlights community engagement in governance as a central facet of a sustainable society and pinpoints several areas where learning and behavioral change are considered most likely to be effective through the agency of community groups. These include tackling climate change, development of transport projects, improvement of the quality of the local environment, and the promotion of sustainable consumption."

4D) Real-time office park car counts / smart parking

Based on the research from the previous SRP study's Smart Parking work, a grant proposal was submitted with the City of Pleasanton to the Bay Area Metropolitan Transportation Commission (MTC) to create the world's first "real-time office park car counting system," based on the existing Pleasanton traffic loop system.

The project concept covers measuring parking counts (roughly 14,000 cars at 10AM every week day) every day in 15 minute intervals via automated means. The benefits of such real-time car counts are as follows:

- Counts will assist in making better urban planning decisions, based on objective data. As HBP grows and moves forward with its evaluation of mixed-use transit-oriented development, accurate data will help Pleasanton to better assess the effectiveness of linkages created between jobs, housing and transit. Doing so will more substantively demonstrate the benefits of land use decisions over the more traditional model-derived LOS calculation. Because of upcoming capacity enhancements to nearby Highways 580 and 680, having accurate car counts will also greatly assist in monitoring the local impacts of these large regional investments.
- Counts allow accurate measurement of transportation demand management (TDM) program efficacy, providing HBP with a greater capacity to experiment with and adjust innovative TDM schemes. Without car counts, it is very hard to measure the impact of new TDM programs.
- An accurate car counting system will save Pleasanton the money being regularly spent on manual car counting projects.
- HBP-wide counting is an evolutionary step on a path that will eventually permit parcel specific assessment, allowing even better fine-tuning of TDM policies.
- It is envisioned that such car counting "instrumentation" will spread to many other major employment centers.



This outside-of-the-box proposal was rejected, but it resulted in the creation of a detailed work scope for such a project should funding opportunities arise in the future.

5. refine the previous survey script and protocol

Outputs/results:

- Hacienda Transit Fair promotional instrument: http://tod.hacienda.org/PRT/Oct5_transpFairHacienda.pdf
- Hacienda Transit Fair survey recruiting tool: <http://tod.hacienda.org/PRT/SurveyFlier.pdf>
- Refined commute profile survey: <http://www.hacienda.org/forms/plantransit>
- Refined future commute preference survey: <http://www.cities21.org/haciendaFutureCommute.htm>

6. conduct on-site and web-based employee surveys

In a letter to the EPA in 2005, a Fortune 500 employer committed to 225 employee surveys at their Pleasanton campus. Further, this employer agreed to buy each employee survey respondent lunch, a \$2,250 commitment to the study. Later, this major employer was acquired by another company and the acquiring company did not honor the previous commitment, creating a very significant problem for the study commitment to 225 completed surveys. Addressing this problem ate up considerable study time and budget. Thanks to the recruitment of Kaiser Permanente, the study resulted in 346 completed employee surveys.

The effort that was expended over three years was much more than was expected, but the resulting participation level was very high. This was surely one of the largest sets of respondents ever for such an involved survey protocol of office park workers.

Outputs/results:

Hacienda’s future commute preferences corroborate the previous Stanford Research Park (SRP) study’s results. PRT new mobility is shown to forecast a 26% nominal reduction in solo commuting:

	current mode	future mode
SOV	68.75%	42.55%
Rail	8.46%	14.88%
Bus	6.21%	11.06%
Carpool	9.94%	17.63%
Bike/walk	2.44%	9.53%
Flexpool pax	0.00%	4.34%

- Survey respondents indicated they planned to take 1.45 PRT rides per day, corroborating the previous SRP study results. Of those 1.45 rides per day, 0.88 were for commuting last mile and 0.57 were for mid-day activities. The breakout of last mile versus mid-day activities is a new contribution.
- 500 Hacienda employees completed commute profiles and then received customized commute plans. 290 of these profile respondents successfully completed the Hacienda Future Commute survey.
- The survey found that each day, 4.34% of commuters (some of those with relatively short commutes) would commute as a flexpool passenger. One can imagine more than 800 Hacienda workers walking a few blocks from their home, hitching a high-tech ride with a stranger to a PRT station (from a homogeneous working population), and end up at work avoiding an SOV commute. This is a new contribution.
- A summary of the 2006 FutureCommute survey responses, generated from Hacienda-wide promotion and Hacienda Commute Fair is provided. These respondents current commute behavior favors



commute alternatives more than the wider Hacienda working population, as these participants showed their interest in commute alternatives by attending the Commute Fair.

http://www.cities21.org/HBP_SurveySummary.pdf

- A summary of the 2008 FutureCommute responses by Kaiser Permanente employees is provided. These employees work in very close proximity to the Dublin/Pleasanton BART station, so would be expected to request fewer PRT commute last mile rides than the wider Hacienda working population. http://www.cities21.org/Kaiser_FutureCommute.pdf
- In creating customized commute plans, the study team identified numerous short-comings with MTC's Take Transit Trip Planner. The team's suggestions and test cases helped with the new and improved version that MTC implemented.

7. investigate the response of Spanish-speaking hourly workers to the service

This task was not completed as a result of the project cost overruns associated with conducting employee surveys.

8. compare Hacienda Business and Stanford Research Park results

Outputs/results:

Comparison provided in: *Major Activity Center PRT Circulator Design: Hacienda Business Park*. Transportation Research Record #2006 (TRB 1/07). http://www.cities21.org/TRB_PRT_HBP.pdf

9. compile inventory of Bay Area office parks

The study team identified 17 Bay Area suburban major employment centers, 13 in Silicon Valley. The boundaries of Silicon Valley centers are drawn somewhat arbitrarily as many touch each other. The 17 centers are mostly traditional suburban office parks with many tech workers. Exceptions to traditional office parks include: a) Emeryville is an edge city with more than 1MM square feet of retail and extensive residential, b) Stanford University encompasses the University, the regional Stanford Shopping Center, Stanford Hospital, and downtown Palo Alto, c) SJC is the San Jose airport major activity center, d) Walnut Creek is a suburban downtown with dense employment. Major employment centers in the urban downtowns of San Francisco, Berkeley, Oakland, and San Jose were excluded.

17 Bay Area suburban major employment centers:

	Workers	City	Typology
HBP	20,777	Pleasanton	Mixed use edge city w/ sharp boundary
SSF	32,445	SSF	Major employment center w/ sharp boundary
SRP	24,763	Palo Alto	Named employment center w/ sharp boundary
Bish	23,894	San Ramon	Named employment center w/ sharp boundary
emery	17,952	Emeryville	Mixed use edge city w/ sharp boundary
Stan	39,204	Stanford	Mixed use edge city w/ sharp boundary - incl dntrn PA
shore	25,103	Mtn View	Named employment center w/ sharp boundary
moftet	33,837	multiple	Named employment center w/ sharp boundary
whisman	25,836	Mtn View	Portion of Silicon Valley job glob
greatam	47,836	Santa Clara	Portion of Silicon Valley job glob
nFirst	82,801	San Jose	Portion of Silicon Valley job glob
237680	47,612	Milpitas	Major employment center w/ a Great Mall, sharp boundary
oakmead	75,701	Sunnyvale	Portion of Silicon Valley job glob
SJC	21,359	San Jose	Airport major employment center
Cup	32,115	Cupertino	Lots of Apple jobs, residential. A big mall. Fuzzy border.



IBM	15,904	San Jose	Named employment center w/ sharp boundary
walnut	26,935	Walnut Creek	Fully mixed use edge city w/ sharp boundary
Total	594,074		

Each center has at least 15,000 jobs. The 17 centers support a total of 594,000 jobs. SOV commute mode share varies from 85% to 65%. The Stanford University job center stands out with 16.8% of commuters biking or walking to work. The other 16 job centers clump between 4.9% and 0.6% bike/ped commute mode share. Stanford's program to put housing by jobs is shown as a singular success in the high-mileage world of suburban job centers.

Commute distance appears longer than was previously thought. A mean "crow flies" one-way commute distance (Stanford Research Park) of 14 miles translates into roughly 18.2 driving miles. Other commute surveys report Silicon Valley commute distance of 14 miles. The CTPP3 data used in this EPA study uses a larger sample than other studies and has less sample bias. This result may point out that the high income workers in job centers live farther away than typical suburban workers, or it may simply point out that other phone surveys underreport commute distance, because higher income workers are more likely to hang up on tele-market researchers.

A very limited print run of a 17x11 "coffee table book" of the Business Park Catalog went to press in March of 2007. The table book provides a series of maps on two facing pages, creating 17x22 maps of labor sheds, etc.

"Cities21's excellent work is a compelling read for all planners struggling to present flow data from CTPP. I was impressed with the quality of maps, and concise presentation. I hope to see many more such case studies using Census data for analyzing commute sheds using CTPP data." - Nanda Srinivasan is an Associate with Cambridge Systematics Inc. He co-authored the 2000 Journey-to-work Trends Report. Mr. Srinivasan has published several papers using Census Transportation Planning Package and National Household Travel Survey.

Outputs/results:

- Bay Area Business Park Catalog: Please see the "Biz Parks" tab at www.cities21.org
- Cities21 interacted with US Census Bureau and the Federal Highway Administration on this work. Cities21 highlighted a number of data quality problems with government datasets. This directly led to a \$60,000 third party study funded by the National Academy of Sciences: "NAS NCHRP 08-36/task 81, Enhancing the American Community Survey Data as a Source for Home-to-Work Flows." <http://www.trb.org/trbnet/ProjectDisplay.asp?ProjectID=2403> .
- Insights from the BABPC led to results sharing and an expert recommendation for better trip diary data for the Bay Area's Regional Transportation Plan: [http://www.cities21.org/MTC RTP_C21.htm#trip diaries](http://www.cities21.org/MTC_RTP_C21.htm#trip_diaries)
- Insights from the BABPC led to results sharing and an expert recommendation for better journey to work data:

The CA Climate Action Team and the Bay Area Metropolitan Transportation Commission (MTC) are very sincere about reducing VMT/carbon via smart growth to protect the climate. Both must have very high quality data to measure the progress of climate protection implementation. Otherwise, both will just be proposing a series of projects without being able to ascertain if they work or not. If the projects don't work, both need to know rapidly, so that they can change course to meet 2020 carbon targets. Nationally, land use related measurement is primitive. State and federal governments really don't know what is happening. MTC has always been the nation's MPO (metropolitan planning organization) measurement leader, but even MTC data is lacking.

To protect the climate, we need innovation in measurement of journey to work information: home origination address and work destination address. We need 95% or better coverage of all Bay Area (and California) workers and all extreme commuters (those who live outside of the 9-county Bay Area but commute in), and we want that 95% coverage updated EVERY year and



made available within three months of data collection. More than 50% of household VMT occurs from commuting.

Heretofore impossible queries will be made possible, such as “San Ramon and Dublin were the fastest growing residential communities in the Bay Area in 2007. 6,000 new housing units were added. What is the distribution of work destinations for these new residents? Is the average journey to work distance shorter or longer than we expect? Are our new policies working like we expected?”

This proposal meets data anonymization/protection standards found in European Parliament Privacy Directive 95/46/EC, the strictest privacy law to date.

Details: <http://www.cities21.org/journey2workData.pdf>

Outcomes / Results:

- Shared results and submitted an expert recommendation to CA Climate Action Team LUSCAT, Bay Area Metropolitan Transportation Commission’s Regional Transportation Plan, and Association of Bay Area Governments.

10. create how-to guide

Provided by: *Major Activity Center PRT Circulator Design: Hacienda Business Park*. Transportation Research Record #2006 (TRB 1/07). http://www.cities21.org/TRB_PRT_HBP.pdf

11. Miscellaneous items

11A. Fostering climate protection innovations

SF Bay Area Metropolitan Planning Commission (MTC) develops the 9-county Bay Area Regional Transportation Plan (RTP), planning out to year 2030. Cities21 shared results and submitted an expert recommendation to develop an Innovations Grant Program, focused on climate protection. Many grant programs are limited to conventional best practices and prohibit the development of innovations beyond best practices. The U.S. Environmental Protection Agency’s Collaborative Sustainability Network grant program encouraged innovative grant proposals, and Cities21 benefited by winning one such grant. Cities21 proposed that MTC support innovative pilot projects and research that goes beyond best practices. (Details: http://www.cities21.org/RTP_SG_challenge.htm)

MTC adopted the Cities21 recommendation and a new, well-funded grant program called the Climate Grants Program was created:

The Climate Grants Program will fund major demonstration projects to test the most innovative strategies to promote changes in driving and travel behaviors. Given that this is the first time that the region has focused its energies on a climate protection initiative, this program provides a great opportunity to learn what kinds of strategies can most effectively reduce GHG emissions. Potential projects may seek to increase the use of low-GHG alternative fuels, expand car-sharing programs, or implement low-GHG tire incentive programs or pricing demonstration projects.

11B. General Plan Updates: Transforming Office Parks into Transit Villages

Submitted recommendations to adopt major portions of this EPA study’s concepts and policies for

- Tysons Corner (VA) Specific Plan
- Redwood City (CA) General Plan Update
- Palo Alto (CA) General Plan Update
- Hillsboro (OR) Tanasbourne / OHSU / AmberGlen Specific Plan



11C. After the project was awarded, the project added three new research collaborators: Bay Area Rapid Transit District, Bay Area Council, and Santa Clara County Valley Transit Authority

Publications

Major Activity Center PRT Circulator Design: Hacienda Business Park. Transportation Research Record #2006 (TRB 1/07). Published as part of U.S. EPA's "Transforming Office Parks into Transit Villages" study. Co-authors: James Paxson, David Maymudes.

ABSTRACT: The design of a comprehensive mobility system for a suburban San Francisco East Bay Area office park exposes a number of new transit circulator implementation challenges. Original system design perspectives are provided regarding:

- "Horizontal mixed use" and how resident out-commuters will generate more trips than employee in-commuters.
- Line haul transit capacity constraints loom as an obstacle to rapid spread of PRT circulators
- PRT station placement challenges with office park "superblocks"
- Design methodology to allocate PRT stations to workers and residents
- Ideal office park characteristics for PRT alignments
- Problems with generating too much PRT circulator ridership solved by semi-independent loops
- Multimodal transit hubs at the edges of the PRT alignment
- PRT alignment "style choices"
- The need for folding grocery carts (and other solutions) when the car is left at home

Full Paper: http://www.cities21.org/TRB_PRT_HBP.pdf - 4.4MB

Bay Area Business Park Catalog. Catalog of commute patterns for 17 major job centers with 594,000 employees. Published as part of U.S. EPA's "Transforming Office Parks into Transit Villages" study, 1/26/07. Catalog: <http://www.cities21.org/BABPC/>

Efficient Edge Cities of the Future. Engineers for a Sustainable World Conference, October 5-9, 2005 Austin, TX.

ABSTRACT: A "story-format" roadmap is provided to reduce edge city per-capita energy consumption by 50%. The roadmap provides an integrated vision combining: multimodal transit, ridesharing, demand management, land use, market forces, policy, technology, and paradigm re-thinking. Changing away from an auto-centered, petroleum-based lifestyle represents a lifestyle change, but not a sacrifice.

Web and GPS cell phones help create a "comprehensive new mobility" system to make green transportation seamless and hassle-free. "Paid smart parking" reduces solo commuting by 25%. "Low Miles residential communities" foster green culture, where residents help each other to reduce carbon dioxide. This green culture is created using the same powerful sociological marketing principles that drive consumer society. Housing preference policies are used to select new residents who will travel less and use green transportation. Two-car families sell one car. As the real-estate gradually changes, asphalt-dominated superblocks are transformed into walkable, New Urbanist locales. Walking, biking, electric scooters, and Personal Rapid Transit enable more than 50% of trips (commute, errands, recreation, etc.) to be made without driving alone. Each of the nation's 200 35,000-employee edge cities can be transformed into huge transit villages of two square miles or more. Through this simple step-by-step plan, you'll save money, shed pounds, meet neighbors, hang out in more lively places, and pay lower taxes.

Full paper: http://www.cities21.org/TRB_Efficient_Edge_Cities_4.pdf

\$2 Daily Workplace Parking Charge + \$4 Cashout. Presented to TRB Transportation Demand Management Committee, Jan 14, 2009.

ABSTRACT: This complicated driving reduction pricing proposal offers large VMT reduction and is less draconian than other measures that are currently being promoted. If business/voters reject the current batch of conceptually simpler pricing proposals: carbon tax, cap and trade, congestion pricing, large gas tax increase, and substantial parking charges, then this policy may arise as a more palatable alternative.

Past efforts to convert free workplace parking to charged or cashout have not flourished. This new scheme begins with \$0.25/day charge and \$1/day cashout. Charges/cashout increase over time to \$2/\$4 as other companies adopt the scheme, addressing the previous recruiting/retention objection. Trust-based, self-reporting enables very low-cost implementation, addressing the previous cost objection. The scheme is marketed to workers as a climate-protecting measure. Potential U.S. commute VMT savings is 23%, reducing 51.7M tons CO2/year. Compared to past efforts, this scheme uses a) collective, phased action to overcome the Tragedy of the Commons, b)



simultaneous charge and cashout, c) trust-based reporting, and d) monetization of saved parking spaces. A company that voluntarily implements this scheme risks productivity-reducing internal employee strife between climate protectors and climate skeptics. To address this objection, a "good cop, bad cop" strategy is proposed. A state threatens a more draconian policy. In the face of a more draconian solution, stakeholders grudgingly adopt this scheme.

This policy research is informed by behavioral psychologists, listserv sounding boards including transp-tdm, and advocacy to nine large Silicon Valley employers. A web-based employee survey was developed to understand qualitative issues associated with the scheme. The survey presented the scheme as a policy debate, with pros and cons, asking respondents for short essay responses. The 55 responses: a) identified special cases in need of clarification and b) provided colorful and useful comments from the extreme ends of the response spectrum.

Full paper: http://www.cities21.org/TRB_Paid_Parking2.pdf

Presentations

2009 Presentations / Conferences

- Western Automotive Journalists Future Cars Conference (http://www.waj.org/Future_Events.cfm), San Jose, Nov. 13. Topic: PRT.
- State of the San Francisco Bay Estuary Environmental Conference (http://sfep.abag.ca.gov/soe/soe_index.html), Oakland, September 29. Poster Session: "Overcoming the Tragedy of the Commons via Persuasive, Educational Surveys," [Description](#). PowerPoint (2.6MB)
- SPUR Panel/Forum: San Francisco Planning and Urban Research Association, San Francisco. Sept. 1, 12:30PM. Topic: Fixing the Burbs, Job Sprawl, office parks, greener commuting, and individual behavior change. [Description](#)
- PRT for Perimeter Center Luncheon, Atlanta. June 3.
- APM 2009 (<http://content.asce.org/conferences/apm2009/index.html>), Atlanta. June 1-3. Topic: Hacienda Biz Park PRT.
- Stanford Urban Studies Urban Professions Seminar. April 22 (Earth Day) 9:00 to 10:30 am.
- UC Davis Institute for Transportation Studies, April 17. Topics: "Less Draconian Driving Pricing" and "Instant Ridesharing: Hope Amidst 15 Failed Pilots." <http://www.its.ucdavis.edu/events/seminarseries/index.php>
- Green Technology Conference, Sacramento, March 17, <http://www.green-technology.org/gcsummit/index.html>. Conference track: Transportation in the Era of Climate Change. Topic: 200 MPG Electric PRT Transit.
- Transportation Research Board Conference, Committee on Emerging and Innovative Public Transport and Technologies (AP020), Jan 12. Topic: Instant/Dynamic Ridesharing Industry Status Report. PPT: http://www.cities21.org/instant_carpooling_TRB.ppt.
- Transportation Research Board Conference, Transportation Demand Management Committee (trip reduction), Jan 14. Topic: \$2 Daily Workplace Parking Charge + \$4 Cashout. Paper: http://www.cities21.org/TRB_Paid_Parking.pdf.

2008 Presentations / Conferences

- U.C. Berkeley, Guest Lecture, Robert Cervero's (author: *The Transit Metropolis*) City Planning 213 *Transportation & Land Use Planning Course*, Nov 26. Topics: Efficient Cities of the Future, Instant Ridesharing.
- Carnegie-Mellon University West (Mountain View, CA). Guest Lecture, graduate Project Management Class (class project was Dynamic Ridesharing), Nov 25. Topic: Instant Ridesharing / flexpooling.
- Rochester, Michigan, Peak Oil Conference entitled *Plan C: Individual and Community Survival Strategies for the Energy Crisis*. Conference is organized by the Community Solutions non-profit: <http://www.communitysolution.org/conference.html>. Topic: Instant Ridesharing / flexpooling.
- Carnegie-Mellon University West (Mountain View, CA) Dynamic Ridesharing Symposium. July 2. Topic: Instant Ridesharing (flexpooling).



- Palo Alto Kiwanis: (<http://div34pakc.thewebsecretary.net/>). Thurs May 8, 12 noon. Topic: [Efficient Cities of the Future](#)
- TransitCamp Bay Area Bar Camp: <http://barcamp.org/TransitCampBayArea> . Sat Feb 23, 3PM. Topic: [Efficient Palo Alto of the Future](#)
- Transportation Research Board Conference, Advanced Transit Association Meeting, Washington DC, Jan 12. Topic: PRT Update.

2007 - Presentations / Conferences

- U.C. Berkeley, November 7, Guest Lecture, Robert Cervero's CP213 *Transportation & Land Use Planning Course*. Topic: [Efficient Cities of the Future](#)
- State of the SF Bay Estuary Conference, October 18. <http://sfep.abag.ca.gov/sfep.html>. Topic: "Efficient Cities: Easy on the C02 and H20." [PowerPoint](#)
- Housing California Conference, Sacramento, April 23-25. <http://www.housingca.org/events/annual-conference>. Topic: [Traffic Reducing Housing](#)
- TALC [Summit](#). March 24. "Make your cool city Super Cool (unlike Palo Alto)." [PowerPoint](#). [Guest Opinion on Housing - Warming](#) .
- Transportation Research Board Conference, Washington D.C., Jan 23. Paper: [Major Activity Center PRT Circulator Design: Hacienda Business Park](#) - <http://www.cities21.org/library.htm#Hacienda>

2006 - Presentations / Conferences

- U.S. Environmental Protection Agency, Pacific Southwest Regional Science Council, Tues Dec 19, 11AM, EPA Region 9, 75 Hawthorne Street, San Francisco. Topic: EPA Project Report [Transforming Office Parks into Transit Villages Study](#). 5MB
PPT: <http://www.cities21.org/Region9scienceCities21.ppt>
- U.S. Environmental Protection Agency, Collaborative Science and Technology Network for Sustainability (CNS) - Progress Review Workshop, December 5-6, Washington, DC. Topic: EPA CNS [Transforming Office Parks into Transit Villages Study](#).
- Advanced Transit Association's [Stepping to Smarter Mobility Conference](#), Nov 17-18, Santa Cruz. Topic: EPA CNS [Transforming Office Parks into Transit Villages Study](#).
- U.S. Green Building Council's [Greenbuild Expo](#), Denver, November 16, Session #405 10:30AM, "What's Next." Cities21 is the "invited visionary speaker on transit innovations and technologies of the future." Topic: [Efficient Suburbs of the Future](#), 2.6MB PPT: <http://www.cities21.org/R1030aS.Raney.ppt>
- Pasadena Art Center College of Design, Advanced Mobility Research Center, October 24, 7PM, Ahmanson Auditorium, Topic: [Efficient Cities of the Future](#)
- California Chapter American Planning Association [Annual Conference](#), October 23, Orange County. Topic: [Traffic Reducing Housing And Upward Mobility](#)
- Sierra Club, Loma Prieta Chapter, Land Use Committee meeting, July 19, Palo Alto. Topic: [Traffic Reducing Housing And Upward Mobility](#)
- California State University, East Bay, China America Business and Education Center, Tianjin Municipal Government [City Planning Program](#), March 14-20. Topics: PRT, Efficient Cities.
- U.S. Environmental Protection Agency, Seattle Region 10, Feb 16, Event Page: Efficient Suburbs of the Future. <http://www.cities21.org/SeattleEPACities21.htm>
- U.C. Davis Institute of Transportation Studies Seminar Series, Feb 3, Topic: "Efficient Cities of the Future."

2005 Presentations / Conferences

- U.C. Berkeley, November 28, Guest Lecture, Robert Cervero's *Transportation & Land Use Planning* course. Topic: "Efficient Cities of the Future."
- U.S. Environmental Protection Agency, San Francisco Region 9, Socio-Economic Causes and Consequences of Future Environmental Changes, November 16.
- ITS (Intelligent Transportation Systems) World Congress, November 8, San Francisco. Topic: "Paid Automated Smart Parking Design for a Large Office Park." Paper (MS Word): http://www.cities21.org/ITSWC_SmartParking_071505.doc



- Engineers for a Sustainable World Annual Conference, October 5-9, 2005 Austin, TX. Topic: "Efficient Cities of the Future."
- USC School of Policy, Planning, and Development, September 19, Guest Lecture in Course on *Institutional and Policy Issues in Transportation*, taught by Genevieve Giuliano, Director, METRANS Transportation Center. Topic: "Efficient Cities of the Future."
- Association for Commuter Transportation (ACT) International Conference, Anaheim, CA. September 19-20. Two papers: "Paid Automated Smart Parking Design for a Large Office Park," and "Digital Hitchhiking (<http://www.cities21.org/CascadiaHitchhikePaper.doc>)."
- Rail~Volution, September 8-11, Salt Lake City, Utah. "Topic: Walk to Work Housing."

Supplemental Keywords:

Provided in the previous project report.