
Parking Pricing Implementation Guidelines

How More Efficient Parking Pricing Can Help Solve Parking and Traffic Problems, Increase Revenue, and Achieve Other Planning Objectives

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If properly implemented, user pay parking can reduce parking and traffic problems, improve user convenience, and provide new revenue.

Summary

Parking pricing (also called *user pay* and *metered parking*) refers to direct charges for using a parking space. Efficient parking pricing can provide numerous benefits including increased turnover and therefore improved user convenience, parking facility cost savings, reduced traffic problems, and increased revenues. This report provides guidance on parking pricing implementation. It describes parking pricing benefits and costs, ways to overcome common obstacles and objections, and examples of successful parking pricing programs. Parking pricing is best implemented as part of an integrated parking management program. Current trends are increasing the benefits of efficient parking pricing. Legitimate objections to parking pricing can be addressed with appropriate policies and strategies.

Introduction

A typical automobile is used about one hour each day and parked for 23. Storing unused vehicles requires lots of parking. Most communities have three to six parking spaces per vehicle (one at home, one at the worksite, plus spaces at various destinations such as stores, schools and parks). These facilities are costly; a typical urban parking space has annualized land, construction and operating costs that total \$500 to \$1,500. Many parking spaces are worth more than the vehicles that occupy them, yet most parking facilities are unpriced, their costs borne indirectly through taxes, rents, higher prices for retail goods, and lower employee benefits.

Parking is never actually free, the choice is really between paying directly or indirectly for parking facilities. Underpricing increases the amount of parking needed to meet demand, and tends to increase problems such as traffic congestion, housing unaffordability, sprawl and pollution. Charging users directly for parking tends to be more efficient and equitable, and generates revenues that can finance new services or reduce taxes and rents. Potential benefits include:

- Increased turnover of the most convenient spaces. This increases consumer convenience, facilitates deliveries, and reduces cruising for parking (searching for an unoccupied space).
- Reduces the number of spaces needed to meet demand, reducing total parking costs, and allowing more compact development.
- Encourages longer-term parkers to use less convenient spaces (such as off-street or urban fringe), and encourages travelers (particularly commuters) to use alternative modes when possible.
- Reduces total vehicle traffic and therefore problems such as traffic congestion, accidents, energy consumption and pollution emissions.
- Generates revenue. Insures that users pay their share of municipal road and parking costs.

Many experts recommend more direct pricing of parking facilities, and for a variety of reasons many cities, campuses and commercial buildings are expanding where and when parking is priced. Several current trends increase the justification for pricing parking, including increased urbanization and land costs, increased concern about vehicle traffic external costs (congestion, accidents, pollution, sprawl), and improved pricing technologies. However, unpriced parking is well established, so parking pricing implementation requires overcoming various political, institutional and technical obstacles. Care is required to communicate the benefits and address potential problems.

Parking pricing is just one of several parking management strategies, as summarized in Table 1. It tends to be most effective and beneficial if implemented as part of an integrated parking management program that includes support strategies such as increased parking options, improved user information, and better enforcement.

This report examines these issues. It describes parking pricing, its benefits and costs, where it is most appropriate, ways to overcome common obstacles and objections, and specific examples of parking pricing implementation.

Table 1 **Parking Management Strategies (Litman 2006)**

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%	✓
Walking and Cycling Improvements	Improve walking and cycling conditions to expand the range of destinations serviced by a parking facility.	5-15%	✓
Increase Capacity of Existing Facilities	Increase parking supply by using otherwise wasted space, smaller stalls, car stackers and valet parking.	5-15%	
Mobility Management	Encourage more efficient travel patterns, including changes in mode, timing, destination and vehicle trip frequency.	10-30%	✓
Parking Pricing	Charge motorists directly and efficiently for using parking facilities.	10-30%	✓
Improve Pricing Methods	Use better charging techniques to make pricing more convenient and cost effective.	Varies	✓
Financial Incentives	Provide financial incentives to shift mode such as parking cash out.	10-30%	✓
Unbundle Parking	Rent or sell parking facilities separately from building space.	10-30%	✓
Parking Tax Reform	Change tax policies to support parking management objectives.	5-15%	✓
Bicycle Facilities	Provide bicycle storage and changing facilities.	5-15%	✓
Improve Information and Marketing	Provide convenient and accurate information on parking availability and price, using maps, signs, brochures and the Internet.	5-15%	✓
Improve Enforcement	Insure that regulation enforcement is efficient, considerate and fair.	Varies	
Transport Management Assoc.	Establish member-controlled organizations that provide transport and parking management services in a particular area.	Varies	✓
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 potential parking management strategies. It indicates the typical reduction in the amount of parking required, and whether a strategy helps reduce vehicle traffic and so also helps address other traffic problems.

Why and How to Price Parking

Parking pricing (also called *user pay* and *metered parking*) refers to direct charges for using a parking space. This can include on-street (curb) parking, parking lots at campuses and buildings, and commercial parking (parking provided for profit). There are also variations:

- *Unbundling*. Parking is rented separately from building space. For example, instead of paying \$2,000 per month for an apartment that includes two parking spaces, occupants pay \$1,800 per month for the apartment and \$100 per for each space, and so only pay for the parking they use.
- *Cash out*. Non-drivers are offered the cash equivalent of parking subsidies provided to motorists. For example, employees can choose between a subsidized parking space, a monthly transit pass or \$100 per month in cash, and retail customers can choose between free parking or a transit fare.
- *Residential parking permits*. Residents can purchase a pass which allows them to park on residential streets. Pass prices are sometimes high enough to generated revenue for municipalities.
- *Stormwater management fees*. Charge fees based on impervious surface area (Cortright 2021).
- *Reform federal tax policies that favor parking over other commuter benefits* (Dutzik, et al. 2017)

Prices can be structured to achieve various objectives, including recovering infrastructure costs, managing travel demands and generating revenue. Table 2 compares these objectives.

Table 2 Parking Pricing Objectives

	Motorist Convenience	Demand Management	Revenue Generation
Description	Maximize motorist convenience by prioritizing uses and financing increased parking supply.	Manage parking and transport demand. Reduce parking and traffic congestion, and reduce parking supply required in an area.	Maximize net revenues.
Parking pricing	Only price when needed. Minimize prices and offer discounts and exemptions, such as low monthly passes.	Set prices to achieve 85% occupancy target. Use variable rates to encourage shifts from congested to uncongested times and locations.	Use revenue-maximizing rates. Expand where and when parking is priced.
Use of revenues	Finance additional parking supply, such as parking garages (parkades).	Finance additional parking supply, alternative modes and management programs.	Municipal services and reductions in other taxes.

Parking pricing must balance different objectives.

Efficient parking pricing means that motorists pay directly for using a parking space, with rates that increase with demand. This is appropriate virtually anywhere that parking is congested. Experts recommend setting prices to maintain 85-90% occupancy rates; this is called *performance-based* or *responsive* pricing (Shoup 2005). If implemented with good user information (signs, maps and brochures that indicate parking location and price), motorists can choose between more convenient but costly parking, or cheaper parking a short distance away. Efficiently pricing is particularly important for on-street parking, since these tend to be the most visible and convenient spaces, and establishes the maximum price for off-street parking; if on-street parking is free or inexpensive, motorists will cruise around looking for an available space rather than paying for off-street parking, resulting in parking and traffic congestion, and inefficient utilization of off-street facilities.

Efficient pricing is justified on equity grounds. Underpriced parking results in cross-subsidies from households that drive less than average to those that drive more than average, and since vehicle ownership and use tend to increase with income, this is regressive. The column, *Stop Giving Away Valuable Public Assets! A Fiduciary Obligation for Road and Parking Pricing* (Litman 2019) points out that underpriced municipal parking forcing local taxpayers to subsidize out-of-town motorists, and that parking mandates force customers who use non-auto modes to subsidize the off-street parking facilities used by those who arrive by car.

Parking pricing can cause various transport system changes; it reduces vehicle ownership (particularly residential parking pricing); shifts modes (from driving to walking, cycling, ridesharing and public transit); shifts destinations (to areas served by non-auto modes or that have cheaper parking); shifts parking location (to cheaper or free parking lots); and reduces parking duration. Demographic, geographic and economic factors affect these changes: impacts are larger with lower-income motorists, discretionary trips, and where there are better mode, destination and parking options.

The price elasticity of vehicle trips with respect to parking price is typically -0.1 to -0.3 (a 10% increase in parking fees reduces vehicle trips by 1-3%), depending on conditions (Khordagui 2019; Litman 2008; Spears, Boarnet and Handy 2014; Vaca and Kuzmyak 2005). In the short run, cost-recovery parking pricing (fees set to recover full parking facility costs) typically reduces the number of spaces needed to serve a destination by 10-30%. For example, if parking is unpriced, 100 employees typically demand about 90 parking spaces, but cost recovery pricing can reduce this to 70 spaces. Larger reductions are possible if implemented with other management strategies described in Table 1, such as pricing with improvements to alternative modes and more sharing of parking facilities.

Total benefits depend on the scale of implementation. Implemented at the site or neighborhood scale reduces local impacts. If widely implemented through a district or region it can significantly reduce traffic congestion, accidents, energy consumption and pollution emissions.

Parking pricing can reduce traffic congestion, by reducing traffic caused by motorists cruising for an unoccupied parking space, and by shifting travel to alternative modes, particularly if implemented widely throughout an urban region and in conjunction with other demand management strategies. This tends to increase economic productivity (Roth 2004). Actual impacts depend on various factors: the proportion of parking priced, the magnitude and structure of fees, the extent to which motorists actually pay parking fees, and the quality and price of alternative parking spaces and transport options.

Surveys indicate that 8-74% of commercial center traffic congestion is caused by vehicles cruising for an on-street parking space (Shoup 2004). Charging residents directly rather than indirectly for parking typically reduces automobile ownership by about 30% (Ostermeijer, Koster and Ommeren 2019; Spears, Boarnet and Handy 2014). Cost-recovery parking fees (such as 50¢ per hour or \$5.00 per day) typically reduce automobile travel by 10-30%, comparable to a 5-15¢ per vehicle-mile road toll. Modeling by Deakin, et al. (1996) estimated that in Southern California (all values in 1991 dollars):

- A 10¢ per vehicle-mile congestion fee reduces VMT 2.3% and congestion delay 22.5% (a 9.8 ratio).
- A \$3.00 per day parking fee would reduce VMT 2.7% and congestion delay 7.5% (a 2.8 ratio).
- A 2¢ per vehicle-mile VMT fee reduces VMT 4.4% and congestion delay 9.0% (a 2.0 ratio).
- A \$0.50 fuel tax increase reduces VMT 4.1% and congestion delay 6.5% (a 1.6 ratio).
- A 1.0¢ per vehicle-mile emission fee reduces VMT 2.2% and congestion delay 3.0% (a 1.4 ratio).

This analysis indicates that parking pricing is the second most effective congestion reduction strategy, less effective than peak-period congestion fees and more effective than flat VMT fees, fuel taxes and emission fees.

Parking pricing has advantages over road pricing. It is generally politically and administratively easier to implement (no new laws or organizations are required) much cheaper (does not require new pricing systems), can be implemented incrementally, and raises few privacy concerns. Parking pricing also has disadvantages: it does not affect through traffic, and parking subsidies are well entrenched so fees are often paid by employers rather than commuters. Table 3 compares parking and road pricing as congestion reduction strategies.

Table 3 Parking Versus Road Pricing As A Congestion Reduction Strategy

Parking Pricing	Road Pricing
<ul style="list-style-type: none">• Already exists in most communities• Equipment is relatively inexpensive and accepted.• Can be implemented incrementally.• Raises few privacy concerns.	<ul style="list-style-type: none">• Applies to through traffic.• Fees more likely to be paid by users.

This table compares parking and road pricing as a congestion reduction strategy.

Efficient management is often more cost effective and beneficial overall than expanding parking supply, particularly where land is expensive or compact development desired. For example, it is often more cost effective for employers to subsidize alternative modes than to expand employee parking, and to implement a parking management program building more downtown parking facilities.

Parking pricing can provide significant revenues. Roads and parking facilities are among the most valuable assets owned by most local governments, and their construction and maintenance absorb a significant portion of municipal budgets. Parking pricing allows governments to recover these costs from users, including non-residents. Similarly, parking typically represents 5-15% of typical campus or building costs, so cost recovery pricing can allow comparable rent reductions.

Parking pricing is particularly appropriate:

- Where parking facilities are costly, where land is valuable or parking facilities are structured.
- In commercial centers with more than about 5,000 employees, since beyond this size surface lots cannot satisfy total parking demand, requiring costly structured parking facilities.
- In areas that want to encourage use of alternative modes to reduce traffic congestion, energy consumption or pollution emissions.
- In areas where environmental protection or community livability justify efforts to reduce impervious surface area (the amount of paved land) and total vehicle travel.
- Where development affordability is an objective.
- When property owners or governments need additional revenues.

Various methods can be used to price parking which differ in their costs, convenience and adjustability as summarized in Table 4. Newer electronic systems tend to be more convenient (they accept more payment options, including coins, bills, debit and credit cards, and telephone payment, and only charge for the amount of time a vehicle is actually parked) and allow more price adjustability (prices can vary by location, time of day or week, and vehicle type), and so can be more efficient and equitable.

Table 4 **Parking Pricing Methods** (“Pricing Methods,” VTPI 2009)

Type	Description	Capital Costs	Operating Costs	User Convenience	Price Adjustability	Enforce-ability
Pass	Users purchase and display a pass	Low	Low	Medium	Poor to medium.	Good
Time-Coded Tickets	Parkers purchase a punch-card for a certain amount of time	Low	Medium	Medium	Medium	Good
Single-Space Meters	Parkers prepay a mechanical or electronic meter located at each space.	High	High	Mechanical meters: low; electronic meters: medium.	Mechanical meters: poor; electronic meters: good.	Mechanical meters: poor; electronic meters: good.
Smart Meters	Parkers prepay electronic meters which automatically reset when vehicles leave.	High	High	Medium.	Good	Good
Pay Box	Parkers prepay into a box with a slot for each space.	Low	Medium	Low	Poor to medium.	Poor
Pay-And-Display Meters	Parkers prepay a meter, which prints a ticket that is displayed in their vehicle.	Medium	Medium	Medium	Mechanical meters: poor; electronic meters: good.	Good
Per-Space Meters	Parkers pay for a specific space using electronic meters.	Medium	Medium	Medium	Very good.	Good
In-Vehicle Meter	Parkers display an electronic meter inside their vehicle when parked.	Medium	Low	High	Moderate	Good
Attendant	Parkers pay an attendant when entering or leaving parking lot.	High	High	High	Good	Good
Valet	Parkers pay an attendant who parks their car.	Low	High	High	Good	Good
Controlled Access	Parkers pay a machine when entering or leaving parking lot	High	Moderate	Medium	Good	Poor
Automatic Vehicle Identification	System automatically records vehicles entering and leaving a parking area.	High	Medium	High	Good	Good
Global location technology	Satellite-based systems automatically tracks parking use and calculates parking fees.	High but declining	High but declining	High	Very high	Good

This table compares various price parking methods. Newer systems tend to provide various advantages.

Optimal Parking Prices

Ideally, motorists would pay directly any time they use a parking space. If transportation is for any reason subsidized, the subsidy would apply to any mode, not just driving, so users could choose the option that best meets their needs. For example, if businesses offer parking subsidies they would also offer cash benefits that could be spent on transit or ridesharing, or pocketed when commuters walk, bicycle or telecommute.

In general, efficient and equitable parking prices are set to equal marginal costs, except if a subsidy is specifically justified, for example, to achieve equity or strategic development objectives. Marginal cost pricing prevents society from devoting two dollars worth of resources to provide a parking space for which users only value at one dollar. Paying directly allows consumers to save money if they reduce their parking costs. For example, if parking is bundled with housing (for example, an apartment automatically includes two parking spaces), renters must pay for parking facilities regardless of whether or not they need them; if residential parking is priced separately households can save money if they reduce their vehicle ownership. Similarly if employees pay directly for parking they can save money by using alternative commute modes, an option not available if unpriced parking is an automatic employee benefit.

Figure 1 Efficient Pricing Gives Consumers More Opportunities to Save

Current Parking Pricing	Efficient Pricing
<p>Motorist Reduces Parking Costs (reduces vehicle ownership, reduces vehicle trips, uses less costly parking spaces)</p> <p>↓</p> <p>Reduced Parking Costs (reduced parking congestion, reduces need to build and maintain parking facilities)</p> <p>↓</p> <p>Cost Savings (Widely dispersed through economy)</p>	<p>Motorist Reduces Parking Costs (reduces vehicle ownership, reduces vehicle trips, uses less costly parking spaces)</p> <p>↓</p> <p>Reduced Parking Costs (reduced parking congestion, reduces need to build and maintain parking facilities)</p> <p>↓</p> <p>Cost Savings (Returned to the individual motorist)</p>

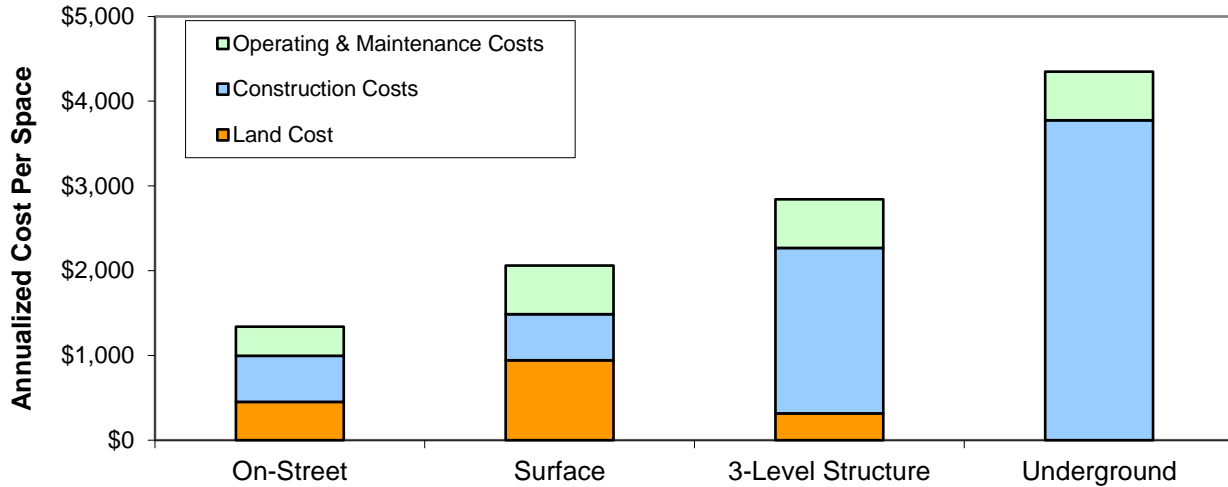
With current pricing, savings from reduced parking costs are dispersed through the economy. Efficient pricing returns more savings to individual consumers who reduce their parking demands.

Exactly what constitutes marginal costs depends on perspective. In the short term most parking facility costs are sunk, so marginal cost is just operating and maintenance expenses. However, if a facility becomes congested the marginal cost is the cost of expanding supply, and parking facility consume resources have alternative uses; structures and land could be converted to other productive uses such as buildings or greenspace. On-street parking occupies road space that could otherwise be used for more traffic lanes, bus or bike lanes, wider sidewalks or landscaping.

As parking prices increase, optimal parking supply (the number of parking spaces required to meet demands) tends to decline. Where parking is unpriced consumers have little incentive to use parking facilities efficiently, for example, by disposing of inoperable or seldom-used vehicles, by shifting to alternative modes, or using less convenient parking spaces when possible. Unpriced parking therefore increases parking demands and total parking costs.

The potential savings and benefits are large. A typical urban off-street parking space costs \$10,000 to \$50,000 to construct, plus hundreds of dollars in annual operation and maintenance costs. Figure 2 indicates typical annualized costs. Providing a free parking space is equivalent to giving out a stack of hundred dollar bills, but only to motorists; it is essentially a matching grant to purchase and drive an automobile.

Figure 2 Typical Annualized Costs For An Urban Parking Space (Litman 2009)



This figure illustrates typical annualized costs per parking space. Actual values vary significantly depending on factors such as local land values and construction costs.

Table 5 indicates the cost recovery needed for various types of parking facilities. A typical parking facility must earn \$5.00 to \$15.00 per day to recover construction and operating costs, and somewhat more to pay property taxes and earn a profit.

Table 5 Parking Facility Costs And Revenue Requirements (VTPI 2007)

Facility Type	Land Cost (per acre)	Construction Costs	Annualized Operating Costs	Total Annual Costs	Breakeven Monthly Revenue	Breakeven Daily Revenue
Suburban, Surface	\$200,000	\$3,000	\$350	\$805	\$96	\$4.79
Suburban, 2-Level	\$200,000	\$15,000	\$350	\$1,952	\$232	\$11.62
Urban, On-Street	\$1,000,000	\$5,000	\$450	\$1,300	\$135	\$6.77
Urban, Surface	\$1,000,000	\$5,000	\$550	\$1,909	\$199	\$9.94
Urban, 3-Level Structure	\$1,000,000	\$18,000	\$800	\$2,661	\$277	\$13.86
Urban, Underground	NA	\$25,000	\$900	\$3,060	\$319	\$15.94
CBD, On-Street	\$5,000,000	\$5,000	\$600	\$2,960	\$274	\$13.70
CBD, 4-Level Structure	\$5,000,000	\$25,000	\$1,000	\$3,695	\$342	\$13.69
CBD, Underground	NA	\$35,000	\$1,200	\$3,903	\$361	\$14.46

This table indicates the typical costs and cost recovery revenue requirements of various parking facilities. (CBD = Central Business District)

The table below indicates typical parking prices in major North American cities.

Table 6 Average Parking Prices (NPA 2009)

Type of Parking Price	US	Canada
Central Business Districts (CBDs)		
First hour	\$4.36	\$4.69
Daily	\$12.51	\$16.06
Monthly unreserved	\$118.90	\$172.98
Hospitals		
First hour – within CBD	\$4.41	\$5.92
First hour – outside CBD	\$2.98	\$3.38
Daily – within CBD	\$12.57	\$17.00
Daily – outside CBD	\$8.52	\$10.75
Monthly unreserved – within CBD	\$109.92	\$140.00
Monthly unreserved – outside CBD	\$85.47	\$61.56
Educational Facilities (Colleges and University Campuses)		
First hour – within CBD	\$6.40	\$2.92
First hour – outside CBD	\$4.49	\$2.75
Daily – within CBD	\$11.35	\$20.50
Daily – outside CBD	\$10.98	\$6.88
Monthly unreserved – within CBD	\$122.73	\$119.58
Monthly unreserved – outside CBD	\$88.84	\$7.50
Hotels		
Daily rates	\$23.10	\$16.03
Airports		
First hour	\$3.78	\$4.63
Daily – on-airport	\$16.95	\$17.50
Daily – off-airport	\$11.61	\$9.50

This table summarizes average prices for various types of parking in North American cities. These prices vary significantly depending on location, time and type of facility.

A parking space priced at \$1.00 per hour, occupied four hours per day, 25 days per month generates about \$100 per month or \$1,200 per year. Municipal parking programs collect additional revenue from violations. Single-space parking meters typically cost \$400 to \$800 each to purchase, plus about \$200 to \$400 annually for operations and maintenance, so a third to half of revenues can be spent on operations, but newer pricing systems can collect more revenue and reduce operating costs (each station serves several spaces), so net revenues are often higher. The following tend to increase net parking revenues:

- Price more parking. Increase when and where parking is priced, for example, to include smaller commercial districts, residential streets, evenings and Sundays.
- Increase parking rates. Charge the highest feasible rates.
- Reduce alternative parking and transport options (such as restricting the availability of free parking nearby, and minimizing public transit service).
- Use more cost effective pricing systems, such as multi-space meters.
- Increase enforcement and fines.

Use of Revenues

Net parking revenues can be used in various ways:

- Recover parking pricing costs (equipment, enforcement, user information, etc.).
- Recover parking facility construction and operating expenses.
- Recover the equivalent of rent and taxes on parking facilities. For example, a municipal parking program can generate net revenues equivalent to what would be earned if the facilities were privately owned and paid rent on the land and taxes on facilities and profits.
- Parking and transportation management program expenses, including commute trip reduction programs and improvements to alternative modes that reduce parking and traffic problems.
- Municipal transportation expenses (street and sidewalk capital and operating expenses).
- Special district and neighborhood improvements, such as streetscaping, improved street and sidewalk cleaning and security, and commercial district marketing.
- Reduce general taxes or offset tax increases that would otherwise be required.
- Help finance special projects or programs, such as a municipal arena or recreation center.

Municipal policies can support development of *parking benefit districts*, which means that a business district and residential neighborhood chooses to have priced parking, with a portion of revenues dedicated to local use (Kolozsvari and Shoup 2003). For example, in commercial areas parking revenues can finance sidewalk cleaning and security, and in residential areas half of net revenues could be used to improve parks and schools, or reduce residents' property taxes. This gives citizens and businesses an incentive to support parking pricing on their streets.

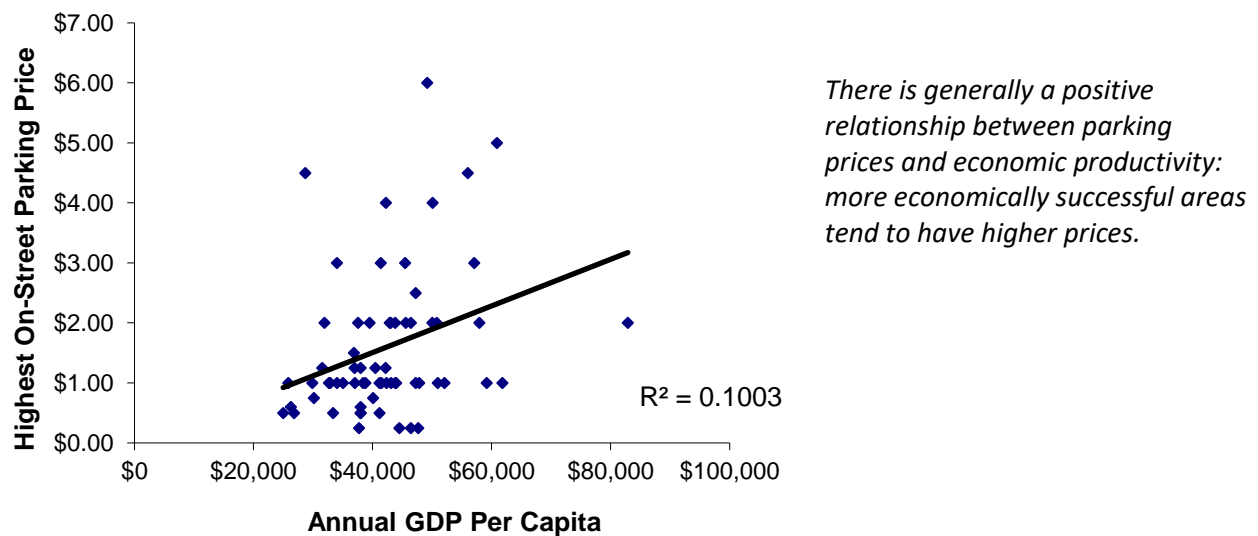
Where parking is managed to maximize motorist convenience, with revenues used to finance additional parking supply, net revenues are generally small, generating less than 1% of total municipal or campus revenues. However, where parking is managed to maximize revenues, parking can generate 5-10% of total municipal or campus revenues.

Economic Impacts

Businesses, particularly retailers, often object to parking pricing out of fear that it will discourage customers. However, experience indicates that customers will pay for parking in areas with attractive businesses and pedestrian environments (Kolozsvari and Shoup 2003). Many of the most successful commercial districts have priced parking, and many commercial centers with abundant unpriced parking are economically unsuccessful.

Figure 3 illustrates a positive relationship between parking prices and regional economic productivity. This does not mean that increasing parking prices will always increase economic productivity; they both tend to increase with more compact, urban development. However, efficient parking management, including pricing, help create commercial environments that maximize economic productivity: affordable, compact, multi-modal commercial centers.

Figure 3 On-Street Parking Rates Versus Regional GDP (NPA 2009)



Critics often claim that parking pricing spoils local economic activity by discouraging customers, but it actually provides both economic benefits and costs. It increases turnover which makes finding a parking space easier, reduces the number of parking spaces required at a location which provides financial savings, and can reduce traffic problems such as congestion. By insuring that a parking space is always available, which facilitates freight deliveries, business trips and errands. The additional revenues can finance improvements such as new street furniture, more cleaning and security, and marketing, or reduced taxes and rents. Negative impacts (reduced customers) are generally local, involving shifts in the location of business activity within a region, but do not reduce total regional economic activity.

The introduction of priced parking to a commercial area often appears harmful because negative impacts (loss of existing customers) tend to be concentrated and visible, while economic benefits (new customers attracted by more convenient parking, additional future development, or tax reductions) tend to be dispersed and long-term. A shop owner is more likely to hear older customers say, "I'll quit visiting your store to avoid parking fees" than to hear new customers say, "I'll start visiting your store because a parking space is easier to find."

Economic impacts tend to be highly variable, depending on the type of businesses, the types of customers, and the quality of alternative parking options, transport options and shopping destinations. Economic impacts can also vary depending on how they are measured. For example, parking pricing may result in a reduction in customer volumes but an increase in revenue and profits since it tends to favor wealthier service-sensitive customers making major purchases, over more price sensitive shoppers making smaller purchases.

Several studies have examined the effects of parking policy changes, including pricing, on local economic activity (CORDIS 2001). Table 7 summarizes short- and long-term effects of parking pricing in various cities in the Netherlands.

Table 7 Short- and Long-Term Impacts of Commercial Area Parking Pricing (CROW 2001)

City	Short-Term Effects	Long-Term Effects
Breda	Change in parking choice Decrease visit frequency	No results, after four months the test is terminated.
Harderwijk	Decrease of car use Change parking choice Decrease visit expenditure Decrease visit duration	The amount of net floor space increased in 17 years with 12,000 square meters
Leeuwarden	Decrease of car use More equal distribution of cars across parking facilities Decrease visit frequency	The amount of net floor space stayed equal over 20 years
Purmerend	Decrease occupancy of parking Decrease visit frequency Visit expenditures unknown Decrease in visit frequency of car users	After 10 years an increase of amount of net floor space with 10,000 square meters is noticed
Tilburg	Decrease occupancy of parking Visit expenditures unknown	In 19 years the amount of net floor space is doubled
Utrecht	Increase public transport use No details of shopping behavior related to parking measure	Amount of net floor space increased with 10 percent

Introducing parking pricing in commercial areas tends to reduce automobile trips, but negative impacts tend to decline over time as customers and businesses adjust.

The authors conclude,

[Parking] fees are largely associated with positive effects on the local economy over the long term, though over the short term there may be a drop in the number of visitors to such an area. The change from negative to positive effect is not only a matter of years but also of extra measures that increase the attractiveness of the shopping area (e.g., new shops and/or renovation of existing shopping). In relation to the parking process, parking fees produce some benefits such as less time spent looking for a parking space, more efficient use of parking spaces, and promotion of 'short stay' parking. (Van der Waerden and Timmermans 2009)

Obstacles to Parking Pricing

This section discusses common obstacles to efficient parking pricing and potential solutions.

Inconvenience

Paying for parking can be inconvenient, particularly with older meters that only accept specific coins and require motorists to prepay for a limited time period. Newer systems accommodate more payment options (coins, bills, credit and debit cards, telephone and Internet), and some only charge for the time a vehicle is parked.

Cost Ineffective

Pricing incurs costs for equipment and administration that often absorbs a significant portion of revenue. Newer electronic meters serve numerous spaces and reduce enforcement costs compared with older meters or time-based regulations, and so are relatively cost effective.

Spillover Impacts

Motorists may park illegally at nearby parking lots, or cause parking congestion problems on nearby streets where parking is unpriced. This can be addressed by improving parking regulations, user information and enforcement.

Discourages Customers and Reduces Economic Activity

Parking pricing may discourage some customers from shopping in an area if nearby competitors offer free parking. However, user pay parking provides business benefits as well as costs: insures that motorists can always find a convenient space, reduces delivery costs, and revenues can finance additional downtown services. Many economically successful retail areas have priced parking while many shopping centers that emphasize free parking are less successful. Many customers, particularly wealthier consumers, willingly pay for parking provided they receive benefits in return: increased convenience and more attractive shopping environments.

Sunk Parking Costs

Where there is abundant parking supply, it seems inefficient to impose parking prices to reduce demand, resulting in unoccupied spaces. However, most parking facilities have opportunity costs: unused parking can be rented, leased, or converted to other uses. Changes in zoning codes and development practices may be needed to take full advantage of these opportunities.

Inequity

Because most parking is unpriced it often seems unfair to charge for parking in just a few locations and times. However, overall, user pay parking is fairer than financing parking facilities indirectly so parking costs are borne by non-users, and the locations where parking is priced tend to be where the costs of providing parking and accommodating automobile traffic is greatest.

Burdensome To Lower-Income Motorists

A given parking fee represents a greater share of income to a lower-income motorist than a higher-income motorist. For example, a \$2 parking fee requires only two minutes of labour for a \$60 per hour worker but eight minutes of labour for a \$15 per hour worker. However, lower-income people tend to drive less, rely more on alternative modes, and devote a greater share of income to general taxes, and so can benefit overall if parking is priced and revenues are used to improve transport options or reduce other taxes.

Examples

There are many examples of parking pricing. User pay parking is common at major commercial centers, airports, college/university/research campuses, and hospitals. In Europe and Asia, even small towns have priced parking. The COST 342 program (CORDIS 2001) provides numerous examples and case studies of European parking pricing practices.

Victoria Parking Pricing (www.victoria.ca/cityhall/departments_engprk.shtml)

Victoria, British Columbia has approximately 80,000 residents and is the primary employment and commercial center for a region that has approximately 330,000 residents. The city's downtown area has approximately 11,000 parking spaces, most of which are priced and available to the general public, including five city-owned parkades (garages), several private commercial (for profit) lots, and approximately 1,900 on-street spaces. On-street parking is priced at \$1 for the first hour and \$2 for each subsequent hour, and parkade parking is priced at \$1 per hour.

Figure 4 Downtown Victoria Parking Map (Victoria Engineering Department)



Downtown Victoria has 1,900 on-street parking meters which generated about \$5 million annually. Revenues are likely to increase significantly in future years due to improved pricing methods.

In 2009 the city earned \$15.4 million in annual gross revenues from on-street meters, parkades and parking fines, and spent approximately \$5.5 million on parking facilities and equipment, operations and enforcement, leaving approximately \$10 million in net revenues, which can be considered rent and tax payments on parking facilities. These net revenues represent about 5.5% of the city's total annual budget, or about \$125 annually per city resident.

The 1,900 on-street parking meters generate about \$5 million per year, or about \$2,400 per space annually. The older, single-space meters experienced significant losses (thieves vandalized the meters to steal coins) so in 2010 the city installed 270 new, pay-per-space parking meters at a cost of \$3 million. The new system is more convenient to use (it accepts coins, bills, credit and debit cards; allows payment for any space at any meter; and charges for just the amount of time a vehicle is parked) and is expected to significantly increase revenues.

Like most North American cities, Victoria has generous minimum parking requirements, except in the downtown, where developers may decide how much parking to provide at each site. In recent years hundreds of new housing units were built downtown, including many relatively inexpensive condominiums with unbundled parking (parking spaces rented or sold separately). A major portion of residents do not own vehicles.

The city currently only prices on-street parking in the downtown, although parking is priced at campuses, hospitals, transportation terminals, and some private buildings elsewhere in the city. For example, private operators charge \$80 per month for parking in lots near but outside downtown, \$0.75 per hour in the Cook Street Village, a neighborhood commercial district, and \$1.50 per hour at the Jutland waterfront development, while nearby on-street parking remains unpriced. Downtown parking is unpriced during evening and Sundays, although parking is often congested at those times. This suggests that the city could expand pricing of municipal parking facilities, generating significant additional revenues.

Downtown Pasadena Redevelopment (<http://shoup.bol.ucla.edu/SmallChange.pdf>)

During the 1950-70s Old Pasadena's downtown had become run down, with many derelict and abandoned buildings and few customers, in part due to limited customer parking. Although curb parking had two-hour limits, this was poorly enforced and employees often used these spaces. The city proposed parking pricing to solve this problem. Many local merchants initially opposed the idea, so city officials agreed to dedicate all revenues to downtown improvements. A Parking Meter Zone (PMZ) was established within which parking was priced and the revenues invested. With this proviso, the merchants supported the proposal. They began to see parking meters as a way to finance new services that directly benefit their businesses. Because downtown parking had previously been unpriced, the city didn't lose any funding by dedicating the revenue to improvements in that area. In fact, the city gained revenue from overtime fines.

The city formed an advisory board of business and property owners to oversee parking policies and revenue distribution. The resulting investments included new street furniture and landscaping, police patrols, street lighting, more street and sidewalk cleaning, pedestrian facility improvements, and marketing. To highlight user benefits each parking meter has a small sticker that reads, "Your Meter Money Will Make A Difference: Signage, Lighting, Benches, Paving."

This created a "virtuous cycle" in which parking revenue funded community improvements that attracted more visitors, which increased parking revenue allowing further improvements. This resulted in extensive redevelopment and business growth. Parking is no longer a problem for customers, who can almost always find a convenient space. Local business activity and sales tax revenues have increased far faster than in other shopping districts with lower parking rates, and nearby malls that offer free customer parking. This indicates that charging market rates for parking with revenues dedicated to local improvements can support urban redevelopment.

San Diego (www.ccdc.com/events/resources/DRAFT%20CITY%20REPORT%20FOR%20ITEM%206.pdf)

San Diego's Centre City Development Corporation (CCDC) conducted a multiyear Downtown Parking Pilot Program in targeted sections of the City's downtown to "provide information and sample techniques that would optimize the use of on-street parking in the downtown area and that could later be applied citywide." A mixture of on-street parking policies and technologies maximized use of the on-street spaces, providing a 15% vacancy rate, so spaces are nearly always available on each block. Parking fees were raised in high demand areas to \$1.25 per hour, and kept as low as \$0.50 in peripheral areas. These policies more than doubled on-street parking turnover and nearly doubled total parking meter revenue. New parking meters that accepted credit cards increased compliance, resulting in a more positive user experience.

Transit Station And Park-and-Ride Parking Pricing

Cities and public transportation agencies apply various policies to parking at transit stations and park-and-ride lots, including regulations, pricing and sharing policies (MTA 2003; MTC 2007). An increasing portion of transit stations have priced parking to generate revenue and encourage more efficient use of parking facilities.

- Some Bay Area Rapid Transit (BART) stations charge daily parking fees of \$1-5, and monthly reserved parking fees of \$30 and \$115.50, with higher fees in more central, urbanized areas where land costs are higher.
- Washington DC Metro station parking lots cost \$4.75 per day (plus \$55 per month for a reserved space), but are free on weekends.
- Parking at Chicago Transit Authority stations ranges from \$2-12 per day and \$40-80 per month.
- Many Los Angeles Metrolink stations have priced parking. For example, the Santa Fe Springs station charges \$1 per day or \$20 per month (\$10.00 for Norwalk and Santa Fe Springs residents).
- The Denver RTA charge \$1-2 per day for regional residents and \$2-4 per day for out-of-region residents for use of parking-and-ride lots.

Ventura, California (Nelson/Nygaard 2006;
<http://venturatransportation.blogspot.com/search/label/parking>)

The City of San Buenaventura, commonly called Ventura, is located on the California coast just north of Los Angeles. It has about 100,000 residents. The city is currently introducing user pay parking, with prices set to achieve a 15% vacancy rate and revenue return to the metered neighborhood. The municipal bylaw states, "All moneys collected from parking pay stations, and meters in this city shall be placed in a special fund, which fund shall be devoted exclusively to purposes within the geographic boundaries of the parking district from which the revenue is collected. Such moneys shall be used for the purposes stated in the parking district establishment ordinance."

Aspen Downtown Parking Pricing (www.aspenpitkin.com/Departments/Parking)

Aspen, Colorado is a rapidly growing resort community. In 1991 the city built a 340-space underground parking structure in the center of downtown, but despite its convenient location and low price it was underused while on-street parking was congested. Many spaces were occupied by locals and downtown commuters who performed the “ninety-minute shuffle,” moving their vehicles every 90 minutes to avoid a parking ticket. In 1995 the city began charging for on-street parking using multi-space meters. Parking fees are highest in the center and decline with distance from the core. The city had a marketing campaign to let motorists know about the meters, including distribution of one free \$20 prepaid parking meter card to each resident to help familiarize them with the system. Motorists were allowed one free parking violation, and parking control officers provide an hour of free parking to drivers confused by the meters. Although some downtown workers initially protested (opponents organized a “Honk if you hate paid parking” campaign the day pricing began), pricing proved effective at reducing parking problems and six months later the program was supported in a municipal election by a 3-to-1 margin. Most downtown business people now support pricing to insure that convenient parking is available for customers and to help finance city programs.

Evening and Weekend Parking Pricing (SFMTA 2009)

The City of San Francisco evaluated the benefits of extending on-street parking pricing to evenings and weekends. It found:

- Demand for on-street parking is high in the evenings and on Sundays, which results in parking occupancies that are often higher than 100 percent due to illegal parking. It is hardest to find available parking spaces after 6 p.m. and on Sundays, when parking at meters is currently free and unrestricted.
- When San Francisco’s meters were first introduced in 1947, many businesses kept traditional hours, usually from 9 a.m. to 5 p.m., Mondays through Saturdays. Today, many businesses are open late in the evening and all day on Sundays, which creates demand for parking at times when parking meters do not currently operate.
- Many cities and towns around the country operate their parking meters Monday through Saturday until 10 p.m., midnight, or 2 a.m., as well as on Sundays.
- Parking availability is the aspect of parking that San Francisco residents value most highly. Cost, though not unimportant, ranked fifth (out of nine) as a concern.
- A plurality of residents supports metering in the evenings and on Sundays if meter revenues are used to improve pedestrian and bicycle facilities and Muni service. Residents who never drive or drive rarely are more likely to support extending the hours than those who drive frequently.

As a result of this analysis city planners developed specific recommendations for expanding the hours of priced parking and improve user convenience, including improved marketing of Parking Cards, extended enforcement hours in residential areas adjacent to commercial streets to reduce potential parking spillover problems, adjust meter hours, prices and regulations to achieve 85% occupancy rate targets, and reduce hourly rates in public parking lots to attract motorists from on-street parking.

Glendale Parking Pricing (Kodama 2010)

Glendale, California is the third-largest city in Los Angeles County, with 207,000 residents. In 2007 the city adopted a comprehensive mobility strategy designed to help revitalize the downtown core. A key part of this strategy was to improve downtown customer parking convenience, reduce cruising for parking, and use available parking resources more efficiently. Glendale now has an integrated on-street and off-street pricing system that efficiently prices the most convenient on-street spaces, and offers free short-term (90 minute) parking in the surrounding garages.

Studies showed that, while on-street parking spaces in the commercial district on Brand Boulevard had more than 90% rates during peak periods, public garages were often only half occupied and virtually never totally full. This problem resulted from a lack of integration between on- and off-street parking.

“While the garages are not overly expensive, it is difficult to justify going into a garage to pay for something that seems to be given away for free,” the *Glendale Mobility Study* reported. “Market-priced on-street parking will save time, reduce traffic, conserve energy, improve air quality and increase public revenue.”

Changing drivers’ habits required a significant policy shift. Glendale approved a plan to eliminate free parking on the main commercial streets downtown. The city installed electronic, pay-per-space meters that allow “demand-responsive” pricing, the city monitors demand and adjusts rates to achieve 15% vacancy rates so spaces are usually available on each block.

Ending free parking in the downtown core was a major change so stakeholder involvement was crucial. Before the multi-space parking meters began operation in December 2008, the city launched a public relations campaign. During the first month “parking ambassadors” provided help at the parking meters and for six weeks only warning tickets were issued for first offenses.

In the system’s first year of operations Glendale experienced significant improvement in downtown parking efficiency. Prime parking spaces are available near businesses (the parking occupancy rate along Brand Boulevard that was previously above 90% has been reduced to about 80%), parking structures have increased occupancy, and there is improved capability to manage operations.

Merchants up and down Brand Boulevard see steady turnover of parking spaces in front of their shops. “For the first time in many years, customers can regularly find a parking space on Brand,” said Eric Olson, President of the Downtown Glendale Merchants Association.

The city’s new approach is the first step in an integrated transportation management system. As a result of the changes implemented, Glendale is expanding the program in several ways. Installation of multi-space parking meters in the city-owned parking lots is underway, and improvements to wayfinding signage and the transit system are in the works.

Redwood City (<http://shoup.bol.ucla.edu/Redwood%20City.pdf>)

The Redwood City, California parking ordinance is written to achieve efficient parking fees and return revenues to local business districts. The city council adopted the policy unanimously in 2005 with the support of local business leaders. Here are some ordinance excerpts:

To accomplish the goal of managing the supply of parking and to make it reasonably available when and where needed, a target occupancy rate of eighty-five percent (85%) is hereby established. At least annually and not more frequently than quarterly, the Parking Manager shall survey the average occupancy for each parking area in the Downtown Meter Zone that has parking meters. Based on the survey results, the Parking Manager shall adjust the rates up or down in twenty-five cent (\$0.25) intervals to seek to achieve the target occupancy rate.

Revenues generated from on-street and off-street parking within the Downtown Meter Zone boundaries shall be accounted for separately from other City funds and may be used only for the following purposes:

- A. All expenses of administration of the parking program
- B. All expenses of installation, operation and control of parking equipment and facilities within or designed to serve the Downtown Core Meter Zone
- C. All expenses for the control of traffic (including pedestrian and vehicle safety, comfort and convenience) which may affect or be affected by the parking of vehicles in the Downtown Core Meter Zone, including the enforcement of traffic regulations as to such traffic.
- D. Such other expenditures within or for the benefit of the Downtown Core Meter Zones the City Council may, by resolution, determine to be legal and appropriate.

Austin Parking Benefit District (www.ci.austin.tx.us/parkingdistrict/default.htm)

Many neighborhood experience various parking spillover problems, including difficulty finding parking for residents and their visitors, concerns that public service vehicles cannot pass two lanes of parked vehicles on the street, or that parking on the street reduces neighborhood attractiveness.

These problems become an opportunity with the establishment of a *Parking Benefit District* (PBD) A PBD is created by metering on-street parking (either with pay stations on the periphery of the neighborhood or with traditional parking meters) and dedicating the revenue, less City expenses for maintenance and enforcement, towards improvements in the neighborhood that promote walking, cycling and transit use, such as sidewalks, curb ramps, and bicycle lanes. To encourage drivers to consider other ways to reach their destination without driving and parking in the neighborhood, parking meters inform drivers of alternative ways to reach their destination. Charging for parking and promoting alternatives should help reduce the number of people parking in the neighborhood, but those who park and pay the meter benefit the neighborhood with additional revenues. The PMD may be used in conjunction with a Residential Permit Parking program to ensure that residents and their visitors have access to parking.

The Parking Benefit District pilot program is funded in part by a grant from the Mobile Source Outreach Assistance program of the Environmental Protection Agency, which selects public education and outreach projects that directly support local efforts to improve air quality from mobile sources.

British Columbia Parking Pricing

Starting 1 January 2010 Downtown Vancouver parking rates range from \$1 to \$6 per hour. In other commercial areas prices range from \$1 to \$3 per hour. Pricing applies from 9am-10pm (13 hours, instead of 9-8, 11 hours) seven days a week, 365 days a year. All metered parking can be paid by phone using credit cards, with no extra charge (previously there was a 30¢ per transaction fee for telephone payments). The pay-by-phone system can also send a text messages to when a meter will soon expire.

Table 8 summarizes parking pricing practices in various BC communities.

Table 8 Parking Pricing In British Columbia Cities

City	Population	Area and Time	Priced Spaces	Rates	Notes
Burnaby	216,336			\$1.00 per hour	On-street metered parking began 1998.
Coquitlam	114,565	Downtown. Pinetree Way, Glen Drive, High Street and parkades		On-street: \$1.00 per hr. Off-street: \$0.50 per hr.	\$18 annual parking pass allows residents unlimited use of city parkades.
Kelowna	106,707	Downtown, Priced 9 a.m. to 5 p.m. Mon. to Saturday	1,200 on-street 2,400 off-street	On-street: 50¢ per hour Off-street: 50¢ to \$1 per hr	Currently developing a downtown parking plan
Nanaimo	78,692	Downtown	924 on-street 1,257 off-street	\$0.50 per hour	Currently developing a downtown parking plan.
New Westminster	57,645				On-street meters were removed in the 1990s, but reinstalled and expanded since
Richmond	174,461	Various commercial areas		On-street: \$2.00 per hour.	Introduced meters in 2003 and updated rates in 2008.
Surrey	394,976	Various commercial arterials and Newton Town Centre		\$1.00 per hour	Introducing pay-and-display meters and expanding paid parking areas.
Vancouver	578,041	Downtown and some local commercial districts	More than 6,000	\$1.00-5.00 per hour \$1.00-2.00 per hour outside downtown.	Meters are in effect seven days a week and until 10 pm.
Victoria	78,659	Downtown	1,900 on-street 2,300 Off-street	On-street: \$2.00 per hr.	Is introducing Pay-&-Display meters.
Whistler	9,595 permanent 1m an. visitors	Village center and day lots		\$1.00-2.00 per hour	Expanding user pay parking
White Rock	18,755	Arena, hospital and along Marine Drive		\$1.00-2.00 per hour	Is introducing Pay-&-Display meters.

This table summarizes parking pricing practices in various BC communities.

Perth, Australia (Richardson and Merz 2015)

The Perth Parking Policy was developed during the late 1990's by state government agencies and the City of Perth. It included strict maximum limits on the amount of private tenant parking that could be provided for all development in the city. These limits could only be exceeded if the Minister for Transport on the recommendation of the Director General of Transport approved a variation. The Perth Parking Management Act also introduced a parking levy or tax on all non-residential parking bays, within the City of Perth, with few exemptions. The main elements of the policy are:

- Licensing of all non-residential parking with an annual licence fee payable for public and private off-street parking and public on-street parking administered by the City of Perth. All fees are paid into a trust account and all funds must be used for improvements to public transport or the pedestrian environment within the City of Perth. To date, all revenue has been used to fund revenue foregone from operation of the city centre free transit zone and the operation of three Central Area Transit (CAT) services that provide free travel between the major bus and rail stations and important business, education, medical and tourist precincts.
- Establishment of strict legal maximum levels of parking for new non-residential development within the city, based on the ground floor space of developable land.
- Establishment of three parking zones to control public parking – a pedestrian priority zone where no parking is permitted; a short stay zone where long stay (all day) parking is not permitted; and a general parking zone, which is on the perimeter of the city.

Ten years after implementation of the Perth parking policy there has been a 10% reduction of parking within the City of Perth; automobile mode share in central Perth has shifted significantly from car to public transport – car 17% down and public transport up 27%; total car travel on city streets and on approach roads to the city has decreased; and the city has continued to experience strong economic vitality and growth of both employment and retail.

The success of the Perth Parking Policy in reducing car travel to central Perth, without discouraging overall access to and activity within the city has encouraged decision makers to endorse more sustainable access and movement strategies.

City of North Vancouver

The City of North Vancouver, British Columbia is a suburban community easily accessible to downtown Vancouver by bridge and passenger ferry. It has a growing downtown that contains high-rise residential buildings, and diverse businesses including major corporate offices, shops and restaurants. It is experiencing increasing parking and traffic problems. In 2002 the city commissioned a parking study to identify solutions to these problems. A key recommendation was to price parking on major downtown commercial streets. This recommendation was rejected at the time due to merchant opposition.

In 2010 the City staff again proposed pricing approximately 1,200 on-street spaces (CNV 2010). An abundant supply of unpriced on-street parking would still be available nearby, including some spaces with 2-hour limits suitable for shoppers, and others with 72-hour limits suitable for commuters. Proposed fees would be one dollar for the first hour rising to two dollars for a second hour, which would generate an estimated million dollars annually (about 2% of the City's total annual budget, and nearly half its transportation and transit expenditure). Public hearings attracted merchants and residents opposed to the proposal (nobody else had motivation to attend). They criticized parking fees as a "cash-grab," harmful to downtown businesses and residents of nearby streets that would experience spillover problems and unfair to lower-income motorists. As a result the City Council rejected the proposal.

Montreal Variable Parking Fees (Zipper 2024)

The district of Rosemont-La Petite-Patrie in Montreal, Canada has residential parking fees based on vehicle weight. Fees for the lightest vehicles pay only C\$115 (US\$90) annually, but this increases to C\$205 (US\$150) for the highest weight class, and lower rates for electric or hybrid cars, and residents with disabilities or low incomes pay the bottom rate no matter what they drive.

Whistler (www.whistler.ca/index.php?Itemid=271&id=180&option=com_content&task=view)

The Resort Municipality of Whistler has charged for on-streets and underground parking. In mid-2009 it proposed fees for previously unpriced surface lots used by employees and visitors to more efficiently manage municipal parking facilities, encourage use of alternative modes, and raise revenue. Opponents raised various objections (www.freewhistlerparking.com):

- Whistler is already an expensive place to visit and live, so priced parking will discourage visitors (and therefore business activity) and is unfair to residents, particularly lower-wage employees.
- Transportation alternatives are inadequate, so people must drive.
- The mayor's wage is excessive.
- The decision was made with inadequate community input.

Although opponents were vocal and received media attention, they represent a minority of Village residents. The city council responded by delaying program implementation for several months and adjusting rates to offer discounts for shorter duration and local users (RMOW 2009). The revised rates are \$1 for the first hour, \$1 for the second, \$2 for the third. Whistler residents can receive refunds for time not used when they pay for parking.

Parking Pricing Design Factors

1. *Area and time.* Prices can be applied to specific spaces, blocks, lots or districts. Efficient (also called responsive) prices are higher for the most convenient spaces during peak periods, and lower at less busy locations and times.
2. *Pricing units.* Prices can be measured per minute, hour, day or month, and vary by time, location, and user type, such as discounts for people with disabilities and lower incomes.
3. *Exemptions.* Exemptions may be provided for quick, high-value stops such as for goods delivery, passenger loading, and quick errands. This is typically 3-10 minutes on busy streets and up to 20 minutes in less busy areas.
4. *Technology.* This can include mechanical or electronic meters, pay-per-space systems, permits, access control, and other methods.
5. *Revenue targets.* Targets can reflect cost recovery (enough to pay for facilities) or profit maximization.
6. *User information and enforcement.* Information can be provided using signs, maps, websites and apps.

Santa Monica Introduces Efficient Parking Pricing

Martha Groves (2009), "Santa Monica To Experiment With Parking Psychology: Consultants Find The City Doesn't Need More Spaces, It Needs To Change How They Are Used." *Los Angeles Times*, 14 Oct. 2009 (www.latimes.com/news/local/la-me-parking-experiment15-2009oct15,0,6335426,print.story).

Embracing a bold experiment to alter human behavior, Santa Monica is poised to raise parking rates on the city's most coveted downtown spots to discourage some motorists from using them. The idea is to get people out of their cars and end what city leaders deem an ill-advised subsidy for public parking.

By boosting rates, officials intend to make the parking closest to the congested Third Street Promenade expensive enough that some visitors will instead walk, take the bus or park in more-distant garages. If it works, the city would benefit from smoother traffic flow, reduced pollution as fewer people cruise for spaces and a better return on land developed for public parking. "What we're saying is: 'Parking's not free in Santa Monica anymore,'" said Councilman Bobby Shriver, who advocates changing the parking rules.

Santa Monica is one of several cities -- including Los Angeles, San Francisco and Washington, D.C. -- turning to market-based pricing in an effort to keep parking lots busy with paying customers while making alternatives such as walking, cycling or taking public transit more appealing.

Critics contend the proposed changes might chase customers away, a risky prospect in a city that depends heavily on sales tax dollars. "Because of the economic climate, any reason to choose another place is one too many," said Kathleen Rawson, chief executive of the Bayside District Corp., the public-private partnership that manages the downtown business district. Pricing proponents say the opposite is more likely: higher rates will mean more open parking spots, which would appeal to rushed customers. Moreover, the motorist willing to pay higher

rates is probably also willing to spend more in stores or leave bigger tips.

Santa Monica arrived at the market-based pricing idea when consultants hired to evaluate the need for additional downtown parking discovered something unexpected: The city actually had plenty. The problem was that visitors and employees were vying for the most convenient spots as hundreds or thousands of other outlying or privately owned spaces sat empty. "We don't really need more parking downtown," said Santa Monica Mayor Ken Genser. "It's the way the parking is being used that's a problem."

The study found that downtown employees were parking and reparking in structures on 2nd and 4th streets near the promenade to take advantage of the two-hours-free policy, taking away spaces from potential customers. To Shriver, the study's key revelation was that municipal structures had essentially become subsidized parking for private-sector employees. "The city policy in its public structures can't be that everybody who works on the promenade gets a free space," he said.

Santa Monica workers and residents have mixed views. Anne Troutman, an architect who lives near the shops and restaurants, sees higher parking fees "as a necessary and gentle step . . . along the path toward reducing our dependence on cars." But she worries about the elderly volunteers at places such as the Santa Monica Bay Woman's Club, for whom even a small increase might prove a hardship.

Hilary Kenny, a bartender who uses the municipal garages, said the current two-hours-free policy is a big selling point for visitors.

Higher rates, she said, would "discourage people who want to pop in to have a drink or go to a movie." However, she said \$1 for the second hour would be "not so bad."

The consultants recommended the city rebuild and expand two existing structures near the promenade but forgo building 1,000 new spaces. The city had projected that new or replacement spaces would cost about \$57,000 each. "It's shockingly expensive," said Steffen Turoff of Walker Parking Consultants, which prepared the Santa Monica report. "From an environmental and financial perspective, it's a waste to build more when so many spaces in this area sit empty even during the busiest times of the week."

Cities pay dearly to create and maintain free or inexpensive parking and devote a tremendous amount of land to it. Parking experts say the cost of building above-ground parking can range from \$15,000 to \$30,000 per space. Under-ground spaces can cost \$25,000 to \$70,000 each.

"We grow up thinking that somebody else should pay for parking," said Donald Shoup, a Yale-trained economist and UCLA urban planning professor who wrote "The High Cost of Free Parking," considered by many the definitive text on the subject. "The cost doesn't go away just because the driver doesn't pay for it."

Ideally, Shoup contends, a city would charge enough so that 85% of all parking spaces were occupied at any one time. If too many spaces are vacant, the price is too high. If no spaces are available, the price is too low.

Once Santa Monica city staff recommends a plan, perhaps by late this year, the City Council is expected to raise daily and nighttime rates

and monthly parking fees and charge a dollar for the second hour of parking in garages. A full day of parking would rise from \$7 to \$9 and on-street parking meters from \$1 to \$1.50 per hour.

Under an agreement with the Bayside District Corp., the city also will explore a comprehensive program to make better use of private parking lots, a centralized valet system, public-transit incentives and shuttles to and from outlying garages. Rates at the newer Main Library and Civic Center lots might be reduced.

Santa Monica's discussion reflects a vexing reality -- that parking has an "unbelievable power . . . to shape and distort cities," said Ventura City Manager Rick Cole. "It's illegal for a car to be homeless but not for people," he said. "As a result, we devote a huge amount of extraordinarily valuable real estate to asphalt and concrete and then we give it away."

Ventura, which does not charge for street parking, plans to install meters in January, three years after it first committed to market-based pricing. "You have to break the initial barrier of charging for parking," Cole said of the delay. He speaks from experience. As mayor of Pasadena in the early 1990s, he helped broker a deal with Old Pasadena retailers that paved the way for paid parking. All the meter revenue went into area amenities, which strengthened demand, turning Old Pasadena into a municipal cash cow.

Turoff, the consultant who managed the Santa Monica project, said it comes down to simple tradeoffs: "Do you want a free space, or do you want to be able to find a space? Are you going to substitute desirable destinations for car storage? You'd lose the attraction, but everybody could park there."

Workplace Parking Levy (WPL) Implementation (Soulsby 2021)

A Workplace Parking Levy (WPL), which charges employers for the number of parking spaces they provide to employees, provides an incentive for employers to reduce parking supply and use non-auto travel modes, as well as generating new revenue that can be invested to improve active travel, public transport and urban realm.

Greenwich Village, New York (Bernstein 2010)

In 2009 New York City increased Greenwich Village parking meter rates from \$2 to \$3 an hour during peak periods (compared with \$17 an hour in nearby garages). As a result, on-street parking spaces are almost always available. As a result, the city is now expanding this price structure to other areas.

Mexico City Parking Pricing Implementation (ITDP 2012)

Mexico City experiences severe traffic and parking congestion, in part because most on-street parking is unpriced, resulting in constant conflicts over available parking. Parking pricing pilot projects in some neighborhoods have proven effective at insuring that motorists can always find a parking space, even in commercial areas. The Institute for Transportation and Development Policy has developed a guidance document (*Manual De Implementación De Sistemas De Parquímetros Para Ciudades Mexicanas*, which translates to, *Parking Meter System Deployment Manual for Mexican Cities*) which describes the benefits of more efficient parking pricing and how it can be implemented in Mexican cities.

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%.

Best Practices

Below are common recommendations for parking pricing implementation. Also see Shoup (2005), Litman (2006a), Marr (1999), MTC (2007), Rye and Ison (2005), Siegman (2008), and the *Parking Reform Website* (www.parkingreform.org).

- Wherever possible, charge directly for using parking facilities. This is more efficient and fair than paying for parking facilities indirectly.
- Manage and price the most convenient parking spaces to favor priority users. Charge higher rates and use shorter pricing periods at more convenient parking spaces (such as on-street and near building entrances) to increase turnover and favor higher-priority uses. Charge performance-based prices, set to maintain 85-90% occupancy rates.
- Implement parking pricing as part of an integrated parking management program that also includes improved user information on parking and transportation options, commuter trip reduction programs, improvements to alternative modes, and adequate, predictable and courteous enforcement.
- Improve pricing methods to make parking pricing more cost effective, convenient and fair. They should accept coins, bills and credit cards, and allow motorists to pay for just the amount of parking they will use (rather than requiring prepayment based on expected parking duration).
- Avoid excessive parking supply. Apply reduced and more flexible parking standards that reduce requirements if parking is efficiently managed.
- Establish pricing policies that respond to changing conditions and demands. Optimal rates may vary from one location or time to another, and often need adjustment as supply and demand changes, for example, if nearby parking lots are closed or new businesses open. Establish performance indicators and identify additional management strategies that can be deployed as needed if problems develop.
- Avoid discounts for long-term parking leases (i.e., cheap monthly rates). For example, set daily rates at least 6 times the hourly rates, and monthly rates at least 20 times daily rates. Even better, eliminate unlimited-use passes altogether. Instead, sell books of daily tickets, so commuters save money every day they avoid driving. Eliminate early-bird discounts.
- Create Parking Benefit Districts, with revenues used to benefit local communities.
- If parking must be subsidized, offer comparable benefits for use of other travel modes, such as Cash Out payments.
- Tax parking spaces. Reform existing tax policies that favor free parking. For example, tax land devoted to parking at the same rate as land used for other development.

Parking pricing implementation requires changing well-entrenched habits and institutional practices, so it is important to build community support. Opponents focus on parking pricing problems and costs, while overlooking benefits. It is important to identify all benefits and to illustrate savings and benefits to typical households. Clearly communicate the options a community faces. For example, explain that “without parking pricing downtown parking problems will grow and property taxes will need to increase by 5%.” Identify benefits to businesses, including improved customer and delivery convenience, and funding for new services or tax reductions.

It is sometimes appropriate to implement pricing on a trial basis to allow community members to experience the system in operation. Identify specific responses that can be used to address potential

problems, such as improved enforcement to address spillover parking, and targeted discounts and exemptions to support retail businesses. Create a business advisory committee to oversee pricing implementation.

Table 9 describes common objections and obstacles to parking pricing, and potential solutions.

Table 9 Parking Pricing Obstacles and Potential Solutions

Objections and Obstacle	Potential Solutions
User inconvenience, delay and frustration with pricing systems and enforcement practices.	Use more convenient pricing systems. Use meters that offers multiple payment options (coins, bills, credit and debit cards, and pay-by-phone) and only charges for the exact amount of time a vehicle is parked. Improve user information on their transport and parking options. Insure that enforcement is fair, friendly and courteous.
High transaction costs, including expenditures on equipment (parking meters) and operations, which consume a significant portion of revenues (often hundreds of dollars annually per space).	Use more cost effective pricing systems, including multi-space meters (each of which serves about ten spaces), and integrated systems that achieve scale economies.
Spillover impacts (motorists parking illegally in nearby parking lots or on residential streets).	Implement parking pricing as part of an integrated parking management program that includes improved parking regulation, user information and enforcement which anticipate and address spillover impacts.
Reduced business and economic activity if competitors offer unpriced parking.	Design parking pricing to improve business access, by favoring delivery and customer vehicles, providing convenient information to customers on their transport and parking options, and supporting other modes. Use portion of revenues to support local economic development. Offer targeted discounts and exemptions, such as customer parking validation.
Financial burden on motorists, particularly those with lower-incomes.	Implement parking pricing in ways that maintain affordable parking options (such as free or low-priced parking a few blocks away) and improvements to alternative modes. Use revenues in ways that benefit lower-income people.
Where parking supply is abundant it seems inefficient to price parking, if this results in spaces left unoccupied.	Allow parking supply to be reduced to optimal level. Rent or lease excess parking spaces, or convert land to other uses.
General unhappiness and distrust of government (perception that taxes are excessive, services are poor, and mayors are overpaid).	Implement parking pricing in a transparent and predictable way. Clearly define how revenues will be used and how this benefits citizens.

This table identifies ways to address common objections and obstacles to parking pricing implementation.

Conclusions

Although most parking is unpriced, truly free parking only exists in the game of *Monopoly*; the real choice is between paying directly or indirectly for parking facilities. Paying directly is more efficient and fair, and helps achieve various planning objectives including improved user convenience, reduced parking and traffic problems, and increased revenues.

Parking is a valuable resource. A typical urban parking space has a \$500 to \$1,500 annualized value, so offering free parking is equivalent to offering a stack of \$100 bills. Unpriced parking increases vehicle ownership and use, typically by about 20%, and so increases traffic problems and land use sprawl.

More efficient parking pricing can provide numerous benefits. It increases parking turnover, encourages motorists to use less convenient spaces and shift mode when possible, and reduces parking demands and therefore total parking costs. It reduces total vehicle travel and therefore problems such as traffic congestion, roadway costs, accidents, energy consumption and pollution emissions. Efficient parking pricing can provide substantial new revenue: it can finance 5% to 10% of municipal budgets, and increase revenues or reduce rents for urban development.

Parking Pricing Benefits

- Insures that a parking space is virtually always available, increasing user convenience and reducing cruising for parking.
- Makes the most convenient spaces available for higher value trips (delivery and service vehicles, errands and shoppers) and encourages longer term parkers to use less convenient spaces.
- Tends to be more flexible to users, and more cost effective to enforce than regulations.
- Reduces total vehicle travel and therefore traffic congestion, roadway costs, accidents, energy consumption and pollution emissions.
- Generates revenues, so motorists help pay for the local parking and roadway facilities they use. Insures that motorists, including non-residents, help finance local road and parking facilities.

Parking pricing is best implemented as part of an integrated parking management program that also includes improved user information, reduced and more flexible parking requirements, and improved enforcement of parking regulations. Current trends are increasing the benefits of efficient parking pricing, including increasing road and parking congestion, increased urbanization, and growing demand for alternative modes.

Parking can be priced in various situations. Virtually any location with a “parking problem,” is a candidate for efficient parking pricing. Municipal governments can price on-street parking, and off-street parking lots at destinations such as recreation centers. They can expand when and where parking is priced to include residential streets, evenings and Sundays. Campuses, hospitals and transportation terminals can charge for parking. Private buildings can price and unbundle parking. Commercial operators can be encouraged to offer for-profit parking.

Despite these benefits, parking pricing is unusual and difficult to implement, since it requires changing well-entrenched practices. However, support for priced parking tends to increase as people better understand the trade-offs involved. If asked, “Do you want free or priced parking?” people generally

choose the free parking. However, if asked, “Do you want to pay for parking directly and always be able to find a space, or pay indirectly through higher rents, taxes and retail prices for congested facilities?” the preference for unpriced parking declines.

Parking pricing has been successfully introduced in many communities. The most economically successful commercial areas generally have priced parking. Legitimate objections to parking pricing can be addressed with appropriate policies and strategies, such as improved pricing systems, better user information, and targeted discounts for customers and people with disabilities. Table 10 summarizes benefits and costs of parking pricing for various perspectives, and possible responses to common objections.

Table 10 Efficient User Pay Parking Benefits And Costs Summary

Group	Benefits	Costs	Responses
Motorists	Improves parking spaces are always available. More flexible than regulations. Reduces traffic congestion.	Motorists bear the inconvenience and financial costs of paying for parking.	Use convenient payment systems. Insure that cheaper parking is available nearby. Provide adequate user information.
Lower-income commuters	May improve transport options (walking, cycling, ridesharing and transit).	Increases costs.	Improve transport options. Offer discounts for lower-income motorists
Non-users (people who do not use downtown parking)	Increases fairness. Non-users are no longer forced to pay for parking facilities they do not use.		Improve alternative modes (walking, cycling, ridesharing, public transit, etc.)
Downtown businesses	Improves convenience for deliveries and customers.	May discourage some shoppers. May increase employees commuting costs.	Use revenues to improve alternative modes and downtown services. Offer free parking coupons to customers.
Nearby residents	Increases fairness and lower taxes. Reduces traffic problems.	Some neighborhood streets may experience more spillover parking problems.	Monitor and enforce parking regulations.
City administration	Reduces parking congestion. More cost effective than regulations. Provides revenues.	Increases parking spillover problems.	Develop integrated parking management program.

This table summarizes user pay benefits and costs, and solutions to problems, for various groups.

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