

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

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In Response to the Call for Papers from TRB Committee ABE50 (TDM & Parking). Specifically, this paper addresses these items in the call:

- TDM and climate change
- TDM climate messages to travelers (workers)
- Regional expectations for TDM – realistic targets
- Land use plans / smart growth: in-fill
- TDM benefits (and debate) with non-technical audiences
- Impact of parking pricing on demand
- Acceptability of parking management strategies
- Cost/benefits of TDM

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ABSTRACT: (191 words)

This driving reduction pricing policy offers the same large VMT/CO₂ reduction as a \$6 per gallon gas tax increase (or changing workplace parking from free to \$6 per day), without causing a popular uprising.

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 "least-worse state-level alternative" meta-strategy is proposed.

This policy research is informed by behavioral psychologists, listserv sounding boards including transp-tdm, and advocacy to nine large Silicon Valley employers.

1. THE CHARGE + CASHOUT SCHEME

The proposed new scheme will be referred to as “charges + cashout.” Anonymizations are used to help protect careers.

Past efforts to convert free workplace parking to paid parking (or to apply parking cashout) in the U.S. have not flourished. Past efforts have not spread widely to create a significant shift away from single occupancy vehicle (SOV) commuting. This scheme differs from past efforts.

Summary:

- Start with \$0.25 per day employee parking charges and \$1.00 per day employee cashout. A cashout is where the employer pays employees not to park at the office.
- SOV employees are assured that all parking charge revenue collected goes to fund cashout.
- Charges and cashout increase gradually over time (to \$2.00 and \$4.00 per day) as other companies adopt the same program, ensuring that no Human Resources (HR) recruiting/retention disadvantage is created. (If Company A and Company B are competitors, and if A charges \$2 for parking and B has free parking, then B has a "\$2 per day" recruiting advantage over A. Hence, both A and B have to participate for the proposal to work.)
- Implement monthly employee reporting via a trust-based, self-reporting HR web applet (one Bay Area company uses this approach). Incorporate other employer commute benefits into this monthly reporting (Commuter Check - pre-tax transit passes, private WiFi express bus service, etc) to ensure that “double benefits” are not provided to employees. Self-reporting makes implementation very low-cost for employers. The company reports that 20% of employees are under-collecting the cashout, validating that company's trust in its employees.
- Position “charges + cashout” as part of a comprehensive employer commute reduction program. Educate employees about the unique behavior-changing/demand-reducing properties of parking charges (23% commute mode shift is expected with the largest shift going to carpooling). Besides reducing CO2, this scheme will: a) ease severe parking shortages at some office campuses, b) create real-estate in-fill opportunities (by permanently reducing cars parked at offices, this scheme enables smart new in-fill on land that was considered to be "built out"), and c) motivate cities to reduce parking maximums for new office development.
- Parking spaces take up valuable land. Employers have to pay for parking space land used by drivers. Employers save money when workers commute via green alternatives (transit, car/van pool, bike, walk, and telecommute) that do not require land for cars. Hence, Bay Area employers provide a hidden \$7.59 daily subsidy to SOV commuters [1. Subsidy]. This cashout + charges scheme reduces land consumption, increasing the economic efficiency of employers. Further, the current policy of subsidizing SOV commuting harms the environment.
- Cities are hard-pressed to meet climate protection and traffic reduction objectives. Because the cashout + charges scheme is so very effective compared to other policies, cities should reward employers that provide leadership on this scheme. "Charging for parking is the single most effective strategy to encourage people to use alternatives to the SOV" - Jeff Tumlin, Nelson Nygaard Associates.
- Many companies and cities can cooperate to spread cashout + charges nationwide, reducing 51.7M tons CO2 per year. See Table 1 below:

	Bay Area	CA	USA
2007 population	6,000,000	37,000,000	300,000,000
50% of residents work, 50% in offices	1,500,000	9,250,000	75,000,000
23% office worker parking reduction	345,000	2,127,500	17,250,000
CO2 tons/yr saved (3 per commute shifted)	1,035,000	6,382,500	51,750,000
VMT reduced/yr @ 6,000 mi/commute	2.0B	12.7B	103.5B
acres of parking freed	2,608	16,080	130,378
new land value created @ \$3M/acre	\$7.8B	\$48.2B	\$391.1B

Table 1: CO2 Savings

Compared to past schemes, this proposal relies on four innovations:

- Collective, phased action to overcome the Tragedy of the Commons
- Simultaneous charges and cashout, with parking charge transfer payment from SOV commuters to greener commuters
- Trust-based monthly self-reporting
- Cities enable real-estate benefit for virtuous employers.

Careful effort has been taken to make this scheme palatable to employers. Past objections have been addressed. By adding in real-estate benefits, the financial outcome for employers will be either positive or neutral.

2. WHY WORKPLACE PARKING REDUCTION IS NECESSARY

Berkeley Professor Robert Cervero states, "Parking lot laden office parks are one of our biggest blights, but they also represent our largest opportunity for in-fill development because of their inefficient use of land."

At the 2005 Congress for New Urbanism Conference, Peter Calthorpe stated, "We New Urbanists didn't focus on the growth of office parks. This was a huge mistake. We need powerful strategies for these job centers." Also at that conference, UCLA Professor Donald Shoup stated, "Parking lots within our office parks represent a 'land bank.' Office parks can be transformed in ways that few people now envision."

Bay Area Metropolitan Planning Commission staffer James Corless indicated that "workplace parking charges are the "Holy Grail of VMT (Vehicle Miles Traveled) reduction," but are exceedingly hard to achieve.

Urban Land Institute's Growing Cooler report states, "the projected 48 percent U.S. increase in the total miles driven between 2005 and 2030 will overwhelm expected gains from vehicle efficiency and low-carbon fuels." [2. Growing Cooler] Hence, what is needed is a large commute mode shift away from SOV commuting, where large is defined as greater than 10%, and the target is about 23%.

3. PREVIOUS WORKPLACE CHARGES AND CASHOUT RESULTS

Parking charges are a part of many U.S. metropolitan downtowns. San Francisco's SOV commute mode share is less than 50%, and parking charges (and hassle) play a large part in the low use of solo commuting. If parking charges are applied to free-parking workplaces, then SOV commute share will go down dramatically. SOV commuting employees will lose financially, seeing a portion of their income lost to charges. Hence, these SOV employees will strongly resist the elimination of free parking. If employers collect the charge revenue, then they gain financially.

If a state were to impose a parking tax payable by employers (increasing government revenue), the resultant commute mode shift would be similar to parking charges. Employers will resist this new expense. Assuming the employer attempted to shift some of the tax to employees, then the same strong SOV employee resistance would apply.

Cashout is not effective. One suburban Bay Area employer (who we will call "Employer X") has a severe parking shortage, so pays employees \$4 per day to not park. Cashout is a "carrot," a benefit used to motivate commuting behavior change. Employer X's \$4 per day cashout program has reduced SOV commute mode share from 78% to 74%. Before cashout, Employer X had 22% green commutes (walk, bus, train, telecommute, carpool, etc). To implement cashout, Employer had to pay the existing 22% green commuters \$4 per day (out of fairness) before motivating 4% new green commuters. Hence, the cost per day per new green commute at Employer X is \$26 per day. Calculations are shown in Table 2 below. This is not a cost-effective way to reduce SOV commuting, nor does it achieve "large" mode shift.

\$4 cashout example. "Before" mode split is 78%. "After" mode split is 74%
 We use 100 employees simplify the mathematics

\$4 cashout paid to 22 existing green employees	\$88
\$4 cashout paid to the 4 employees who change modes because of cashout	\$16
total cashout payout	\$104
Cost of program per new green commuter =	
total cashout payout / 4 employees	\$26

Table 2: Employer X Cashout Calculation

One TDM consultant commented, "The cost problem with parking cashout is that you have to grandfather in all the existing green commuters before you can entice new green commuting. Cashout is a very expensive TDM measure." A State of California TDM staffer commented, "Cashout cannot be easily done. California's cashout law unfortunately has limited applicability. Cashout, where you have to grandfather all the existing green commuters, is not cost-effective."

This paper will argue that an equivalent level of charges + cashout can provide the same mode shift as a pure charge, but with more political acceptability. With charges + cashout, SOV employees lose financially, but less than through a pure charges regime. Charges + cashout represents a transfer payment from SOV employees to commuter alternative takers.

These arguments are summarized in Table 3 below:

Winners & Losers	govt rev	employer	employee: SOV	employee: non-SOV	mode shift
\$6/gal gas tax increase	W		L		23%
\$6 parking charge, employer keeps revenue		W	L		23%
\$4 cashout		L		W	4%
\$2 charge + \$4 cashout			smaller L	W	23%

Table 3: gas tax, parking charge, cashout policy impact

One common employer objection to parking charges is "we can't penalize employees," but, free-parking workplace TDM cannot be cost-effective and cannot produce a large mode shift without a penalty such as a charge. Free-parking workplaces cannot get below 70% SOV mode share.

4. IRRITANT THEORY OF BEHAVIOR CHANGE

There is an intuitive psychological theory as to why cashout is not very effective. High-paid office workers ignore small-benefit programs such as \$4 per day cashout. This "carrot" is not a sufficiently large motivator to cause commuting behavior to change. Employees will not think about the cashout on a regular basis. We believe that parking charges will "irritate" SOV commuters. These SOV commuters will think about the parking charges every day they commute. Eventually this irritant gnaws at them long enough to cause many to change behavior. Changing commuting mode choice is a significant decision because of relatively high barriers to changing away from the convenience of driving alone. This difficult decision is not a "snap decision" and may require pondering over many weeks. The same \$ value of irritant/stick has a much higher impact than the same \$ value of cashout/carrot. The intuitive theory is well substantiated from both field results and from "behavioral economics" research:

A 1989 study found that commute carrots are less effective than sticks: "A program of transit and vanpool subsidies as well as preferential parking for carpoolers had little effect until Twentieth Century Corporation in Los Angeles raised the price of employee parking from no charge to \$30 per month for solo drivers. Solo driving decreased from 90 to 65 percent after pricing." [3. Willson]

A 1990 paper found that charges changed behavior where incentives had not: "CH2M Hill in Bellevue, Washington began charging solo drivers \$40 per month for parking, the amount the company pays the

building owner for parking. All employees receive a \$40 per month travel allowance in their paychecks. Carpoolers park for free. Walkers, cyclists and drop offs keep the travel allowance. Solo driving declined from 89 percent to 64 percent after the parking policies were put into place." [4. Symposium]

Best Workplaces for Commuters compiled a spreadsheet with 41 TDM case studies. The case studies measure the "number of parking spaces freed per 1,000 workers" – the equivalent nominal mode shift would be larger than this measure, because a shift from SOV to carpooling still requires some parking spaces to be used. Some of these 41 cases are comparable to the \$4 charge + \$2 cashout scheme: cases 10, 11, 18 and 38 (both are the CH2M Hill Bellevue example), 33, and 35 (the Twentieth Century example). The average number of parking spaces freed per 1,000 workers is 219. Summaries of these cases are provided in Table 6 at the end of this paper. [11. BWC]

For calculations in this paper, a nominal mode shift of 23% is assumed. The 219 spaces out of 1,000 workers would translate into a higher mode shift. The two most applicable cases, CH2M Hill and Twentieth Century, have higher shifts. For suburban tech worker commute, it is expected that more of the mode shift will occur via carpooling rather than via transit. With new GPS cellphone technology (Apple iPhone & Google Android T-Mobile phones), "instant ridesharing" is enabled, where one-time rides are arranged within minutes of the start of the trip. With instant ridesharing, a person may carpool every day, but with the flexibility of a different departure time and group of people each day. Instant ridesharing can handle schedule variations in a manner that makes transportation routine and hassle-free. Evolving solutions come from Avego, ZimRide, Goose Networks, Carticipate, Piggyback, NuRide, and Google RideFinder.

From the field of behavioral economics, there is evidence that potential losses are more motivating than potential gains. In *The Paradox of Choice*, Barry Schwartz has a discussion of this "loss aversion" phenomenon. Schwartz cites research by Kahneman and Tversky demonstrating that, "Losing \$100 produces a feeling of negativity that is more intense than the feelings of elation produced by a gain of \$100." [5. Tversky]

In the book *Fostering Sustainable Behavior: An Introduction to Community-Based Social Marketing*, the author provides a discussion of positive (gain) and negative (loss) framing: Behavior change "messages which emphasize losses which occur as a result of inaction are consistently more persuasive than messages that emphasize savings as a result of taking action." [6. Message]

Janis Hom, consumer product marketing expert states, "The idea of rewards motivating behavior change is really only a wishful theory. When a sufficient pain threshold is reached, then people change. The frog being brought to a slow boil is an apt analogy. At a moderate heat/pain level, you can slow-cook a frog. If you turn the heat up high, the frog jumps out of the pot (a behavior change). \$4/day is not a sufficient reward to significantly change worker commute patterns – especially high-paid workers."

Our \$4/day cashout combined with \$2/day charges has not only a \$2/day irritant that will continue to gnaw at SOV commuters over time, but the dollar benefit for green commuting versus SOV commuting is \$6 per day (\$1,380 per year), a significant level of financial motivation that SOV commuters will think about (rather than ignoring) during this gnawing process. The 1990 Ch2M Hill example given above achieved nominal 25% mode shift via this combined carrot/stick approach, with a daily parking charge rate that was close to \$2 per work day.

Transportation Elasticity Supports 23% VMT reduction

VTPI's 2009 Transportation Elasticities Report lists three reports suggesting a greater than 23% reduction can be expected, while one report suggests a less than 23% reduction can be expected:

- Parking fees are found to have a greater effect on vehicle trips, typically by a factor of 1.5 to 2.0 (USEPA, 1998). For example a \$1 per trip parking charge is likely to cause the same reduction in vehicle travel as a fuel price increase of \$1.50 to \$2.00. [14. VTPI, pg 18]
- \$4 parking charge for suburbs yield a 36.1% reduction. [14. VTPI, pg 19, Table 15]
- Shoup found that charging reduces SOV by 20-40%. [14. VTPI, pg 21]
- Hess (2001) found \$6 daily parking charge reduced SOV from 62% to 46%, only a 16% nominal reduction. [14. VTPI, pg 19]

Low Gas Prices Encourage Driving - U.S. versus Japan, France, Germany, and UK

A price difference for green commutes versus SOV commutes of \$6 has the equivalent financial motivation of \$6 gallon gas tax increase. [7. Gas Calc] Per capita driving is influenced by many other factors besides gas price (such as auto-centered land use, scarcity of quality transit options, high per capita residential square footage, etc), but a comparison of developed countries with higher gas prices than the U.S. (Japan, France, Germany, and the UK) shows an interesting correlation. The non-U.S. gas prices analyzed are historically 190% to 270% of U.S. prices. As would be expected, low U.S. gas prices are correlated with high per capita vehicle miles traveled (VMT). This is a further argument that suggests that the charges + cashout scheme will result in a large commuting behavior change.

Once the cost of driving is permanently increased, then driving behavior changes. By a "permanent price increase," we mean that a majority of drivers believe higher prices are "here to stay" as opposed to representing only a temporary price fluctuation.

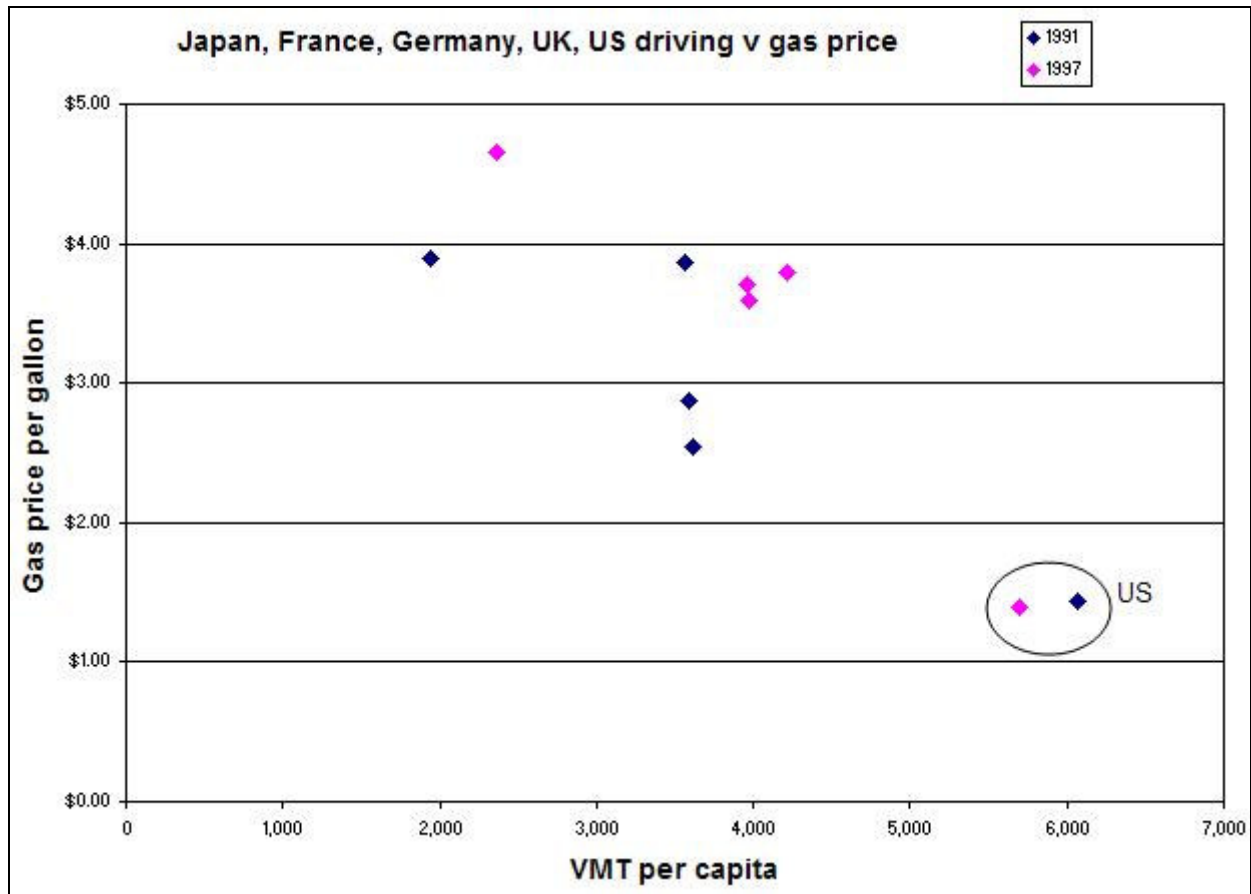


Figure 1: Gas prices are "at the pump" gas prices, including taxes [12. Gas Price]

The 2009 "Moving Cooler Report" states that moving to European level gas taxes, "starting at \$2.40 a gallon in 2015 and increasing to \$5.00 a gallon in 2050 could result in a 28% reduction in GHG emissions." [13. Moving Cooler, pg 80]

5. META STRATEGY: "LESS WORSE"

A State of California TDM staffer commented, "If the government could mandate a parking tax or charging for parking, we could reduce commute VMT to a level that would be in line with climate protection goals. But, a

10-year-old survey of pricing measures found that parking charges rated the lowest. Hence, high parking charges do not appear to be politically feasible. Folks think free [suburban] parking is their god-given right.”

A company that voluntarily pioneers charges + cashout risks productivity-reducing internal employee strife between climate protectors and climate skeptics. Companies objected to the idea of workplace parking charges with responses such as:

- "I don't foresee our company ever imposing a parking fee directed towards our employees. We prefer to offer incentives to use alternative transportation (such as our commuter shuttle service) verses implementing a system that penalizes employees. For example, recruitment and employee retention are vital to our success. Telling our employees that they have to pay for parking would not fly."
- "Charging is not in keeping with our culture. We have lots of incentives in place."

Voters and companies could conceivably be moved to support state-mandated charges + cashout as a more palatable alternative. A state mandate would displace the blame for the charge away from the employer.

Charges + cashout is a complicated pricing scheme. Conceptually simpler pricing proposals (such as carbon tax, congestion pricing, \$6/gallon gas tax increase, and substantial parking charges) bring much more economic harm to constituents. A staffer for a California state senator advised that more draconian pricing policies could advance first, raising the ire of commuters and business interests. With the threat of unpopular policies made, then charges + cashout can advance politically as the “less worse” alternative. The staffer envisioned a slow process to bring this about. The 2008 political failures of both San Francisco’s Doyle Drive congestion charge and New York City’s \$8 86th Avenue congestion charge are illustrative of the political challenge faced by more economically punitive policies.

Charges + cashout helps to reduce the perceived real-estate advantage of free-parking suburbs over metropolitan downtowns, hence metropolitan in-fill political champions could be called upon to lobby on behalf of the policy.

Companies also objected to the cost of time in explaining an unpopular policy to employees as well as the potential productivity-reducing internal employee strife between climate protectors and climate skeptics:

- “An employer’s organizational cost for communicating complex, new initiatives such as parking charges is huge. Employees can only absorb so much corporate information. Cashout is a complicated-to-explain concept. Parking charges are a complicated-to-explain concept. Combining both is complicated further still. The time spent internally communicating this program (and dealing with objections and questions) will cause delays to other important corporate messages. There is an opportunity cost associated with a company engaging on this issue. Your program will suck up a lot of valuable time by exec staff and HR, don’t think that it is simple to implement such a program. You should not underestimate the corporate cost of this program. There may also be fear of an uncontrollable change in corporate culture.” The state’s role is to make this scenario the least worst alternative, and to cause a “media swarm” to explain the policy to all state residents, reducing the need for corporate communication and eliminating the motivation for internal debate.
- “You’re telling 75% of our employees (the SOV commuters) that they are bad.” Without a state mandate, employers are forced to introduce a divisive political issue into a workplace where all workers should cooperate to maximize company share price. Even if 95% of workers were climate protectors in favor of the scheme and only 5% were climate skeptics, strife between the two sides would lessen company productivity. The state’s role is to allow companies to be the savior, claiming lobbying success to avoid a draconian \$6 per gallon gas tax increase. Furthermore, the initial \$0.25 charge was selected to be small to reduce irritation compared to the \$2 charge.
- One climate-skeptic employee revealed a passionate opinion revealing the potential for internal strife, “If my company made me listen to that sort of propaganda, I would look for another job. The personal car IS the right to be mobile. To oppose its use is to oppose our freedom.”

6. COLLECTIVE ACTION AND THE TRAGEDY OF THE COMMONS

There is free parking at every U.S. workplace surface parking space, where the following three conditions exist:

- the office has no parking structure
- the office is not in a central business district
- the office is in an office zone rather than a university zone.

By reducing commute VMT/CO2 by 23%, charges + cashout will benefit everyone, and by reducing the demand for parking spaces at worksites, employers reduce expenses and gain a potentially lucrative opportunity to re-develop the land. So why are free-parking workplaces never converted to charged? Because of the Tragedy of the Commons, the inability to act in the larger collective interest because of individual/local counter-incentives. There is a first-mover disadvantage preventing implementation. [8. Tragedy]

If one city with 5,000 office surface parking spaces starts charging for parking, then that city becomes uncompetitive with the rest of the local office market (not to mention the national market). Thus, cities/employers need to "jump in together" to overcome the Tragedy of the Commons. (The implementation will have multiple major U.S. office sub-markets jump in by charging a small amount, on the assumption that 75% or more of the office market will still have free parking. The policy will then spread with a time lag to new markets, and the parking charges will increase over time.)

Here is an example of collective action by cities to impose smoking bans: (anonymous source)

"Interesting example in the Twin Cities. It was always "impossible" to change bars and restaurants to non-smoking. Every time any city council member proposed it, they were shouted down by people who said, "But people will go somewhere else and all our businesses will lose out." Then one December day the city of Bloomington (largest suburb) passed a smoking ban. The following month St. Paul did the same, then Minneapolis right after. It turns out the cities had been in agreement all along about who would go first and who would follow next."

7. "TROJAN HORSE" DIFFUSION STRATEGY

A flavor for a nationwide charges + cashout spread can be illustrated by example. A leading state or states could phase in a parking tax, with raises every six months. The state would allow companies to substitute charges + cashout in place of the parking tax, allowing similar phasing. The state would require large companies to adopt the policy first, then lower the company size threshold every six months. The state's example would lead other states to follow in implementation. Eventually, a U.S. example would lead to other auto-centered countries adopting the same. By "Trojan Horse," the notion of converting from \$0.00 per day parking charges to almost any small charge breaks through the free parking barrier, allowing increased charges in the future. The challenge is not in moving from \$1.75 to \$2.00, but in moving away from \$0.00.

Large companies might be forced to jump in during January 2009, implementing \$1/day cashout and \$0.25/day charge. Six months later, during July 2009, the large companies would advance to \$2 cashout and \$0.50 charge. Also in July 2009, the next tier of slightly smaller companies would jump in at \$1 cashout + \$0.25 charge. The policy would spread by a charge gradient. Eventually, all companies beyond a minimum size would advance to \$4 cashout + \$2 charge. By "stairstepping" companies based on size, there is only a slight first-mover disadvantage, only a \$0.25 per day HR recruiting disadvantage for largest companies versus next-largest companies.

8. GRANDIOSITY

A "grandiose" scheme is ambitious and elaborate, and possibly foolhardy. Reducing U.S. CO2 by 51.7M tons per year via collective action and individual behavior change is grandiose. A reading of ULI's Growing Cooler report suggests that multiple grandiose schemes should be attempted simultaneously in order to meet 2020 and 2050 climate objectives. Private sector companies regularly strive to achieve grandiose objectives such as 90% market share in large markets.

9. TRUST BASED MONTHLY REPORTING

To implement parking charges, it is often necessary to have "access control" at parking lots to track the comings and goings of parkers for charging purposes. Access control may be implemented via "a man in a

booth controlling an access gate" or via more automated means. In the past, access gates have been found to be cost-prohibitive because entryway paving and landscaping has to undergo major modifications.

One Bay Area company has pioneered low-cost, trust-based employee cashout monthly reporting. About once a week, employees fill out a web-based form to record their commuting and to collect their cashout benefits. With self-reporting by employees, there is risk that employees could "cheat" and collect more benefit than they deserve. The company's periodic mode choice / parking count studies have found that employees under-collect their \$4 per day cashout benefit by about 20%. Hence, for this company, self-reporting appears to work successfully.

For implementation of cashout + charges, a company would probably decide that monthly web reporting should not allow double commuting benefits. For days when a worker commutes via modes where the company provides some subsidy or funding, the \$4 per day cashout would not be provided.

A hypothetical self-reporting web screen example is provided below for "Company Y" in San Jose. Company Y participates in the Commuter Check program, where employees buy transit passes with pre-tax dollars and Company Y subsidizes transit pass purchases. Company Y has decided that Commuter Check is a sufficiently large benefit that the \$4 per day cashout will not also be provided on days when employees commute using Commuter Check. Likewise, Company Y provides an express commute bus from San Francisco to San Jose for employees, with a company funded cost of \$20 per commute per day. The express bus and \$4 cashout are also mutually exclusive. In this example, there are 22 work days in May. The employee submits the report and Company Y pays this employee \$36 (\$40 worth of parking cashout less \$4 worth of parking charges). If an employee parks a car at the office a majority of days, then that employee will owe Company X for parking charges.

May 2008, 22 working days

	Days	\$/day	\$	comment
Vacation / sick days	1	0	\$0	
Commuter Check days	7	0	\$0	Using pre-tax Caltrain or VTA passes
SF->SJ express bus	2	0	\$0	
Other green commutes	10	\$4	\$40	rideshare, telework, bike, walk
Parked car at office	2	(\$2)	(\$4)	Did not share a ride
total	22		\$36	

Table 4: Web-based Self-reporting Screen

Unsystematic survey research found that the majority assumed that others would cheat frequently. One company commented, "Self-reporting won't work. Without enforcement, there will be too much cheating. You have to have some teeth. The current web-based self-reporting that one Bay Area company has implemented is ONLY for a cashout. When you move to charges, then self-reporting won't work. Some workers will rebel against the charge and they will influence others to further rebel."

If cheating is prevalent, then web-based reporting will fail. There are ways to detect cheating. Transportation firms can count people as they come onto company property in the morning, logging their commute method (they have to count people rapidly when carpools come in). The firms can accurately estimate actual company-wide commuting behavior, allowing comparison against self-reporting.

The initial \$0.25 charge + \$1 reward was designed to ease in the self-reporting scheme with a very small monthly charge for solo drivers. This should reduce the motivation for cheating. If cheating is a huge problem, then executive staff can raise the issue with the entire company. Remedies include implementing automated (non-gated) parking systems or canceling the program. The field of inexpensive, technology-intensive, automated parking systems is expanding rapidly, and may provide a reasonably priced solution. The threat of canceling the \$2/day charge + cashout program, to be replaced with a \$6/day parking tax should motivate individual compliance.

10. MONETIZATION OF SAVED PARKING SPACES & EMPLOYER FINANCIAL IMPACT

Discussions with employers have made it clear that there is no one, single benefit that a major employer's real-estate department is looking to obtain from a city in exchange for reducing VMT and parking demand. Real-estate situations experienced by different employers vary greatly, influenced partly by the current financial performance of each company. Some companies wish to expand, some wish to contract, some have severe parking shortages, some have large parking surpluses, some own their land and buildings, some lease their land and buildings.

Some employers have such severe parking shortages that a 23% reduction in parking demand would provide a huge benefit. For these companies, the value of the daily subsidy for parking a car at the office is much greater than \$7.59. These employers may be less motivated to negotiate additional benefits from cities.

Some employers would be very happy to reduce parking demand and in-fill directly on the recovered land. Others would be happy for new, tradable development entitlements to be created that they could sell to others. Some employers would find expedited processing by the City's Planning Department to be of value. Some companies would want to negotiate for reduced traffic impact fees for their next expansion. Some companies would ask for tradable rights to reduce impact fees that they could then sell to third parties.

One can even envision a "parked car cap and trade system." For a 35,000-job office park, the number of cars could be capped at current levels. When an employer with 3,000 employees within the office park implemented cashout + charges, new development credits would be granted to that employer to add new development to bring the car count back up to the cap. The credits could be traded (sold for profit) within the office park to landowners interested in in-filling. The parked car cap would effectively cap real-estate development, only allowing new development when virtuous employers reduced cars. [9. CRIB]

At \$4 cashout and \$2 charge, parking revenue does not completely cover cashout cost. Unless other benefits are created, a company "loses money" for being virtuous. This level of loss is less than the loss from a state \$6/day parking tax. A example below in Table 5 calculates cashout cost and parking revenue. For this example, an additional benefit of \$1.35 per green commuter per work day would break even.

The example below is for a typical employer with 80% SOV commute mode share in 2008 and 1,000 employees. Cashout cost and parking revenue under the \$4/\$2 scheme is calculated for 2012 below. To put this in perspective, in 2008, the employer's annual subsidy to accommodate parked cars is \$1.4M - much, much larger than cashout cost. In 2012 when a 23% commute mode shift is achieved, the potential "car parked subsidy" savings on the 23% of cars that disappear would be \$419,000 (at \$7.59 per car parked per day), far in excess of the cashout cost.

CASHOUT COST	
employees	1,000
2008: 20% non-parking	200
2012: 43% non-parking	430
work days/yr	240
2012: daily reward/green	\$4
2012: cost/yr	(\$412,800)
PARKING REVENUE	
2012: 57% park	570
2012: daily charge	\$2
2012: rev/yr	\$273,600
ADDITIONAL BENEFITS	
HR recruiting advantage	
CEO ego benefit	
Parking shortage fixed	
Real-estate reward from City	
Real-estate in-fill benefit	possibly huge

Table 5

For \$4 cashout and \$2 charge, assuming 23% nominal mode shift away from SOV, the “breakeven” for a company (ignoring many additional corporate benefits) is about \$4 cashout + \$3 charge. If only a 15% nominal mode shift away from SOV was achievable, then the corporate breakeven scheme would be \$4 cashout + \$2.15 charge (when there is less money to pay out as cashout, then the parking charge may be reduced). It is worthwhile to mention that an implementation could adjust the ultimate cashout level and charge level, based on the interim mode shift measurements.

11. CONCLUSIONS FROM THE TRANSPORTATION RESEARCH BOARD 2009 CONFERENCE

At TRB 2009, it became clear that climate-leader New York City had missed an opportunity. In NYC’s taking of a virtuous stance to protect the climate, NYC missed an opportunity to demand that job-rich suburbs take tiny steps to reduce commuting. NYC should have conditioned their actions on small employee parking charges for White Plains, Purchase, and Parsippany workers. NYC could have moved the Trojan Horse of parking charges into suburban job sites, where those charges could have later increased. Carbon from suburban commuting is far larger than big city commute carbon. NYC should focus on its suburbs, not on competing with London, San Francisco, and Seattle.

12. ACKNOWLEDGEMENTS

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- Research Funding Provided by U.S. Environmental Protection Agency Collaborative Network for Sustainability grant program, Transforming Office Parks into Transit Villages study. Diana Bauer, Program Manager.

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Table 6: Best Workplaces for Commuters: TDM Case Studies

<p>Case #: 10</p> <p>Author: Tabitha Graves</p> <p>Title: Transportation Demand Management (TDM) Programs: Profiles of Selected Universities</p> <p>Publication: University of Wisconsin-Madison Environmental Management Campus Ecology Research Project No.5</p> <p>Date: December 1993</p> <p>Web site: http://www.fpm.wisc.edu/campusecology/cecp/tdm/tdm.htm</p> <p>Excerpt: See table: The percentage of drive-alone employees arriving on the UCLA campus between 6 and 9 a.m. fell from 73.7 percent in 1984 to 57.7 percent in 1992. This was a result of a variety of TDM measures, including parking pricing, carpool and vanpool programs, local bus service, late night van service, and emergency ride home</p> <p>Policies: Worksite TDM (general)</p> <p>pkng spcs freed per 1,000: 160</p> <p>Location: University of California at Los Angeles</p>
<p>Case #: 11</p> <p>Author: Comsis Corporation</p> <p>Title: Implementing Effective Travel Demand Management Measures</p> <p>Publication: Federal Highway Administration and Federal Transit Administration</p> <p>Date: September 1993</p> <p>Excerpt: "[Pasadena's] TDM program includes a drive-alone disincentive, parking fees, but also many incentives to employees to carpool. Elements of the program that influence carpooling include: reduced parking cost..., transportation allowance..., guaranteed ride home..., on-site ridematching.... Between 1989 and 1990, SOV percentage decreased 30 percent, from 83 percent SOV to 58 percent SOV at City Hall."</p> <p>Policies: Worksite TDM (site-specific)</p> <p>pkng spcs freed per 1,000: 250</p> <p>Location: Pasadena, California</p>
<p>Case #: 18</p> <p>Report No. FHWA-SA-90-005</p> <p>Pub Title: Evaluation of Travel Demand Management: Measures to Relieve Congestion (Case Study 6: CH2M Hill, Bellevue, Washington)</p> <p>Pub Date: February 1990</p> <p>Author: US DOT, Federal Highway Administration</p> <p>Summary: CH2M Hill is an architectural/engineering firm of approximately 400 employees that has used a "transportation allowance" program in conjunction with restricted on-site parking. The company has achieved a mode share of 54% drive alone, 17% transit, 12% carpool, 17% other (59.4 vehicle trips per 100 employees). These figures were compared to regional control sites' mode share of 81.8% drive alone, 3.3% transit, 11.0% carpool, 0.8% vanpool, and 3.1% other (86.4 vehicle trips per 100 employees).</p> <p>Policies: Worksite TDM (site-specific)</p> <p>pkng spcs freed per 1,000: 278</p> <p>Location: Bellevue, Washington</p>
<p>Case #: 33</p> <p>Author: Daniel Baldwin Hess</p> <p>Title: The Effects of Free Parking on Commuter Mode Choice: Evidence from Travel Diary Data</p> <p>Publication: Ralph & Goldy Lewis Center for Regional Policy Studies at UCLA Working Paper Series #34</p> <p>Date: April 2001</p> <p>Web site: http://www.spsr.ucla.edu/lewis</p> <p>Excerpt: "[A multinomial logit model] predicts that with free parking, 62 percent of commuters [in Portland's CBD] will drive alone, 16 percent will commute in carpools and 22 percent will ride transit; with a daily parking charge of \$6, 46 percent will drive alone, 4 percent will ride in carpools and 50 percent will ride transit."</p> <p>Policies: Parking Pricing</p> <p>pkng spcs freed per 1,000: 160</p>

<p>Location: Portland, Oregon</p> <p>Notes: This is a modeling study based on empirical data from the Oregon and Southwestern Washington 1994 Activity and Travel Behavior Survey conducted by Cambridge Systematics.</p>
<p>Case #: 35</p> <p>Author: Richard Willson, Donald Shoup, and Martin Wachs</p> <p>Title: Parking Subsidies and Commuter Mode Choice: Assessing the Evidence</p> <p>Publicaton: University of California at Los Angeles</p> <p>Date: July 1989</p> <p>Excerpt: K.T. Analytics (FTA Parking Cash Out Web page): "A program of transit and vanpool subsidies as well as preferential parking for carpoolers had little effect until [Twentieth Century Corporation in Los Angeles] raised the price of employee parking from no charge to \$30 per month for solo drivers. Solo driving decreased from 90 to 65 percent after pricing, a 49 percent decline."</p> <p>Policies: Parking Pricing</p> <p>pkng spcs freed per 1,000: 250</p> <p>Location: Los Angeles, California</p> <p>Notes: Decline of 49% cited in text appears to be incorrect.</p>
<p>Case #: 36</p> <p>Author: Monica Surber, Donald Shoup, and Martin Wachs</p> <p>Title: The Effects of Ending Employer-Paid Parking for Solo Drivers</p> <p>Publicaton: University of California at Los Angeles</p> <p>Date: 1984</p> <p>Excerpt: "Ending free parking for solo drivers at [the Southern California transportation services firm] Commuter Computer dramatically reduced solo driving. Solo driving decreased from 42 percent of the modal split during the last 4 months of free parking to 8 percent during the first 3 months after the parking subsidy for solo drivers was ended."</p> <p>Policies: Parking Pricing</p> <p>pkng spcs freed per 1,000: 340</p> <p>Location: Los Angeles, California</p> <p>Notes: The parking subsidy at Commuter Computer was removed only for employees who did not need their car for work.</p>
<p>Case #: 38</p> <p>Title: Proceedings--Commuter Parking Symposium</p> <p>Publicaton: Metro and Association for Commuter Transportation, Seattle, Washington</p> <p>Date: December 1990</p> <p>Excerpt: K.T. Analytics (FTA Parking Cash Out Web page): "CH2M Hill in Bellevue, Washington] began charging solo drivers \$40 per month for parking, the amount the company pays the building owner for parking. All employees receive a \$40 per month travel allowance in their paychecks. Carpoolers park for free. Walkers, cyclists and drop offs keep the travel allowance. Solo driving declined from 89 percent to 64 percent after the parking policies were put into place, a 28 percent decline."</p> <p>Policies: Parking Pricing</p> <p>pkng spcs freed per 1,000: 250</p> <p>Location: Bellevue, Washington</p>

Table 6

***** end of TRB paper *****

APPENDIX A. SURVEY RESEARCH [10. Working Paper]

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.

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 prefers free suburban workplace parking to subsidize solo commuting over green commute alternatives. The persuasive, educational survey provided a "fair" set of pro/con policy arguments (where "fair" follows political science "framing" 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.

Two Framing References:

- Willem E. Saris, and Paul M Sniderman (eds.), 2004, *Studies in Public Opinion: Attitudes, Nonattitudes, Measurement Error, and Change*, Princeton, N.J.: Princeton University Press. Chapter 5, The Structure of Political Argument and the Logic of Issue Framing.
- *On the Limits of Framing Effects: Who Can Frame?* James Druckman, University of Minnesota. The Journal of Politics (November 2001 Vol 63 #4), 63:1041-1066 Cambridge University Press

The persuasive survey can bring about Druckman's "belief content" change. IE persuasion occurs, it's not just a battle over which of two different frames are more important in the voters' mind.

Citizens aren't educated about transportation and land use as part of civic learning. Both fields are complicated topics where urban legends inform voting. Everyone experiences land use and everyone drives, so therefore voters think they are experts. For complex Tragedy of the Commons issues, Walter Lippmann's 1922 critique (oversimplified and ill-informed citizens) is accurate.

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

- Driving has to be reduced to meet Climate objectives.
- Commute/parking behavior is radically different in SF 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.

A panel of credible professional methodologists could take the survey instrument, modify it a bit, and bless the resultant instrument as "fair." Such a process could provide a moderate to high level of Druckman's "source credibility."

The complicated survey instrument was successful in taking respondents through a complicated policy debate in 10 minutes. 48 out of 55 respondents completed the main five questions. A typical, complicated pro/con debate, multiple choice question, and free-text essay field follows:

Assume the following hypothetical scenario: Starting January 2009, your company will charge \$0.25 per day for parking, for each worker who drives alone to work. Your company will also reward each worker who uses commute alternatives with \$1.00 per day. Once per week, you will take one minute to report your commuting in a web form. You will be charged/rewarded based on your report.

Pro: This will reduce traffic and induce greener commuting. Charging for parking has been shown to be effective in changing commuting behavior.

Con: Paying for parking is inconvenient. Employees are entitled to free parking.

DETAILS

Pro:

- * For about 75% of Bay Area workers, commuting by driving alone is the preferred mode compared to commute alternatives {transit, carpooling, telecommuting, biking, and walking}. In some downtowns, parking is an expensive hassle. In San Francisco, 43% of workers commute by driving alone. The majority of this commuting difference is explained by parking charge/hassle, although good transit options also play a role.
- * Bay Area parking spaces take up valuable land. Employers have to pay for parking space land used by drive alone workers. Employers can save money when workers commute via alternatives that require less land for cars. Because of land costs, Bay Area employers provide a hidden \$7.59 daily subsidy to free-parking, drive alone commuters.
- * All workers are not entitled to free parking. Many companies have pay-for-parking downtown offices, for example: {Google, 76 Ninth Ave., New York; San Francisco: eBay 199 Fremont; Yahoo 475 Sansome; Adobe 601 Townsend.}
- * Rewards-only policies for commute alternatives are ineffective in changing commute behavior. Studies show that charges (irritants) are effective whereas small rewards are ignored.

Con:

- * "There is free parking at almost every non-downtown parking space at U.S. offices. There is no justification for breaking away from free parking. Our company has no obligation to change this."
- * "I don't foresee our company ever charging employees for parking. We provide incentives to use commute alternatives (such as our commuter bus service) versus penalizing employees. Recruitment and employee retention are vital to our success. Telling our employees that they have to pay for parking would not fly. We previously asked employees about parking charges and received strong negative responses."
- * "\$0.25 per day parking charges are a joke. The policy won't make a difference."

END DETAILS

2. In light of the pros and cons given above, are you in favor of the \$0.25 per day parking charges + \$1.00 rewards scheme? (0 = strongly opposed, 5 = neutral, 10 = strongly support)

Your comments/advice related to this page <free text entry>

The web survey was posted on seven list servs, shown in Table 6 below. Four list servs are majority climate protectors, one list serv is majority climate skeptics:

	members	responses
Sierra Club Bay Area Transit list serv		2
Climate Concern yahoo group	2365	2
Transport Policy yahoo group	335	4
CUTR's Transp-TDM - commute reduction	1263	21
Fostering Sustainable Behavior		20
CUTR's Parking	146	0
SF Bay Peak Oil yahoo group	211	6

Appendix Table 7

Respondents identified a number of special cases to be addressed:

- Address spillover parking (for large office parks with adjacent residential, implement residential parking permits with high enough permit prices to cover implementation costs).
- Develop exceptions for swing and graveyard shift workers.
- Companies whose employees are covered by bargaining unit contracts could be charged with unilaterally making a change in 'working conditions'. Hence, this scheme would have to be negotiated with the bargaining unit, not imposed unilaterally.

Respondents helped add questions to the scheme's Frequently Asked Questions document. This FAQ should be useful for implementation.

APPENDIX B: IMPLEMENTATION NOTES

KP, EDF: States are hesitant to move unless the policy has been tried. You should get an employer or developer to try it first. (Advocacy is currently being undertaken. It might be possible to provide a financial incentive for a tech company first mover to pioneer the program.)

JH, NRDC: Look at the coal industry lobbying, it's in the tens of millions. Plus, you have this complicated issue where you have to educate. So a public education campaign is expensive too. But, could an existing lobbying organization pull this off? Yes, possibly without too much additional funding. Probably need to get NY Times and Huff Post coverage. Need that for a break. Maybe some national figure could bring it into public discourse.

Budget:

* \$100K for software integration with the two main HR software apps (Oracle and SAP). Employee web data entry feeds into payroll. Reports include charge receipts vs. cashout payout, parking space utilization, commute mode share, SOV elasticity, and longitudinal trend report. Make source available.

* \$100K to develop a generic employee self-reporting web applet that produces a data set for easy integration into various HR systems. Make source available & support integration.

* \$100K for "customer" support, policy analysis, communications, overhead, selected employer "hand measured" parking lot commute mode share / car count studies to calibrate behavior change, etc.

It's crucial to signal that the 23% reduction in commuting is PERMANENT. With permanence comes real-estate developer willingness to undertake in-fill projects in parking lots. If a developer believes that the reduction is only temporary and that parking demand will surge in the future, then those parking spaces won't be redeveloped. Permanence is also important for regions and cities to reduce building code parking space requirements. With smart growth laws such as California's SB375, we're seeing some public policy moves to tighten parking as part of climate protection strategy. Within San Francisco, there has been a permanent signaling that fewer parking spaces are required per square foot of leasable office space, and developer plans and city building codes reflect this. This is the model for US suburban office development to evolve to.

APPENDIX C. SELECTIVE REVIEWER COMMENTS

a) I found the concepts you present very interesting. I've always believed cash out could be a very effective strategy when it could be applied. But I confess I've been guilty of believing cash out has limited U.S. application due to the wide availability of free parking and the limited ability of suburban employers to save money by reducing their parking demand, because a large share lease rather than own their office space. Your paper presents an interesting long-term policy approach that could make cash out viable for a wider market in the growing number of "suburban edge cities." We certainly are seeing many more proposals for redevelopment of such places as Tysons Corner, VA, which you mentioned in your paper, that convert the "seas of parking" to a higher commercial use through in-fill. So I appreciate your creative thinking.

b) You highlighted many points that are ongoing concerns for cash out and suggested creative approaches to address them. You've also synthesized observations from diverse disciplines – unusual in our business. You present a concept that is food for thought and, I hope, for the subject of further research.

c) The proposed policy makes a lot of sense and may have some real legs.

The conclusion that \$4 cashout produces only 4% new green commuters, but \$4 cashout + \$2 parking charge produces 23% VMT reduction is startling.

The discussion about finding policies that are breakeven from a financial standpoint is useful. By charging a bit for parking, cash out could immediately be implemented in a breakeven manner for employers, even when some parking cannot immediately be shed.

d) A very interesting approach to parking fees, which can only be described as an art in dealing with the irrational parker's mind. Your sociological thoughts on this topic were insightful. Incrementalism is beautiful. The "break even" section is quite insightful