How New Parking Spaces May Effectively Increase Typical U.S. Urban Housing Total Unit Costs by $52,000 to $117,000

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ABSTRACT

Minimum parking requirements raise housing costs substantially. This research conservatively estimates an effective cost increase of $85,000 per typical U.S. urban dwelling unit (with a range from $52,000 to $117,000) for each net parking space created as a result of zoning mandates, which is derived from actual observed differences in housing prices, reduced loan eligibility because of increased car-related household costs, increased public infrastructure costs, and external cost impacts on existing neighbors. Minimum parking requirements are especially unfair to the poor and elderly, who own fewer cars than others, but who often still must pay for parking they do not need in their rents and purchase costs. Some households in every income group will choose to forego car ownership, or get by with just one car, and no one should have to pay for more parking than they desire. It is the failure of local governments to effectively manage on-street parking, including through the use of pricing, that instead compels them to require off-street parking with new development. Great financial costs and other negative consequences make it imperative that this situation changes.

INTRODUCTION

The purpose of this paper is to summarize what is known or can readily be discerned about the effects of parking requirements on housing affordability. Such requirements apply to new development and, in some cases, expansion of existing units and predicate permits for such projects on constructing a specified number of on-site parking spaces. Past research on this subject shows that minimum parking requirements raise housing costs substantially; however, parking's negative effects on housing affordability have, despite this general finding, been very much underestimated. For example, while research on this subject generally attempts to quantify the building costs of off-street parking, it only rarely attempts to quantify its often greater effects on price, and typically fails to also acknowledge that many lenders, especially in some targeted cities, will allow substantially higher mortgage loans for households minimizing or avoiding car ownership—something that minimum parking requirements discourage. To fairly calculate the impact of minimum parking requirements on housing affordability, both the actual price increase resulting from the parking and the opportunity cost of lost eligibility for a higher loan amount need to be considered.

Minimum parking requirements on new developments also affect the transportation costs of existing residents because of the land use implications of the requirements. Even residents of homes built prior to the imposition of minimum parking requirements will likely have higher vehicle ownership and usage rates due to such requirements leading to auto-oriented neighborhood designs and the spreading of destinations resulting from reduced land use intensity. That is, as destinations spread and accommodations are made for more cars, travel modes such as transit, walking, and bicycling become less viable and cars become more necessary.

The effect on housing price of each new "real" parking space added due to zoning is even greater than all of the above would suggest because access to off-street parking spaces generally requires removal of some on-street spaces for curb cuts. Thus fewer

parking spaces are netted than those constructed to comply with codes and it makes sense to look at the cost for each space netted, versus built, as it is only the former that provides a new place to park. Under the worst circumstances, a curb cut for a one-car garage in front of a home could remove a full on-street parking space, meaning no real parking is gained from the requirement (*1*). If we conservatively estimate that one on-street parking space is effectively removed because of needed curb cuts for every four off-street spaces mandated, the true cost per space netted rises by 33.3% above the build cost, which in turn is raised further by the factors discussed earlier, including the forgone opportunity cost of securing a higher loan.

There has been a good deal written about the public infrastructure costs associated with different patterns of development. Essentially, the more dispersed and less contiguous the development, the higher the fixed and on-going public infrastructure costs required to serve it. Such costs are sometimes partially, but rarely fully, paid by project builders and beneficiaries, but rather are typically underwritten by taxpayers. Nevertheless, such costs are real and they are paid by someone (or everyone), and, thus, they are estimated as part of this research.

The purpose of this paper is not to say that parking, even if compulsorily provided, offers no benefits. Rather, by focusing on its costs in the urban context, this paper shows the savings to urban residents that would be possible—some going to home purchasers and others going to city taxpayers in general—if some parking and its related benefits were forgone. Costs vary based on urban land values, land uses, and the types of parking constructed, among other things. What is of greatest interest here is the average cost effect of parking regulations in U.S. urban environments. While this paper and the research it cites focus on large urban areas, many small cities and big-city suburbs face similar costs and issues, although to a lesser extent, that warrant separate analysis.

Some households may consider parking to be a luxury, while others may consider it a necessity, but consumers should have a choice to purchase the parking quantity and quality (e.g., driveway or garage) that suits them, as they can with other household amenities (e.g., fancy kitchens, enclosed porches, and extra bathrooms). Low-income households, because they own the fewest number of vehicles and face serious financial constraints, would have the most to gain if the choice to purchase housing with no or less parking were presented. Of course, some low-income households may require parking (although not necessarily off-street) for vehicles needed to access entry level jobs in the outer suburbs, thereby limiting their potential savings in parking costs. Other households purchase housing with parking in excess of minimum requirements and thus would save nothing if minimum requirements were eliminated or reduced. But some households would purchase less or no parking with their housing if they could, and this paper attempts to quantify the related potential savings.

PAST RESEARCH ON PARKING REQUIREMENTS AND HOUSING PRICES

Minimum parking requirements raise housing costs in general and, specifically, reduce the supply of low-income (and, indeed, of all) housing. In Chicago, garage parking spaces were found to cost $35,000 each and underground parking even more. Parking requirements have been estimated to add up to 17% to the sales price of an average

Chicago home (*2*). In Minnesota, planners estimate an average $15,000 cost for above-ground structured parking and $27,000 per underground garage space (*3*). In Washington, DC, a single underground parking space serving a multi-family housing development costs $25,000 to $35,000. This observation was further coupled with the fact that in some Washington, DC, neighborhoods, 70% of households do not own cars, thereby suggesting the wastefulness of parking requirements especially as applied to such neighborhoods (*4*). A more general estimate is that each parking space per unit increases housing costs by an average of 12.5% (*5*).

The San Francisco Planning Department has published estimates that a parking space adds $20,000 to $30,000, and even up to $50,000 in some parts of the city, to the cost of housing (*6*). In perhaps the best study of the effect of parking on housing price, conducted in San Francisco, an even greater average impact was found. A regression analysis that included all factors that could have an effect on San Francisco housing prices in 1996 was developed with the result of parking being shown to lead to a $46,391 increase in the price of single-family dwellings and $38,803 in condominium unit prices. Minimum parking requirements in San Francisco, and elsewhere, almost certainly suppress this price differential by artificially raising parking supply, meaning a larger differential would be expected if such requirements were eliminated. This study concluded that fully 24% more households in San Francisco could afford houses and 20% more could afford condominiums, if they did not include parking (*7*). These very high percentages would be even higher had they incorporated the fact that today in many cities, including in San Francisco, lenders will allow higher loan amounts in neighborhoods with fewer cars because households that do not own cars save money, and thus would further increase affordability in such circumstances.

The costs of complying with parking requirements is underestimated because of increased property tax burdens and operating costs associated with privately owned spaces (*8*). This paper deals with this issue by assuming these costs are proportionate to housing tax and maintenance costs.

Minimum parking requirements create a housing stock that, as a corollary to reduced affordability, has been shown, at least in one study, to be less desirable in the marketplace. Specifically in San Francisco, single-family homes and condominiums sold five and 41 days quicker, respectively, if they did not contain off-street parking (*9*).

As noted parking expert Dr. Donald Shoup has written on numerous occasions, and as the figures above attest, the average parking space is worth more than the average car parked in it. As one example at the University of California, Los Angeles, the cost of a new parking space constructed since 1977 has averaged 155% of the cost of a new car (*10*).

Shoup cites a before-after analysis of an Oakland, California, requirement, beginning in 1961, for one parking space per apartment building dwelling unit. He asserts that this before-after analysis is the only study of its kind on the effect of parking requirements on housing. In addition to construction cost per dwelling unit rising by 18%, housing density fell by 30%, housing investment per acre fell by 18%, and land values fell by 33%. An Oakland developer interviewed about this result said that

apartments with a higher rent structure were needed in order to offset higher costs (*10*). Clearly, minimum parking requirements are not without effect; they have a serious impact on what developers will do, rather than merely codifying what developers plan to do or have already done.

Reduced density in itself increases the need for and ownership of automobiles as it spreads destinations and creates an environment less hospitable to walking and other alternative transportation modes. A doubling of residential density, for example, reduces vehicle ownership by 32 to 40% (*11*). This suggests that neighborhoods encouraging new infill development may need proportionately less parking over time, but today's typically rigid parking requirements would preclude such an evolution. It is even conceivable that, contrary to common folklore, car ownership can decline without declining population or wealth. New York City, for example, experienced a nearly 5% decline in car ownership from 2.04 million vehicles to 1.94 million vehicles from 2000 to the beginning of 2004, while population continued to increase slightly (*12*).

Reduced density also increases public infrastructure costs, including for roads, water, sewers, trash collection, utilities, and school transportation. One study, which summarized many other studies on this topic, provided a range between $5,000 to $75,000 in fixed infrastructure costs that could result from choosing the least efficient over the most efficient development pattern, with a $500 to nearly $10,000 annual cost on top of this (*13*).

Parking requirements applied to infill low-income housing development projects on blighted urban parcels can be especially onerous and, therefore, not infrequently preclude such development (*3*). Since the cost of land to meet parking requirements is higher in urban areas than in outlying ones, minimum parking requirements shift development away from urban areas (*14*).

Perhaps the most pernicious effect of minimum parking requirements is how they severely limit the number of low-income households that could benefit from public resources supporting the construction, purchase, and rental of housing designed for their use. By one estimate, a housing unit without parking that can be purchased for $80,000 would be affordable to a household earning $30,000 per year if a $4,000 annual subsidy were provided. The same unit with one and two parking spaces added would require annual subsidies of $12,792 and $26,251, respectively, thus meaning that a subsidy for a two-parking-space home would need to be about 6.5 times higher than for a no-parking-space home that is otherwise the same (*1*).

There are multiple congestion, environmental, and safety external harms associated with driving and parking that minimum parking requirements exacerbate. Environmental externalities include: air pollution resulting from increased driving, loss of open space, visual blight, and increased impervious surfaces leading to water quality degradation. Safety related harms include: injuries and fatalities, publicly-funded medical expenses, and lost wages. There are also private opportunity costs for underutilized lands (e.g., enabling less building and all its possible attendant uses on a parcel of land in order to accommodate more parking), as well as various public losses,

including lowered tax receipts and reduced transit service efficiency. Finally, spreading land uses curtails access for those unable to drive, whether for age, physical, or financial reasons (*14*).

While quantifying the magnitude of all of the above is not a focus of this paper, it is important to note that the magnitude is quite large and public policy measures to address the underlying problem can yield great benefits. For example, it is estimated that a 20-30% increase in vehicle travel and parking—clearly exacerbating the problems above—result from motorists not directly paying for what amounts to an average $0.15 per mile driven for their own parking (representing about half of the total of what motorists do pay to drive). If consumers were charged directly for parking, they would have an opportunity to save such costs that they do not now have (*14*).

PARKING MINIMUMS FAIL TO MATCH SUPPLY AND DEMAND: ALTERNATIVE APPROACHES DO BETTER

Linking parking requirements with either the number of housing units built or floor-area of commercial developments is not only harmful—reducing low-income housing and retail as discussed above—but it is also arbitrary and has little rational basis. Indeed, only a small percentage of the variation in parking demand can be explained by these factors, especially with commercial uses—where only 4% of variation in parking generation for fast food restaurants, for example, can be explained by floor area (*15*)—and when considering special-population (e.g., low-income and elderly) housing. The composition and characteristics of households explain a lot about parking demand, regardless of housing choices. One Bay Area study showed that households of exclusively people 62 years old or older own 31% fewer cars than households with no seniors (*9*). Likewise, households with residents under 30 years of age own fewer cars. Household size certainly has an enormous effect on parking demand. Neighborhood factors, too, such as high density and nearness to transit stations, correlate with reduced car ownership, as do availability of and membership in carsharing organizations (*1*).

A 1990 comparison of Bay Area household income and car ownership showed over a 375% difference in car ownership between households earning $5,000 to $9,999 per year (with an average of 0.68 vehicles per household) versus those earning over $100,000 per year (with an average of 2.56 vehicles per household) in 1990 dollars (*16*). Zoning codes rarely recognize this disparity, thereby in many cases forcing poor, urban, car-free households to pay for the rental or purchase of parking they do not need when they might very much prefer to apply their meager funds to better housing. Also, since parking minimums eliminate the ability of households to save on housing costs by owning fewer vehicles, they have the effect of increasing vehicle ownership; and since poorer households would be more responsive than richer ones to giving up cars they do own if the opportunity to save on parking-related housing costs was presented to them, minimum parking requirements probably depress the difference in car ownership among income groups that would otherwise be realized.

Regardless of average household vehicle ownership rates—and regardless of household income—some households will choose to own multiple vehicles and some will choose to own none, although households in all income groups will on average choose to

own fewer vehicles if parking minimums were eliminated and parking costs were unbundled from housing costs. Depending upon the cost for parking and elasticity of vehicle ownership vis-à-vis such cost, one study shows a range in reduced vehicle ownership when parking costs are paid directly from 4% to 38%, with a 17% reduction resulting from a mid-point estimate of a $75 monthly parking fee and a 0.7 price elasticity (*1*).

There is a market for housing with little or no parking to serve at least some households in all income groups, but especially low-income households. Since zoning codes in many cities have precluded the construction of new housing that serves households owning fewer than the average number of vehicles, there is certain to be a highly pent up consumer demand for newly constructed housing without bundled parking and its requisite costs.

One need look no further than the older high-end housing stock in many U.S. cities that is selling very well and at high prices despite, in many cases, not including car parking to see the market potential for urban housing units sold without parking. The market potential is even clearer when considering that the upscale housing without parking being sold is typically to high-income individuals, who as a group have the highest car ownership rates, and is often located in neighborhoods where on-street parking even with a residential parking permit is very hard to come by and off-street parking, where available, is very pricey.

One of the great benefits of living in a city with pedestrian-oriented neighborhoods, well served by transit, is that many households can make do without owning a car, especially where carsharing services are available. (Note one rule of thumb commonly understood within the carsharing industry is that one carsharing vehicle—with one reserved parking space—can serve up to 20 households.) Not owning a car generally saves households a lot of money and this cost savings has been recognized by Fannie Mae and a host of lenders offering Location Efficient Mortgages (currently offered in four U.S. cities—Seattle, San Francisco, Los Angeles, and Chicago) that allow households living in locations with reduced average car ownership rates and transportation costs to borrow more money for a housing purchase and pay off the additional mortgage using their savings in transportation costs. The increase in allowable loan amount is quite substantial—enabling the housing cost-to-income ratio to rise from 35 to 39% (*17*), meaning a household that could afford a $100,000 loan in a traditional neighborhood would be permitted to borrow $111,429 in a location-efficient one. A similar program, known as the Smart Commute Initiative Mortgage, is currently available in 25 U.S. cities and offers similar benefits (*18*). This program, which builds off of the pre-existing Energy Efficiency Mortgages, was created to reward homeowners who live within one-quarter mile of a bus stop or one-half mile of a rail-transit station, and who use these transport modes. Eligible participants typically are allowed to borrow an additional $10,000 for their housing and are frequently rewarded with discount transit passes and carsharing memberships (*19*).

A MODEST, REAL-COST URBAN HOUSING PRICING SCENARIO

This section attempts to combine the best available cost figures to estimate the total per unit housing cost of minimum parking requirements in a typical urban setting. Table 1 succinctly describes all of the cost and loss categories itemized in this section, while Figure 1 shows all of the specific cost and loss dollar amounts under each of three scenarios.

This paper examines what it costs for each "real" off-street parking space demanded by zoning codes, even when the full cost may not, in some cases, be fully borne by the purchaser, such as for the extra public infrastructure required to service homes that, because of minimum parking requirements, are more spread out than they would otherwise be. A "real" space is defined as one that is actually created, and subtracts on-street parking spaces that are lost due to curb cuts needed to access new required off-street spaces. In our first scenario, we modestly assume that one on-street parking space is lost for every four off-street spaces created. In truth, since a required single-car garage would most likely result in the loss of one on-street space, this estimate is probably conservative.

The San Francisco study, discussed earlier, applied the most rigorous methodology to show that a parking space raised the price of a San Francisco condominium by $38,803 and a San Francisco house by $46,391 in 1996 dollars (*7*). If we adjust this to 2003 dollars (various web-based calculators make such adjustment calculations easy: we used http://www.westegg.com/inflation/), and discount this by 20% to account for San Francisco's relatively high land and housing costs, we get a composite (house and condominium) average per housing unit cost increase of $39,371 per parking space. Since we assume, as discussed above, that one on-street space is lost for every four off-street spaces required, we need to build 1.33 off-street spaces to get one "new" space. This raises the cost of a "real" off-street parking space required to $52,495.

To this figure, we add $10,000 for the lost additional loan amount for a Smart Commute Initiative Mortgage (had we chosen an eligible housing site closer to transit without off-street car parking) to get $62,495 (*19*). Having added in the foregone additional loan amount, this figure at least partially incorporates the higher household transportation costs associated with parking-related car dependence.

Requirements for new parking reduce overall neighborhood density. Changing neighborhood characteristics affect all households equally, including those residing in homes constructed prior to such requirements. Since the best estimate of the effects of parking requirements on density comes from an Oakland, California, study, discussed earlier, this study is used to estimate such effects under all of the scenarios evaluated. The Oakland study found a 30% reduction in development density associated with the introduction of new minimum parking requirements for housing units (*10*). If we conservatively assume that the urban housing stock averages 50 years of age (it is probably younger), meaning that 2% of such stock is redeveloped every year, new standards would apply to half of such stock over a 25-year period. Thus, a 30% reduction

in development density would apply to such new stock, with no reduction to the existing stock, leading, therefore, to an overall 15% reduction in neighborhood development density over the 25-year period.

As stated earlier, a doubling of residential density reduces vehicle ownership by 32 to 40% (*11*). Assuming the average of these and scaling down to the 15% density reduction leads to a 5.4% increase in vehicle ownership for the half of households over the 25-year period for which the new minimum parking requirements does *not* directly apply. Like above, we assume affected households lose the $10,000 additional loan amount for a Smart Commute Initiative Mortgage because of their increased transportation costs. We also conservatively assume an equal number of households lose the additional loan eligibility because spreading housing leads to transit service reductions that result in their housing units failing the accessibility test for such a loan (while they may not move immediately, this would still make their home less affordable to purchase). Thus, 10.8% of the population living in older housing stock loses $10,000 in loan eligibility, translating to a $1,080 average loss over this whole population. It is fair to apply or "charge" this lost loan eligibility to the new parking construction required, and, thus, the $1,080 should be added to the $62,495 to get $63,575 under the first scenario. This can be added directly since there is one affected existing housing unit for each new housing unit causing the change in neighborhood density and related loan eligibility over the 25-year time period being considered.

Finally, we consider the public infrastructure costs associated with accommodating development which is less dense than it would otherwise be if there had not been minimum parking requirements. As discussed earlier, a host of studies provide a wide range of estimates, ranging from $5,000 to $75,000 per dwelling unit in fixed costs, and $500 to almost $10,000 in annual costs, associated with less efficient development patterns (*13*). While minimum parking requirements create less efficient development patterns than would otherwise result, the change may not be as radical as for other policies, such as for encouraging dense infill development or for accommodating dispersed, leap-frog development. As such, we assume figures only in the fifth percentile ($8,500 per dwelling unit fixed costs and $975 in annual costs) for our first-scenario assessment. To convert the $975 annual cost to a fixed loan principal amount, we assume a 30-year fixed mortgage and a 6% annual interest rate. Using a web-based amortization calculator (http://ray.met.fsu.edu/~bret/amortize.html), we find a cost of $13,552 on top of the $8,500 one-time fixed cost, or $22,052 in total for infrastructure. Adding this to the $63,575 calculated above, we find a total cost of $85,627 per dwelling unit.

To ascertain the robustness of this result, we test two other scenarios by changing some of the most important numerical assumptions to first be more modest and then be more aggressive. Thus, we develop our most conservative cost estimate by discounting San Francisco's parking costs by 40%, instead of 20%; assuming one parking space in six, rather than one in four, is lost to curb cuts for off-street parking access; and assuming the very lowest figures for additional infrastructure costs from the range cited above ($5,000 per dwelling unit, fixed, and $500 per year). We develop our most aggressive cost estimate for our last scenario by assuming no discount in San Francisco's parking costs, one parking space in three is lost to curb cuts, and additional infrastructure costs

are in the tenth percentile of the above figures ($12,000 per dwelling unit, fixed, and $1,450 in annual cost). In both cases, we hold other numbers constant. The result is a low total per dwelling unit cost of $52,558 in the second scenario and a high per dwelling unit cost of $117,054 in the third scenario.

Reviewing all of the costs above, it is apparent that some are paid fully and directly by the homebuyer, while other costs may be spread to the population at large. Economic efficiency would direct that costs be paid by the party incurring them, but even though this sometimes does not occur, such costs are real and must be paid, and, thus, are considered here.

If minimum parking requirements are this costly, why are they pervasive? This question is further confounding because a development project with insufficient off-street parking would, like a house with too few bathrooms, appear only to burden its own owners or renters (in this case, with the need to search for on-street parking), and perhaps also jeopardize developer profit, but not affect others. On a closer look it becomes clear that the primary reason for off-street parking requirements is because existing residents, with support from their local political leaders, feel they have no way of guaranteeing that an on-street parking space will continue to be available to them rather than to either a new resident or an outside "poacher." Instead, they insist, through their local governments, that developers build sufficient off-street parking spaces for the vehicles of new residents and their guests. Existing residents advocate for a supply-oriented solution that new developers and their users, but not they, pay for, thus burdening new housing with the high cost of creating off-street spaces.

DEVELOPMENT IMPACT FEES ARE BETTER, BUT INADEQUATE

New development, especially if large-scale and concentrated in urban areas with already overburdened infrastructure, can cause temporary challenges to infrastructure and finances for which many cities charge development impact fees to address. Development impact fees reflect the specific costs a local government encumbers for public services and infrastructure related to new development. Typical elements covered by such fees include school construction, bus stops and related amenities, sidewalks, nearby roadway accommodations, sewer connections and improvements, and off-site parking. Communities could reward developers for constructing low-income housing, agreeing to garage a carsharing vehicle, subsidizing resident/employee transit passes, or providing important public amenities on site by reducing impact fees charged.

In the case of off-site parking, there is no real reason to assess development impact fees, assuming that on-street parking is well managed, since housing and parking developers will construct parking (both on- and off-site) if sufficient market demand exists to make it profitable. Nevertheless, development impact fees are a better solution than minimum parking requirements because their costs are transparent, they allow more flexibility to developers to construct additional housing units on a parcel of land, and they enable innovative shared parking solutions that require less total parking where adjacent land uses make this feasible.

If the government considers raising impact fees to, among other things, provide parking, this would at least enable some competition for related revenues between parking and other common purposes for which such revenues are often used. Thus, government would and should make trade-offs, such as between providing more off-street parking and adding classrooms to an overcrowded school. Today, by contrast, minimum parking requirements can increase development costs by more than ten times the impact fees for all other purposes combined (e.g., 12 times higher in Palo Alto), and money to meet such requirements cannot instead be used for other purposes. In one sample calculation, providing the required single parking space per 1,000 square feet of new San Francisco office development costs 4.7 times more than the $5 per square foot transit-impact fee assessed on the developer; an outcome that is very difficult to justify in an urban area where transit oriented development is a stated public policy objective (*10*).

In-lieu-of fees that cover minimum parking requirements have been shown to cost 4.4 times more than impact fees levied for all other public purposes combined. Such fees can be quite high. In Beverly Hills, California, for example, the average fee paid between 1978 and 1992 was $37,000 per space, and the highest was $53,000, as compared to an $11,305 per space U.S. average (*8*). These costs are even more substantial than they appear because development with reduced parking will sell for less than if parking had been fully supplied. The fact that it is still more profitable to provide less parking and pay these fees suggests that the provision of required parking is near impossible at times or that the additional market value of an alternative development scheme exceeds the sum of the in-lieu-of fee and lost revenue associated with reduced parking.

The average U.S. in-lieu-of fee is clearly less than the price of parking. This is typically justified by the argument that charging the full cost of parking (assuming the intent is to provide it off-site) would be too high. Interestingly, when the one-time parking costs become transparent as a result of such fees, they are generally perceived as too high, and thus are reduced (*8*).

Using a meager 4% interest rate amortized over 30 years, the average U.S. in-lieu-of fee costs $54 per space per month, or more than double the average cost of fuel for commuting (*8*). Thus, it would be significantly cheaper for a housing developer to offer free fuel for commuting for 30 years than to provide parking, or—put another way—*requiring* a housing developer provide free fuel for commuting to those purchasing their houses would be much cheaper than current requirements that they provide parking or pay in-lieu-of-parking fees. Even if developers were required to pay for all household fuel use, its cost would be little different than for current residential parking requirements (*1*). Developers might prefer to provide transit passes in perpetuity or other transportation benefits to reduce driving and parking, at a cost less than that of an in-lieu-of fee, and certainly less than for the actual cost of parking (*8*). One such benefit could be subsidizing a carsharing vehicle on site which would reduce ownership of and parking demand for personal vehicles.

In addition to development impact fees, a host of other policies have been recommended as substitutes for minimum parking requirements. They include: allowing

developers to reduce parking demand rather than increasing supply, centralized and shared parking, site-specific studies demonstrating an appropriate reduction in parking, reduced parking requirements for housing a carsharing vehicle, and setting aside land for overflow parking but only building it if needed (*1*, *8*, *20*). While all of these ideas are important and certainly worthy of implementation, the bottom line is still that if on-street parking is appropriately managed, minimum parking requirements are not needed, just like there is no need to regulate the number of bathrooms in housing units.

ON-STREET PARKING CHARGES AND MANAGEMENT ARE NEEDED

To avoid spillover parking problems resulting from new development in urban areas and, thus, to find an alternative to the $85,000 or so affective housing-cost increase or to high parking-related development impact fees, appropriate pricing and regulation of on-street parking (with rebates and other measures to make such pricing politically palatable) need to be instituted. The purpose of such measures would be to encourage efficient parking management, give priority to favored users, and bring demand for on-street parking into close conformity with its supply. Parking problems most often result from competition for the most convenient spaces and under utilization of other spaces (*21*), and management and pricing of on-street parking can solve this problem without resorting to very costly minimum parking requirements. Parking pricing, because by dealing with the parking spillover problem enables housing to be built without expensive parking, is actually beneficial to low-income groups, unlike other price increases, such as for transit use. Indeed, revenues from such pricing can be rebated to residents, be used to subsidize or improve transit, even support the construction of low-income housing, or be used for any combination of these. Merely controlling on-street parking in this fashion would, even if all revenues were wasted, contribute to affordable housing since minimum parking requirements would no longer be needed. Further, if minimum parking requirements are eliminated, using pricing to manage on-street parking will signal developers to build an appropriate quantity of nearby or on-site parking (hopefully made available as a separate purchase from housing), since free on-street parking will no longer be competing with off-street parking that is not free.

Even urban areas that fail to muster the political courage to use pricing to manage on-street parking can still provide developers the option to construct housing without parking so long as the new residents are made ineligible for on-street parking permits (*22*) or made eligible for only a very limited number of such permits, priced through auction (as Shanghai does for new vehicle license tags).

Providing on-street parking is not the only or in many cases the best way to provide transportation access for new urban residents. Bus service with dedicated curb lanes through major through-fares could benefit far more people than a limited amount of on-street parking spaces would. Similarly, reserving the most desirable on-street parking spaces for carsharing vehicles available for hourly rental enables residents to enjoy the benefits of car ownership without the high upfront costs. Indeed to encourage the transition from car ownership to carsharing, parking revenues could be applied to partially cover car sharing membership and usage costs. This would increase the number of people who would find it cost effective to sell their cars, freeing curb-side space and reducing the demand (and cost) for providing off-street parking.

If on-street parking is properly managed, there simply should be no need to require off-street parking, since developers—left to their own devices—will provide parking sufficient to meeting market demand at a market price. If off-street parking is demanded but is unavailable on or near developed sites, developers would have difficulty selling or leasing their properties. A strong financial incentive would then exist to remedy such shortfalls in adjacent subsequent development projects.

BENEFITS TO ALTERNATIVE TRANSPORTATION

In addition to revenues, unbundling parking from housing, raising on-street parking costs to match supply and demand, eliminating some on-street parking to create exclusive bus lanes, and relying on the private market to provide off-street parking where needed would substantially increase bus speeds and, thus, vastly improve the transportation situation for low-income urban residents. In London, for example, well publicized cordon charges have been applied to private cars leading to an amazing 15% reduction in vehicles and 30% reduction in congestion in the charging area, which in turn has led to a 6% increase in overall bus speeds, service reduction due to traffic delays falling by 60%, and a 38% increase in patronage (*23*). One might expect that the universal application of parking charges of the magnitude of the London cordon charges might have similar benefits.

Increased transit speeds, by reducing commute times, allow low-income workers to work more hours while spending the same amount of time away from home, effectively increasing their wage rates. Even when working additional hours is not an available option, low-income people, like others, place some monetary value on their time and, thus, would appreciate the “cost savings” of reduced commute time.

CONCLUSIONS

With minimum parking requirements, we demand more housing for cars and less housing for people than the market would otherwise provide and substantially drive up housing costs as a result. We would never consider requiring developers contemplating building a parking garage to build a certain number of housing units or commercial dwellings for every parking space they build, but we routinely tell those who build housing and commercial space that they must build parking too.

This paper attempts to quantify just how much minimum parking requirements increase housing costs in typical U.S. urban environments. Low- and high-range cost scenarios were developed that show a cost range of between $52,558 and $117,054, with a mid-range scenario cost estimate of $85,627, for each new parking space netted as a result of minimum parking regulations in U.S. urban areas. These figures are derived from actual observed differences in housing prices, reduced loan eligibility because of increased car-related household costs, public infrastructure costs associated with accommodating developments that are more dispersed than they would otherwise be because of parking requirements, and direct financial impacts on neighbors of new developments.

For advocates of affordable housing, there is no more important issue than eliminating minimum parking requirements. To make this change possible from a

political standpoint, on-street parking must be managed and priced, and complementary policy measures need to be instituted.

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Table 1. Description of Costs and Losses Related to Parking Requirements

Costs / Losses	Who Pays or Loses	How Pay or Lose
Direct housing cost increase for base-level of mandatory parking	Purchaser pays	Pays in mortgage
Additional housing cost increase for parking mandated to recover lost curb space	Purchaser pays	Pays in mortgage
Reduced loan eligibility	Purchaser loses	Loses through decreased mortgage allowance
Reduced loan eligibility for neighbor properties	Purchaser of neighbor's home loses	Loses through decreased mortgage allowance
Increased public infrastructure costs	Taxpayers pay	Pays primarily through a variety of local tax charges

Figure 1. Parking Costs and Losses