Parking Management
Strategies for More Efficient Use of Parking Resources
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TDM Encyclopedia
Victoria Transport Policy Institute
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This chapter describes various management strategies that result in more efficient use of parking resources, including sharing, regulating and pricing of parking facilities, more accurate requirements, use of off-site parking facilities, improved user information, and incentives to use alternative modes. For more information see [Parking Management: Strategies, Evaluation and Planning](#).

Contents

Description

Parking Management includes a variety of strategies that encourage more efficient use of existing parking facilities, improve the quality of service provided to parking facility users and improve parking facility design. Parking Management can help address a wide range of transportation problems (see [Parking Evaluation](#) and [Parking Solutions](#)), and help achieve a variety of transportation, land use development, economic, environmental objectives.

Specific parking management strategies are described below.

Share Parking

Sharing parking spaces typically allows 20-40% more users compared with assigning each space to an individual motorist, since some potential users are usually away at any particular time. For example, 100 employees can typically share 60-80 parking spaces, since at any particular time some employees are on leave, away on business, or using an alternative commute mode. Even greater reductions are possible with mixed land uses, since different activities have different peak demand times. For example, a restaurant can share parking with an office complex, since restaurant parking demand peaks in the evening while office parking demand peaks during the middle of the day. Public parking facilities, including on-street parking spaces, can usually be shared efficiently among many destinations.

In lieu fees allow developers to pay into a fund for off-site municipal parking facilities instead of providing their own on-site parking (Shoup 1999a). This results in more efficient Shared Parking facilities, and allows parking facilities to be located where they most optimal for urban design.

The appropriate number of motorists that can be assigned to a particular number of parking spaces depends on several factors. In general, the more diverse the users and the larger the facility, the more parking spaces can be shared.

Regulate Parking Use

Parking facilities can be managed and regulated to encourage more efficient use of parking resources and more efficient travel. This often involves making the most convenient parking spaces available to certain higher-value uses. Below are typical strategies.

- Regulate based on the type of vehicles or users. For example, during peak periods dedicate the most convenient spaces for service vehicles, customers, Rideshare vehicles, and vehicles used by People With Disabilities.

- Limit parking duration (5-minute loading zones, 30-minutes adjacent to shop entrances, 1- or 2-hour limits for on-street parking in commercial areas), to encourage turnover and favor shorter-term users (since higher priority trips, such as deliveries and shopping, tend to park for shorter duration than lower priority trips).

- Encouraged employees to use less convenient parking spaces (such as parking lots at the urban fringe) during peak periods, in order to leave the most convenient spaces for customers. Develop a system to monitor use of parking facilities and send reminders to employees who violate these guidelines.

- Charge higher Parking Prices and shorter payment periods for more convenient spaces. For example, in prime central locations charge 25¢ for each 15-minute period with a two-hour maximum, while at the fringe charge $2.00 for 4-hours, with no smaller time periods available.

- Implement more flexible Pricing Methods which allow motorists to pay for only the amount of time they park, which makes shorter parking periods relatively attractive.

- Limit use of on-street parking to area residents, or provide discounts to residents for priced parking.

- Limit on-street parking of large vehicles (e.g., vehicles over 22 feet long or trailers) to ease traffic flow and discourage use of public parking for storage of commercial vehicles.

- Prohibit on-street parking on certain routes at certain times (such as on arterials during rush hour), to increase traffic lanes.

More Accurate and Flexible Parking Standards

Current parking requirements are often inflexible and generous, applied with little consideration to specific geographic and demographic factors that affect parking demand at a particular location (Cervero and Arrington 2009; CTR 1999; Engel-Yan and Passmore 2010; Litman 1999; Millard-Ball 2002; Rowe, et al. 2013; Shoup 1999). Parking

requirements are based on parking generation studies that are mostly performed at new, suburban sites with unpriced parking, resulting in standards that tend to be excessive in urban areas with more multi-modal transportation, where parking is priced, and at sites with TDM programs (Shoup 2002). Current minimum parking standards are often inflexible, applied with little consideration to specific geographic, demographic, economic and management conditions.

In many situations, parking standards for new facilities, and the supply of parking at existing facilities, can be reduced without creating significant parking problems, particularly if implemented as part of an integrated parking management program. *More accurate and flexible parking requirements* means that parking standards reflect the parking demand and costs at a particular location, taking into account geographic, demographic, economic and management factors. This allows parking requirements to be reduced in exchange for implementation of specific parking and mobility management strategies, such as:

- Shared Parking.
- Regulations that encourage more efficient parking facility use.
- Priced Parking and Parking Cash Out.
- Overflow parking plans to deal with occasional peaks.
- Transit and Rideshare improvements.
- Smart Growth that increases land use Accessibility.
- Other TDM strategies that affect Parking Demand

Reduce Residential Street Width Requirements

Most jurisdictions require wide residential streets in order to provide on-street parking. This practice is not justified for safety or by consumer demands, since many households would not choose to pay for parking if it were unbundled, and so represents a hidden subsidy of automobile ownership and use (Guo, et al. 2012). Reducing minimum residential street widths in municipal zoning codes and development policies allows developers to build *new urbanist* communities with narrower streets and less parking, and rely more on efficient parking management.

Parking Maximums

Some communities limit on the maximum amount of parking capacity allowed at particular sites or within a particular area, particularly in growing Commercial Centers (Millard-Ball 2002; Manfille and Shoup 2004). This can be in addition to, or instead of, minimum parking requirements that are commonly imposed. Below are some examples (K.T. Analytics 1995):

- *Portland.* In 1975, the City of Portland set an overall cap of approximately 40,000 parking spaces downtown, including existing and new parking facilities. The cap was increased to about 44,000 spaces by the 1980's and increased again in the 1990's. The City is generally satisfied with its parking policies and believes it has helped increase transit use from 20-25% in the early 1970's to 48% in the mid-1990's.

- *San Francisco.* The city of San Francisco's "Transit First" policy allows parking to consume only up to seven percent of a building's gross floor and new buildings must have an approved parking plan prior to receiving an occupancy permit. In some cases, only short term parking is approved; in another, a mix of long, short and carpool parking was approved. This policy has helped prevent increased peak vehicle traffic despite considerable office growth.

- *Boston.* In 1977, the City of Boston adopted a freeze on commercial parking open to the public, but not parking reserved for individuals or a company use within office buildings. While the number of commercial spaces have not increased, there was a 26% increase in exempt spaces between 1984 and 1987 alone and motor vehicle traffic increased dramatically along major corridors to the city.

- *Seattle.* The City of Seattle allows a maximum of one parking space per 1,000 sq. ft. of downtown office space.

Remote Parking and Park & Ride

Remote Parking involves encouraging motorists (particularly commuters and residents) to use off-site or fringe parking facilities (typically located a few blocks from a Commercial Center), so the most convenient spaces are available for priority users (such as service vehicles and customers). Motorists usually prefer the closest parking location, but given a choice some will park further away to save on parking fees. In some situations (airports, large entertainment centers, and large commercial centers), Shuttle Services may allow longer distances between parking facilities and destinations. Strategies to accomplish this include:

- Information (signs, maps and brochures) on remote parking availability.
- Regulations and pricing that encourages long-term parkers to use urban fringe facilities
- Shuttle services, free transit zones and pedestrian facilities to improve access to remote parking facilities.

Park & Ride consists of parking facilities at transit stations, bus stops and highway onramps, particularly at the urban fringe, to facilitate transit and rideshare use. Parking is generally free or significantly less expensive than in urban centers.

Improve User Information and Marketing

Many parking problems result, in part, from inadequate user information and Marketing. Motorists need convenient and accurate information on parking availability and price, including what parking facilities exist near a destination, whether spaces are available in a particular facility at a particular time, the price they will need to pay, and whether there are less expensive alternatives nearby. Produce a Transportation Access Guide that provides concise information on how to access a particular destination by various modes, including parking availability and price. Parking information can include maps, signs, brochures and various types of Electronic Communication systems to provide information to motorists on parking facility location, availability (whether a parking lot is full), service options, and price (FHWA 2007). This can help improve user convenience and security, increase the functional supply of parking, address many objections to specific parking management strategies. For example, motorists may be less resistant to parking regulation, pricing and reduced supply in a particular location if they can easily obtain information on alternatives parking and travel options that can meet their needs.

Smart Growth and Location Efficient Development

Smart Growth (also called New Urbanism) is a general term for policies that integrate transportation and land use decisions, for example by encouraging more development within existing urban areas where additional growth is desirable, and discouraging low-density, automobile dependent development at the urban fringe. Smart Growth can help create more accessible, less automobile-dependent land use patterns. Smart Growth is an alternative to urban sprawl. Smart Growth tends to reduce per capita vehicle ownership and encourage use of alternative travel modes, and so it can reduce parking requirements and support other parking management strategies.

Location Efficient Development means development that is designed and managed to take advantage of more Accessible, multi-modal locations (good walking, cycling and transit). Parking requirements can be reduced in such areas due to reduced automobile ownership and use. Location Efficient Mortgage (LEM) means that lenders take into account transportation cost savings by households that choose more accessible locations when evaluating borrowing ability (Hoeveler 1997). This encourages infill, multi-modal development.

Improve Walkability

The usable parking supply serving a destination can often be increased by improving Walkability (the quality of the walking environment). Walkability takes into account sidewalk, path and roadway conditions; land use patterns; social acceptance; security and comfort for walking. Improved walking conditions expands the range of Shared Parking, and encourages *park once* trips, which means that visitors park their vehicles and walk to several destinations, rather than driving to, and parking at, each destination. There are many specific ways to Improved Walkability:

- Improved sidewalks, crosswalks and paths.
- Creating pedestrian shortcuts, such as mid-block paths and connections between dead-end streets.

- Improve facility designs to accommodate special needs, including people using wheelchairs, walkers, strollers and hand carts.
- Provide covered walkways, loading and waiting areas with shade from hot sun and protection from rain.
- Street furniture (e.g., benches) and design features (e.g., human-scale street lights).
- Implement traffic calming, speed reductions and vehicle restrictions.
- Address pedestrian Security Concerns.
- Creating more attractive, interesting and clean walking areas.

Transportation Management Associations and Parking Brokerage

Transportation Management Associations (TMAs) are private, non-profit, member-controlled organizations that provide transportation services in a particular area, such as a commercial district, mall, medical center or industrial park. Transportation Management Associations can provide a variety of services that encourage more efficient use of transportation and parking resources. TMAs allow small employers to provide Commute Trip Reduction services comparable to those offered by large companies. They are usually more cost effective than programs managed by individual businesses.

Transportation management associations can provide parking brokerage services, allowing businesses to share, trade, lease, rent and sell parking facilities. For example, a TMA can match businesses that have extra parking supply at a particular time with nearby businesses that need parking at that time. This helps businesses deal with changing parking demands, and allows businesses that implement successful trip reduction programs to save money if they end up with unused parking spaces.

Increase Capacity of Existing Parking Facilities

Increase the number of spaces in existing parking facilities by:
- Using currently wasted areas (corners, edges, undeveloped land, etc.).
- Changing from parallel to angled parking.
- Sizing a portion of spaces for motorcycles and compact cars. Small size stalls (275 square feet) require about 20% less space than average stalls (325 square feet). Up to 25% of spaces can typically be sized for compact vehicles, resulting in a 5% increase in total parking capacity compared with all spaces being average size. Motorcycle parking can sometimes be located in an area that is too small for automobile parking spaces.
- Car stackers and mechanical garages use various types of lifts and elevators to increase the number of vehicles that can fit in a parking structure. They can nearly double the number of vehicles that can be parked in a given area, although they are only suitable for cars (most trucks, vans and SUVs are too high), and require an attendant to operate.
- Using valet parking services. This can increase parking capacity by 20-40% compared with self-park.

Implement TDM Programs

Implement TDM programs to reduce vehicle trips, and reduce parking requirements at sites that implement such programs. For example, parking requirements can usually be reduced 10-30% at sites with Commute Trip Reduction programs. Parking Cash Out is particularly effective at reducing parking demand. Carfree and Location Efficient Development may provide parking spaces for Carsharing vehicles, each of which can substitute for several private automobiles, and therefore reduce total parking requirements.

Price Parking

Parking Pricing means that motorists pay directly for using parking facilities. Parking Pricing may be implemented as a parking management strategy (to reduce parking problems in a particular location), as a mobility management strategy (to reduce vehicle traffic in an area), to recover parking facility costs, to generate revenue for other purposes (such as a local transportation program or downtown improvement district), or for a combination of these objectives. *Performance-based parking pricing* means that prices are set so that about 15% of parking spaces are unoccupied

during peak periods, with higher rates for peak locations and times (Shoup, 2006 and 2008). Use [Improved Pricing Methods](#) to improve user convenience, pricing flexibility and cost efficiency.

Cost-based parking pricing (i.e., prices set to recover the full cost of parking facilities) typically reduces parking demand 10-30% compared with unpriced parking. Pricing of commuter parking, and time variable-rates (higher rates during peak periods) is particularly effective at reducing peak use. Pricing of commuter parking, and time variable-rates (higher rates during peak periods) is particularly effective at reducing peak use. Charging motorists directly for parking is more economically efficient and fair (horizontal equity) than unpriced parking that results in cross-subsidies from consumers who drive less to those who drive more than average.

When parking is priced, it is often leased by the month, with significant discounts compared with short-term pricing. This encourages motorists who pay the fee to drive in order to get their money's worth. It is more efficient to rent parking in smaller time blocks (hourly or daily rates), or to prorate monthly leases by the portion of days parking facilities are used. For example, if full-time parking costs $50 per month, commuters who only drive 3 days a week should only pay $30. This gives motorists more options and a financial incentive to use alternative modes when possible. Similarly, some parking facilities offer "Early Bird Specials," which favors long-term parking – such discounts are appropriate for less convenient parking facilities, but not for parking at prime locations, which should be reserved for people parking for short-term errands.

Shoup (2005) provides the following guidelines for efficient parking pricing:

- Price parking for full cost recovery: at a minimum, all costs of building and operating parking facilities should recovered from users. Prices may be higher to reflect the opportunity cost of land and to provide profits.

- Price the most convenient parking, such as on-street spaces, so occupancy averages 85-90%. Use variable fees, with higher rates during peak periods and lower rated during off-peak periods.

- Dedicate some or all of the revenue from on-street parking to benefit local businesses and residents.

- Unbundle parking from building rents, so occupants only pay for the number of parking spaces they want.

- Allow private developers and building managers to decide how much parking to provide at each destination, rather than relying on rigid regulations.

Commuter Financial Incentives (Parking Cash Out and Transit Benefits)

[Commuter Financial Incentives](#) means that commuters are offered financial incentives to use alternative travel modes and reduce their use of parking facilities, particularly the most convenient parking spaces during peak periods. *Parking Cash Out* means that commuters who are offered a free or subsidized parking space have the option of choosing the cash equivalent, and *Transit Benefits* means that employers help fund their employees' transit and rideshare fares. For example, employees might be able to choose between a free parking space, a monthly transit pass, a vanpool subsidy, or $50 cash per month. These payments may be prorated, so for example, employees who drive 30% of the time receive a 70% cash-out payment. This creates a more neutral benefit with respect to travel mode, letting commuters decide which commute subsidy they prefer. These incentives tend to reduce automobile commuting by 15-25%, and are fairer, since they give non-drivers benefits comparable to those offered motorists.

Commuter Financial Incentive benefits represent the savings that result from reduced parking costs. Businesses that own adequate parking may perceive little short-term savings from reduced parking demand. For example, if Commuter Financial Incentives convince 20 employees to shift from driving to alternative modes the employer may simply have 20 unused parking spaces. However, over time most firms have opportunities to benefit financially from reduced parking demand: by reducing the amount of parking they lease with their building, to provide additional parking to accommodate growth, to lease or sell to other businesses, or to use the land for a new building, equipment storage, or greenspace. To make it easier for businesses to save from reduced employee parking demand,

commercial leases can unbundle parking (parking spaces are leased separately rather than automatically included with building space), and list parking as a separate line item (parking rents are listed separately from building rents). Parking brokerage services, provided by a Transportation Management Association or other local business organization, can help employers capture financial savings from reduced parking use.

Unbundle Parking

Unpriced parking is often "bundled" with building costs, which means that a certain number of spaces are automatically included with building purchases or leases. *Unbundling Parking* means that parking is sold or rented separately. For example, rather than renting an apartment for $1,000 per month with two parking spaces at no extra cost, each apartment can be rented for $850 per month, plus $75 per month for each parking space. Occupants only pay for the parking spaces the actually need. This is more efficient and fair, since occupants save money when they reduce parking demand, are not forced to pay for parking they do not need, and can adjust their parking supply as their needs change.

For this to function efficiently, building owners must be able to lease or sell excess parking spaces (such as parking brokerage services described below), and local officials should regulate nearby on-street parking to avoid spillover problems that could result if residents use onstreet parking to avoid paying rents for parking spaces.

Tax Parking Facilities or Their Use

If governments must tax something, it may be appropriate to tax parking as a way to control demand and correct existing distortions that underprice parking. Taxes can be applied to parking spaces, parking subsidies and parking rental transactions. For example, a municipality can charge a special property tax of $5 annually per parking space owned by businesses, $10 annually per space provided free to employees, or a special sales tax of 20% on commercial parking transactions. For example, the city of San Francisco charges a 25% tax on commercial parking transactions (*www.ci.sf.ca.us/tax/parking.htm*). Municipalities could also charge a tax on curbcuts comparable to potential revenue foregone had the same curb area been devoted to priced on-street parking. This would encourage property owners to minimize the number and width of curb cuts, through access management and consolidation of driveways and parking facilities, which helps improve traffic flow and create more pedestrian friendly streetscapes.

2. It would encourage consolidation of curb cuts between property owners.

Parking tax reform can also be used to correct existing policies that undertax parking. For example, land devoted to parking is sometimes assessed at a lower rate than if the same land were used for buildings, on the assumption that rents are paid on buildings, while parking is an ancillary use. Taxing land devoted to parking at the same rate as building land gives businesses an incentive to reduce parking supply.

Control Parking Passes

Parking passes sold or allocated to employees, officials or visitors should have clear limitations regarding where, when and by whom they may be used, and these limitations should be enforced. For example, it is often appropriate to limit parking pass use to a specific vehicle, individual, and area.

Employees, officials and volunteers are often allocated parking passes for use on official business. Such passes are sometimes abused, such as being used for personal trips, or loaned to other motorists. Such passes should be carefully controlled, with regular audits of their need and use.

Bicycle Parking

Bicycle Parking, storage and changing facilities are important ways to provide convenience and security for cyclists at destinations. Bicycle parking improvements can reduce automobile parking and travel demand if inadequate bike

storage is major deterrents to cycling. Effective bicycle parking requires a properly designed rack in an appropriate location for the type of use. There are many types of bicycle racks and lockers available.

Develop Overflow Parking Plans

Excessive parking is often provided to meet infrequent peak demand that occurs during Special Events or other limited time periods. Parking requirements can be reduced by developing an overflow parking plan. This can include:

- Shared Parking arrangements during peak periods.
- Use of remote parking facilities with Shuttle Services.
- Promotion and pricing to encourage peak-period motorists to use remote parking.
- Promotion of alternative modes such as public transit and ridesharing to major events.
- Encourage employees to use remote parking sites or alternative modes during peak periods.
- Special parking regulation to favor priority vehicles (emergency, service, HOV, disabled, etc.)
- Improved walkability between destinations and nearby parking facilities.

Address Spillover Problems

Generous and free parking is often justified in order to avoid "spillover" parking problems in nearby areas. Spillover problems can be addressed directly with management, pricing and enforcement strategies. On-street parking can be limited to residents, which can be enforced by issuing permits to residents, or simply in response to complaints. Residential neighborhoods can be designated "Parking Benefit Districts," where on-street parking is priced (residents can be exempt), with revenues used for neighborhood enhancement or to reduce property taxes (Shoup, 1994 and 1995).

Another approach is to provide some sort of compensation to residents who experience parking problems. For example, a high school can send complementary sport event tickets to residents of nearby streets who bear spillover parking problems. Shoup (1995) proposes using revenues from on-street parking in ways that directly benefit neighborhood residents.

Parking Facility Design

Parking facility design changes can address a variety of problems and concerns (Mukhija and Shoup 2006):

- *User information.* Add signs and wayfinding information within parking facilities.
- *User convenience.* Improve walkability within parking facilities, for example, by adding walkways, shading and covered shelter areas.
- *Aesthetics*. Create more attractive parking facilities, with landscaping, building, quality building materials, public art and other attractive design features (Smith, 1988).
- *Cleanliness*. Keep parking facilities clean and in good repair.
- *Stormwater management*. Use state-of-the-art stormwater management and pollution controls. Use on-site stormwater retention. Reduce total impervious surface and maximize greenspace. Use permeable pavement surfaces. (*Center for Watershed Protection*; *NEMO*; Booth and Leavitt 1999)
- *Safety.* Design parking facilities with state-of-the-art safety design features and speed controls (Hamilton Associates 1998)
- *Security Concerns.* Design parking facilities for maximum natural surveillance (i.e., visibility from the street or nearby buildings), adequate lighting, patrols, emergency alarms and closed circuit video observation.
- *Disabled Access*. Use state-of-the-art accessibility standards for parking and pedestrian facilities.

Summary of Parking Management Strategies

Table 1 summarizes these parking management strategies, indicates their typical reduction in parking requirements, and whether they tend to reduce vehicle traffic and therefore provide additional benefits (such as reductions in congestion, accidents, energy consumption, pollution emissions and consumer costs).

Table 1   Parking Management Strategies

Strategy	Description	Typical Reduction	Traffic Reduction
Shared Parking	Parking spaces serve multiple users and destinations.	10-30%	
Parking Regulations	Regulations favor higher-value uses such as service vehicles, deliveries, customers, quick errands, and people with special needs.	10-30%	
More Accurate and Flexible Standards	Adjust parking standards to more accurately reflect demand in a particular situation.	10-30%	
Parking Maximums	Establish maximum parking standards.	10-30%	
Remote Parking	Provide off-site or urban fringe parking facilities.	10-30%	
Smart Growth	Encourage more compact, mixed, multi-modal development to allow more parking sharing and use of alternative modes.	10-30%	X
Walking and Cycling Improvements	Improve walking and cycling conditions to expand the range of destinations serviced by a parking facility.	5-15%	X
Increase Capacity of Existing Facilities	Increase parking supply by using otherwise wasted space, smaller stalls, car stackers and valet parking.	5-15%	X
Mobility Management	Encourage more efficient travel patterns, including changes in mode, timing, destination and vehicle trip frequency.	10-30%	X
Parking Pricing	Charge motorists directly and efficiently for using parking facilities.	10-30%	X
Improve Pricing Methods	Use better charging techniques to make pricing more convenient and cost effective.	Varies	X
Financial Incentives	Provide financial incentives to shift mode, such as cash out.	10-30%	X
Unbundle Parking	Rent or sell parking facilities separately from building space.	10-30%	X
Parking Tax Reform	Change tax policies to support parking management objectives.	5-15%	X
Bicycle Facilities	Provide bicycle storage and changing facilities.	5-15%	X
Improve User Information and Marketing	Provide convenient and accurate information on parking availability and price, using maps, signs, brochures and electronic communication.	5-15%	X
Improve Enforcement	Insure that parking regulation enforcement is efficient, considerate and fair.	Varies	
Transportation Management Associations	Establish member-controlled organizations that provide transport and parking management services in a particular area.	Varies	X
Overflow Parking Plans	Establish plans to manage occasional peak parking demands.	Varies	
Address Spillover Problems	Use management, enforcement and pricing to address spillover problems.	Varies	
Parking Facility Design and Operation	Improve parking facility design and operations to help solve problems and support parking management.	Varies	

This table summarizes the parking management strategies described in this chapter. It indicates the typical reduction in the amour parking required at a destination, and whether a strategy helps reduce vehicle traffic, and so also provides congestion, accident an pollution reduction benefits.

Wit and Humor

"If every place worth visiting had enough parking for all the people who wanted to visit, there would be no places left worth visiting."

"I have sometimes thought of the modern university as a series of individual faculty entrepreneurs held together by a common grievance over parking."
- *University of California president Clark Karr*

"The chancellor's job has come to be defined as providing parking for the faculty, sex for the students, and athletics for the alumni."
-A UC Berkeley chancellor

How It Is Implemented

Parking Management is usually implemented by local governments or individual businesses in response to specific parking and traffic problems. Some Parking Management programs are coordinated by regional governments. Concerns over an immediate parking problem will instigate development of a comprehensive parking planning process. Transportation engineers and planners, either within public agencies or hired as consultants, are usually responsible for performing parking studies, evaluating parking solutions and developing parking management plans.

Below is the typical process for developing a Contingency-Based parking management plan (TDM Planning):

1. Define general problems to be addressed (parking congestion, traffic congestion, excessive parking facility costs, poor pedestrian environments, etc.) and the geographic areas to be considered.

2. Perform the following studies:
   - A parking supply inventory (how many spaces exist of each type of parking: public and private, on- and off-street, short- and long-term, free and paid, etc.) for each geographic area.
   - A parking utilization study (what portion of each type of parking is used at various time, particularly peak-periods) for each geographic area.
   - Projections of how parking supply and demand are likely to change in the future, taking into account expected changes in land use, population, commercial activity, travel patterns, etc.
   - Use this information to identify when and where parking supply is or will be inadequate or excessive.

3. Identify potential solutions (Parking Solutions).

4. Work with stakeholders to evaluate the effectiveness, benefits, costs, equity impacts, feasibility and barriers of each potential solution. Use this information to prioritize these options.

5. Develop an integrated parking plan that identifies changes in policies and practices, tasks, responsibilities, budgets, schedules, etc.

Travel Impacts

Abundant, free parking encourages driving and helps create dispersed, automobile-dependent land use patterns. Many Parking Management strategies significantly reduce automobile travel, as indicated in Table 1.

Automobile travel tends to be quite sensitive to parking supply and price. The Price Elasticity of parking is –0.1 to –0.3, meaning that a 10% increase in parking charges reduces driving by 1-3%. Charging cost-recovery prices (i.e., rates that recover the full costs of providing parking facilities) typically reduces drive alone commuting by 10-30%, particularly if implemented with other Commute Trip Reduction strategies (Analytics, 1995; Shaw, 1997).

Parking Management can help shift automobile travel to alternative modes, and improves access by creating more clustered, multi-modal land use patterns. As the number of parking spaces per employee in a commercial center declines, use of alternative modes tends to increase (Morrall and Bolger 1996; Mildner, Strathman and Bianco 1997). See Transport Elasticities and Land Use Impacts on Transport for additional information on how parking policies can affect travel decisions.

Table 2 **Travel Impact Summary**

Travel Impact	Rating	Comments
Reduces total traffic.	3	Reduces total driving.
Reduces peak period traffic.	3	
Shifts peak to off-peak periods.	1	If prices are higher during peak-periods.
Shifts automobile travel to alternative	3	

modes.		
Improves access, reduces the need for travel.	3	Allows higher-density, mixed land use.
Increased ridesharing.	3	
Increased public transit.	3	
Increased cycling.	3	
Increased walking.	3	
Increased Telework.	3	
Reduced freight traffic.	1	

Rating from 3 (very beneficial) to –3 (very harmful). A 0 indicates no impact or mixed impacts.

Benefits And Costs

Parking Management can provide several types of benefits, described below. For additional information see [Parking Evaluation](#).

Parking Management Benefits

Efficiency and Savings
Parking Management that reduces parking requirements can provide cost savings and increase consumer [Affordability](#). Parking is one of the largest transportation costs (Litman, 2002; www.vtpi.org/tca/tca0504.pdf). A comprehensive Parking Management program that includes several strategies ([Shared Parking](#), more accurate parking requirements, pricing, [Cash Out](#), etc.) can often reduce parking requirements by 30-50% compared with generous minimum parking requirements, unpriced parking, and each space assigned to an individual motorist. With appropriate Parking Management motorists still have adequate parking, although they may need to walk somewhat farther, and pay directly rather than indirectly for parking.

The magnitude of savings that result from Parking Management depends on specific conditions, including the cost per parking space and how much parking can be reduced. Below are some examples of potential savings, assuming that a comprehensive Parking Management program can reduce parking requirements by a third, and annualized parking facility costs average $1,200 in urban conditions and $600 in suburban conditions:

- Cashing Out free parking is equivalent to a 3% wage increase for an employee earning $40,000 per year at an urban location, and a 1.5% wage increase for suburban employees.

- If building rent represents 20% of a business's total costs, and parking represents 25% of rent costs, reducing parking costs by 40% results in a 2% reduction in total costs. If the business has a 10% profit margin, this increases profits by 20%.

- If two parking spaces are currently included with housing, decoupling parking (renting parking spaces separately) provides $100 monthly savings for an urban household that only owns one vehicle, and $200 monthly savings if it owns no vehicles. This represents a 12-25% reduction from a $800 per month rent or mortgage payment. Suburban households save half this amount, a 10-20% savings from a $500 per month rent or mortgage payment.

- If standard practices result in an average of two parking spaces per vehicle in urban areas and four spaces per vehicle in suburban areas, a 33% reduction in total parking requirements results in total annualized savings of $800 per vehicle.

- Parking cost savings depend on the ability of facility managers to sell, lease or rent excess parking capacity. For example, if a business has 100 parking spaces, and its [Commute Trip Reduction](#) program reduces demand to 60 parking spaces, it will have 40 parking spaces that are no longer needed. The business will need to sell, lease or rent these spaces, or convert the land to other uses, in order to benefit from this reduced demand. Parking brokerage services, perhaps through a [Transportation Management Association](#), a chamber of commerce or other organization can help businesses capture parking cost savings.

Reduced Automobile Use
Parking Management is one of the most effective ways to reduce motor vehicle traffic and achieve TDM objectives. Parking Management (Parking Pricing, Cashing Out parking, unbundling parking from housing) can reduce total automobile trips by 10-30%, and more if implemented as part of a comprehensive TDM program (see discussion of travel impacts above). This helps reduce traffic congestion, road and parking facility costs, road risk, pollution emissions and urban sprawl, and can increase Transportation Diversity.

Improved Design
Parking Management allows greater flexibility in facility location and site design. It gives building managers and developers more options for dealing with parking problems. It gives communities more control over land use, allowing higher density, more walkable urban areas. It can facilitate the preservation of historic buildings and districts, and allows designers to position buildings to meet access, aesthetic and environmental objectives in ways that are impossible if parking requirements are inflexible. Such design flexibility is particularly important for infill development and areas with high land costs, allowing redevelopment of central business districts and urban communities. Parking Management is an important component of efforts to create more efficient and attractive urban conditions (New Urbanism).

Business Impacts
Parking restrictions and pricing can reduce business activity in an area and shift travel to more suburban locations (Shiftana 1999), although these impacts depend on specific conditions, including how prices are structured, and the quality of travel and location alternatives. When parking revenues are used to improve local streetscape conditions or to fund transportation alternatives they can increase business activity in a downtown (Kolozsvari and Donald Shoup, 2003).

Reduced Environmental Impacts
Pavement imposes environmental impacts including reduced groundwater recharge, increased stormwater management requirements, reduced greenspace and wildlife habitat, and heat island effects (Land Use Evaluation). Parking consumes a significant portion of urban land, particularly in commercial and high-density residential areas. Parking Management can reduce urban sprawl and the environmental impacts that result (Willson 2015).

Parking Management Costs
Increased Management and Transaction Costs
Parking Management often increases administrative responsibilities for public officials and facility managers, and additional responsibilities and inconvenience on motorists.

Spillover Impacts
Parking charges and restrictions in one area may cause motorists to park in other areas where they create congestion problems. This may increase management and enforcement costs, and create conflicts between neighbors.

Table 3 **Benefit Summary**

Objective	Rating	Comments
Congestion Reduction	3	Reduces vehicle travel, particularly in urban areas.
Road & Parking Savings	3	Reduces vehicle travel and parking requirements.
Consumer Savings	0	Mixed, depending on strategy. Reduces driving affordability but reduces indirect parking costs through taxes and rents.
Transport Choice	0	Mixed, depending on strategy. Reduces driving affordability and convenience but improves other modes.
Road Safety	3	Reduces vehicle travel.
Environmental Protection	3	Reduces vehicle travel and the amount of land paved for parking.
Efficient Land Use	3	Reduces vehicle travel and allows higher-density development.
Community Livability	3	Reduces vehicle travel and the amount of land paved for parking.

Rating from 3 (very beneficial) to –3 (very harmful). A 0 indicates no impact or mixed impacts.

Equity Impacts

The Equity impacts of Parking Management depend on the type of strategies used, where and how they are applied, and the quality of transport alternatives. Strategies that reduce subsidies and charge motorists directly for the parking costs they impose tend to increase fairness (horizontal equity).

Some Parking Management strategies, such as parking Cash Out and Location Efficient Development can provide significant benefits to lower income and transportation-disadvantaged people. Most Parking Management strategies benefit people who are transportation disadvantaged by helping to create less automobile-dependent land use patterns, and reducing the parking costs they bear through taxes, rents and employment benefits.

Parking Pricing can be regressive, but overall equity impacts depend on how revenues are used and the quality of travel choices. If revenues are used to benefit lower-income households and there are good travel alternatives to driving, pricing and taxes can be progressive overall (Pricing Evaluation).

The table below summarizes the major equity impacts of various Parking Management strategies. Most tend to increase equity overall.

Table 4 **Equity Analysis of Parking Management Strategies**

	Treats everybody equally	Individuals bear the costs they impose	Progressive with respect to income	Benefits transport disadvantaged	Improves basic mobility
More flexible requirements	1	3	3	3	0
Shared Parking	0	0	0	Yes	0
Priced Parking	2	3	-2*	2	2
Cash Out free parking	3	0	3	3	0
Unbundled parking	3	3	3	3	0
Favor short-term parking	0	0	0	0	0
Address spillover problems	3	3	1	3	0
Location Efficient Development	3	3	3	3	3
Restrict parking	2	2	1	3	1
Tax Parking	1*	1*	1*	1*	0

Rating from 3 (very beneficial) to –3 (very harmful). A 0 indicates no impact or mixed impacts.
* Depends on who bears the cost, how revenues are used, and the quality of alternative modes.

Applications

Parking Management can be applied in many situations (Evaluating Parking). It is particularly appropriate where:
- A specific parking problem exists.
- Land values and parking facility costs are high.
- Smart Growth and Transit Oriented Development are desired.
- Dense development and urban redevelopment are desired.
- Traffic congestion or vehicle pollution are significant problems.
- Excessive pavement is undesirable.

Table 5 **Application Summary**

Geographic	Rating	Organization	Rating
Large urban region.	2	Federal government.	1
High-density, urban.	3	State/provincial government.	2
Medium-density, urban/suburban.	3	Regional government.	3
Town.	2	Municipal/local government.	3
Low-density, rural.	1	Business Associations/TMA.	3
Commercial center.	3	Individual business.	3

Residential neighborhood.	3	Developer.	3
Resort/recreation area.	3	Neighborhood association.	3
		Campus	3

Ratings range from 0 (not appropriate) to 3 (very appropriate).

Category

Incentive to Reduce Driving and *Land Use Management*

Relationships With Other TDM Strategies

Parking Management supports and is supported by most other TDM strategies. Parking Management includes many Parking Solutions. It is often implemented as part of TDM, Commute Trip Reduction, Transportation Management Associations and Campus Trip Reduction programs, based on Contingency-Based Planning. It supports and is supported by Pedestrian and Cycling Improvements, Transit Improvements, Smart Growth, New Urbanism, Transportation Pricing Reforms and Context Sensitive Design. It is important for Location Efficient Development.

Stakeholders

Parking Management programs are primarily implemented by local government policies and agencies, and by individual businesses. Implementation often involves changing current planning, enforcement and design practices, sometimes with the support of professional organizations. Transportation Management Associations can provide Parking Management and parking facility brokerage services (for example, maintaining a system to match businesses that have excess parking capacity with those that need additional spaces and arranging for parking facilities to be shared when appropriate).

Barriers To Implementation

Parking Management often represents a significant change from current practices, and so requires overcoming various institutional and political barriers. Current parking policies are based on the assumption that maximum parking capacity is desirable. Current parking standards tend to be applied inflexibly, for administrative convenience, with little consideration of demographic, geographic and management practices that may affect parking requirements. Parking Management requires public officials, planners and business leaders to become familiar with the many Parking Management strategies and their potential benefits. Parking Management requires changing current development, zoning and design practices. It requires an institutional framework (such as TMAs and TDM Programs) and addressing concerns over spillover impacts.

Best Practices

Best practices for Parking Management are described below, and in various documents listed in *References and Resources*. For more information see Evaluating Parking Policy.

- Parking policies should emphasize efficient use of resources. User information services, Shared Parking, Parking Pricing and overflow parking plans allow more efficient use of existing capacity and avoid the need for excessive requirements.

- The most convenient parking spaces should be managed and priced to favor priority users, such as people with disabilities, Rideshare vehicles, delivery vehicles, business customers and clients.

- Parking prices should be higher during peak-periods. There should be little or no discount for long-term leases.

- Parking should be considered a high-quality service. Signs, maps and brochures should be used to provide accurate information to users. Facilities should be attractive and safe. Users needs and potential problems should be anticipated.

- Parking services need not be one-size-fits-all. A parking facility may provide a variety of services tailored to different users, including valet services for premium users, convenient short-term parking for shoppers and delivery vehicles, longer-term parking for commuters and residents, and special arrangements when appropriate for commercial users.

- Parking facilities should be integrated with overall facility and district design and style.

- Parking Management policies and programs should be coordinated through a district or region, so prices and management practices are consistent in comparable areas.

- Stakeholders should be consulted and involved in Planning parking policies and programs.

- New technologies should be used to improve user information, convenience and safety, and for control revenue.

- Parking management planning should anticipate potential spillover problems, and respond with appropriate regulations and enforcement programs. Enforcement should be adequate to maintain a high level of compliance, predicable and courteous.

Wit and Humor

A Texan with a big cowboy hat, boots and plenty of jewelry parks his sparkling new limousine in front of a bank in New York city, walks in, and says, "I'd like to borrow $500 immediately."

The loan officer hands him an application form. For an address he writes, "Ritz Hotel." For collateral he writes, "Cadillac, estimated value $100,000." The loan is approved and the satisfied customer hands the limousine keys to the bank in exchange for a $500 check.

Two weeks later the Texan returns and returns the check, plus a $5 bill for interest. Curious about this strange transaction, the loan officer inquires, "Sir, you are obviously rich. You have a valuable car. You stay at the fanciest hotel. You wear thousands of dollars worth of jewelry. Why did you borrow such a small sum and not even bother to cash the check?"

The man replies. "I didn't need the money. But where else can I park my car in central New York for two weeks for just five dollars."

Examples and Case Studies

For more examples see the Parking Solutions chapter.

Commercial District Parking Management (Gibbs 2012)

In his book *Principles of Urban Retail*, Gibbs (2013) describes various ways to create more attractive urban retail centers, including ways to manage parking for shopper convenience. The book describes various types of urban shopping demands and the types of retail centers that serve them. It emphasizes the importance of convenience and secure parking that accommodates various types of customers. The book points out that accepted parking ratios for regional centers have declined significantly in recent decades, from 10 cars per 1,000 square feet of building area during the 1960s to 4.0 to 4.5 per today, and that this can be further reduced in urban centers, particularly if parking supply is efficiently managed. Gibbs recommends pricing the most convenient parking spaces to insure that parking spaces are always available to shoppers in a hurry, and that the parking meters be convenient to use.

Tri-Met Parking Management (www.tri-met.org)

The Tri-County Metropolitan Transportation District, which manages transportation in the Portland, Oregon area, has implemented various parking management strategies around transit stations to minimize costs and support Transit Oriented Development. These include:

- Arranging Shared Parking with Park & Ride and other types of land uses, including apartments, churches, movie theaters and government buildings near transit stations.
- Using lower minimum parking requirements around transit stations.

- Allowing Park & Ride capacity near transit stations to be reduced if the land is used for Transit Oriented Development, thus allowing car trips to access transit to be replaced by walk/bike trips.

More Accurate Parking Requirements (www.sfu.ca/~ssbc/Resources.htm)

The City of Vancouver is developing a more flexible approach to parking requirements for mult-family dwellings to support efficient transportation, smart growth and affordable housing planning objectives. City staff have proposed a Sustainable Transportation Credit Program that allows developers more flexibility based on their specific location and circumstances. The program is loosely based on the LEED TM Green building rating system. Developers receive credits for reducing the number of parking stalls, providing parking spaces for carshare vehicles, and providing annual transit passes to building occupants.

Reducing Parking Requirements (Marshall and Garrick, 2006)

Researchers Marshall and Garrick compared parking supply and demand in three new urbanist and three conventional small city centers. In general, the three mixed-use study sites provided much less parking per square foot than the conventional control sites. The study sites thrived by making much more efficient use of land for parking. The study sites also furnished a significant amount of on-street parking and relied more on shared municipal parking lots and parking garages. However, the towns with mixed-use centers still demanded almost as much parking for new construction as did the towns in which the conventional sites are located. On average, the amount of parking mandated by base regulation in these six towns is about two and a half times more than the peak use.

Centralized Parking (USEPA 2006)

To encourage downtown development the Chattanooga Area Regional Transit Authority developed peripheral parking garages with free shuttle service. By constructing parking facilities at either end of the business district, the system intercepts commuters and visitors before they drive into the city center, reducing traffic problems. Free shuttle buses are financed through the garages' parking revenues. They depart from each garage every five minutes all day, every day, and pass within walking distance of most downtown destinations. The electric-powered shuttles transport approximately one million riders each year, making shuttle-served property attractive to businesses. Since 1992, when the shuttle service began, over $400 million has been invested in the downtown, including a major freshwater aquarium, over 100 retail shops and 60 restaurants.

San Francisco Parking Policy Reforms (www.livablecity.org/campaigns/c3.html)

The following policy reforms were implemented by the city of San Francisco in 2006:

- Eliminate minimum parking requirements for downtown housing. This allows developers to decide how much parking to provide at each location, based on market demand.

- Establish a maximum of 1 space for every 4 units, with additional parking allowed if more affordable units are provided.

- Establish a maximum parking ratio for dwelling units of 3 spaces for every 4 units. One space per unit is allowed for units with two or more bedrooms. Developers and individual tenants are free to secure additional parking spaces off-site.

- Provide flexibility in configuring off-street parking to give developers the flexibility they need to create space-efficient parking through the use of tandem, valet, and stacked mechanical parking.

- Require off-street parking to be below ground, or on the ground floor with active uses on all public frontages to prevent ugly, multi-story concrete parking garages and blank building fronts in the downtown area; some exceptions are allowed with a conditional use authorization by the planning commission, which is appealable to the Board of Supervisors.

- Establish limits on width of garage openings to off-street parking and loading to reduce vehicle exit speeds and conflicts with pedestrians.

- Prohibit residential portes-cochere (covered areas) for loading or parking, and prohibit garage entrances on important pedestrian, bicycle and transit streets. Driveways and narrowed sidewalks for portes-cochere and garage entrances create conflicts between autos and other modes.

- Require secure bicycle parking citywide for residential buildings of four or more units. 1 space is required for every 2 units in projects up to 50 units, and 1 space per 4 units in projects larger than 50 units.

- Require that parking spaces be sold/leased separately from dwellings in projects of more than 10 units, and provides exceptions for affordable housing projects. By "unbundling" the price charged for housing from the price charged for parking, people have the choice to purchase only as much parking as they need, people without cars aren't forced to pay for parking they don't need, and everyone pays less for their housing.

- Require car share spaces citywide at the ratio of 1 dedicated space for car sharing vehicles for each 200 dwelling units. Studies show that car-sharing services in the Bay Area are proven to reduce the number of vehicles people own and the number of car trips taken, while providing a car when needed.

Market Commons Unbundled Parking (Wilbur Smith Associates, et al, 2006)

Residents in 300 apartment units at Market Common in Arlington Virginia have no assigned parking – spaces are "unbundled" from rent. Residents pay $25 per month for one space and $75 to $100 for a second (in contrast, owners of 87 townhouses at Market Common get two parking stalls as part of purchase, no choice). They use a parking structure that is shared with retail and restaurant patrons. Retail patrons and tenants share about 1,100 spaces in a parking structure, though there also is some on street parking for shoppers (36 spaces are referenced in one web page summary of the project).

Residents pay building management (not the parking operator) for swipe cards used at structure gates. Shoppers buy short term permits to access the garage ($1-4/hr depending on length of stay, with merchant validation allowed). Because retail is at ground floor and resident units at upper floors (10 story building), residents generally park on the upper levels where spaces are generally available. Elevators in the parking structure leading to residential areas are opened only by tenant pass key to maintain security.

City of Ventura Downtown Parking District (www.ci.ventura.ca.us)

Ventura, California created a Downtown Parking Management Program based on the principle that parking facilities should set prices at municipal on- and off-street parking facilities to achieve a 15% vacancy rate. Parking meter revenues may be used to defray city parking and transportation service expenses, including funding alternative transportation programs, projects and enhancements that reduce the demand for, or increase supply of parking resources in the parking district.

Redwood City Parking Management Plan (Redwood City 2007)

Redwood City (2007), a San Francisco suburb, sponsored a parking planning workshop which lead to the following policies, which they call *performance-based pricing*:

- Installed new, electronic parking meters.
- Eliminated meter limits. Motorists may stay in one space as long as they pay for it.
- Structured parking prices to achieve about 85% occupancy (called the *Goldilocks Principle*: not too high and not too low). More popular spaces have higher prices and less popular spaces are cheaper, with price adjustments as needed.
- An education campaign to inform motorists of their parking options.
- Monthly permits for municipal parking lots, marketed to downtown commuters.
1. Additional revenue finances additional downtown area services, providing about $1 million annually for increased policing and cleaning.

Urban Parking Restrictions (Martens, 2006)

A study comparing various cities found that:

- Many European cities restrict commercial building parking supply, ranging from 270 to 500 square meters of office floor area per parking space (approximately 0.2 to 0.37 parking spaces per 1,000 square feet).
- Management of on-street and off-street public parking spaces is a natural complement of restrictive norms with regard to private parking places.
- Restrictive parking policies and public transport improvements support each other, but major transit service improvements need not precede adoption of parking restrictions.
- Restrictive city center parking policies have been introduced without strict regulations preventing unwanted suburbanization of economic activities.
- These case studies suggest that parking restrictions will not have negative economic impacts if implemented in cities with a strong and vibrant economic structure.

Campus Parking Management (Isler, Hoel, Fontaine 2005)

A survey of university campuses indicate that many are converting parking lots to buildings, fewer are adding parking capacity, and many are implementing various parking and transportation management strategies in order to devote more campus land to academic facilities rather than parking lots. Typical parking management strategies include permits, meters, cash-out program, prohibitive policy for freshmen, and eligibility based on residential location. Annual permit fees varied by location of campus and location of a parking space within the campus. Various strategies are used to deal with spillover parking problems.

Lloyd District, Portland (http://downtownaustin.com/downloads/RickWilliamsLloydTMA0509.pdf)

The Lloyd District is a TOD in East of downtown Portland, Oregon, across Willamette River. As of 2008 it had 275 acres, 600+ businesses, 23,000 employees and 1,000 residential units. It has achieved the following:
- Reduced the number of parking spaces required in the area from 12,000 (conventional requirements) to 3,120 (actual requirements), reducing estimated parking facility costs from $360 million to just $94 million. The average built ratio of parking is 1.8 stalls per 1,000 SF, compared with 3.5+ for typical commercial development.
- Public transit service improvements. 3 new bus lines since 1997, rerouting of existing service to the commercial core, and a Fareless Square (area with free transit service).
- Over $1.5 million annual private investment in transit program.
- Revenue sharing of meters and transit pass sales.
- Employee transit passes from 1,250 (1997) to 6,000+ (2008).
- Transit Commute Mode Splits from 21% (1997) to 41% (2008).
- Bicycle Mode Splits from 1% (1997) to 5% (2008).
- Pedestrian commute trips up 46% over three years.
- Commercial office vacancy rate 12% (2001) to 4% (2008)
- Over 1.75 million SF of new public/private development since 1995, no net increase in total parking supply (includes Convention Center expansion).

Parking Facility Design Guidelines (Toronto, 2007)

The city of Toronto developed parking facility design guidelines to deal with common urban design and environmental challenges found within and around surface parking lots. 'Greening' the surface parking lot involves:
- Planting trees.
- Providing good quality soil and generous landscaped areas.
- Enhancing pedestrian and cycling infrastructure.
- Managing stormwater on-site.
- Reducing the urban heat island effect.
- Using sustainable materials and technologies.

Less Parking, More Healthy Food (www.streetsblog.org/2009/06/19/less-parking-more-healthy-food)

StreetBlog, Sarah Goodyear, June 19, 2009

We're taking another look at urban supermarket planning, specifically the issue of how to get quality food markets built in underserved neighborhoods (so-called food deserts) -- where people often walk or take transit to the store.

They write about how cities like New York and Washington, DC, can encourage supermarket construction by relaxing onerous zoning requirements for parking spaces.

The New York Times mentioned that one of the strategies New York City is using to attract more supermarkets into food deserts is to change the city's zoning laws that would "free smaller supermarkets from having to supply parking spaces." Reducing or eliminating parking minimums for new development is good urbanism. But if it can help provide affordable, accessible, and nutritious food to low-income residents of the District -- which is already a District goal -- the planning commission has one more very good reason to wean us off of cars. The District is taking steps to achieve this. Anita Hairston, the Chief of Staff of the Office of Planning, assures me by e-mail that:

- Any commercial building (this would include supermarkets) located in the central employment area of the city and is connected to a Metrorail station can have their parking requirements reduced or eliminated.
- Any commercial buildings that are less than 800 feet from a Metrorail station can have their parking requirements reduced by one-quarter.
- Any planned unit development project (regardless of location) can work with staff in our office to propose potential reduction or elimination of parking requirements.

San Francisco On-Street Parking Management and Pricing Study (www.sfcta.org/content/view/303/149)
The 2004 San Francisco Countywide Transportation Plan identified the need for better parking management at the neighborhood level. It called for improved on-street parking management through a variety of strategies to support policy goals and improve on-street parking conditions. In response the Transportation Authority undertook the *On-Street Parking Management and Pricing Study* to assess on-street parking conditions and investigate innovative approaches for more efficiently managing San Francisco's curbside parking. The study:

- Reviews San Francisco's existing on-street parking management programs and neighborhood parking conditions.
- Considers various strategies for improved management of on-street spaces.
- Investigates the potential for using innovative technologies and approaches, including variable pricing of on-street parking, more widely to manage demand and increase availability.
- Discusses residential parking management issues and explore the use of potential new parking revenues to support neighborhood transportation enhancements.
- Describes peer city parking management case studies.
- Makes recommendations for comprehensive neighborhood parking management to improve parking conditions and support policy goals.

The study reached the following key conclusions:

Effective parking management requires a neighborhood-level approach. On-street parking management should be planned and coordinated at the neighborhood level, with attention to the tradeoffs associated with any strategy and the interactions between component parts of the parking supply (i.e., individual block faces and off-street supplies). Neighborhood-level parking management requires flexible approaches that can be tailored to an area's conditions, needs, and priorities, which must evolve over time to reflect changing land use and travel patterns.

Existing management strategies are ill-suited for confronting key parking challenges. On-street parking regulations have developed incrementally over time, such that many neighborhoods are subject to an uncoordinated management regime that is misaligned with parking conditions and management needs. Existing strategies cannot address parking availability when there is an imbalance between supply and demand.

The most promising management approach for addressing imbalances between supply and demand is pricebased regulation, which also has significant secondary benefits. Variable pricing of on-street spaces according to parking demand is a strategy to ensure sufficient availability, improve utilization, and value on-street space appropriately. Addressing availability—within the confines of finite supply in an urban environment—is the central purpose and benefit of parking pricing. Secondary benefits include a reduction in "cruising" behavior and the opportunity to reinvest new parking revenues in transportation improvements.

Underpriced parking represents a significant source of untapped revenue that could be dedicated to transit-first uses; attempts to close this pricing gap must be planned and executed carefully, in a manner that the public will understand and support. Given that on-street parking in many areas is currently minimally regulated, future revenue gains have the potential to be substantial. It is doubtful that the public will support widespread parking charge increases without a clear link to tangible transportation improvements in the city's neighborhoods. The "user fee" principle is also supported by providing a high-quality parking experience through improved payment options, real-time information, and flexible time limits. Currently, parking revenues are a crucial source of locally-generated and locally-controlled funding, which is prioritized to support Muni operations. Reinvestment of a portion of future new revenues will encourage neighborhood-level support for parking pricing, thus increasing the overall pool of funds from which transit stands to benefit.

Current parking policies contradict other planning objectives and warrant significant reform. Reforms to residential parking management are warranted to better value on-street space, create a more multimodal program, and provide more equitably distributed costs and benefits. Neighborhoods should have the ability to utilize pricing strategies to manage parking demand while returning benefits to the area in which revenues are collected.

The report made the following recommendations:

Re-balance the allocation of on-street spaces. The goal of re-balancing is to better accommodate varying demands within the confines of scarce supply. Examples of rebalancing include periodic consideration of the demand for commercial loading zones and evaluation of the appropriateness of various time limitations. This assessment should be done in cooperation with neighborhood residents and merchants, and other strategies and tools should be considered along with conventional regulatory strategies.

Regulate unregulated or under-regulated spaces. Where warranted, currently metered areas could be expanded, or unregulated spaces could be otherwise regulated. For example, studies in the Glen Park and Balboa Park neighborhoods revealed a substantial number of unregulated spaces that contributed to parking shortages and low turnover; these issues have since been remedied or are in the process of being addressed. A technical evaluation is required to identify the best regulatory design (e.g., meter vs. time limit vs. color curb). Typically, meters have been confined to the downtown area and neighborhood commercial corridors (and some adjoining blocks). Extending metering hours into the evening (until 10:00 p.m., for example) is appropriate in those areas with evening parking generators, such as restaurants or nightlife, where turnover is desirable, provided that adequate enforcement can be provided. Extension of metering into evening hours can provide a significant benefit to local commercial activity, by prioritizing metered spaces during high demand periods for shorter-term uses (rather than overnight storage).

Reform residential parking permit management. The existing RPP program provides benefits to a small group—eligible permit holders that store their car(s) on-street during weekday middays.

Establish a policy on the use of new incremental parking revenue. SFMTA has not articulated a clear policy on the use of any revenue gains associated with implementation of demand-responsive pricing. It is important to affirm the policy of applying the revenues to parking improvements and transit-first uses. SFMTA should clarify this policy and allow for public review and input into this decision.

Share some portion of net new revenues with the areas in which the monies are collected. By investing in the neighborhoods affected by parking pricing, tangible benefits will accrue to the areas that are priced and local impacts are mitigated. The public will be skeptical of any program that simply provides incremental revenue to an opaque budget that funds programs across the entire city. Specifically, it is recommended that if demand-responsive pricing results in at least 50% growth in parking revenue in a neighborhood, at least 25% of the net new revenue should be returned directly to the area in which it was collected. The affected community should have an opportunity to provide input into the program of projects funded by the parking revenue. This will help generate support for pricing programs, as well as increase the overall pool of funds from which Muni stands to benefit.

Pursue data-driven pricing policy, in support of articulated performance objectives. Ongoing system monitoring is a crucial component of demand-responsive parking pricing. This monitoring and analysis facilitates ongoing management and operation of the system guided by street-level outcomes.

Adjust parking rates systematically. In order to be effective, demand-responsive pricing requires periodic adjustments to parking rates. These adjustments must be performed frequently enough to seek the desired availability target but not so frequently as to obscure the behavior response. Overly frequent rate changes are also likely to engender public consternation and confusion. Monthly adjustments are appropriate for the first several months of implementation in a given area to allow for program managers to find the necessary price structure to meet performance objectives. Following the initial period, less frequent adjustments (such as quarterly) are warranted.

Coordinate demand-responsive pricing implementations in metered areas with the regulations in place on unmetered blocks, including warranted expansions of metered areas. The implementation of demandresponsive pricing is a unique opportunity to better manage parking on a neighborhood or area level. Current policies create an artificial distinction between blocks designated as commercial and residential. As demand-responsive pricing is implemented in neighborhoods, an assessment of parking conditions in metered and unmetered blocks is necessary. This assessment may reveal a need to expand the metered areas and/or metered time periods as new payment technologies and pricing strategies are implemented.

A Recommended Approach to Neighborhood Management: Parking Benefit Districts

Pricing is the most efficacious means of managing on-street parking when occupancy routinely exceeds practical capacity. A *Parking Benefit District* (PBD) program could be made available to neighborhoods facing parking challenges, regardless of whether the neighborhood is currently covered by an RPP. The PBD program would incorporate the following components:

• *Allow neighborhoods to opt-in.* Neighborhoods could elect (through an adopted administrative process) to create a PBD. If the neighborhood is currently covered by an RPP, the PBD would replace the RPP (or applicable portion thereof).

• *Employ price-based regulation and associated elements.* Variable pricing is necessary to effectively manage on-street parking in high-demand neighborhoods. New technology would be deployed to allow for variable pricing, user information, and enhanced enforcement. The hours during which parking is priced would be evaluated and modified as necessary. Conventional strategies, such as provision of loading zones, would be reevaluated and adjusted appropriately.

• *Expand metering to areas with peak parking demands in excess of 85%.* All blocks with practical capacity issues warrant price-based management. Expansion of metering into areas traditionally designated as "residential" could potentially be paired with an exemption for preferential permit holders (priced at higher than current rates, as discussed above) at all or some times of day.

• *Provide parking privileges to preferential permit holders at an appropriate price point.* Residents of the neighborhood would be permitted to purchase monthly permits for on-street parking on residential streets in the neighborhood. Permits should be priced at a high enough level to appropriately value on-street space and reduce demand for on-street parking (by encouraging offstreet parking, reduced vehicle ownership, etc.).

• *Invest a portion of net new revenues within the neighborhood and involve the community in prioritizing expenditures.* This is the central element of PBDs. By pairing the PBD concept with price-based regulation there is even greater opportunity for neighborhoods to reap the benefits of pricing—through improved parking reductions and a reduction in traffic volumes, as well as through funding available to invest in local transportation projects.

• *Recognize the limits of fully addressing peak demand in residential areas.* In many neighborhoods, demand for overnight on-street parking is especially high. Overnight parking demand is likely to be managed to some extent by higher preferential permit fees, but even a price-based PBD program must recognize the limits of using price during very late hours when enforcement is more of a challenge. It is important to note that on-street occupancies in excess of 85 percent may be more tolerable during the late-night periods, when traffic volumes are light, and businesses and other activities are less dependent on prioritizing short-term parking and ensuring sufficient availability.

These strategies represent a significant change for any neighborhood. As such, neighborhoods should be involved in choosing the amount and type of price-based regulation and supporting strategies that are desired in a given area. Because more aggressive strategies will provide more revenue, higher levels of

Redeveloping Transit-Station Area Parking Lots (CNT, 2006)

The study, *Paved Over: Surface Parking Lots or Opportunities for Tax-Generating, Sustainable Development?"* (www.cnt.org/repository/PavedOver-Final.pdf), evaluates the potential economic and social benefits if surface parking lots around rail transit stations were developed into mixed-use, pedestrian friendly, transit-oriented developments. The analysis concludes that such development could help to meet the region's growing demand for affordable, workforce, senior, and market rate housing near transit, and provide a variety of benefits including increased tax revenues and reduced per capita vehicle travel. The parking lots in nine case studies are estimated to be able to generate 1,188 new residential units and at least 167,000 square feet of new commercial space, providing additional tax revenues, plus significant reductions in trip generation and transportation costs compared with more conventional development.

Parking Policy Reforms (www.transalt.org/files/newsroom/reports/suburbanizing_the_city.pdf*)*

The report, *Suburbanizing the City: How New York City Parking Requirements Lead to More Driving* (Weinberger, Seaman and Johnson, 2008) recommends the following reforms for more sustainable parking management in New York City:

1. Fully assess the amount of existing and planned off-street parking.
   - Inventory existing and planned off-street parking. This will provide a baseline to assess the impact of additional parking.
   - Measure how much driving is created by new off-street parking.
   - Determine parking demand based on the assumption that off-street parking has a cost.
   - Measure the effect of increases in parking growth on neighborhood and citywide traffic congestion.

2. Consider measures to significantly reduce required parking.
   - Unbundle the price of parking from the cost of new residences.
   - Eliminate minimum parking requirements.
   - Reclassify minimum parking requirements as maximums.
   - Peg the maximum parking requirement to the proximity to transit.
   - Establish impact fees for new parking spaces.
   - Prohibit curb cuts on key pedestrian and transit streets.
   - Incentivize car-sharing spaces in new development.
   - An interim strategy is to simply convert existing minimums to maximums.

3. Revise environmental laws to fully account for parking impacts.
   - Revise CEQRA and the special permitting process so that the cumulative impact of new parking on neighborhoods is considered.

4. Stop directly subsidizing new parking and freeze special permits
   - Place a moratorium on issuing new special parking permits in Manhattan's Clean Air Act Zone (the Manhattan Core) until an inventory of existing and planned parking is completed, and a study of the cumulative environmental impact of new parking is conducted.
   - Freeze new city subsidies for building parking until a complete accounting of the extent and environmental impact of those subsidies is completed.
   - Eliminate minimum parking requirements for affordable housing developments.

Seoul Parking Enforcement (http://english.seoul.go.kr*)*

Employees at the city of Seoul, South Korea TOPIS (Transport OPerations and Information Service) traffic control center monitor major arterials using a closed circuit television network. If a vehicle stops or parks illegally, they record a time-stamped image of the vehicle and its license plate. After five minutes, if the vehicle has not moved, a second set of images are recorded, the license number automatically read using optical character recognition (OCR), and a parking ticket is sent to the motorist. After another ten minutes a tow truck is dispatched to remove the vehicle. This system has greatly reduced traffic delay and accident

risk caused by illegally parked vehicles at relatively low cost and with few challenges (since motorists are sent photographic images of their illegally-parked vehicles).

Curbside/On-Street Parking Best Practices (Weinberger, Kaehny and Rufo 2009)

- *Enforcement:* Automated scanning enforcement as employed in Chicago, Illinois; parts of Virginia and Santa Barbara, California appears transformative, though in its early stages. Other technology, especially wireless, handheld devices with cameras have made traditional enforcement more efficient; as has software which automatically issues and tracks parking summonses.
- *Pricing Policy:* Variable or peak hour metering in which the price is set based on a curbside occupancy target of under 85% is a logical and consistent way of managing a congested curb. San Francisco's SFpark is the largest application of this approach, which is also employed in Redwood City, California, and in a flexible form by New York City's Parksmart. Another effective practice is to both restrict curb access to commercial vehicles and meter them. New York City does this and adds an escalating meter fee of $2, $3, $4/hour to encourage short stays, high turnover and faster deliveries.
- *Payment Medium and Meters:* Pay-by-phone is growing rapidly in popularity. Industry experts believe that remote payment will eventually replace meters. In the meantime, the state of the art meters are solar powered, multi-space meters which are in wide use across the U.S.
- *Building support for metering via Parking Benefit Districts and revenue return.* In 20-30 special parking districts, in cities as varied as Boulder, Colorado, Los Angeles and San Diego, meter revenues support streetscape improvements to attract more retail business.

Montreal Parking Space Tax (http://spacingmontreal.ca/2010/01/17/the-parking-lot-tax)

The 2010 City of Montreal budget, one of the new measures it includes is a special tax on downtown parking spaces. Parking lots in residential areas are taxed at a lower rate than in the central business district (CBD), and surface parking is taxed at a higher rate than structured parking. The charges range from $4.95 per square metre for neighborhood structured parking up to $19.80 per square metre for CBD surface parking, or $75 to $300 annually for a three by five meter space. The city expects it to collect around $20 million dollars per year which is earmarked for improving public transit.

Nottingham Workforce Parking Levy (www.nottinghamcity.gov.uk/index.aspx?articleid=2570)

A *Workplace Parking Levy* (WPL) is a charge on employers that provide free or relatively cheap workplace parking. It is being introduced in the United Kingdom as a way to generate revenues and discourage automobile commuting. Starting April 2012 the City of Nottingham plans to implement a WPL on employers that provide 11 or more liable parking places. This is being implemented as an alternative to a road user charge. All WPL revenue will be invested into improving public transport. The pricing itself is expected to have only a small congestion reduction impact, since only a small portion of the fee is expected to be passed onto commuters, but the additional transit service funding is predicted to increase City Centre public transport travel by over 20% and reduce area traffic growth from 15% to only 8%, which should provide significant congestion reduction benefits.

GreenTRIP (www.transformca.org/GreenTRIP)

GreenTRIP is a Traffic Reduction + Innovative Parking certification program for new residential and mixed use developments. It rewards projects that reduce traffic and greenhouse gas emissions. GreenTRIP expands the definition of green building to include robust transportation standards for how people get to and from green buildings. Each certified project receives a *Project Evaluation Report* which describes the project location, details and inventories how the project meets GreenTRIP standards. This typically includes features such as an Accessible and multi-modal location (near shops and other services, good neighborhood walkability, near public transit), unbundled parking (parking spaces rented separately from building space), Carshare services, discounted Public Transit passes, and Affordable housing.

The GreenTRIP program provides the following support:

- *Tailored Traffic Reduction Strategies* – Experts work work with developers, designers and operators to identify the most appropriate transportation and parking management strategies in a particular situation.

- *Public Hearing Testimony* - GreenTRIP staff will explain the traffic and greenhouse gas reducing benefits achieved by GreenTRIP Certified projects to decision-makers and the public.

- *Market Differentiation* - Use of the GreenTRIP name and logo in promotional materials, and a plaque to mount on the project when built.

As of March 2010 the following projects were certified:
The Crossings (www.transformca.org/files/SLCrossingsProjEvalRpt.pdf)
Parker Place (www.transformca.org/files/ParkerPlace_ProjEvalRpt.pdf)
Station Park Green (www.transformca.org/files/StationParkGreenProjEvalRpt.pdf)
The Ohlone (www.transformca.org/files/OhloneProjEvalRpt.pdf)

"Parklets" Pavement to Parks (http://sfpavementtoparks.sfplanning.org)
The City of San Francisco is converting on-street parking and unused bits of streetspace into "parklets," small plazas and seating areas, by painting or treating the asphalt, placing protective barriers along the periphery, and installing moveable tables and chairs.

Why Do We Force Bars To Provide Parking? Drinking and mandatory parking shouldn't mix
Eric de Place, Sightline Institute (http://daily.sightline.org/daily_score/archive/2011/04/08/why-are-bars-forced-to-encourage-driving)

The front page of the *Seattle Times* has a story about a driver convicted of drunk driving 12 times, now going on 13. It's a tragic and horrifying story. It should also be an opportunity for broadening our analysis of the problem.

Serial drunk driving tends be treated as either a failure of the judicial system or as a problem of addiction, both of which are partially right. We might also take a closer look at the design of our cities, because they help create this kind of thing. If we're going to sell alcohol widely -- a notoriously powerful drug that impairs motor skill and judgment, and that is lethal in large quantities -- then perhaps it's not a great idea for us to require by law that alcohol purveyors provide parking. But we do.

Seattle legally mandates parking at bars. So does Portland. So does virtually every community in North America.

Let that sink in. We don't let bar owners decide whether to provide parking for patrons or how much -- we force them to do it and we spell out the quantities. And in most every community in the Northwest, it's provided gratis for patrons. It's probably the single best example of land use code that is clearly not in the public interest, and yet it is nearly ubiquitous.

Luckily, reform is easy. All you need is a black magic marker in the hands of your city council. Here's how the proceedings might go:
Council president: "Please turn to the section of the land use code on "parking minimums at drinking establishments."
[sound of paper rustling]
Council president: "Okay, strike that section out. Next order of business?"

Or if we wanted to get really serious about discouraging drunk driving, we might add something back into the code: a prohibition against providing parking at bars.

Right Size Parking Project (http://metro.kingcounty.gov/up/projects/right-size-parking)
King County's *Right Size Parking Project* is developing practical tools for more accurately calculating parking demand, taking into account geographic and economic factors. The study found that parking demand per unit declines with

increased transit proximity, local population and employment density, and parking price (the amount that residents must pay extra, if any, for a parking space), and increases with rents, unit size and number of bedrooms. The resulting model can be used to determine the parking supply needed in a particular development.

Seattle Parking Planning Tools *(www.seattle.gov/transportation/parking/parkingplanning.htm)*

King County's **Right Size Parking Project** (www.rightsizeparking.org) has developed practical tools for more accurately calculating parking demand, taking into account geographic and economic factors. The study found that parking demand per unit declines with increased transit proximity, local population and employment density, and parking price (the amount that residents must pay extra, if any, for a parking space), and increases with rents, unit size and number of bedrooms. The resulting model can be used to determine the parking supply needed in a particular development.

Underground Parking Profitably Converted To Storage

The *Broadway Store-All* (www.weblocal.ca/broadway-store-all-vancouver-bc.html) in Vancouver, British Columbia demonstrates that excess parking spaces have other profitable uses. This building was originally constructed with an extra 28 underground parking spaces to serve a nearby restaurant, but the restaurant soon found that these were not needed. In response, the building operator obtained municipal approval to convert parking spaces into commercial storage lockers. They constructed 28 wooden lockers, each with a sprinkler head, and installing heaters and fans for climate control. The lockers rent for about $250 per month, more than twice the rate charged for parking spaces in that area. They are mostly used by nearby businesses to store archive files. Renters have access to the facility Tuesday through Saturday. The facility is fully occupied although virtually nothing is spent on advertising.

Parking Management in Rapidly Developing Cities

The *Parking Guidebook for Chinese Cities* (Weinberger, et al. 2013) identifies international strategies for efficiently managing parking resources in urban areas that are experiencing increased motorization and perceived parking shortages, in ways that support strategic, long-term goals. A special section focusing on Guangzhou serves as a case study of one particular Chinese city coming to grips with how to approach growing motorization and the seemingly unyielding demand for parking in the best possible way. It recommends these eight strategies:

1. Establish a centralized management of all parking activities.
2. Implement performance standards for parking management.
3. Use Appropriate Technology for Payment and Data Collection.
4. Reduce or eliminate parking minimums, establish maximum allowances or area-wide parking caps.
5. Decouple land use from off-street parking requirements and implement shared parking.
6. Price or tax off-street parking according to market cost.
7. Enhance enforcement with electronic technology and physical design.
8. Provide clear information on parking supply to ensure its effective use.

San Francisco Regional Value Pricing Parking Program *(http://regionalparking.mtc.ca.gov)*

The Value Pricing Pilot (VPP) Parking Pricing Regional Analysis Project is part of Metropolitan Transportation Commission's (MTC) 2014-2015 Parking Initiative. The Project uses case studies, academic research, policy analysis and data analysis to address the relationship between parking pricing, policies, parking supply, and parking demand in cities around the Bay Area. As part of this project, eleven policy questions are addressed through a range of best practices, case studies, technical analysis, and expert panel review.

Key Findings:

1. Most of the study locations have significant amounts of unused parking, even during the peak use time. While there is excess parking demand and usage on particular streets during the peak in some locations, there are significant amounts of unused parking spaces in lots and structures within a few blocks in almost all the locations at almost all times.
2. Many locations do not have pricing policies that effectively balance parking demand across their area. There is a lack of coordination of prices between on-street and off-street parking. Prices for on-street parking are typically lower, or free, while lots and structures

tend to have higher prices. This commonly results in drivers double parking and searching for on-street parking spaces, clogging up local business districts and resulting in excess vehicle miles of travel, while structures go underutilized.

3. Many parking requirements are not closely aligned with demand of the relevant population in the local context. Households that are younger or lower income and who have good walk/bike and transit access have lower automobile ownership rates. High parking requirements make housing less affordable. There is some movement toward reformed parking requirements based more on local populations, local land uses, transit access, and prices; regional support is valued.

4. When parking structures are included in transit projects, there is often a lack of analysis of relative cost and effectiveness of alternative modes of access and pricing on the need for or appropriate size of a structure. While parking structures can be a component of the transit system, their relative cost effectiveness and usefulness depends on local land use and transportation conditions. In some cases high density housing would provide higher transit ridership and more revenue to the transit agency.

5. Employee programs that charge for parking are the most effective in reducing driving to work. However, many employers are reluctant to charge employees for parking. Parking cash-out is an attempt to put charging for parking into a more favorable perspective, but is not being implemented in the Bay Area. Programs that provide subsidies for alternative modes are more expensive and less effective than charging for parking, but appear to be more acceptable; combinations of charging for parking and subsidies for other modes may be most effective and acceptable.

6. Regional parking policies are a logical policy approach as part of the Sustainable Community Strategy (SCS), as per SB 375. Regional policies can be effective by providing expertise, supporting local analyses and implementation, conditioning funds on local adoption of appropriate parking policies, new innovative programs and increased scrutiny on the use of regional funds.

The study used these results to develop recommended policy reforms and programs to support more efficient parking management.

The High Price of Parking: Housing Costs Inflated by Minimum Requirements for Parking Spaces
New York Times, 12 Nov. 2006
Spawned by suburban sprawl in the 1950s, local requirements for the minimum of one or more parking spaces per unit have abetted car dependency and - letting builders fold the $30,000-$40,000 per slot into unit prices - pushed housing costs especially high in big cities, some of which are now eliminating or revising parking space minimums to boost transit and lower housing costs, with University of California-Los Angeles Professor Donald Shoup saying, ''In the future, we will look back at minimum parking requirements as a colossal mistake.''

Author of ''The High Cost of Free Parking'' (American Planning Association, 2005), Professor Shoup tells *New York Times* writer Linda Baker that with its expensive housing and cheap parking, the nation ''got it the wrong way around,'' but the change is under way. Condominiums without parking are already common in Manhattan and a few other East Coast city cores, the writer reports, but downtown Los Angeles still mandates 2.25 parking spaces for any unit, and Houston requires 1.33 spaces for a one-bedroom and 2 spaces for a three-bedroom, with a committee reconsidering these minimums along the light-rail line.

Portland, the writer continues, eliminated central city parking minimums six years ago; Seattle reduced the parking minimums for multifamily housing in three major commercial corridors last year and may eliminate them in six core districts and near light-rail stations next month; and San Francisco, which gained more downtown housing in the last few years than in the previous 20, replaced downtown minimums with a maximum of 0.75 parking space per unit.

''The city's modus operandi is 'transit first,''' stresses city planner Joshua Switzky, pointing out that now downtown builders must ''unbundle'' the price of parking from the price of a condo and adding, ''Buyers aren't obligated to buy a parking space, and developers don't have the incentive to build spaces they can't sell.''

In downtown Seattle's neighborhood of Belltown, where the average condo has 1.5 parking spaces, the 251-condo Moda project, now under way, includes 83 units without parking, 125 with access to permit parking, and only 43 with assigned spaces, each priced at about $30,000 more than the others, and all 251 sold within a week.

The same happened with 24 condos without parking in the 261-unit Civic project under construction near bus and light-rail stops six blocks from downtown Portland. The Gerding/Edlen Development Company ''decided to test the water and see if there was a market for units without parking spaces,'' says project manager Tom Cody. ''We're always looking for ways to promote smart growth.''

European Parking Management (Kodransky and Hermann 2011)

European cities are reaping the rewards of innovative parking policies, including revitalized town centers; big reductions in car use; drops in air pollution and rising quality of urban life, according to *Europe's Parking U-Turn: From Accommodation to Regulation*, published by the Institute for Transportation and Development Policy. The report examines European parking over the last half century, through the prism of ten European cities: Amsterdam, Antwerp, Barcelona, Copenhagen, London, Munich, Paris, Stockholm, Strasbourg and Zurich. It found:

- European cities are ahead of the rest of the world in charging rational prices for on-street parking. In Paris, the on-street parking supply has been reduced by more than 9% since 2003, and of the remaining stock, 95% is paid parking. The result, along with other transport infrastructure improvements, has been a 13% decrease in driving.
- Parking reforms are becoming more popular than congestion charging. While London, Stockholm, and a few other European cities have managed to implement congestion charging, more are turning to parking. Parking caps have been set in Zurich and Hamburg's business districts to freeze the existing supply, where access to public transport is easiest.
- Revenue gathered from parking tariffs is being invested to support other mobility needs. In Barcelona, 100% of revenue goes to operate Bicing—the city's public bike system. Several boroughs in London use parking revenue to subsidize transit passes for seniors and the disabled, who ride public transit for free.
- Parking is increasingly linked to public transport. Amsterdam, Paris, Zurich and Strasbourg limit how much parking is allowed in new developments based on how far it is to walk to a bus, tram or metro stop. Zurich has made significant investments in new tram and bus lines while making parking more expensive and less convenient. As a result, between 2000 and 2005, the share of public transit use went up by 7%, while the share of cars in traffic declined by 6%.

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#28