

SII – Sustainability Innovation Inventory

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July 2008

San Francisco Parking Meter Pricing



Executive Summary

In 2005, Donald Shoup's book, *The High Cost of Free Parking*, put municipal parking pricing on the radar screen for city planners. According to Shoup's research, an average of 30 percent of city traffic congestion is due to cars "cruising for parking." This major traffic inefficiency, Shoup shows, stems from cities under-pricing public parking. By contrast, he argues that if public parking was priced to balance supply and demand, according to market forces, parking spots would always be available for people who really need them and city traffic congestion would ease as the incentive for drivers to "cruise" for cheap parking diminished (Shoup, 2005).

In response to parking pricing research by Shoup and others, San Francisco will be rolling out a pilot program in September 2008 to price public parking spaces at market rates. The new program, SFpark, will update parking in San Francisco with a number of new technology-enabled features to facilitate "demand responsive" pricing, including:

- Multispace parking meters with variable pricing programmability
- In-street sensors to determine parking spot occupancy and availability
- Remote monitoring of parking usage made available to parking enforcement officers through handheld monitoring devices
- Remote parking availability and price information made available to drivers through Internet-enabled devices and mobile phones
- Remote payment and time limit warning system for drivers using municipal parking

- Dynamic signage

Under the SFpark program, the new parking infrastructure will allow the city to regulate the price and time limits for parking according to real-time demand. In addition to regulating routine rush hour and business traffic, this system will also be able to respond to unusual traffic conditions (i.e. to handle more traffic during special events or less during holidays). Parking pricing will be adjusted to keep demand at or below 85% capacity at all times. This target capacity, which is based on Shoup's research, is intended to enable people who absolutely must drive to always be able to find a spot wherever they need one without having to "cruise" (Markoff, 2008).

As the SFpark program intends to regulate parking using market forces alone, a correlated goal of the program is to improve the convenience of the public parking system for drivers who choose to pay for it. Through SFpark, drivers will be able to communicate with the new traffic meter system via Internet or phone, through which they can learn about rates and availability of parking, or add money to their meter remotely. The new meters will even be equipped to send drivers text-messages to let them know when a meter is running low.

The SFpark pilot program is a partnership between the San Francisco Municipal Transportation Agency and the U.S. Department of Transportation. It is one of five city projects supported by the federal Urban Partnership Agreement (UPA) program.

Why is SFpark a sustainable practice?

By encouraging "cruising" and obstructing traffic, current public parking systems contribute significantly to urban congestion, delays for public and private transportation users, and environmental degradation. For example, a recent study of parking inefficiencies in Westwood Village, a fifteen-block neighborhood in Los Angeles, found that traffic due to parking-spot hunting resulted in an estimated 950,000 excess miles driven per year. Put in different terms, these excess miles waste 11 years of drivers' time and 47,000 gallons of gasoline, and they produce 730 tons of avoidable CO₂ emissions – and this is only one neighborhood in one city (Shoup, 2007).

Improving parking practices in urban areas has the potential for many positive impacts, including:

- Reducing traffic-related air pollution in business, shopping, or residential areas, where pedestrians are affected by air quality at street level
- Improving the quality and reliability of public bus service
- Improving traffic safety
- Generally improving ease and efficiency for drivers and parking enforcement officers and reducing the overall carbon footprint of the city

Variable parking pricing will be most effective for cities interested in capping the total parking available downtown or in certain neighborhoods, as the higher prices during peak times will encourage public transportation use, ride-sharing, and walking. By providing pricing incentives to park farther away from a desired location and walk, variable parking pricing can also be helpful for cities interested in achieving a more even distribution of parking and traffic.

Current Technology

The City of San Francisco currently manages 335,000 parking on- and off-street parking spaces. The SFpark pilot program will initially upgrade 11,677 parking spaces in city-run parking lots and 6,425 on-street parking spaces with monitoring and variable pricing technology; however, the Mayor of San Francisco hopes to extend the program to all municipal parking spots by 2010 (Markoff, 2008).

Pricing for each space will depend on several factors, including:

- Time of Day

- Length of Stay
- Location
- On / off street spot
- Special events

Parking spots in the pilot program will be equipped with street-embedded sensors, called “bumps,” which will send occupancy information to a central parking monitoring system. The sensors, designed by a company called Streetline, are wireless battery-operated devices protected by a 4 inch by 4 inch plastic cover and designed to function for 5-10 years without servicing. The sensors will measure both parking spot occupancy and the speed of traffic passing them on the street (Markoff, 2008). This information will then be transmitted to city planners to help them set parking prices in particular locations. Both availability and pricing will subsequently be made available to drivers through their mobile phones, the Internet, or other web-enabled devices to help them decide where to park.

Networked multi-space meters will replace traditional meters in many locations, enabling the San Francisco Municipal Transportation Agency to manage pricing, payment, and meter service requests remotely. Additionally, the meters will enable drivers to add money to their meters remotely, using their phone or the Internet. Moreover, the networked meters will communicate parking density to parking enforcement officers, thus alerting them to locations where parking offences may be more common (and where their time would be most efficiently spent).



Figure 1: Multispace Parking Meters: These new meters give drivers several options for payment and time management. They are also equipped to communicate parking occupancy data to a central management system and help with parking enforcement.



Figure 2: Remote Parking Management. The SFpark program will allow drivers to add money to their parking meters by phone or Internet.

Technology and Experience Roadmap

Golden Gate Bridge Variable Toll Project

In addition to the new parking management program, SFpark has plans to coordinate with an experimental variable toll program for the Golden Gate Bridge. The UPA's support for SFpark includes funding for an evaluation of city mobility under a combined system of parking and toll management. Consequently, the SFpark pilot program is scheduled to continue for at least three months after the launch of the Golden Gate Bridge variable tolling program.

Personal Navigation Devices

Personal in-car navigation devices already tell drivers which streets to avoid during peak traffic. With the new remote sensing and communications capabilities of SFpark, these navigation devices could be updated to receive real-time parking information at drivers' intended destinations. Connecting parking availability maps to personal navigation devices will allow drivers to find easier, faster, or cheaper parking while they are on the road, or even before they leave.

"Parking Increment Finance"

Shoup points out that individual neighborhoods may not support increases in parking pricing without seeing any of the benefits of the extra charges. He encourages cities to consider profit sharing by promising neighborhoods use of the profit increment – the amount of money collected beyond the current expected income from municipal parking. Giving Business Improvement Districts (BIDs) control over revenue generated on their own streets will add local incentives to variable parking

pricing programs and help bring needed amenities to neighborhoods even as it reduces traffic and increases travel convenience. Shoup also argues that BIDs with a stake in collecting parking meter money will be stricter about enforcing parking compliance (2007).

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The SII – Sustainability Innovation Inventory is part of a research project on Connected Urban Development between MIT Mobile Experience Lab, Massachusetts Institute of Technology and Cisco Systems, Inc.

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