SF*park*
Pilot Project Evaluation Summary

A summary of the SFMTA's evaluation of the SF*park* pilot project

SFpark | SFMTA Municipal Transportation Agency

June 2014

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OVERVIEW

SF*park* was a federally-funded demonstration of a new approach to managing parking. It used better information, including real-time data where parking is available, and demand-responsive parking pricing to help make parking easier to find.

An overview of SF*park*

A summary of the policies of the SF*park* pilot project

This section summarizes the policies behind the SF*park* pilot project and how the project design enabled a rigorous evaluation.

What is SF*park*?

SF*park* is the brand for SFMTA's approach to parking management. SF*park* was a demonstration project funded through the Department of Transportation's Urban Partnership Program. For the SF*park* pilot projects, the SFMTA used several strategies to make it easier to find a space and improve the parking experience, including:

- Demand-responsive pricing
- Making it easier to pay at meters and avoid citations
- Longer time limits
- Improved user interface and product design
- Improved information for drivers, including static directional signs to garages and real-time information about where parking is available on- and off-street
- Highly transparent, rules-based, and data-driven approach to making changes to parking prices

SF*park* piloted and cultivated several emerging technologies, including smart meters, parking sensors, and a sophisticated data management tool.

Demand-responsive pricing

At the heart of the SF*park* approach is demand-responsive pricing, whereby the SFMTA gradually and periodically adjusted rates up or down at meters and in garages. The goal was to achieve a minimum level of availability so that it was easy to find a parking space most of the time on every block and that garages always have some open spaces available. Furthermore, meeting target availability also means improving utilization of parking so that spaces—on-street or off—would not sit unused.

On-street

For on-street parking, the SF*park* used occupancy data from in-ground parking sensors in each space to adjust rates at meters up or down to help achieve the target occupancy rate of 60–80 percent. Each data-driven rate adjustment used the following rules. When average occupancy was:

- 80–100 percent, the hourly rate was raised by $0.25
- 60–80 percent, the hourly rate was not changed
- 30–60 percent, the hourly rate was lowered by $0.25
- Less than 30 percent, the hourly rate was lowered by $0.50

Hourly rates were not allowed to exceed $6.00 per hour or go below $0.25 per hour. SF*park* adjusted on-street rates about every eight weeks starting in August 2011. Over the course of the two-year pilot evaluation period (i.e., through June 2013), the SFMTA made ten on-street rate adjustments.

Off-street

As parking garages were converted to the SF*park* approach, the SFMTA simplified rate structures, reduced discounts that previously encouraged peak hour commuting (e.g., early bird, daily, monthly), and moved to time-of-day pricing to make sure rates between meters and garages were easy to compare, and to make it easier for customers to understand what they would be charged. Thereafter the SFMTA changed hourly rates quarterly according to the following rules. When average occupancy was:

- 80–100 percent, the hourly rate was raised by $0.50
- 40–80 percent, the hourly rate was not changed
- Less than 40 percent, the hourly rate was lowered by $0.50

Evaluating SF*park*

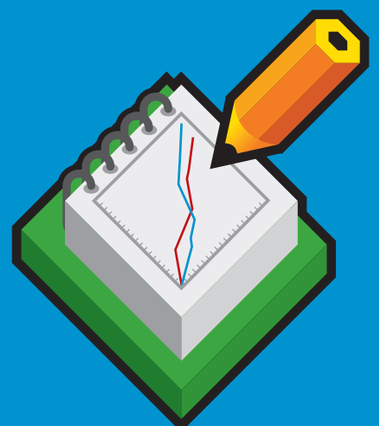
The SFMTA used data gathered during the pilot period to evaluate how effectively the SF*park* approach delivered the expected benefits. To isolate and measure the effects of these policy changes, the SFMTA designated seven parking management districts as pilot areas, which included 6,000 metered spaces, or a quarter of the city's total metered parking spaces, and 12,250 spaces in SFMTA-administered garages, or 75 percent of the off-street spaces managed by the SFMTA. The SFMTA also used two additional areas as control areas where no changes to parking management or technology were implemented. The SFMTA collected "before", "mid-point", and "after" data in both pilot and control areas.

This document summarizes the SFMTA's evaluation of the SF*park* pilot project. The full evaluation is available at SFpark.org.

Download the full evaluation at:
SFpark.org/docs_pilotevaluation

EVALUATION

As a federally-funded demonstration of a new approach to managing parking, the SF*park* project collected an unprecedented data set to enable a thorough evaluation of its effectiveness.



SFMTA evaluation results

An overview of the benefits of the SF*park* pilot project

The SFMTA evaluated the SF*park* pilot project to see how effectively this approach to managing parking delivered the expected benefits. This section outlines what the SFMTA learned from this evaluation and provides transportation managers in other cities an overview of how parking management can help achieve their goals.

Rate change summary

Over the course of the SF*park* pilot project, the SFMTA lowered the average hourly rate at meters by 11 cents from $2.69 to $2.58 and average hourly rates at SF*park* garages by 42 cents from $3.45 to $3.03.

Hourly parking rates in SF*park* areas

Before vs. after (10 rate changes)
On- and off-street rates

SF*park* improved parking availability

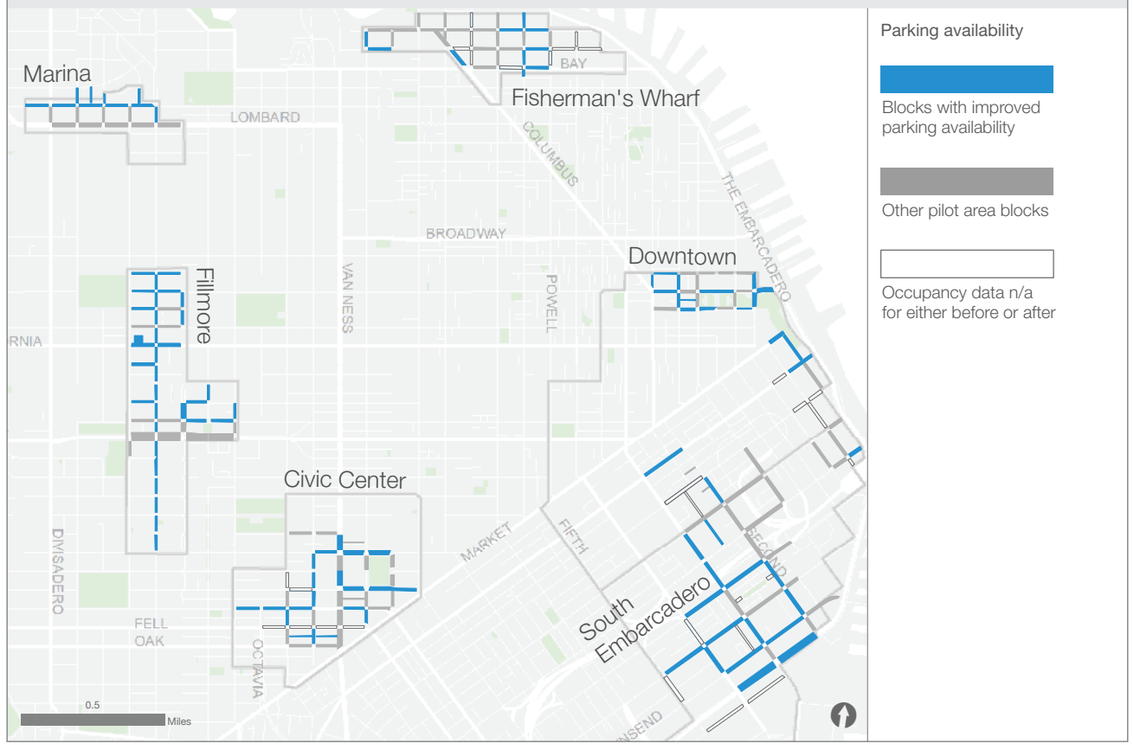
While the SF*park* pilot project had many goals, its primary focus was to make it easier to find a parking space. More precisely, the goal was to increase the amount of time that there was parking available on every block and improve the utilization of garages. Besides helping drivers, making it easier to park more of the time was expected to deliver other benefits (e.g., reducing circling, double parking, greenhouse gas emissions, etc.).

Even as the economy, population, and overall parking demand grew, parking availability improved dramatically in SF*park* pilot areas. The amount of time that we achieved the target parking occupancy (60 to 80 percent) increased by 31 percent in pilot areas, compared to a 6 percent increase in control areas. On blocks where people paid the meter most of the time (in high payment compliance or "HP" pilot areas) where we would expect pricing to be most effective, achievement of the 60 to 80 percent target occupancy rate nearly doubled.

Even more importantly, the amount of time that blocks were too full to find parking decreased 16 percent in pilot areas while increasing 51 percent in control areas. In other words, SF*park* made it easier for drivers to quickly find parking spaces. In areas where people pay at the meter most of the time, the impacts were even more notable, with a 45 percent decrease.

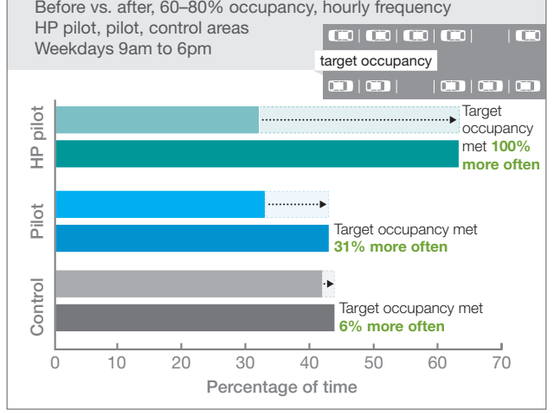
Improved parking availability

Blocks where frequency of 90–100% hourly occupancy rates decreased from spring 2011 to spring 2013 | Weekdays 9am to 6pm



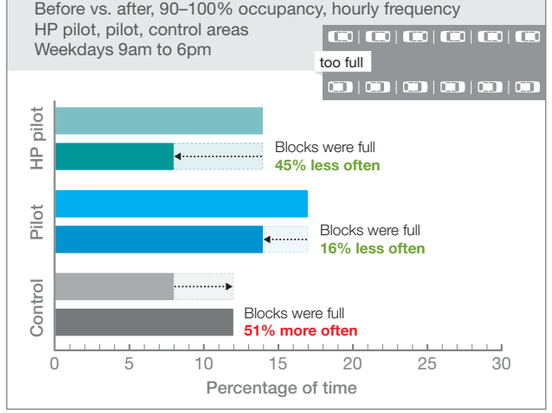
How often do blocks meet target occupancy?

Before vs. after, 60–80% occupancy, hourly frequency
HP pilot, pilot, control areas
Weekdays 9am to 6pm



How often are blocks too full?

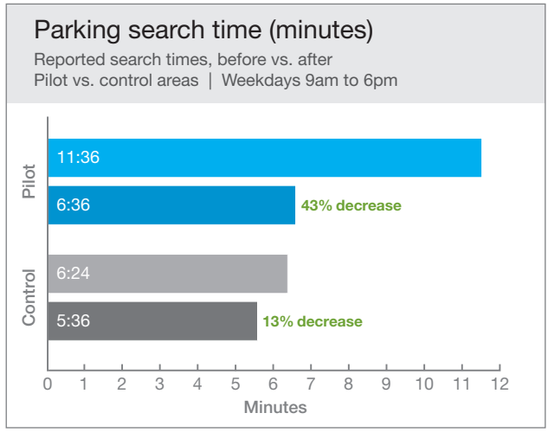
Before vs. after, 90–100% occupancy, hourly frequency
HP pilot, pilot, control areas
Weekdays 9am to 6pm



Secondary benefits

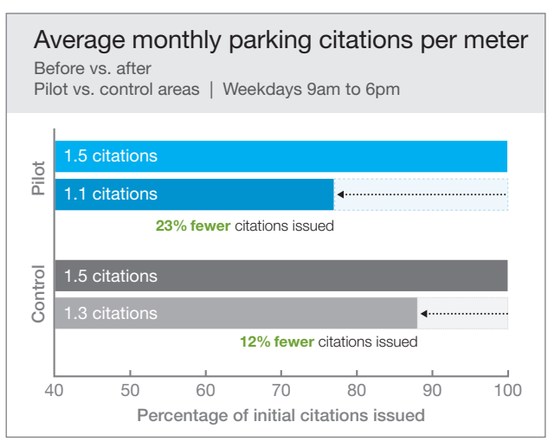
This section outlines the benefits of meeting occupancy goals and making sure that there are open parking spaces.

It is easier for drivers to find a parking space. In SF*park* pilot areas, the amount of time most people reported that it took to find a space decreased by 43 percent, compared to a 13 percent decrease in control areas.

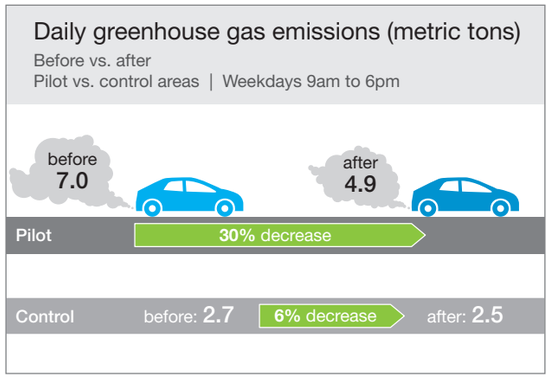


It is easier to pay and avoid citations. SF*park* also sought to create a parking experience that is simple, consistent, easy to use, and respectful. The pilot project improved the experience of parking by lengthening time limits and making it much easier to pay. Drivers surveyed before and after SF*park* were asked to rate their parking experience; after SF*park*, the likelihood of reporting that it was somewhat or very easy to pay for parking increased in pilot areas by 75 percent, or twice as much as in control areas that did not receive new meters or longer time limits.

Making it easier for drivers to pay for parking also made it easier to avoid parking tickets; in SF*park* areas, the SFMTA gave 23 percent fewer parking meter-related citations per meter than before the pilot.



Greenhouse gas emissions decreased. Drivers generated 7 metric tons of greenhouse gas emissions per day looking for parking in pilot areas. This dropped by 30 percent by 2013, compared to a decrease of 6 percent in control areas.

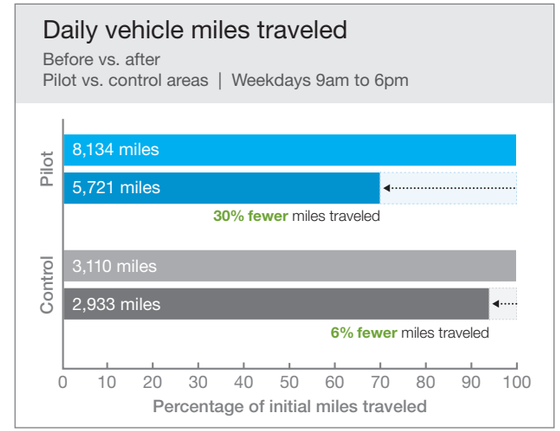


Peak period congestion decreased. SF*park* encouraged people to drive at non-peak times and improved parking availability when it mattered most. On-street parking availability improved by 22 percent during peak periods, compared to 12 percent during off-peak. In SF*park* garages, morning peak entries rose 1 percent while off-peak entries rose 14 percent, and evening peak exits rose 3 percent while off-peak exits rose 15 percent. This suggests that SF*park* helped to reduce peak-period congestion, which makes the roads flow more smoothly for drivers and transit.

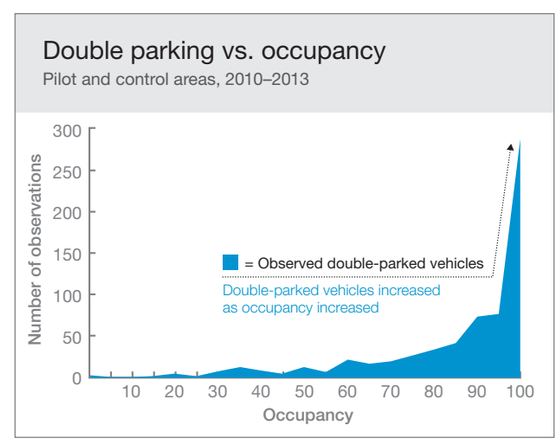
Traffic volume decreased. In both pilot and control areas, where parking availability improved, traffic volume decreased by approximately 8 percent, compared to a 4.5 percent increase in areas where parking availability worsened.

Traffic speed improved. While overall traffic speed decreased, it decreased by 3 percent in areas with improved parking availability, compared to a decrease of 6 percent in areas with worsened parking availability.

Vehicle miles traveled decreased. As a result of less circling, pilot areas saw a 30 percent decrease in vehicle miles traveled from 8,134 miles per day in 2011 to 5,721 miles per day by 2013. Control areas saw a 6 percent decrease.



Double parking decreased when parking availability improved. Double parking increases as parking gets harder to find, and it increases dramatically as parking occupancy exceeds 80 percent. In pilot areas, double parking decreased by 22 percent versus a 5 percent decrease in control areas.



Transit speed improved where double parking decreased. Transit speed increased 2.3 percent from 6.4 to 6.6 mph along corridors with reduced double parking, and it decreased 5.3 percent from 7.1 to 6.7 mph along corridors with increased double parking. Besides helping to increase transit speed, fewer unpredictable delays help transit operate more reliably.

Net parking revenue increased slightly. Though the purpose of SF*park* was to deliver transportation, social, and environmental benefits, it also appears to have, in total, increased SFMTA net parking revenues by approximately $1.9M per year. In comparing the pilot areas to citywide trends, the installation of credit card enabled parking meters and longer time limits in SF*park* areas appears to have increased net annual revenues from meters by approximately $3.3M from FY2011 to FY2013. In the same period, annual citation revenues appear to have decreased by approximately $0.5M in SF*park* pilot areas (a decrease 10 percent greater than the citywide trend of declining citation issuance). SF*park* appears to have slightly slowed the growth of revenue for garages, accounting for about $0.9M in annual revenue that may have been earned had SF*park* garage revenue grown at the same pace as non-SF*park* garage revenue, though revenue from SF*park* garages increased at a faster rate since FY2012. Annual parking tax collected in pilot areas increased by $6.5M, or 43 percent, during the same period, compared to a 3 percent increase in the rest of the city, but it is unclear what portion of that is attributable to SF*park*.

Improved availability supports economic vitality. While available data does not allow us to confirm a causal relationship, the SFMTA assumes that improving parking availability improves customer access to commercial districts and therefore supports economic vitality.

Safer streets because of reduced vehicle miles traveled and less distracted driving. The SFMTA assumes that reducing circling by distracted drivers looking for parking helps to reduce collisions with pedestrians, cyclists, and other cars.

Case study: Fillmore

The Fillmore pilot district illustrates how demand-responsive pricing improved both parking availability and parking utilization. Prices decreased on blocks that were underused, which increased use, and prices increased on blocks that were too full, which tended to lower occupancy into the target range.

With each data-driven rate adjustment, SF*park* followed this set of rules:

- When occupancy was 80–100 percent, the hourly rate increased by $0.25
- When occupancy was 60–80 percent, the hourly rate was not changed
- When occupancy was 30–60 percent, the hourly rate decreased by $0.25
- When occupancy was less than 30 percent, the hourly rate decreased by $0.50

In the Fillmore pilot area, the average hourly cost of metered parking increased during the pilot period from $2.00 per hour to $2.37 per hour.

Fillmore

Pricing and occupancy summary

Weekdays 9am to 6pm | Average weekday rate change: $0.37

45/45 blocks = 100% of blocks in Fillmore participated in all 10 rate adjustments

50% of blocks with rate increase[1]

	Price			Occupancy		
Timeband	Before	After	Net	Before	After	Net
Open to noon	$2.00	$3.63	$1.63	86	70	(16)
Noon to 3pm	$2.00	$3.58	$1.58	83	70	(13)
3pm to close	$2.00	$3.61	$1.61	84	71	(14)

42% of blocks with rate decrease[2]

	Price			Occupancy		
Timeband	Before	After	Net	Before	After	Net
Open to noon	$2.00	$0.67	($1.33)	61	65	4
Noon to 3pm	$2.00	$1.28	($0.72)	68	61	(7)
3pm to close	$2.00	$1.11	($0.89)	62	64	2

8% of blocks with no change overall[3]

	Price			Occupancy		
Timeband	Before	After	Net	Before	After	Net
Open to noon	$2.00	$2.00	$-	76	66	(10)
Noon to 3pm	$2.00	$2.00	$-	73	75	2
3pm to close	$2.00	$2.00	$-	75	62	(13)

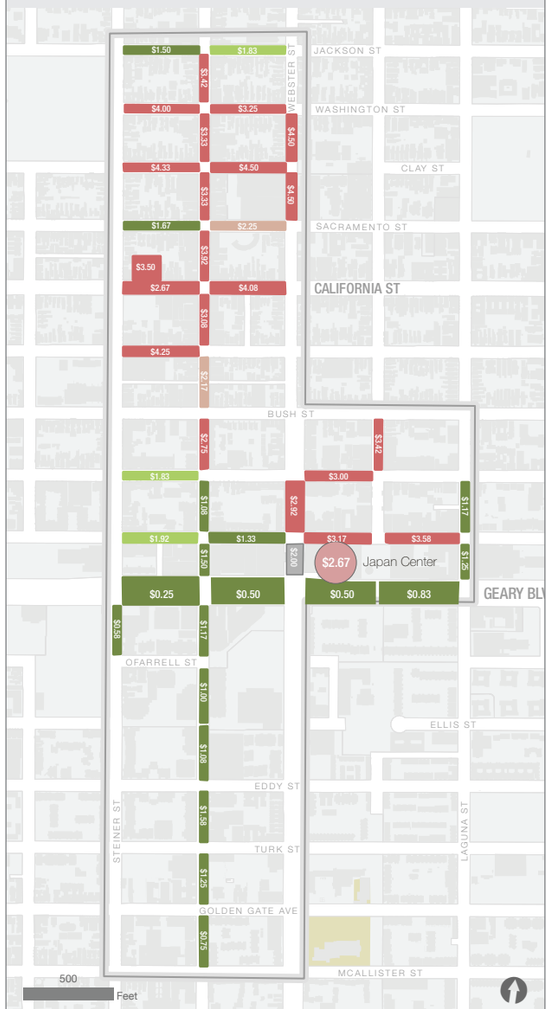
1 These blocks may have seen a price decrease mid-way through but by rate adjustment 10 were at a higher price than they were before SFpark

2 These blocks may have seen a price increase mid-way through but by rate adjustment 10 were at a lower price than they were before SFpark

3 These blocks may have seen a price change mid-way through but by rate adjustment 10 were at the same price as they were before SFpark

Rate change, before to after

Hourly rate for "After" shown



Hourly garage rates

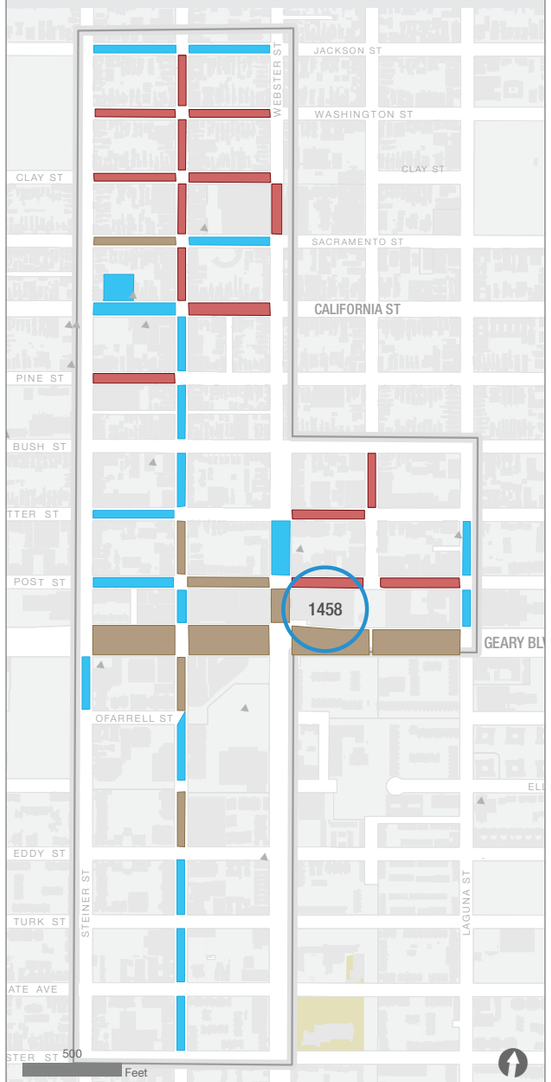
- $1.00 or more decrease
- $0.01 to $1.00 decrease
- No change
- $0.01 to $1.00 increase

Hourly meter rates

- $0.25 to $3.25 decrease
- $0.25 to $0.01 decrease
- $0.01 to $0.25 increase
- $0.26 to $2.50 increase
- No overall rate change

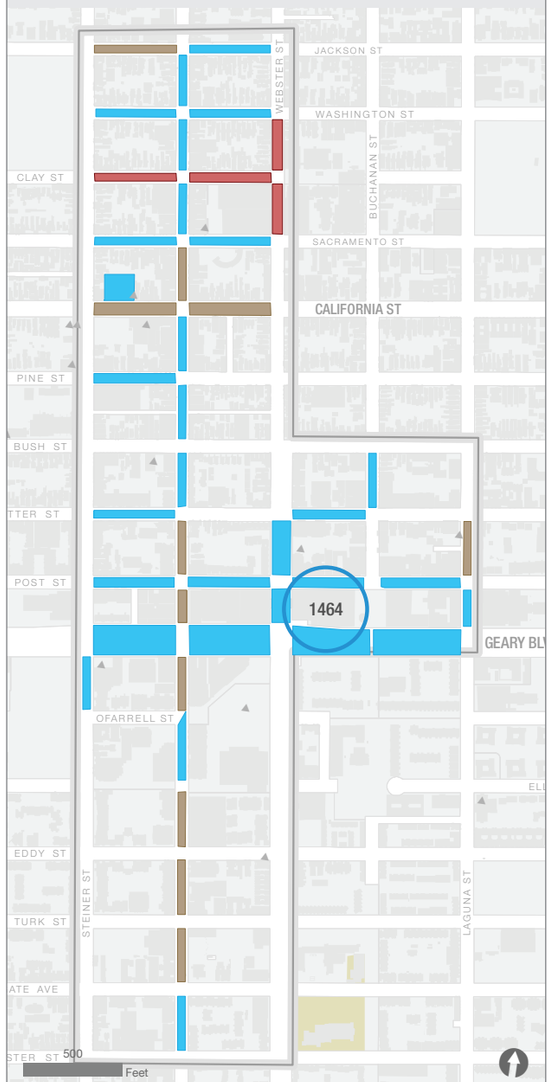
Average occupancy: before

Weekday average, 9am to 6pm



Average occupancy: after

Weekday average, 9am to 6pm



Occupancy[1]

- 0 – 30%
- 30 – 60%
- 60 – 80%
- 80 – 100%

SF*park* garage usage[2]

Other garages/lots

[1] Occupancy not shown for blocks with poor quality parking sensor data for the "Before" or "After" period

[2] Garage usage shown for weekdays and weekends, all operating hours

About the evaluation

The SFMTA's evaluation of the SF*park* pilot project was predicated on effective study design, an unprecedented amount of data collection, careful data management, significant staff resources, and support from consultants, leading experts in the transportation and parking management fields, and a federal evaluation team.

An evaluation of this nature and magnitude has inherent limitations and challenges for the study design, data collection, and evaluation. For example, it is not possible to do purely "apples to apples" comparisons between pilot and control areas because every neighborhood is unique. The Downtown and Civic Center pilot areas have no analog that can be used for comparison or benchmarking. While the level of data collection for this project is unprecedented, that cannot overcome the fact that countless (and often immeasurable) factors affect travel behavior and parking demand. In other words, while parking pricing and information are critical factors, they were not the only variables to change in these San Francisco neighborhoods over the course of a two year pilot project.

As a result, one must use considerable sophistication, care, and judgment when evaluating this data, and use caution when trying to definitely establish causality (i.e., that SF*park* was or was not responsible for a particular outcome), especially when trying to evaluate the effect of SF*park* on more complex and nuanced secondary outcomes.

One of the largest confounding factors for the project evaluation is the fact that the two-year SF*park* pilot began as San Francisco was emerging from the economic recession of 2008-2010. This is in addition to other possible confounding factors such as the unknown variations in the level of parking enforcement, the increase in bicycling and ride sharing, improvements to transit service, capital projects impacting San Francisco's streets, and other changes to the built environment. This evaluation incorporates our best effort to address these challenges and accurately assess the effects of SF*park*.

Additional findings: meters are effective parking management tools

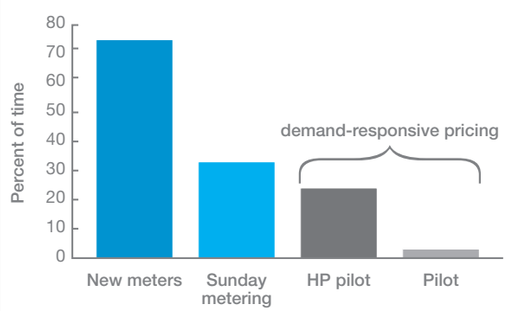
Demand-responsive pricing helps to improve parking management and optimize outcomes, but the starkest improvements come from whether or not (or when) parking meters are used as parking management tools. Though not the purpose of the SF*park* pilot project, one of the clearest findings of this evaluation is that parking meters are extremely effective at managing parking demand, helping to achieve parking occupancy goals, and thereby achieving other goals such as reducing circling and greenhouse gas emissions.

For example, starting to enforce meters on Sundays in January 2013 resulted in improved parking availability, parking search time, and parking turnover on Sundays. Additionally, the SFMTA introduced new meters on many blocks in 2011, resulting in improved parking availability. Prior to installing meters, parking was too full 90 percent of the time. After installing meters, this dropped to just 15 percent of the time.

Evenings provide additional evidence; parking occupancy spikes approximately 30 minutes before the SFMTA stops operating meters (typically around 6pm) making parking often hard to find in the evening in San Francisco's commercial areas.

Change in percent of time parking was available

Change in percent, before to after, occupancy less than 90%
New meters, Sunday metering, and demand-responsive pricing



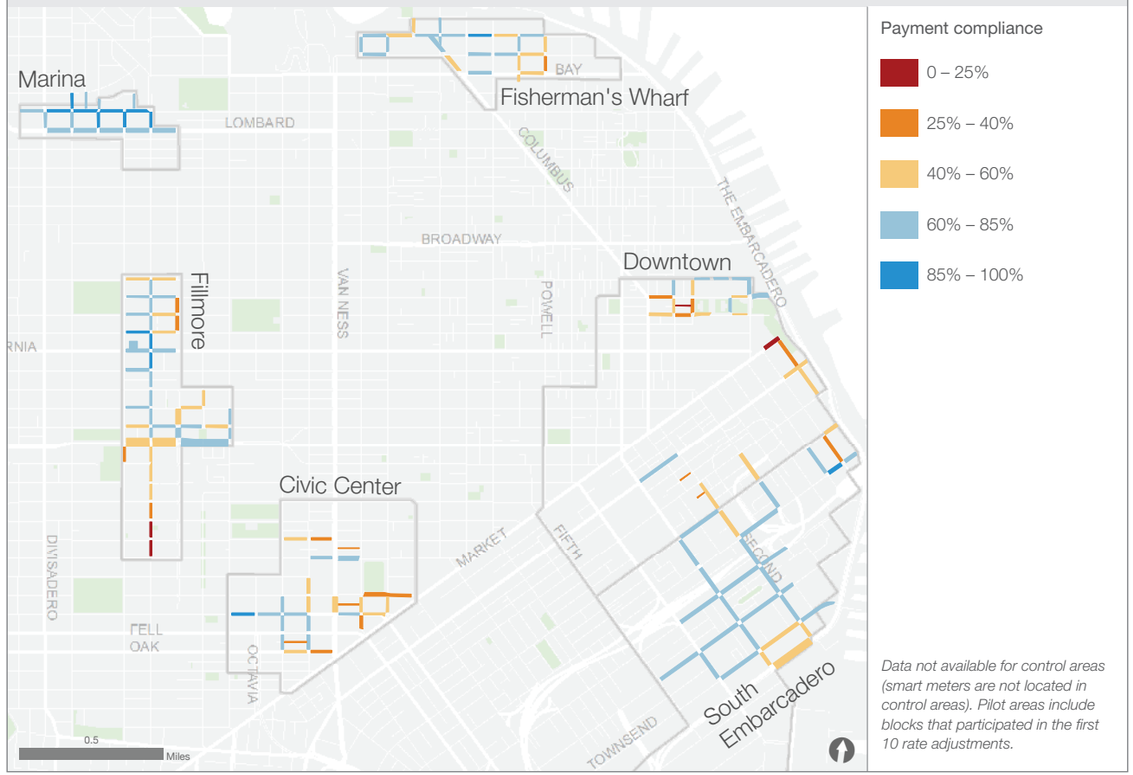
Payment compliance: findings and challenges

While demand-responsive pricing delivers the benefits we expected, those benefits are more pronounced when most people pay at the meter. Data from this evaluation confirmed that many blocks consistently had low payment compliance, which is when cars are parked without paying the meter.

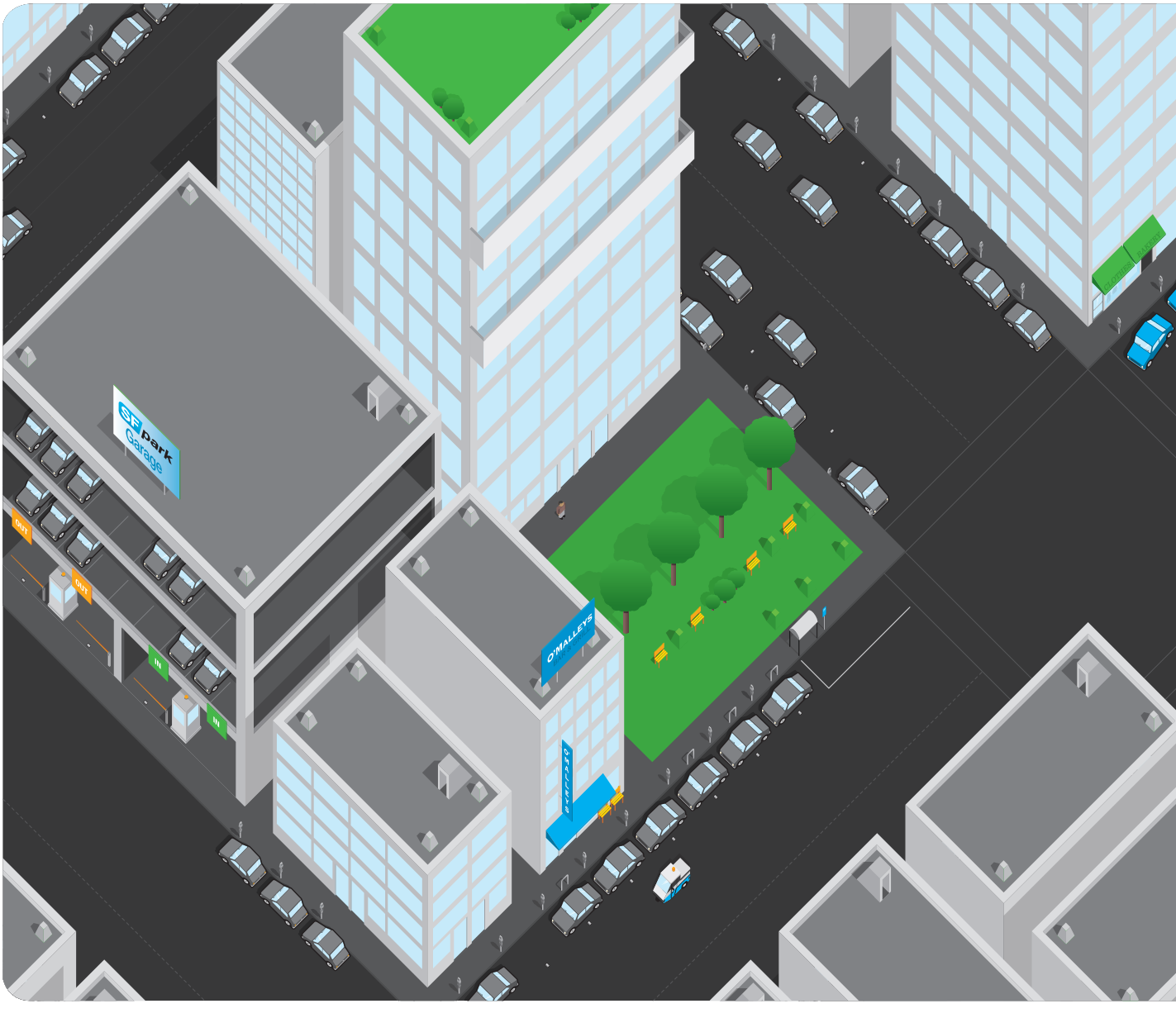
HP blocks, or blocks with high payment compliance where at least 85 percent of occupied time was paid for, saw the biggest improvements in several indicators. This suggests that improving parking enforcement to increase compliance rates has the potential to increase the social and transportation benefits of parking management. This also highlights why it is desirable for cities to strive to ask all drivers to pay at the meter; the more drivers that are exempted from paying the meter, the less that demand-responsive parking pricing will deliver benefits.

Payment compliance rates

Share of paid time to occupied time, July 2011 – June 2012
Blocks that participated in the first 10 rate adjustments



Data not available for control areas (smart meters are not located in control areas). Pilot areas include blocks that participated in the first 10 rate adjustments.


SF park
Garage
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OUT
IN
IN
O'MALLEYS
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