SF*park*

Putting Theory Into Practice

Pilot project summary and lessons learned

SF*park* | SFMTA Municipal Transportation Agency

June 2014

SFpark

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Pilot project summary and lessons learned

SFMTA
Municipal Transportation Agency

Acknowledgements

Thank you

SFMTA

Launching the SF*park* pilot project depended on the dedication of a multidisciplinary team within the San Francisco Municipal Transportation Agency (SFMTA).

Project partners

The SFMTA has worked closely with various partners to deliver the SF*park* pilot project. Below is a summary of these companies, organizations, and individuals.

Organizational partners

The SF*park* projects would not have been possible without the generous financial support of the United States Department of Transportation (USDOT) and Federal Highway Administration as part of the Urban Partnership Program.

SF*park* academic advisory team

The following people formed the academic advisory team for the project that offered early guidance and support for the design of this demonstration and how it could offer the most valuable data possible for evaluation.

- Donald Shoup, University of California, Los Angeles
- Robert Hampshire, Carnegie Mellon University
- Adam Millard-Ball, Stanford University
- Rachel Weinberger, University of Pennsylvania

The academic work and writing of Dr. Shoup requires special acknowledgement as it provided the intellectual foundations of the approach to parking management used in the SF*park* project.

Program partners

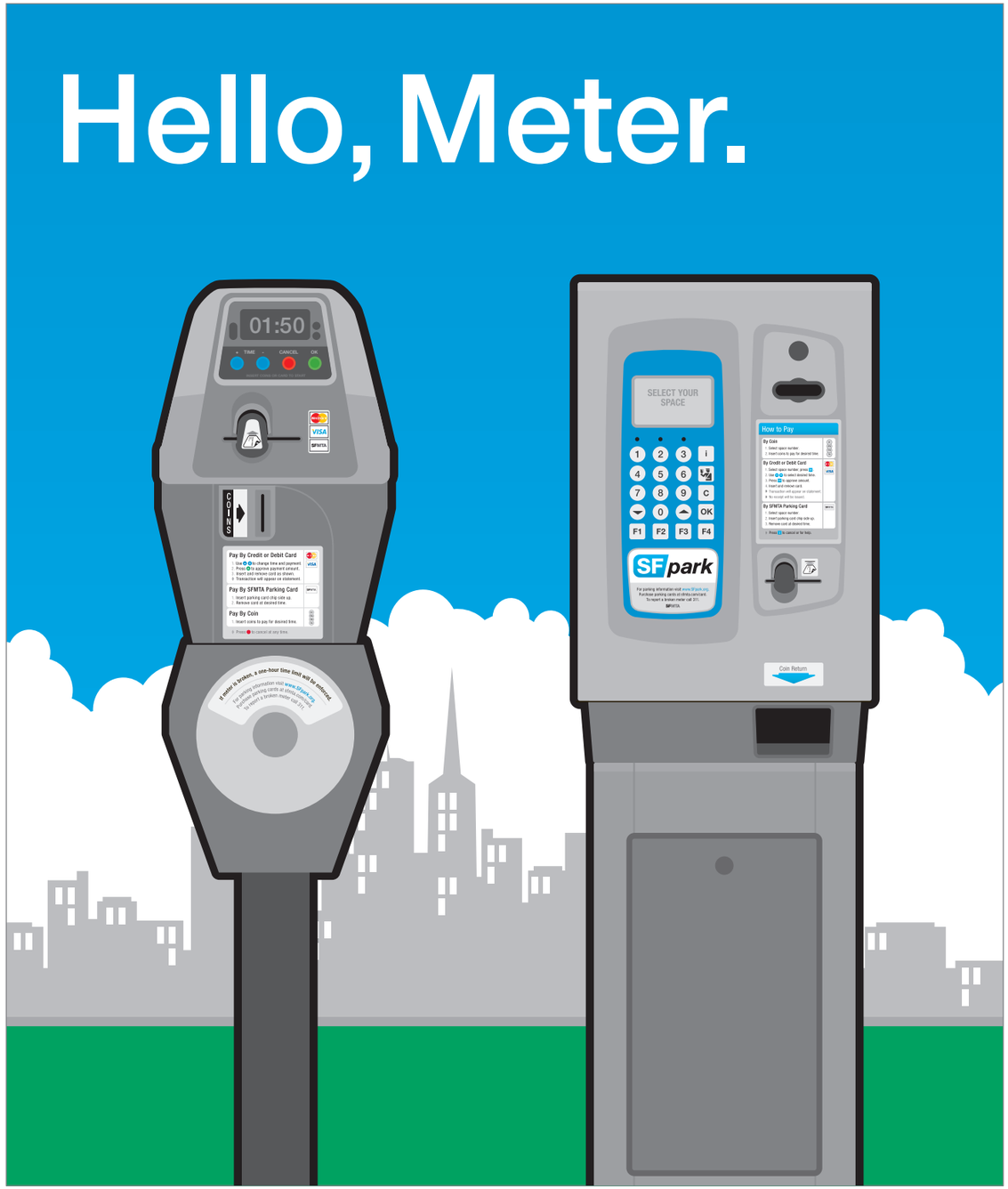
The following companies were major partners with the SF*park* project.

- Serco Inc. Serco acted as the prime contractor that led procurements and administered subcontracts.
- Oracle. The SF*park* project utilized Oracle data warehouse and business intelligence software and a development team from Oracle Consulting Services.
- Affiliated Computer Solutions (ACS). ACS was a subcontractor to Serco for parking sensors and also worked, under an existing SFMTA contract, on updating the handheld devices used by Parking Control Officers.
- StreetSmart Technology, LLC. StreetSmart provided parking sensors in partnership with ACS.
- IPS Group, Inc. IPS provided single-space parking meters.
- Duncan Solutions. Duncan provided multi-space parking meters.
- Words Pictures Ideas. WPI, with vs.Goliath as a partner, provided communications strategy, marketing, and design.

Program contributors

The following companies made important contributions to the SF*park* pilot project.

- DataPark. Parking garage revenue control system programming and price changes
- Ewald & Wasserman Research Consultants. Data collection
- Nelson\Nygaard Consulting Associates. Data collection, evaluation, and policy analysis
- OpenGeo. Mapping technical support and development
- Phoenix Electric Company. Roadway sensors installation and maintenance
- Pictoform. Parking garage signage
- Sensys Networks. Roadway sensors
- Verrus. Service provider for payment by cell phone



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1.

INTRODUCTION & OVERVIEW

Many cities have expressed an interest in learning more about SF*park*. This book is intended to support other cities as they consider similar initiatives.

Introduction & overview

A short overview of the project

This chapter provides an overview of the context, goals, outcomes, and schedule of the SF*park* pilot project as well as its relevance and lessons for other cities.

Goal of the book

As a federally-funded demonstration, the San Francisco Municipal Transportation Agency (SFMTA) purposefully and openly shares information about implementing the SF*park* pilot project that other cities might find useful as they consider how to manage parking. This book summarizes the SF*park* pilot project and documents lessons learned from project planning, implementation, operation, and evaluation. It was written in late spring 2014 after the pilot and its evaluation report were completed.

This book is an updated version of what the SFMTA wrote in August 2011 soon after the first demand-responsive rate adjustment. It is complemented by a detailed evaluation of the pilot project as well as a technical "how to" manual that summarizes the technical and information management aspects of the project to make it easier for other cities to understand and improve upon what has happened in San Francisco.

Download the PDF of this book at:
SFpark.org/docs_pilotsummary

Download a summary of the evaluation findings at:
SFpark.org/docs_evalsummary

Download the full evaluation report at:
SFpark.org/docs_pilotevaluation

Download the technical "how to" at:
SFpark.org/docs_techmanual

Project context

The SF*park* pilot project was implemented within San Francisco's unique context. The SFMTA is the agency in San Francisco that plans, manages, and operates the city's transportation system, including local public transit (Muni), walking, biking, roads, on-street parking, parking enforcement, and a significant portion of the city's off-street parking supply (see SFMTA.com to learn more).

In San Francisco, the SFMTA sets parking rates for on-street meters and for the 19 garages and 19 lots managed by the SFMTA. In November 2008, the SFMTA Board of Directors approved the legislation that enabled the SF*park* pilot project. It defined the SF*park* pilot areas and policies, and empowered the SFMTA Director of Transportation to set rates—within ranges determined by the SFMTA Board—for on-street metered spaces and SFMTA-managed lots and garages in SF*park* pilot areas.

For the SF*park* pilot project, the SFMTA has also worked closely with the Port of San Francisco, which has jurisdiction—through state legislation—for the over 1,200 metered on-street spaces along the city's waterfront. The Port has contracted the SFMTA to operate, maintain, and enforce its parking operation and adopted the SF*park* enabling legislative language to define its parking management policies.

Prior to SF*park*, the San Francisco Board of Supervisors managed paid parking much like it is managed in most other North American cities. Parking rates and fines were used to achieve turnover goals through short time limits as well as, often, to increase revenues to balance budgets. Rate setting was not tied to transportation policy goals, and rates at on-street meters were the same all day, every day, regardless of demand. Meter rates were set lower than the rates at municipal garages, giving drivers financial incentive to circle to find on-street parking.

The historical approach to parking management that emphasizes flat meter rates and short time limits to achieve turnover has been reasonably effective but is not convenient for drivers, nor does it explicitly manage towards creating parking availability and thereby achieving broader goals for the city or its transportation system. Low parking availability is inconvenient for drivers but also causes broader problems. For example, when parking is hard to find people either double-park or circle the block looking for parking. Circling drivers are distracted drivers who make lots of right and left turns trying to find a place to park, causing safety issues for other drivers, cyclists, and pedestrians. Circling also wastes time and fuel.

Consequently, everyone experiences the burden of unnecessary greenhouse gas emissions and roads that are less safe and more congested. Store owners often complain that it can be difficult for their driving customers to find a place to park. Public transit sometimes must navigate its way around double-parked cars or drivers waiting to make right or left turns, slowing transit and making it less reliable.

Project goals and outcomes

The primary goal of SF*park* was to make it easy to find a parking space. In other words, SF*park* aimed to manage demand for existing parking supply towards availability targets so that people, when they choose to drive, rarely circle to find parking or double-park. To the extent the right level of parking availability is maintained, everyone benefits.

▼ San Francisco Mayor Lapham operating the first parking meter installed in San Francisco in 1947

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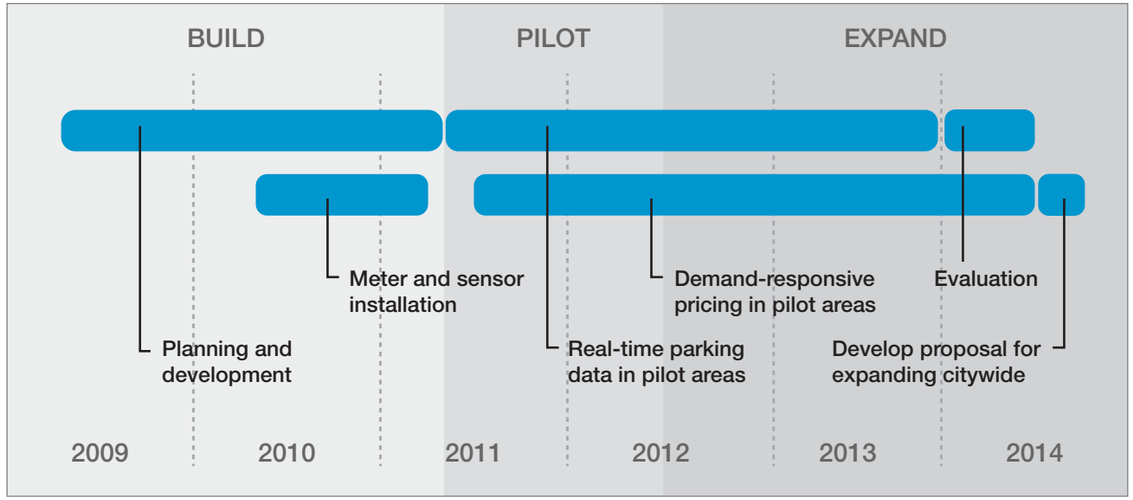
The SFMTA's evaluation of SF*park*, which is detailed in Chapter 4, found that SF*park* delivered many of the benefits that were expected. The principle goals and outcomes of SF*park* include:

- Demand-responsive pricing to meet occupancy goals. SF*park* used gradual and periodic (i.e., about every eight weeks) demand-responsive rate adjustments to find the lowest rate possible to achieve availability targets. SF*park* increased rates when parking was hard to find and lowered them when demand was low. Even in the context of a growing economy and population, the evaluation shows that parking availability improved dramatically in SF*park* pilot areas, significantly outperforming control areas. The amount of time that we achieved the target parking occupancy increased by 31 percent in pilot areas, compared to a 6 percent increase in control areas. Even more significantly, the amount of time that blocks were too full to find parking decreased by 16 percent in pilot areas when it increased by 51 percent in control areas.
- Meeting occupancy goals to make it easier to find parking. When there are always a few spaces available, drivers have to spend less time circling for parking. In SF*park* pilot areas, the amount of time that it took for most people to find a space decreased by 43 percent, compared to a 13 percent decrease in control areas. SF*park* also shortened the distance drivers had to travel before finding a spot.
- Easier payment methods. New parking meters accept payment by coin, credit card, the SFMTA parking card, and phone. The likelihood for participants in an intercept survey to report 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 where meters were not upgraded.
- Lower rates. In addition to making it easier to pay, SF*park* also lowered rates. Over the course of the SF*park* pilot project evaluation period, 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.
- Longer time limits. Time limits in SF*park* pilot areas were extended to four hours and in some areas eliminated altogether. This change emphasized using smart rates rather than inconvenient time limits as the primary tool for creating parking availability, which is the ultimate goal of turnover.
- Fewer parking tickets. By making it easy to pay and extending parking time limits, it is easy for drivers to avoid parking tickets. In SF*park* areas, the number of parking-meter related citations issued decreased by 23 percent compared to a 12 percent decrease in control areas.
- Better parking information. SF*park* helped drivers find spaces with a combination of real-time and static information. Parking wayfinding signage directs drivers to lots and garages; variable message signs and show which garages have availability; mobile web apps and the region's 511 system showed on- and off-street parking availability; and an open data feed enabled others to display the data as well.
- Reduced congestion and improve traffic flow. More parking availability means that drivers spend less time circling to find parking, which implies less congestion and greenhouse gas emissions and better quality of life. 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. And while overall traffic speed decreased, it decreased only by 3 percent in areas with improved parking availability, compared to a decrease of 6 percent in areas with worsened parking availability.
- Reduced illegal parking. More parking availability means that fewer drivers should be tempted to double-park or park illegally in bus zones, on sidewalks, or in front of fire hydrants or driveways. The evaluation showed that where parking availability improved, double parking decreased. Instances of double parked vehicles increased as parking occupancy rates increased and began to spike around 80 percent occupancy. Double parking decreased in pilot areas by 22 percent, compared to a 5 percent decrease in control areas.
- Improved transit speed and reliability. Less circling and double-parking helps transit become faster and more reliable, especially on busy commercial corridors. 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.

- Improved safety for all road users. The right level of parking availability reduces double-parking and circling, both of which present hazards for pedestrians, bicyclists, and other drivers. The SFMTA assumes that reducing circling by distracted drivers looking for parking helps to reduce collisions with pedestrians, cyclists, and other cars.
- Better air quality. Approximately half of San Francisco's greenhouse gas emissions are transportation-related. Less congestion and circling, as well as helping Muni to become more viable for more trips, reduces greenhouse gas emissions and other pollutants. The evaluation showed that greenhouse gas emissions decreased. Drivers generated 7 metric tons of greenhouse gas emissions per day just looking for parking in pilot areas. This dropped by 30 percent by 2013, compared to a decrease of 6 percent in control areas.
- Increasing San Francisco's economic vitality and competitiveness. SF*park* significantly improved parking availability in pilot areas, which improved customer access to commercial districts. SF*park* also significantly improved the utilization of our garages, helping to return them to their original purpose—to make it easy to find parking for short-term trips and support economic vitality rather than as places for commuters to park. 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.
- Increasing funding for transit. Though raising revenue was not a goal of the project, between meter, garage, citation, and parking tax revenue, SFpark appears to have caused a net increase of $1.9M in annual parking-related revenue. By City Charter, this additional revenue returns to the SFMTA to help pay to operate public transit.

Schedule



Scope

- 7 pilot areas with new policies, technology, and significant data collection
- 2 control areas with no new policies or technology but significant data collection
- 6,000 metered spaces, or 25 percent of the city's total
- 12,250 off-street spaces, or 75 percent of off-street spaces managed by the SFMTA

Relevance for other cities

Cities around the world are interested in the common and urgent goals of reducing traffic congestion and transportation-related greenhouse gas emissions.

SF*park* is a demonstration of a parking-based approach to congestion management. Parking availability and price are two of the most important factors when people choose whether or not to make a trip by car. The combination of time-of-day, demand-responsive pricing and off-peak discounts at garages was intended to reduce circling and double-parking, and to influence when and how people choose to travel.

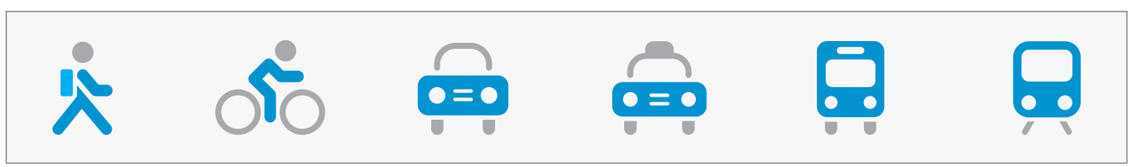
SF*park* is relevant for other cities because the SF*park* approach is replicable. Every major city already has parking management infrastructure (e.g., parking meters and garages), and people are accustomed to paying for parking. Parking-based strategies complement other congestion management strategies, and they are relatively low cost, do not present privacy issues, and require only local approvals in most cases (rather than state approvals, which can be the case for approaches such as congestion pricing).

Lessons learned

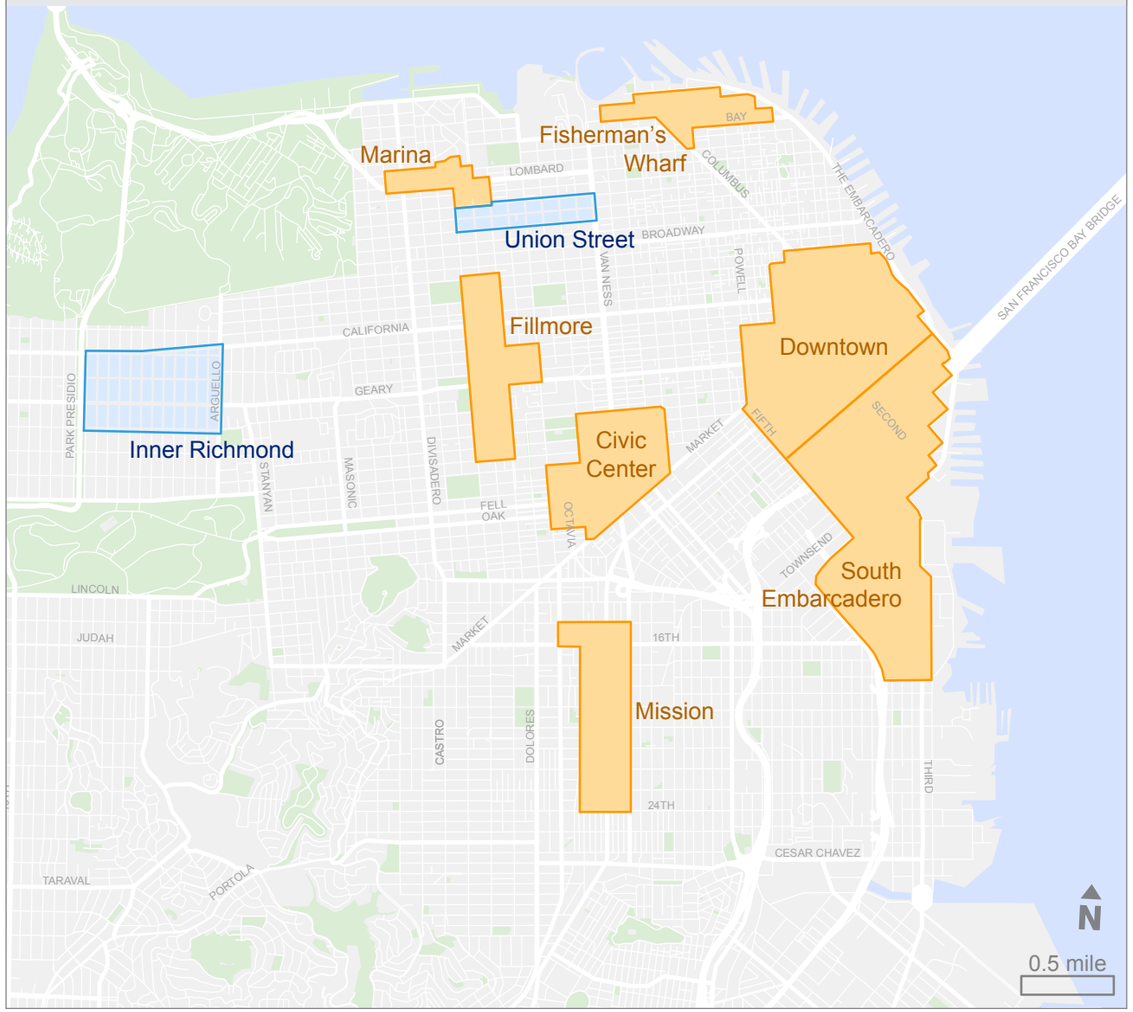
The following observations and overall lessons learned were gathered during pilot project planning, implementation, and evaluation.

Project planning

- Scope of work. It is easy to underestimate the scope, magnitude, and technological sophistication necessary to offer real-time parking data and provide demand-responsive pricing.
- Executive leadership. Many challenges accompanied planning and implementing a ground-breaking project with complex technology, significant policy changes, and a large amount of discovery and uncertainty. The support of a dedicated executive at the agency was critical, as was having appropriate financial resources.
- Understanding the parking supply. For reasons explained in Chapter 4, understanding the existing parking supply was a critical first step in the planning, implementation, and evaluation of SF*park*.
- Strong and coherent intellectual foundations. This parking management approach was based on the pioneering academic work of Professor Donald Shoup from UCLA. The clarity and strength of those foundations made it easier to develop policies, goals, and tools that were easily communicated and understood.
- Striking the right balance between complexity and simplicity. We have had to balance the potential complexity of managing parking effectively with the need to have something simple enough to be communicated clearly and quickly to customers. We had to strike a similar technological balance between what is desirable and what is feasible.
- Emphasizing data collection and project evaluation. The SMFTA committed to stakeholders that we would gather the data that would allow a rigorous evaluation of the project. That improved the project's credibility.



SF*park* pilot and control areas



Control area

Pilot area

Institutional

- SFMTA's role. The fact that the SFMTA manages on-street parking, municipal parking garages and lots, and parking enforcement allowed the SFMTA to focus more on project delivery instead of interagency coordination and communication. In some cities, various parking functions are managed by separate agencies, which may pose significant challenges.
- Internal consensus and cultural change. Even with the SFMTA's advantageous organizational structure, building internal consensus and cooperation for SF*park*'s significant policy, organizational, and technological changes required significant time and effort.
- The SFMTA Meter Shop was critical. SF*park* was only possible because of the Meter Shop's strong support of the program and previous accomplishments. One foundation for the SF*park* pilot project was the Meter Shop's existing meter data and configuration management system. Without it, the SF*park* project team likely would have had to undertake that separate (and sizeable) development effort. The existing system also meant that the Meter Shop was already accustomed to using information systems to manage meters and could advise the SF*park* development team.

Communications

- Parking management as powerful tool. With the SF*park* pilot project, the SFMTA has shifted towards recognizing parking management as a powerful tool for achieving transportation goals. Being able to communicate that promise with our customers and stakeholders, and then following through by lowering parking rates where merited, was important. These actions help to establish more trust and credibility in SFMTA parking management. Many people were skeptical of the SFMTA's goals for parking management and feared that SF*park* was simply a way to raise parking rates.
- Destination of revenue. In San Francisco, revenue from parking meters, citations, and garages is returned to the SFMTA to support transit services. It was important to have a clear explanation of how parking revenue from SF*park* (or SFMTA parking management) is used, and relating parking management revenues to funding transit and the overall transportation system was typically well-received.
- Effective communications. Having a skilled communications and design team that was passionate about the project was part of the success in the project.
- Conducting extensive outreach. Outreach, including hundreds of one-on-one meetings with community leaders from the start of the project, was essential to the project's reception. Through this outreach, key leaders in the community came to understand the project and were then able to effectively advocate for SF*park* to their constituencies. Project outreach to customers, stakeholders, and within the SFMTA required a large amount of time and effort.
- Transparency. It was helpful to be open and clear about SF*park*'s goals, policies, and methods. For instance, when prices are adjusted, both the rules and the data used to make decisions to raise rates, lower them, or keep them the same were all shared online.

Contracting and administration

- Procurement approach. It was important to choose a flexible contracting and procurement approach so that we could move quickly in an unpredictable environment.
- Uncertainty and discovery. Because of that high degree of uncertainty and immaturity in the field, a significant amount of discovery was required for the development of the back-end SF*park* system. With the continuous adjustments necessary for the project, the collaborative and interactive Agile methodology was more appropriate than the traditional process-based approach to project management.
- Permitting and regulations. Permitting and regulations (e.g., poles, street installation, power, signs), as well as contract negotiations for new technologies, took much more time than expected.
- Procurement logistics. The logistics of procuring so much new equipment presented significant challenges and required resources, including warehouse and staging areas, people to receive and verify the goods, and accounting.

Implementation and operation

- Enforcement. Parking policies require effective enforcement. Without it, the benefit of any policy changes is likely to be compromised.
- Urgency. Federal project deadlines created an urgency that is uncommon in public projects and gave us aggressive goals to work towards.
- Custom technology. The technology used in SF*park* is not plug and play. Implementing SF*park* required a lot of hand coding for different technologies to work together. As this field and market matures, this problem will likely diminish, but for now it remains an issue for any city, as well as an opportunity to significantly upgrade a city's ability to manage data and make more informed decisions.
- Organizational changes and challenges. Creating the SF*park* data management system and then preparing to run a real-time information service required several significant changes within the SFMTA. From a technical perspective, it has challenged the SFMTA to determine the best ways to use, support, and maintain that system with the rigor that is required for providing a high-availability data service.
- Most technology used did not meet our initial expectations. In particular, the accuracy and reliability of parking sensors is not perfect, which limits the possibilities of what can be done with that data. However, the technology continues to evolve and improve. In the meantime, the SFMTA has developed a method for approximating parking availability from meter payment data.
- Parking sensor data is new, subtle, and complex. There was a learning process for SFMTA to discover how to better understand and use that data for operations, contract management, and evaluation. As parking sensors become more commonplace, it is likely that de facto standards will develop in this area.
- Pursuing SF*park* on a pilot basis was a sound approach. To have attempted this change all at once citywide would have had an unacceptably high risk of failure.

2.

PARKING MANAGEMENT POLICY

The SF*park* project sought to manage parking via clear and transparent policies. This chapter summarizes the policy that enabled SF*park*, the detailed policies for setting rates, and other related policies.

Enabling policy

The policies that enabled and defined the SF*park* pilot project

In November 2008, the SFMTA Board of Directors approved legislation that enabled the SF*park* pilot project. It defined the SF*park* pilot areas and specified the ranges and limits for rates, time limits, and parking availability targets. Subsequent policy documents elaborated and refined this legislation.

Enabling legislation

The SF*park* pilot project required several legislative changes, and the November 18, 2008, enabling legislation was the most important. That legislation was intended to be detailed enough to define how the pilot project would operate while being flexible enough to refine and adjust policies during detailed planning and implementation.

Changing prices slowly and incrementally turned out to be a successful approach, allowing the city to gradually adjust rates just enough—and not more—to achieve the desired outcomes. While this approach lengthened the amount of time to achieve an optimal price, it also gave customers time to react to changes and may have prevented opposition when and where rates were increased.

The enabling legislation is annotated with comments and planned refinements, followed by excerpts from subsequent policy documents that provide more detail.

MUNICIPAL TRANSPORTATION AGENCY
BOARD OF DIRECTORS
RESOLUTION No. 08-192

WHEREAS, On November 6, 2006, the San Francisco Municipal Transportation Agency (SFMTA) Board of Directors approved Resolution 07-169, which authorized the acceptance and expenditure of various funds associated with the Urban Partnership Program (UPP) in anticipation of establishing the SF*park* program and approved variable pricing required for the acceptance of these funds; and,

WHEREAS, On April 15, 2008, the SFMTA Board received a report on SF*park*, a program to evaluate new parking management approaches and technology in order to manage San Francisco's parking supply and demand to support the SFMTA's overall transportation goals; and,

WHEREAS, The SFMTA Board approved Resolution 08-086 on April 15, 2008, approving two contracts required to implement SF*park* and the associated pilot projects; and,

WHEREAS, Pricing ranges and strategies as well as occupancy standards for use in association with SF*park* have been developed since presentations on those subjects were made to the Board; and,

WHEREAS, A public hearing on these pilot program parking pricing modifications was noticed in compliance with requirements of Charter § 4.104 and 16.112; and,

WHEREAS, The Port of San Francisco approved on October 28, 2008 Resolution No. 08-68, approving parking pricing and management changes consistent with those contained in this Resolution, and thereby adopting a consistent approach to parking management for the metered on-street parking in its jurisdiction, including areas along the Embarcadero that are adjacent to the SF*park* Pilot Project Areas; and,

WHEREAS, The SF*park* Parking Pilot Project received environmental clearance under the California Environmental Quality Act[1] as a Class 6 Categorical Exemption from the San Francisco Planning Department on May 19, 2008; now, therefore, be it

1 As a federally funded project, the SFMTA also received federal environmental (NEPA) clearance.

RESOLVED, That the San Francisco Municipal Transportation Agency Board of Directors authorizes the Executive Director/CEO to set parking rates within SF*park* Parking Pilot Project Areas and Parking Pilot Project Special Event Areas for the approximate 18 month duration of the SF*park* parking pilot projects; and, be it further

RESOLVED, That parking within the areas specified in Attachment A, incorporated by reference into this resolution, are designated as SF*park* Parking Pilot Project Areas; and, be it further

RESOLVED, That parking within the areas specified in Attachment B, incorporated by reference into this resolution, are designated as SF*park* Parking Pilot Project Special Event Areas; and, be it further

RESOLVED, That the San Francisco Municipal Transportation Agency Board of Directors authorizes the Executive Director/CEO to adjust parking rates within SF*park* Parking Pilot Project Areas as often as every 30 calendar days[2] for the duration of the SF*park* parking pilot projects; and, be it further

RESOLVED, That the San Francisco Municipal Transportation Agency Board of Directors authorizes the Executive Director/CEO to adjust metered parking rates within SF*park* Parking Pilot Project Areas in increments of no more than $0.50 per hour and in increments of no more than $0.50 per hour for parking garages and lots; and, be it further[3]

RESOLVED, That the San Francisco Municipal Transportation Agency Board of Directors authorizes the Executive Director/CEO to vary metered parking rates within SF*park* Parking Pilot Project Areas in as small increments as the block level (i.e., two opposing block-faces or both sides of one street between two cross streets); and, be it further

RESOLVED, That the rate structure for all parking meters, parking garages, and parking lots in SF*park* Parking Pilot Project Areas may be either flat rates (same price per hour all day), or may be based on time of day (variable price by time of day), length of stay (variable price by how long a vehicle has been parked), or a combination of those pricing structures[4]; and, be it further

RESOLVED, That the rates for parking meters and metered lots in the SF*park* Parking Pilot Project Areas, including all types and kinds of parking, including but not limited to automobile, commercial loading, and motorcycle, parking meters, shall be between $0.25 per hour and $6.00 per hour; and, be it further

RESOLVED, That the hourly rates for parking garages in the SF*park* Parking Pilot Project Areas shall be between $1.00 per hour and $10.00 per hour; and, be it further

RESOLVED, That for on-street parking rates in the SF*park* Parking Pilot Project Special Event Area shall be between $0.25 per hour and $18.00 per hour during or up to four hours before special events; and, be it further[5]

RESOLVED, That the Executive Director/CEO is authorized to provide for those drivers who pay an hourly rate for at least three hours at parking garages in SF*park* Parking Pilot Project Areas a discount of between $0.50 and $2.50 for entering garages during off-peak times (based on availability and congestion targets) and/or a discount of between $0.50 and $2.50 for exiting garages during off-peak times, without being required to provide this discount for those drivers who pay a "early bird", monthly, or other fixed time period or special rate structures; and, be it further

RESOLVED, That for parking garages in SF*park* Parking Pilot Project Areas, during the SF*park* parking pilot period the Executive Director/CEO is authorized to specify the times when "early bird" parking rates may apply, so long as those times are restricted to those drivers who enter a garage between 5:00 AM and 10:00 AM and exit the garage between 3:00 PM and 8:00 PM; and, be it further[6]

RESOLVED, That for parking garages in SF*park* Parking Pilot Project Areas, during the SF*park* parking pilot period the Executive Director/CEO is authorized to adjust the cost of all types of daily, monthly, "early bird", and all other non-hourly parking rates in garages in SF*park* parking pilot areas by up to 50 percent compared to those rates as of November 30, 2008; and, be it further[7]

RESOLVED, That any parking price or rate changes for parking meters, garages, and lots that are within the ranges specified in this resolution must be posted on the SFMTA website no less than seven calendar days in advance of the price change; and be it further

RESOLVED, That any parking price or rate changes for monthly parking in parking garages that are within the ranges specified in this resolution must be posted on the SFMTA website and at the specific location where price is changed no later than 30 calendar days before the commencement of the revised pricing; and, be it further

RESOLVED, That the initial availability standards for SF*park* pilot project areas are 10 to 35 percent for metered on-street parking (automobile), 10 to 35 percent for metered on-street parking (motorcycle), 10 to 35 percent for metered on-street commercial loading parking (yellow zones), 10 to 35 percent for metered on-street short-term parking (green zones), and 10 to 35 percent for parking garages and lots; and, be it further[8]

RESOLVED, That the initial availability target for the SF*park* pilot project areas is to achieve the availability standards 80 percent of the time that parking is priced; and, be it further[9]

RESOLVED, That the Executive Director/CEO is authorized to adjust availability standards and targets during the pilot project period to better achieve the goals of SF*park*.

2 A minor refinement will be to reduce this to at least every 28 days to enable monthly changes.

3 The Executive Director/CEO is able to assign this ability to a staff-level designee. The intent is to make the setting of parking rates into a more technical data-driven process guided by rules and policies set by the SFMTA Board.

4 As seen in the more detailed pricing policy documents, the pilot project is using time of day pricing. The rationale is that time of day pricing more effectively influences when people drive, and therefore congestion. More complex pricing structures were considered, but were not adopted because of the necessity to readily communicate (and understand) them at the meter or garage.

5 City law requires that upper and lower bounds be set. For on-street parking, $6.00/hr was set as the theoretical maximum that could be reached during the pilot projects, however unlikely or rare that might be. For garage parking, $10.00/hr was set $3.00 higher than the highest hourly rate at that time.

6 Subsequent policy documents define the off-peak and early bird discount time periods as before 7:30am and after 7:00pm.

7 This rate range was too narrow and, for several garages, will likely need to be adjusted during the course of the project.

8 Setting availability standards for each type of parking was deferred until more detailed analysis could be completed. These standards are refined in the more detailed pricing policy documents.

9 This concept (a target of achieving the availability standard 80 percent of the time) was abandoned during the development of the detailed rate adjustment policies because availability is being calculated or averaged over a significant period of time (e.g., three hours), which already allows for the possibility of exceeding the standard part of the time. The intent of accepting some amount of time where parking availability standards are exceeded is to not over manage or over price parking by too rigorously trying to achieve an availability standard at all times.

Graphic explaining demand-responsive pricing

On-street pricing

Demand-responsive pricing to achieve parking availability goals

This section excerpts large sections of the policies used to set rates in the SF*park* pilot project (with some minor updates for this book). These documents are available in their entirety online as part of a transparent, rules-based approach to setting rates.

On-street pricing

*This section excerpts the SF*park *on-street rate adjustment policy that outlines how the SFMTA uses occupancy data to make demand-responsive rate adjustments at on-street parking meters.*

As part of the SF*park* pilot project, the San Francisco Municipal Transportation Agency (SFMTA) uses a demand-based approach to adjusting parking rates at metered parking spaces in the SF*park* pilot areas. The goals include:

- Having a consistent, simple, and transparent approach for setting meter rates.
- Using those rates, including demand-responsive pricing and off-peak discounts, to help manage congestion, improve Muni speed and reliability, and achieve other transportation-related benefits.
- Achieving parking availability targets to reduce the number of drivers who double-park or circle while looking for parking.

This document contains a summary of the:

- Pre-SF*park* parking meter policies.
- Plan for improving the management of metered parking spaces in SF*park* pilot areas.

Pre-SF*park* parking meter policies

Rates

Prior to SF*park*, parking meters in San Francisco charged a single hourly rate regardless of the time of day or year. Meter rates varied by zone, with the most expensive rates downtown and the cheapest in the neighborhood commercial districts:

Zone	Price per hour
Downtown	$3.50
Downtown periphery	$3.00
Fisherman's Wharf	$3.00
Neighborhood commercial districts	$2.00

Method of setting rates

Prior to SF*park*, the San Francisco Board of Supervisors set meter rates via periodic price changes based on recommendations made by the SFMTA, mainly during the budget-planning process. There was no set formula or approach for setting meter rates, and changing meter rates was often a contentious process.

Hours and days of operation

Most parking meters in the city are operational Monday through Saturday from 7am to 6pm or 9am to 6pm, depending on location. In a portion of the Soma pilot area, meters within SFMTA jurisdiction operate until 10pm to facilitate special event pricing, particularly during baseball games at AT&T stadium. Meters in Fisherman's Wharf are operational every day from 7am to 7pm, and meters in areas administered by the Port of San Francisco (mostly along the Embarcadero) are operational every day from 7am to 11pm.

SF*park* on-street pricing

In SF*park* pilot areas, meter rates vary based on time of day and day of week, and rates are adjusted over time in response to demand. Rates are adjusted on a block-by-block basis, using occupancy data from parking sensors installed in most on-street parking spaces in the SF*park* pilot areas.

Adjusting rates

1. Meter operational hours are split into distinct rate periods

To help ensure that parking is available in metered parking spaces, SF*park* meters charge different rates based on the time of day. To facilitate this demand-responsive, time-of-day pricing, the meter operational hours are split into distinct rate periods throughout the day.

Most meters in the city operate on a 9am to 6pm schedule. Those meters are split into the following rate periods:

7 am	8 am	9 am	10 am	11 am	noon	1 pm	2 pm	3 pm	4 pm	5 pm	6 pm	7 pm	8 pm	9 pm	10 pm
		9am–Noon			Noon–3pm			3pm–6pm							

Meters operating on a 7am to 6pm schedule are split into the following rate periods:

7 am	8 am	9 am	10 am	11 am	noon	1 pm	2 pm	3 pm	4 pm	5 pm	6 pm	7 pm	8 pm	9 pm	10 pm
7am–Noon					Noon–3pm			3pm–6pm							

Meters in Fisherman's Wharf operate every day from 7am to 7pm. For those meters, the rate periods are:

7 am	8 am	9 am	10 am	11 am	noon	1 pm	2 pm	3 pm	4 pm	5 pm	6 pm	7 pm	8 pm	9 pm	10 pm
7am–Noon					Noon–3pm			3pm–7pm							

Meters in the areas of the city overseen by the Port of San Francisco (generally along the Embarcadero), operate every day from 7am to 11pm. For Port meters, the rate periods are:

7 am	8 am	9 am	10 am	11 am	noon	1 pm	2 pm	3 pm	4 pm	5 pm	6 pm	7 pm	8 pm	9 pm	10 pm
7am–7pm												7pm–11pm			

The SFMTA has proposed that the Port of San Francisco adopt the following rate periods:

7 am	8 am	9 am	10 am	11 am	noon	1 pm	2 pm	3 pm	4 pm	5 pm	6 pm	7 pm	8 pm	9 pm	10 pm
7am–Noon					Noon–3pm			3pm–7pm				7pm–11pm			

These rate periods are as consistent as possible across meters to make it easier for drivers to use meters in different parts of the city. Because SF*park* meters charge different hourly rates at different times of day, if a driver arrives at a meter during one rate period but leaves during another, he must pay the correct hourly rates for each rate period in which he parks. Thus, a driver who arrives at a meter at 11am and parks until 1pm must pay for one hour at the 9am–Noon rate, and one hour at the Noon–3pm rate.

2. Weekend rates differ

Because weekend parking trends differ significantly from weekday parking trends, demand-responsive rate adjustments separate weekdays from weekends. This helps ensure that parking is available in metered parking spaces every day of the week.

3. Rates respond to demand over time

Rates for parking meters change gradually and periodically based on demand. Changes to the rates are made no more often than once per month. At the outset of the SF*park* program, rates at meters respond to demand as shown by occupancy in the previous month. As SF*park* continues to collect occupancy data from the parking sensors, however, occupancy data from earlier months and years will be considered in making pricing determinations and, if necessary, possible adjustments to analysis of occupancy to correct for concentrated use of disabled parking placards on particular blocks.

To achieve the goal of at least one available parking space per block, meter rates are adjusted with the goal of maintaining no more than 80 percent occupancy on

any given block. Rates are adjusted using the following formula:

- When occupancy is 80–100 percent, the hourly rate is raised by $0.25.
- When occupancy is 60–80 percent, the hourly rate is not changed.
- When occupancy is 30–60 percent, the hourly rate is lowered by $0.25.
- When occupancy is less than 30 percent, the hourly rate is lowered by $0.50.

In accordance with the SF*park* enabling legislation approved by the SFMTA Board of Directors in November 2008, the SFMTA notifies the public of price changes no less than seven calendar days before the change in prices via the SFMTA and SF*park* websites.

For parking occupancy, some cities use a target of no more than 85 percent. This threshold refers to parking occupancy as measured at a single point in time, typically via manual observation which is the only method available to most cities. The SFMTA target of 60 to 80 percent occupancy refers to the average parking occupancy as measured continuously over a period of time (typically three hours of continuous data rather than a one or two snapshots in time as in most manual surveys of parking occupancy). Via the SF*park* pilot project, the SFMTA pioneered this approach to measuring parking occupancy, adapting parking occupancy measurement and targets to newly available technology and the radically increased amount of occupancy data that parking sensors provide. The 60-80 percent target range for average parking occupancy is intended to ensure that the commonly cited 85 percent threshold is rarely exceeded during the three hour period so that most drivers can typically find a parking space quickly.

4. Rates are adjusted on a block-by-block basis

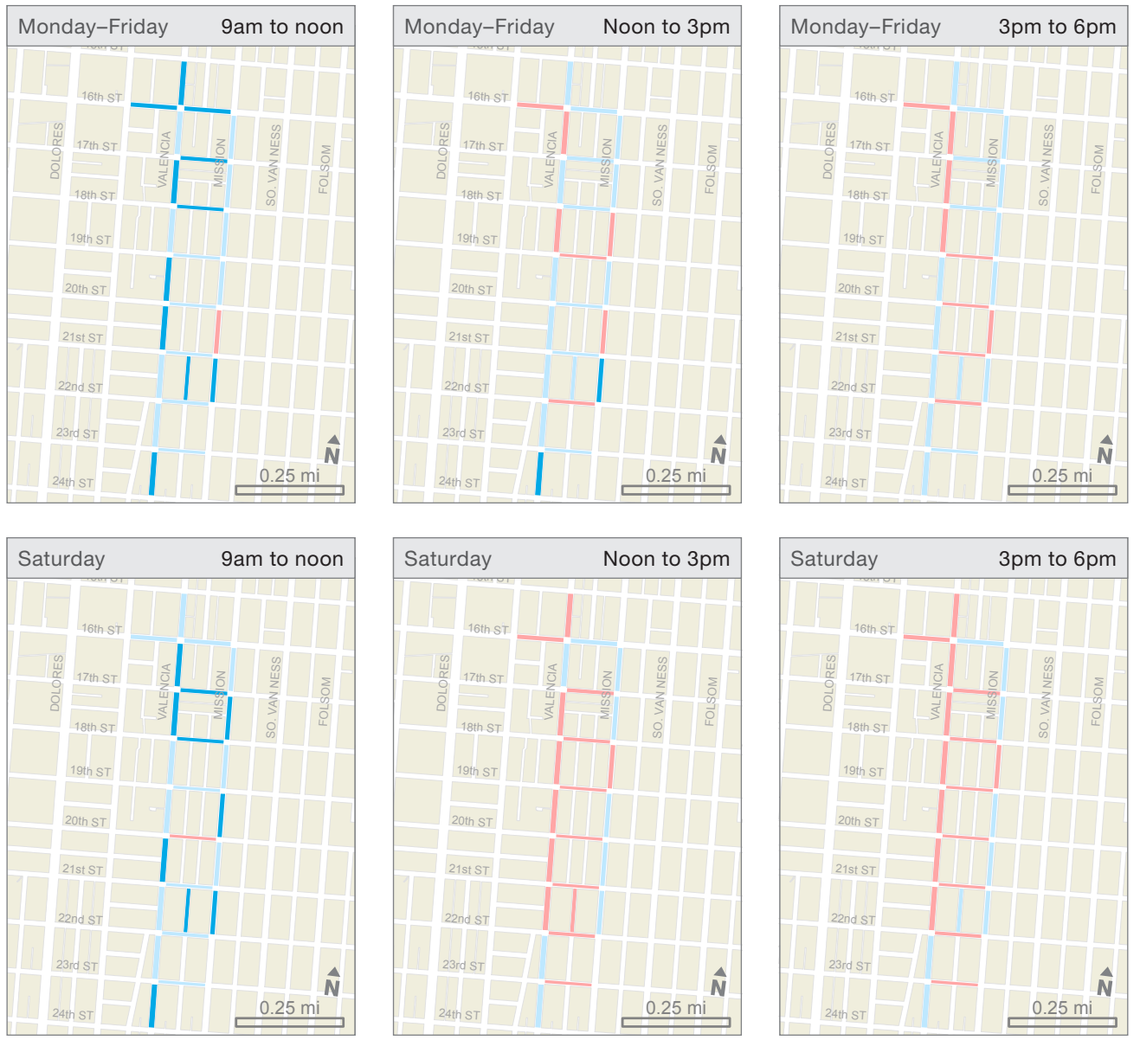
Price changes made to meters on a per-block basis. The SFMTA considered larger areas but chose blocks to allow parking rates to respond to rapidly changing parking demand patterns that sometimes shift block to block in San Francisco. Pricing changes on a block-by-block basis was also expected to more effectively redistribute parking demand within a neighborhood to better achieve availability targets and therefore the larger parking management goals of SF*park*.

Thirteen rate adjustments

Between July 2011 and January 2014, the SFMTA executed thirteen demand-responsive rate adjustments at SF*park* meters. As a result, the average cost to park at metered spaces decreased from $2.73 per hour to $2.46 per hour.

Download rate adjustment data and maps at:
SFpark.org/rates

July 2011 rate changes: **Mission**



Estimating parking occupancy using meter payment data

This section outlines the SFMTA's plan to continue demand-responsive rate adjustments by using meter payment data rather than sensor data to estimate occupancy.

Overview

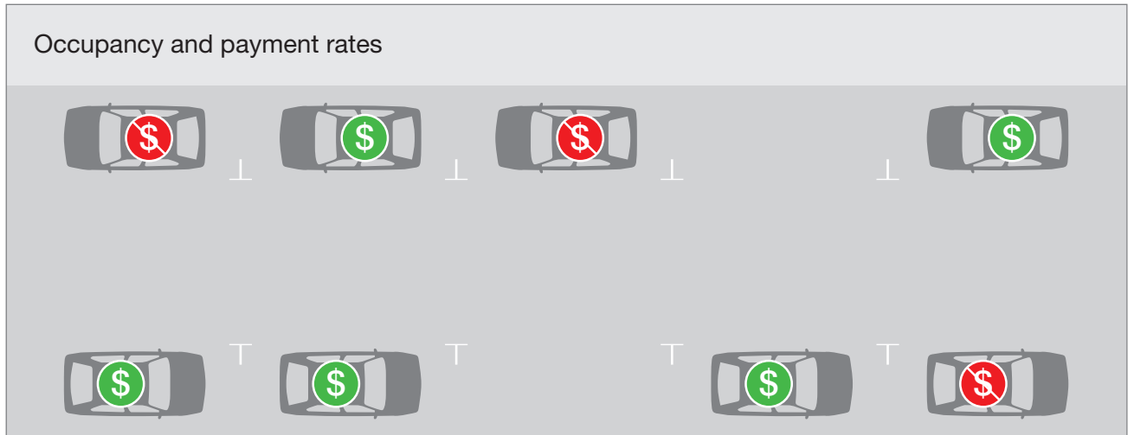
During the SF*park* pilot, the SFMTA used in-ground parking sensors to estimate parking occupancy in SF*park* pilot and control areas. Since August 2011, the SFMTA made 13 demand-responsive rate adjustments from occupancy data from parking sensors. At the end of 2013, parking sensors reached the end of their useful lives and were deactivated. As part of evaluating the SF*park* pilot projects, the SFMTA will evaluate whether or not to use parking sensors in the future.

The SFMTA has also collected meter payment data from smart parking meters that can wirelessly communicate payment status. Using data from parking sensors and parking meters collected throughout the SF*park* pilot, the SFMTA developed a model to estimate parking occupancy using meter payment data. The SFMTA intends to use the Sensor Independent Rate Adjustment (SIRA) model to continue demand-responsive rate adjustments.

Developing the Sensor Independent Rate Adjustment model

The SFMTA developed the SIRA model by analyzing the relationship between parking occupancy rate (how many spaces are occupied) and meter payment rate (how many spaces are paid). If everyone paid the meter for exactly all of the time that they park, the SFMTA could simply use payment rate as the occupancy rate.

However, data from the SF*park* pilot confirmed that payment rates are lower than occupancy rates, meaning that for all of the time that meters are occupied, they are only paid some of that time. This is a result of people using parking permits (such as disabled placards and City official business permits) to legally occupy a space without paying the meter, non-functioning meters, people running over the time that they paid, or people simply not paying the meter.



The SFMTA analyzed the statistical relationship between occupancy and payment rates from the SF*park* pilot to develop the SIRA model. The SIRA model uses linear regression to estimate occupancy rates using payment rates. After examining millions of records and adjusting for the factors explained below, the SFMTA found that there is a stable and consistent relationship between occupancy and payment rates.

The SIRA model includes adjustment factors to account for three types of variation. First, because not everyone pays the meter, the model adjusts for the difference between occupancy rates and payment rates. Second, the SIRA model accounts for variation in behavior between weekdays and weekends. Third, the model accounts for differences in payment rates in different parts of the city. For example, payment rates are different in primarily neighborhood commercial areas than in the financial district.

The SFMTA measured accuracy of the SIRA model by testing it against historical sensor data. Specifically, the SFMTA ran hypothetical rate adjustments using both historical parking sensor data and the SIRA model and compared the outcomes. Rate adjustments using the SIRA model would have correctly raised, lowered, or kept rates the same about 70 percent of the time. When the model yielded a different result, it was twice as likely to result in an hourly price that was too low than too high.

Using SIRA as an approach to changing rates will allow the SFMTA to continue doing demand-responsive rate adjustments with slightly less accuracy than using parking sensors, but any errors will tend to result in lower rather than higher meter rates. The meter rate generated by SIRA on these blocks will be slightly too low, but the SFMTA prefers to err on the side of under-charging rather than over-charging at the meter.

Using SIRA for demand-responsive rate adjustments

The SFMTA plans to start adjusting on-street rates using the SIRA model in SF*park* areas in June 2014, and to continue those rate adjustments about every two months. Guided by the SF*park* pilot evaluation and after the installation of smart meters citywide, the SFMTA will develop a proposal for expanding demand-responsive pricing beyond current SF*park* areas and to all meters citywide.

Expanding use of the SIRA model

The SIRA model was developed using data from the SF*park* pilot, representing a quarter of San Francisco's metered spaces over a distinct period in time. When considering if and how the model needs to be recalibrated to use in more areas in the future, thought should be given to its underlying assumptions about how non-payment varies (or not). A variety of factors may explain non-payment, but the important ones are parking policies and practices, particularly those involving:

- Parking enforcement strategies (because the perceived level of enforcement drives how many people choose not to pay)
- Parking citation or fine amounts
- Legal forms of meter non-payment (such as disabled placards)
- Time limits
- Payment methods (because payment rates increase when it is easy to pay)

The SFMTA will continue to refine and update the SIRA model as necessary.

Download full document at:
SFpark.org/docs_paymentdata

Special event

This section describes how the SFMTA adjusts parking meter rates in special event pricing areas.

As part of SF*park*, the SFMTA tested using demand-responsive pricing to better achieve parking space availability targets during special events such as baseball games. Beginning in 2013, the SFMTA implemented special event pricing around San Francisco's baseball stadium in the South Embarcadero pilot area.

In this special event area, meter rates during special events are either $3, $5, or $7 per hour depending on how close a parking space is to the stadium. These rates can be adjusted to achieve parking availability targets of 20 to 40 percent during special events. The following guidelines determine special events price changes:

- When availability is less than 20 percent, the hourly rate rises to the next special event price level.
- When availability is 20–40 percent, the hourly rate does not change.
- When availability is greater than 60 percent, the hourly rate decreases to the lower price level or is considered for removal from special event pricing.

The above guidelines are utilized to the extent that price adjustments would help to preserve and/or enhance the clearly defined and easily communicated boundaries for the different types of special event rates.

Event rates are programmed at the beginning of the season, and even with smart meters, they are not easily changed for last-minute changes to events (e.g., when a baseball game is cancelled due to rain). While the SFMTA can adjust event rates incrementally over time, and non-event meter rates in SF*park* areas do vary by block and change over time, the SFMTA opted to keep special event rates more stable so they would be easier to communicate and be more easily understood by customers, many of whom do not typically park in that area. The SFMTA did not change special event rates during the 2013 season and made only small adjustments for the 2014 season.

A majority of the special events in this area occur in the evening, so hours of operation were extended to 10pm in the area to cover most of the typical event hours. On non-event evenings, meter rates after 6pm were started at $0.25 per hour and typically stayed at that level reflecting relatively low parking demand.

Download full document at:
SFpark.org/docs_events

Special event pricing evaluation

The SFMTA evaluated special event pricing in early 2014, including recommendations to continue the pilot with minor adjustments to pricing and boundaries.

Download full document at:
SFpark.org/docs_eventevaluation

Motorcycle

*As part of the SF*park *pilot project the SFMTA uses demand-responsive pricing for metered motorcycle parking in order to achieve availability targets..*

Prices at metered motorcycle spaces are adjusted periodically to achieve the target availability rate of 20 to 40 percent at peak hours. During the pilot period, prices at motorcycle parking spaces were changed infrequently because: 1) parking sensors cannot detect motorcycles accurately, so the SFMTA uses manual surveys to obtain motorcycle occupancy data; and 2) the SFMTA did not upgrade motorcycle meters during the SF*park* pilot period, so rate changes had to be entered manually in the field. The SFMTA is replacing the motorcycle parking meters in 2014, which will allow for more frequent rate adjustments if needed.

Download full document at:
SFpark.org/docs_motorcycles

Time limits

Using price rather than time limits to achieve availability

Since San Francisco started using parking meters in 1947, time limits of 1 to 2 hours have been the main tool used to achieve turnover. Availability is the ultimate goal of turnover, so the SFMTA is emphasizing demand-responsive pricing, rather than time limits, to achieve parking availability targets in the SF*park* pilot projects.

Expanded meter time limits

Prior to the pilot project, short time limits at metered spaces could be inconvenient and unpredictable, sometimes forcing people to cut their stays short or risk receiving a parking ticket. For Parking Control Officers, time limits are difficult and labor intensive to enforce, requiring the officer to pass the location twice to enforce rather than once to verify parking meter payment status.

For the SF*park* pilot project, in April 2011 the SFMTA lengthened time limits in most pilot areas to four hours and eliminated time limits altogether in the Fillmore and parts of the South Embarcadero pilot areas.

Download full document at:
SFpark.org/docs_expandedtimelimits

Broken meter time limits

A policy allowing cars to park for free at broken parking meters creates an incentive to vandalize or disable meters. If city policy allows vehicles to stay at broken meters up to the time limit, then lengthening or eliminating time limits would also provide the same incentive. In preparation for SF*park*, the SFMTA established a two-hour maximum time limit for parking at all inoperable or broken parking meters to reduce this incentive in SF*park* pilot areas.

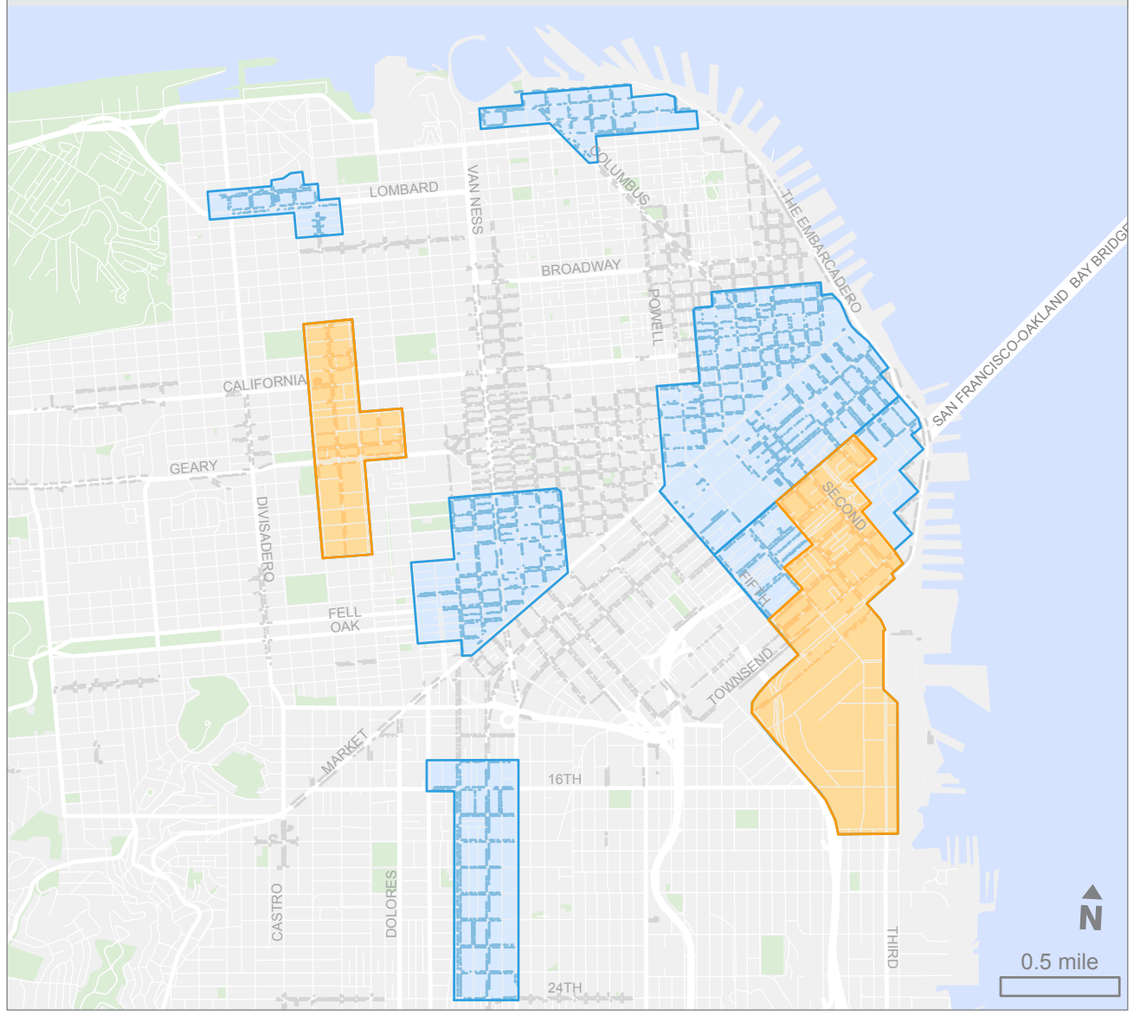
The goals of this policy change were to:

1. Create a uniform, easily understood meter enforcement policy that balances public interest in using available parking spaces with the desire to discourage vandalism.
2. Anticipate the impact of longer time limits at meters for the SF*park* pilot project.
3. Ensure fairness and equity between people parking at meters. The two hour time limit at broken meters was meant to discourage people from monopolizing these spaces.

The SFMTA considered prohibiting parking at broken meters, which was a successful policy in Los Angeles, but chose to establish a two-hour maximum broken meter time limit instead. However, a new California state law terminated local authority over this topic and invalidated both policies. This law, AB 61, became effective in January 2014 and stated that vehicles must be permitted to park at "inoperable meters" for the maximum amount of time permitted by that meter.

Download full document at:
SFpark.org/docs_brokenmetertimelimits

Time limits in SF*park* areas



Metered parking space

Four-hour time limit

No time limit

Managing parking when and where appropriate

The importance of managing parking when and where there is significant parking demand

Parking meters are simply tools to manage parking demand to achieve certain goals, whether for transportation or economic vitality. Parking meters were first introduced to increase parking availability on busy commercial streets, and they remain a powerful tool to make parking easier to find. Data from the SF*park* project shows that managing parking when and where there is significant parking demand delivers sizeable benefits, even without demand-responsive pricing or real-time parking availability information.

Extended parking meter hours study

In 2009, the SFMTA proposed expanding the hours when parking meters are enforced to better match times of high demand when stores are open. This section contains a summary of that proposal, which was not implemented.

In 2009 the SFMTA developed a proposal to operate parking meters on Sundays and evenings. The proposal was intended to align when and where meters operate with when and where parking is difficult to find in commercial areas. The study includes a survey of other jurisdictions' practices, a review of previous reports on parking in San Francisco, and the collection of data on parking occupancy levels, business hours of operation, stakeholder concerns, and residents' opinions. The study found:

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

Using this study, the SFMTA recommended that the parking meter hours of operation be extended as follows:

- Sundays: Establish metering hours from 11am to 6pm citywide.
- Mondays through Saturdays: Operate parking meters until 6pm, 9pm, or midnight when and where parking demand warrants.
  - Extend meter hours until 9pm Monday through Thursday and until midnight Friday through Saturday at 68 percent of metered spaces.
  - Extend meter hours until 9pm on Friday and Saturday at 20 percent of metered spaces (leaving Monday through Thursday until 6pm).
  - Extend meter hours until midnight Monday through Saturday in areas where parking availability is low throughout the week, which is 12 percent of metered spaces.
  - Operate meters Monday through Saturday until 6pm at one percent of metered spaces.
- Rates: Retain current rates (but use demand-responsive pricing in SF*park* pilot areas).
- Time limits: Establish 4-hour parking time limits after 6pm and all day on Sundays.

The following additional recommendations were based primarily on feedback from intercept surveys and stakeholder interviews:

- Make it easier for drivers to pay for parking and avoid parking tickets.
- Offer residents who live adjacent to commercial corridors the option to extend Residential Permit Parking (RPP) enforcement hours to reduce potential parking "spillover" in their neighborhoods. Hours of RPP enforcement could either match or extend beyond metering hours.
- Review metering hours at least every two years using 85 percent occupancy as the criteria and adjust metering hours as necessary to achieve availability goals.
- Reduce hourly meter rates in SFMTA parking lots when and where parking occupancy does not exceed 60 percent and consider lengthening time limits at those lots to improve driver convenience.

Download full document at:
SFpark.org/docs_hours

Operating parking meters on Sundays

*This section excerpts the SFMTA's evaluation of Sunday meter enforcement. While this policy change was not part of the SF*park *pilot project, it offered valuable lessons about effective parking management.*

In 2013, the SFMTA began enforcing parking meters on Sundays for the first time, requiring meter payment at all SFMTA meters from noon to 6pm. For many years, parking meters in San Francisco were enforced Monday through Saturday from 9am to 6pm. As the Extended parking meter hours study confirmed, most businesses were closed on Sundays when parking meters were first installed in San Francisco in 1947, but that changed significantly over the last 60 years.

To help open up parking spaces for businesses that are open on Sundays, in January 2013 the SFMTA began operating parking meters on Sundays from 12pm to 6pm with four-hour time limits. This policy was intended to make it easier to find a parking space in commercial areas on Sundays (and thereby improve access, driver convenience, and economic vitality). Based on public feedback, the SFMTA chose to begin meter enforcement at noon rather than 9am as on other days of the week. Customers who park before noon are able to pre-pay for parking so they do not have to return to the meter in the middle of their day (meaning you can park and pay for parking at 9am, but the meter will not begin charging until noon). For the first three weeks after the policy went into effect, SFMTA staff issued informational flyers instead of parking citations on Sundays.

The SFMTA evaluated how well metering on Sundays achieved the following goals:

- Make it easier to find a parking space in commercial areas on Sundays (and thereby improve access, driver convenience, and economic vitality).
- Reduce double parking and circling, which supports goals for reducing delays for transit, greenhouse gas emissions, and congestion, and improving safety for pedestrians, cyclists, and other drivers.
- Off-set the costs of operating the city's transit system.

The SFMTA's evaluation of metering on Sundays showed that as a result of operating meters on Sundays:

- It is easier to find parking spaces in commercial and mixed use areas on Sundays. Prior to operating meters on Sundays, it was hard to find parking in almost every commercial area in the city. Now parking availability is much higher, so it is easier for drivers—many of whom are likely customers of neighborhood businesses—to access commercial areas. Data from a sample of streets showed that the average parking availability on Sunday doubled during metered hours once meters were enforced, increasing from 15 percent to 31 percent.
- More people can park because there is more turnover. Prior to operating meters on Sundays, some drivers would park in metered spaces on Saturday evening or Sunday morning and not move their car until Monday morning, reducing turnover and the parking availability in commercial areas on Sundays. This behavior decreased with Sunday metering: the number of cars that parked in each space per day increased by at least 20 percent from 0.5 per hour to 0.6 per hour during Sunday afternoons, and the percentage of spaces occupied on Saturday night through Sunday afternoon decreased by two thirds, from 6 percent to 2 percent. Prior to metering on Sundays, half of all cars parked for less than three hours, while half stayed for three or more hours. After metering on Sundays, 76 percent of cars stayed for up to three hours (with 50 percent staying for less than one hour), and less than one quarter of all parked cars stayed for three or more hours.
- More people park in parking garages, opening up more on-street spaces. Sunday meters also encouraged more drivers to go directly to a garage rather than circle for free on-street parking: SFMTA garage occupancy on Sundays from 12pm to 6pm increased by 13 percent. Getting more drivers off the road and into garages quickly opens up on-street parking spaces for others, effectively increasing the usable parking supply. It also improves the utilization of these important city resources.
- People spend less time circling to find a parking space. Prior to metering on Sundays, data indicate that drivers would circle for an average of over four minutes to find a parking space. After metering on Sundays, the average search time in the same areas is now under two minutes. This reduction improves the experience of driving to visit these areas, and it also reduces congestion and greenhouse gas emissions. The variability of parking search time, or how predictable the parking experience is, also improved. The amount of time a driver reasonably should budget to find a parking space (measured by the 95th percentile) decreased from about 14 minutes to about four minutes once meters were operating on Sundays
- Increased net revenue helps pay for local transit. Parking provides one source of SFMTA's revenue, helping to pay for the services SFMTA provides, such as transit service on Sundays. Meter payments and citation fees on Sundays are much greater than the associated ongoing costs, or even the one-time implementation costs.

Download full document at:
SFpark.org/docs_sundayevaluation

Neighborhood parking planning

In addition to considering when to manage parking, it is also important to consider where to do so. This section discusses the SFMTA's experiences looking at parking management at a neighborhood level.

Parking management in San Francisco is generally aligned with existing land uses, but there are several large areas of our rapidly evolving city where parking management has not kept up with development. These areas have little parking management, and they are challenged with very high parking demand combined with long-term vehicle storage.

Over the course of several years of the SF*park* pilot project, the SFMTA developed a proposal to manage parking in these areas, and to include them as expansions of existing SF*park* areas to manage this parking as intelligently as possible. During the community process, many community members expressed uneasiness about being part of the pilot until further evaluation of its success. Based on this feedback, the SFMTA proceeded with parking management planning for these areas using its regular policies and practices.

The SFMTA used policy parameters, data, and community input to develop parking management proposals for each neighborhood. For each neighborhood, it conducted a thorough report on the existing conditions, including:

- Block-level data. The SFMTA collected comprehensive data about every block in the proposal area.
- Neighborhood-level research and surveys. The SFMTA gathered data on transportation access, double-parking, parking search time, day-to-day turnover, oversized vehicles, and an out-of-area analysis using license plate data.

Currently, the neighborhood parking plans include significantly less parking management than originally proposed but are still moving forward. From this process, the SFMTA learned several lessons:

- Consensus that there is a parking problem may not translate into consensus on the solutions.
- Communities are often open to considering paying for parking but are sometimes wary of adding new parking meters (to previously unmanaged spaces). Communities voiced a desire not to pay for parking, fear of citations, and inconvenience (from time limits and having to pay).
- In terms of public support, creating newly metered spaces is much harder than adjusting rates in existing metered spaces (which was widely supported).

Parking planning documents

SFMTA policies for on-street parking management

In the process of developing proposal for expanding where the SFMTA manages parking, the SFMTA articulated its past practices and policies to improve the transparency, consistency, and clarity of our policy guidelines.

Download full document at:
SFpark.org/docs_parkingmanagement

How the SFMTA makes parking management decisions

To help communicate those policies with communities, the SFMTA created this pamphlet to summarize those parking management policies.

Download full document at:
SFpark.org/docs_parkingdecisions

Block-level data collection form

The SFMTA created this form to standardize what data is collected for each block when making parking management decisions, including:

- Parking supply: How many legal parking spaces currently exist?
- Existing parking regulations: What regulations are already in place in the neighborhoods?
- Zoning: What is the zoning of each parcel?
- Land use: What is the current legal land use of each parcel?
- Parking occupancy: What percent of the legal parking supply is occupied during the survey period?

Download full document at:
SFpark.org/docs_blockdata

City and SFMTA employee parking

Applying parking management rules equitably

The effectiveness of demand-responsive pricing to manage parking relies on drivers being subject to those prices. In preparation for SF*park*, in early 2011 the SFMTA implemented new policies to better manage parking by city vehicles and parking demand from the SFMTA's own 5,000 employees. Most of these policy changes were approved in their entirety. These proposals were important for overall parking management, and they increased the SFMTA's parking management credibility.

City employee parking proposal

This section summarizes the 2010 proposal that removed parking payment exemptions for many city employee vehicles.

The SFMTA released a proposal in 2010 to better manage city vehicle parking. In this proposal, rather than being exempt from paying parking meters, all city vehicles (except emergency vehicles with lights flashing) would have had to pay to park either via a prepaid annual permit or via prepaid parking cards. The approved version of the policy applies only to sedans and other passenger vehicles, which are approximately half of the city's vehicle fleet. The majority of the remainder of the proposal, such as removing the majority of free reserved on-street parking spaces in front of city facilities, was approved by the SFMTA Board and implemented in summer 2011.

Prior to implementation of these measures, there were many types of parking privileges for government employees and officials in San Francisco, both formal and informal, amounting to at least 3,000 free on-street spaces. The SFMTA issued some of these permits, and the Transportation Code allowed some city departments to issue an unlimited number of their own parking permits that gave employees free parking without time limits. Because there was no standard permit and no limit on quantities, these permits were easy to abuse and difficult for SFMTA to enforce.

There were a variety of parking privileges for government employees and officials in place, including:

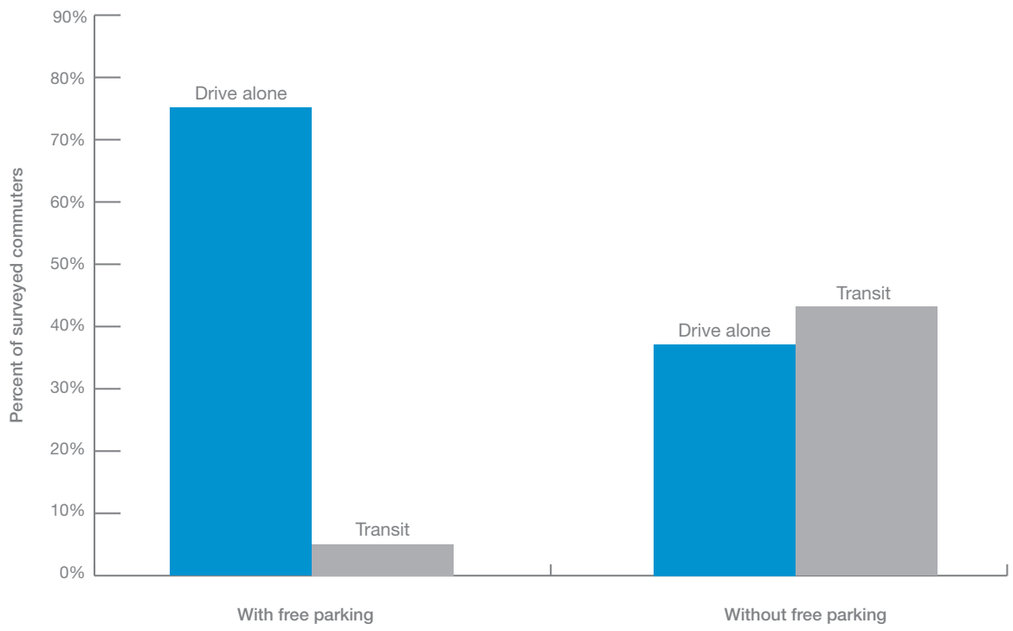
- Free on-street reserved spaces around some government facilities.
- Free parking placards printed by some city departments and government agencies.
- Areas of non-enforcement of parking violations around government facilities.
- Free and reserved parking spaces in city garages for some city employees and officials.
- Free parking included in some collective bargaining agreements with unionized employees.

Together, these privileges, exemptions, and permits encouraged city and government employees to drive rather than utilize transit and other forms of transportation, undermining the city's goals for transportation. Because current policy allowed many departments to print their own placards for free parking, the precise number of placards circulating was unknown and uncontrollable. At least 3,000 parking spaces were unavailable for public use, typically clustered around city and government facilities, reducing public access to government services and nearby businesses.

The various parking privileges for government employees undermined the city's parking management and overall transportation goals. Parking price and availability are two of the primary factors in how people decide to travel, whether by car or a more sustainable mode. While some types of parking exemptions may be sensible, such as parking of vehicles related to public safety, free or subsidized parking at work encourages people to drive, and these trips contribute to traffic congestion and greenhouse gas emissions.

A 2005 survey of Bay Area commuters sponsored by the Metropolitan Transportation Commission found large differences in travel behavior between groups of

Bay Area commute decisions
August 2005



	With free parking	Without free parking
Drive alone	75%	37%
Transit	5%	43%

Source: *Commute Profile 2005, a Survey of San Francisco Bay Area Commute Patterns*. RIDES for Bay Area Commuters, Inc. August 2005. Region-wide telephone survey of 3,600 commuters sponsored by the Metropolitan Transportation Commission (MTC).

commuters that had access to free parking and those without access to free parking. The survey found that approximately 75 percent of commuters drove alone when free parking is available, but only 37 percent drove alone when free parking is not available. Less than five percent of commuters with free parking commuted by transit, versus 43 percent of commuters without free parking. Although the survey did not control for outside factors that influence commute decisions, the contrast suggests to what extent free parking plays a role in commute decisions.

To address these issues, the SFMTA proposed to improve management of city and government employee parking privileges. The goal of this proposal was to apply the same parking management principles and policies to government employees that are applied to residents, business owners, and visitors. To achieve these goals, the SFMTA proposed to:

- Issue all parking permits. Other city departments and other governmental agencies would no longer be able to issue their own permits. The SFMTA would provide convenient ways to pay for parking via work order for a SFMTA City Business permit or SFMTA parking cards.
- Eliminate free on-street reserved spaces for government employees (e.g., around City Hall).
- Eliminate areas of de-facto non-enforcement around some government facilities (e.g., around the Hall of Justice).
- Eliminate free and reserved parking for government employees and officials in city-owned garages.
- Equalize rates for existing SFMTA-issued permits so that no group receives free parking.
- Assume management of press parking passes from the Police Department to consolidate all parking permits under the SFMTA.

For mid-term implementation, the SFMTA recommended developing policy proposals for these additional areas:

- Remove parking benefits from future labor agreements
- Offer better city employee transit benefits
- Improve management of disabled parking placards
- Improve management of residential parking
- Enforce existing ordinance that regulates pricing of off-street parking

The SFMTA successfully implemented most of the short-term proposals. The SFMTA created a single city vehicle parking permit and attached an annual price; and now only those permits are considered valid by the Parking Enforcement Division. The SFMTA partially reformed the reserved on-street parking spaces in front of city facilities: a permit was established with an annual price, and departments received a letter giving the option to return those spaces to public parking, which some did. Many of the mid-term policy suggestions are under way.

Download full policy proposal document at:
SFpark.org/docs_employeeparking

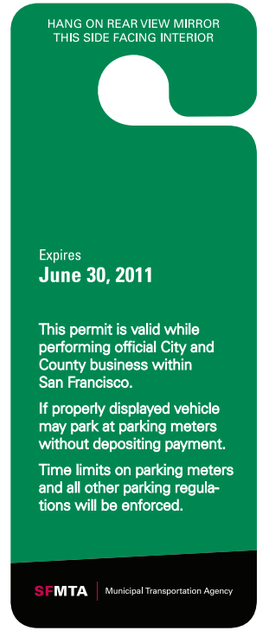
SFMTA employee parking management

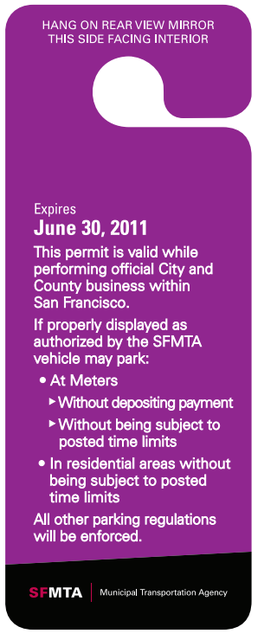
In 2011, the SFMTA proposed a parking management policy for off-street parking its employees. The proposal aimed to hold SFMTA employees to the same or higher standards for parking management as the people we serve, and to discourage single occupant work trips by car.

Prior to reform in 2011, a large portion of SFMTA employees had free off-street parking at their work site (e.g., within bus yards or dedicated (i.e., not publicly available) lots or garages). The original proposal would have required all 5,000 SFMTA employees to pay for off-street parking at SFMTA facilities if they drive, but existing labor agreements exempted approximately 800 people from the policy that was adopted and implemented.

These free parking provisions encouraged SFMTA employees to drive alone rather than utilize other forms of transportation such as public transit or carpooling, undermining the SFMTA's goals for transportation as well as the city's Transit First policy. Parking price and availability are two of the primary factors in how people decide to travel, whether by car or a more sustainable mode. Free or subsidized parking at work encourages people to drive, and these trips contribute to traffic congestion and greenhouse gas emissions.

Free parking for SFMTA employees, particularly for transit operators, has previously been justified by the need to have easy access to parking in order to get transit vehicles out on schedule. The early morning and late night hours of operation and security of vehicles on the street have also been cited as reasons for providing free parking for employees at division yards. While providing parking for SFMTA employees may be helpful for employees who already drive, there is no reason that paid parking





would slow down operations or make parking more difficult for employees. Parking supply is very limited at most SFMTA facilities—at some transit yards, personal vehicles cram in around transit vehicles and are shuffled around throughout the day as transit vehicles come and go. Pricing parking appropriately can serve as a parking management strategy to encourage some to carpool or use other modes of transportation, and thereby make it easier for others to find a parking space.

To address these issues, the SFMTA proposed to improve how it managed SFMTA employee parking privileges. The goal of this proposal was to apply the same parking management principles and policies to SFMTA employees that are applied to residents, business owners, and visitors. To achieve this goal and make it easier for those who do drive to find a space, the SFMTA proposed to:

- Require all SFMTA employees to pay to park at all off-street parking facilities, including SFMTA yards, garages, and lots.
- Place parking meters and/or time limits where appropriate.
- Establish an employee parking permit for employees at operation and maintenance divisions.
- Facilitate carpooling.
- Convert the Scott Parking Garage (1849 Harrison Street) into a paid public parking garage.

For mid-term implementation, the SFMTA is developing policy proposals for these additional areas:

- Remove parking benefits from future labor agreements.
- Improve bicycle infrastructure at SFTMA facilities.

Most of the short- and mid-term recommendations were implemented or are under further study. The SFMTA implemented paid parking for all employees at SFMTA facilities. After implementation, a legal challenge required the payment requirement be repealed for members of the mechanics unions, due to language in a related labor document; and the SFMTA now issues exemption permits for those employees. Parking payment is now considered during labor negotiations with the remaining unions that still receive free parking.

Download full policy proposal document at:
SFpark.org/docs_SFMTAemployee

Off-street pricing

Demand-responsive pricing to achieve parking availability goals

This section excerpts large sections of the specific rate-setting policies used in the SF*park* pilot project (with some minor updates for this book) for off-street garages and lots. These documents are available in their entirety online as part of a transparent, rules-based approach to setting rates to achieve certain goals.

Parking garages

*This section contains large excerpts of the policy that outlines how the SFMTA uses occupancy data to make demand-responsive rate adjustments at SF*park *parking garages.*

At SF*park* garages, prices for all rate types are based on the hourly rates, which gradually respond to demand. This demand-responsive pricing is at the heart of the SF*park* pilot project and finds the lowest rates possible that achieve parking availability targets. While hourly rates vary from garage to garage (as some garages see higher demand than others), the hourly time frames, types of rates, and ratios used to calculate the rates are the same at all garages.

Hourly rates

1. Rates vary based on time of day

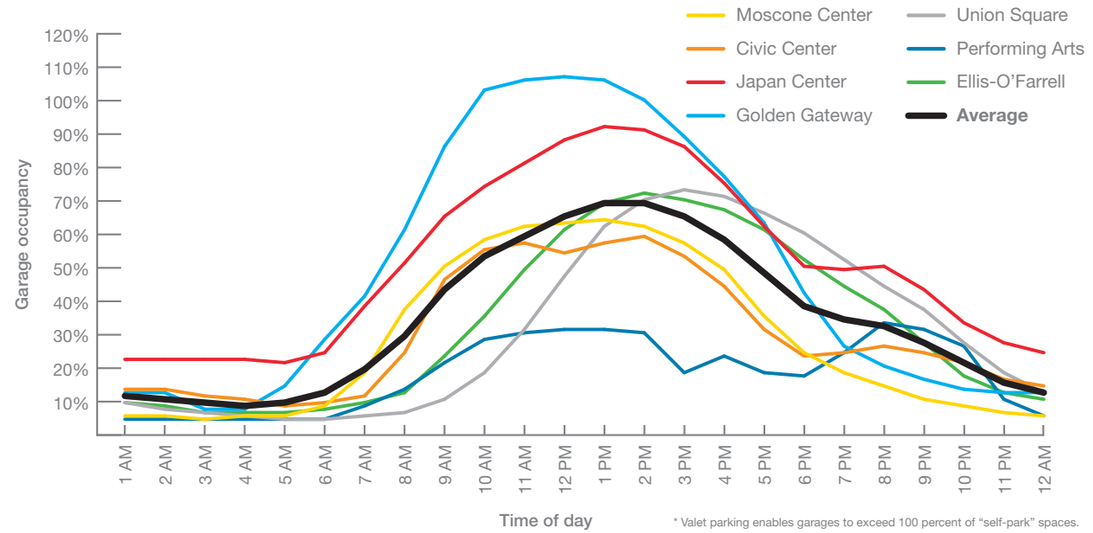
To help ensure that parking is always available in the garages, encourage drivers to use the garages rather than on-street parking, provide incentives to drive and park at off-peak times, and thereby reduce congestion on San Francisco's streets, SF*park* garages—just like meters at on-street parking spaces—charge different rates based on the time of day a car is parked. Where parking demand patterns vary significantly, prices differ based on the day of week (e.g., weekday v. weekend).

The SF*park* approach relies on demand-responsive time-of-day pricing, whereby the day is divided into distinct time periods during which different parking rates may be charged. The past single-hourly-rate approach to pricing at SFMTA garages does not allow prices to respond to demand. Periodic and gradual changes to parking prices give people time to learn new price signals and, potentially, adjust their travel choices about when and how to make trips.

One goal of the SF*park* program is to improve the customer experience by simplifying and unifying the policies, branding, and signage for SFMTA-administered parking garages. To help achieve that goal, the SFMTA implemented a single set of rate periods. Rate periods are bands of time during which the same hourly rate is charged. These rate periods are consistent across all garages—rates vary by garage within the rate periods. Consistency in rate periods also allows garage rates to be easily comparable with on-street metered rates that use the same rate periods. These rate periods are set broadly around workday commuter parking demand patterns so that rates can respond to demand and thereby, in conjunction with an off-peak discount, help to manage congestion.

To determine the rate periods, the SFMTA analyzed data for half of the garages in the SF*park* program: Golden Gateway, Moscone Center, Union Square, Ellis-O'Farrell, Civic Center, Performing Arts and Japan Center. This sample provided an effective cross-section of the parking

Weekday SF*park* parking garage occupancy*
November 2009 – October 2010



* Valet parking enables garages to exceed 100 percent of "self-park" spaces.

habits of the people who park in San Francisco: downtown commuters, convention-goers, shoppers, government workers and visitors to the courts, performing arts attendees, and visitors to the neighborhood commercial districts.

Utilization of these garages, averaged over the 12-month period, is illustrated in the chart above. The garages fall into three basic usage categories:

- The vast majority of parking happens during traditional workday hours, likely due to business commuters (Golden Gateway and Moscone Center);
- The vast majority of parking is shifted approximately two hours later than traditional workday hours, likely due to the influence of tourists and shoppers (Union Square and Ellis-O'Farrell); and
- A considerable number (usually the majority) of cars are parked during traditional workday hours, but with a distinct influx in the evening hours, likely due to attendance at arts performances or movies, or going to dinner in a neighborhood commercial district (Civic Center, Performing Arts and Japan Center).

To accommodate these distinct but similar parking trends, the rate periods to be used in SF*park* garages are set as follows:

midnight	1 am	2 am	3 am	4 am	5 am	6 am	7 am	8 am	9 am	10 am	11 am	noon	1 pm	2 pm	3 pm	4 pm	5 pm	6 pm	7 pm	8 pm	9 pm	10 pm	11 pm
Midnight–9am									9am–Noon				Noon–3pm			3pm–6pm			6pm–Midnight				

The daytime rate periods (9am to Noon, Noon to 3pm, and 3pm to 6pm) are each three hours long, which simplifies the rate structure for customers and garage operators. The rate periods switch between the end of one day to the beginning of the next (i.e., midnight), which makes communicating prices each day much easier than having a rate period which crosses from one day into the next. The daytime rate periods also match the bounds of on-street meter operating hours, which are usually 9am to 6pm.

Overlaid on these rate periods are off-peak discounts, discussed below, aimed at encouraging parking garage customers to drive at times of day with lower congestion, and to be parked, rather than driving on the roads, when Muni is busiest. Rates charged within the rate periods may

vary from one garage to the next based on demand, and prices when demand is typically low will likely be lower than prices during times of day when demand is typically high. Rate-period consistency between garages and on-street metered spaces makes those rates easily comparable to help drivers better evaluate the value of the two options. Initially, to transition from the current rate structure to time-of-day pricing, rates were set close to the rates that had been charged in the garages based on occupancy data, and were lower than many of the current rates.

2. Rates respond to demand over time

Just like with meters at on-street parking spaces, parking garage rates change gradually and periodically based on demand. To start, changes to the rates charged at SF*park* garages are made on a quarterly basis and may be made more frequently during the pilots (but never more often than once per month). Rate changes both respond to and anticipate changes in demand for parking spaces at garages (as measured by garage occupancy) by evaluating demand patterns in the preceding quarter and in the upcoming quarter of the previous year.

The following formula, which balances response to and anticipation of demand at parking garages, is used to determine prices changes for an upcoming quarter:

- Compare garage occupancy for the preceding quarter and garage occupancy for the preceding quarter in the previous year. This number reflects the net change in parking demand from a multitude of factors, including price changes and other exogenous factors such as economic conditions in the Bay Area, etc.
- Take the difference and add it to or subtract it from the garage occupancy for the upcoming quarter in the previous year.

This method responds to changes in overall demand at a garage by using the difference in demand from the previous year, and anticipates seasonal changes in demand by using occupancy from the upcoming quarter of the previous year. Once the formula is applied to reach an occupancy number, the following guides are used in making a price change:

- When occupancy is 80–100 percent, the hourly rate is raised by $0.50.
- When occupancy is 40–80 percent, the hourly rate is not changed.
- When occupancy is less than 40 percent, the hourly rate is lowered by $0.50.

For example, suppose we are approaching the beginning of the 3rd Quarter of 2012. For the 9am–Noon rate period, the occupancy data for the relevant quarters are:

- 2012 Q2: 63 percent
- 2011 Q2: 52 percent
- 2011 Q3: 46 percent

The difference between the occupancy for Q2 in 2012 and 2011 is an additional 11 percent. This 11 percent is then added to occupancy for Q3 of 2011 (46 percent), to reach an occupancy figure of 57 percent. Because 57 percent is greater than 50 percent and less than 80 percent, prices for Q3 of 2012 would not be changed.

SF*park*'s enabling legislation permits the SFMTA to charge between $1.00 and $10.00 per hour in the garages. The rate floor is further refined as follows: during hours of meter operation (9am-6pm), the minimum hourly charge at a particular garage will be set as $1.00, or $0.50 less than the lowest meter rate within two blocks of the garage, whichever is lower. This rate floor accomplishes two goals: (1) it prevents daytime hourly rates from falling to $1.00 due solely to lack of inherent demand for parking in the area of the garage (which might result from construction, the closing of an office building, an economic downturn, or simply the size of the garage); and (2) it explicitly relates garage rates to meter rates, while supporting SF*park*'s goal of giving drivers a financial incentive to go directly to garages by setting the garage rate floor below the rate of nearby meters.

SF*park*'s formula for implementing rate changes allows the lead time necessary to upgrade garage rate signs. In accordance with the SF*park* enabling legislation, the SFMTA notifies the public of rate changes no less than seven calendar days before the change in prices via the SFMTA and SF*park* websites.

Rates in the garages are displayed on two different kinds of signs: boards positioned at automobile entrances to the garages, and smaller signs placed at cashier booths, on ticket machines, and at pay stations. The board has been designed so that the rates themselves are printed on a removable panel. The smaller sign has decals that can be placed securely on a hard surface.

To put any new rates into effect by programming software, printing new signs and replacing the signs, in the garages, several different parties must be informed of the new prices. New rates are conveyed in advance of the date the new rates are set to take effect to the following parties:

- The vendors operating the revenue-control equipment in the garages.
- The vendor retained to print signs.
- The garage operators, who are responsible for replacing all rate signs in their garages at each rate change.

3. "Off-peak" discounts encourages customers to drive and park at times of lower demand

SF*park* offers off-peak discounts to drivers who enter or exit the garages at times of day with low demand for parking and roadway space. Off-peak discounts are most directly aimed at encouraging commuters to arrive before the morning and/or leave after the evening rush hours, to reduce traffic congestion, which slows other drivers and, most importantly, Muni surface vehicles. In order to receive the discount, a driver must park for at least three hours. This requirement prevents short-term parkers from receiving free parking; time-of-day pricing already provides price incentives to travel at off-peak times for short-term parkers. The off-peak discount is only available to people who pay hourly; it is not available for daily (early bird or daily maximum) or monthly parkers. Customers who receive validated parking and are eligible for an off-peak discount receive both discounts.

Transit ridership was included in determination of time periods for off peak discounts. Automatic Passenger Count (APC) data shows that the average number of passengers getting on or off a Muni bus peaks at about 8:30 in the morning and about 5:30 in the evening. The average on/off number passes 20 at about 7:30am and does not dip below 20 again until 7:00pm.

Roadway usage data from the San Francisco County Transportation Authority's Congestion Management Program monitoring report shows that traffic peak periods are similar to the peak periods for Muni service. For automobile travel, that report defines the "AM peak period" as "between 7:00am and 9:00am" and the "PM peak period" as "between 4:00pm and 6:00pm."

In setting the initial off-peak discount times, Muni peak-periods were considered against the potential of the off-peak discount periods to reduce congestion. If the off-peak discount times are set too early or too late, they likely will fail to influence enough drivers to realize the goal of reducing congestion. According to the APC data, avoiding the Muni peak period completely would require setting the morning off-peak time before 7:00am, and the evening off-peak time after 8:30pm, periods when parking demand at garages is relatively low, thus reducing the potential to influence the behavior of enough drivers to effectively influence congestion.

The times set for the off-peak discount at SF*park* garages are as follows: drivers get discounts if they arrive between midnight and 8:30am or leave between 6:30pm and midnight. The effectiveness of these times and the discount amount will be evaluated periodically and adjusted if necessary to better achieve the SFMTA's goals for parking and transportation management.

SF*park*'s enabling legislation allows off-peak discounts between $0.50 and $2.50 per time period. At the outset of the program, off-peak discounts were set at $2.00 (or a total of a $4.00 discount if a driver arrives before 7:30am and leaves after 7:00pm). This discount level may be adjusted during the pilot period to help better achieve goals.

4. SFMTA will continue to have special event pricing at garages

In SF*park* garages, the SFMTA continues to administer special event rates under existing rules for setting special event rates.

5. "Early bird" entry and exit times are consistent across those garages that offer it

Several SF*park* garages offer an early bird rate on weekdays, which provides a discount for entering in the morning and exiting in the evening before certain specified times. Garages that had early bird rates prior to SF*park* retain them, but early bird rates were not added to additional garages. To reinforce the intent of using discounts to encourage drivers to travel at off-peak times, the time period when the early bird rate applies is as follows: a driver must arrive at the garage before 8:30am and exit before the garage closes (or Midnight, for 24-hour garages). For each garage that offers early bird, the early bird rates are set in a range of 33 to 45 percent less than

the daily maximum rates.[1] Drivers who qualify for both the early bird and off-peak discounts are not be provided both discounts, but receive the lower of the two charges.

6. Demand-responsive pricing replaces "evening" and "overnight" rates

Several garages offered low overnight or evening flat rates, which required a driver to enter after a certain time and exit before a certain time the next morning. In those same garages under SF*park*, the flat rates are eliminated, but the hourly rate at those times is lower than at peak times, achieving an effect similar to evening/overnight flat rates through time-of-day pricing. At first, evening parkers may pay more than they do under current rates, but if demand in the evenings is low, rates will continue to drop. All garages, including those that are not open 24 hours a day, charge for parking at all hours of the day.

7. Consistent "grace periods" and "lag times" to improve customer service

Parking garages typically have "grace periods" to prevent customers from being charged for an entire additional hour or half-hour if they leave the garage just a few minutes after the end of a rate period. For example, if there is no grace period, if a customer intends to park for 60 minutes to avoid paying for 90 minutes of parking and attempts to pay after 59 minutes, but waits in line for three minutes to pay and therefore appears to have parked for 62 minutes, the customer will then be charged for 90 minutes. This is a significant, if not the most prominent, source of customer complaints in SFMTA-administered garages. In SF*park* garages, there is a consistent grace period of 2 minutes. As an example, if a customer parks for 1 hour and 32 minutes, that customer is charged only for parking for 1 hour and 30 minutes.

In addition, garages with self-pay systems (in which customers pay at a pay station before returning to their cars, instead of paying an attendant upon exiting the garage), customers require a certain amount of "lag time" after they have paid to get from the pay station, to their cars, and to the garage exit. Currently, all garages with self-pay systems or central cashiers have a 15-minute lag time. SF*park* standardizes this practice, so that all garages offer customers a lag time of 15 minutes.

8. Demand-responsive pricing simplifies rate types

In SF*park* garages, some rate types were eliminated because they are so little used and/or used in so few garages. Demand-responsive time-of-day pricing offers other opportunities to eliminate rate types and simplify the user experience while still offering similar rates.

The garages in the SF*park* pilot areas had 22 different rate types, which result in complex signage. Garages in SF*park* pilot areas reduce the number of rate types, and reduce the number of rate types that are posted on the entry sign, in order to reduce complexity for customers and make it easier to design and update effective signage that quickly and clearly communicates rates. This makes SF*park* garages more friendly and attractive. The following table shows the rate types that have been retained, replaced or eliminated.

1 *During the course of the SF*park *pilot, the early bird rate range was updated from 33 percent less than the daily maximum rate to a range of as 33 percent to 45 percent less than the daily maximum rate. This provided more flexibility to garages that relied heavily on early bird parkers for usage and revenues.*

Current garage parking rate types *(number of garages that used the rate)*	**SF*park* garage parking rate types**
Hourly (15)	Hourly
Weekend (2)	Weekend
Evening (8)	(replaced by demand-responsive hourly pricing)
Overnight (2)	(replaced by demand-responsive hourly pricing)
Sunday (2)	Sunday
Early bird (9)	Early bird and Off-peak discount (for hourly parkers)
12-hour max (1)	Eliminated
Max up to 5pm (1)	Eliminated
24-hour max (15)	Daily maximum
Juror (1)	Retained but not advertised
Student (1)	Retained but not advertised
Monthly (15)	Monthly
Monthly reserved (15)	Monthly reserved
Monthly M–F daytime (6)	Retained but not advertised
Monthly evening (6)	Retained but not advertised
Monthly carpool/carshare (13)	Monthly carpool/carshare
Monthly resident (1)	Retained but not advertised
Daily motorcycle (9)	Daily motorcycle
Monthly motorcycle (11)	Monthly motorcycle
Validation (7)	Validation
Park & Ride validation (1)	Retained but not advertised

Daily rates that are "retained but not advertised" kept their existing prices. Any monthly rates are priced using their approximate current ratios to regular monthly parking rates.

Examples of hourly charges

In SF*park* garages, different hourly rates are charged for different time frames during the day. If a driver enters the garage during one time frame but exits during another, he is charged at one hourly rate for the time parked during the first time frame and a different hourly rate for the time parked during the second time frame (subject to the technical limitations discussed above). The total charge is then rounded down to the nearest quarter to reduce coin handling at garages; thus, a driver whose park time would yield a charge of $16.37 is charged $16.25.

The graphic below illustrates this approach to pricing and how it affects the customer. ▼

Daily maximum and monthly rates

In SF*park* garages, daily maximum, monthly, monthly area reserved (in which a certain area of the garage is set aside for monthly parkers) and monthly reserved (in which customers are guaranteed a spot in the garage) rates are based on a formula in relation to the hourly parking rates. This allows daily and monthly parking rates to fluctuate based on demand along with hourly rates.

Under past garage pricing plans, the 24-hour maximum rates averaged 8.6 times the hourly rates charged by the garages; in other words, the 24-hour maximum rates averaged 36 percent of what a customer would have been charged to park her car for 24 hours at the regular hourly rate. Monthly rates were, on average, 10.6 times the 24-hour max rates, or 35 percent of the amount a driver would have been charged to park at the daily maximum rate for 30 days. Monthly reserved rates at the garages were, on average, 50 percent more than regular monthly rates.

To calculate daily maximum and monthly rates, the SFMTA uses a multiplier between 8 and 14 times the average hourly rate. The average hourly rate is calculated using the average of hourly rates charged between 9am and 6pm on weekdays. This multiplier range closely matches past average ratios, and provides the SFMTA with flexibility in responding to market conditions. This approach to setting daily and monthly rates is intended to be a transparent and easy to understand method for setting daily and monthly rates:

- Daily maximum: The maximum daily rate (which is also the lost ticket rate) is 8 to 14 times the average hourly rate. This is approximately a 60 percent discount from the amount a driver would be charged if he were required to pay for 24 hours of parking.
- Monthly rates: The monthly rate is 8 to 14 times the daily maximum rate, which is approximately a 67 percent discount from the amount a driver would be charged if he were required to pay the daily maximum rate for 30 days.
- Monthly area reserved rates: Approximately a 10 percent surcharge above the monthly rate.
- Monthly reserved rates: A 40–67 percent surcharge above the monthly rate.
- Monthly carpool/carshare rates: 50 percent of the monthly rate.

▼ Sample garage rates

Time of day	Hourly rate
Midnight–9am	$2.50
9am–Noon	$3.00
Noon–3pm	$3.00
3pm–6pm	$2.50
6pm–Midnight	$2.50

▼ Receipt mockups using sample rates

1. Driver parks from 9:00am to 5:00pm

SF*park*
Moscone Center Garage
255 3rd Street, San Francisco, CA 94103
(415) 777-2782
San Francisco Municipal Transportation Agency
sfmta.com | SFpark.org

November 16, 2010, 5:00pm

Thank you for parking with us!
Parking charged in 60-minute increments
Prices include all tax

Hours parked	Price per hour	Hours charged	Total charge
9:00am (entry) – Noon	$3.00	3	$9.00
Noon – 3:00pm	$3.00	3	$9.00
3:00pm – 5:00pm (exit)	$2.50	2	$5.00
		Total	$23.00
		You pay	$23.00

2. Driver parks from 8:53am to 9:40am

SF*park*
Moscone Center Garage
255 3rd Street, San Francisco, CA 94103
(415) 777-2782
San Francisco Municipal Transportation Agency
sfmta.com | SFpark.org

November 16, 2010, 9:40am

Thank you for parking with us!
Parking charged in 60-minute increments
Prices include all tax

Hours parked	Price per hour	Hours charged	Total charge
8:53am (entry) – 9:23am (exit)	$2.50	1	$2.50
		Total	$2.50
		You pay	$2.50

3. Driver parks from 2:32pm to 8:17pm

SF*park*
Moscone Center Garage
255 3rd Street, San Francisco, CA 94103
(415) 777-2782
San Francisco Municipal Transportation Agency
sfmta.com | SFpark.org

November 16, 2010, 8:17pm

Thank you for parking with us!
Parking charged in 60-minute increments
Prices include all tax

Hours parked	Price per hour	Hours charged	Total charge
2:32pm (entry) – 3:32pm	$3.00	1	$3.00
3:32pm – 6:32pm	$2.50	3	$7.50
6:32pm – 8:17pm (exit)	$2.50	2	$5.00
		Off-peak discount	- $2.00
		Total	$13.50
		You pay	$13.50

Other important notes about daily and monthly rates:

- Daily maximum rates are rounded to the nearest dollar (rates ending in $0.49 or lower rounded down, rates ending in $0.50 or higher rounded up), while all monthly rates are rounded to the nearest $5 (rates ending in $2.49 or lower rounded down, rates ending in $2.50 or higher rounded up).
- Drivers who pay monthly rates at the garages tend to be repeat customers who are likely to expect consistency in those rates. The SF*park* pricing formula provides such consistency by making monthly rates approximately 100 times hourly rates (8 to 14 x average hourly rate = daily maximum, 8 to 14 x daily maximum = monthly rate). Multipliers were adjusted during the program to better achieve parking and transportation goals[2].

Motorcycle rates

In SF*park* garages, motorcycles are charged a flat daily rate that is between a 67 percent and 80 percent discount off the daily maximum rate charged to cars. The rationale for offering this discount is that, in garages, one car space can accommodate three to five motorcycles. This is also consistent with the current average discounts for motorcycles. The actual charges to motorcycles are rounded to the nearest dollar to reduce coin handling. The monthly rates for motorcycles are set as follows: motorcycle daily flat rate times a multiplier between 9 and 13 equals the monthly motorcycle rate.

Download full document at:
SFpark.org/docs_offstreetgarages

Off-street metered lots

This section summarizes how the SFMTA uses occupancy data to make demand-responsive rate adjustments at parking meters in SFMTA parking lots.

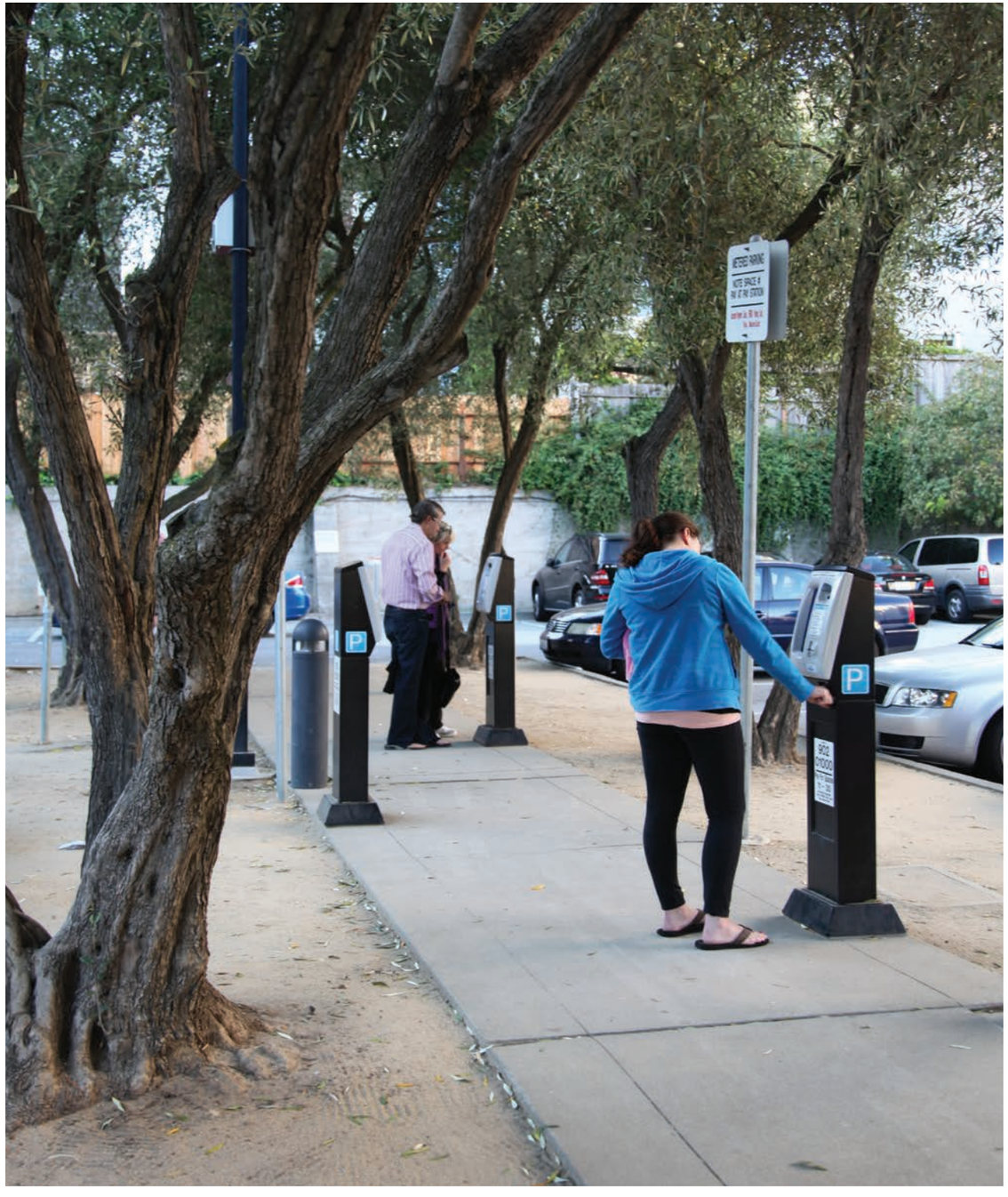
The off-street metered lots are managed similarly to the on-street metered spaces. They offer demand-responsive rates according to similar occupancy goals and time bands for pricing.

Off-street metered lots may operate for longer hours than nearby on-street meters. In these cases, additional time bands are added.

On blocks that offer both on-street and off-street metered spaces, the off-street meter occupancy levels are evaluated separately from the on-street spaces for all time bands. Rate changes occur in coordination with on-street rate changes.

Download full document at:
SFpark.org/docs_offstreetlots

*2 The initial SF*park *off-street pricing policy calculated daily maximum and monthly rates using multipliers between 9 and 13. These multipliers were expanded to 8 to 14 in order to give garages more flexibility in addressing differences between hourly, daily and monthly parking demand, and in competing with other nearby off-street parking facilities.*



Other parking management policies

Accessible parking, residential parking, and on-street car share

There are many pieces to the parking management puzzle that work together to meet a city's goals. The SFMTA has addressed three primary areas over the last several years: disability parking placard policies and improving residential parking management can help open up parking spaces for those who need them, while utilizing on-street spaces for car share can reduce parking demand.

Accessible parking

The Accessible Parking Policy Advisory Committee reviewed and made recommendations regarding on-street accessible parking policies, including those governing disabled placards and blue zones. This section excerpts the Accessible Parking Policy Advisory Committee's recommendations report.

On a daily basis, people with disabilities have trouble finding parking in San Francisco, making it more difficult to access their destinations. Current disabled parking placard and blue zone policies are failing to increase access for people with disabilities, reducing parking availability for all drivers. San Francisco's Accessible Parking Policy Advisory Committee worked together to find a better solution.

In October 2012, the SFMTA worked with the Mayor's Office on Disability to gather 16 stakeholders who would tackle the challenge of making parking more accessible. The majority of the Accessible Parking Policy Advisory Committee members were disability rights advocates, joined by others representing business, regional transportation, and medical voices. For six months, they worked to identify problems, establish goals, review research, analyze solutions, and create an integrated set of recommendations.

The Accessible Parking Policy Advisory Committee identified an interconnected program of policy recommendations to increase access to street parking and reduce disabled parking placard misuse. After researching best practices from cities across the country, analyzing San Francisco's needs, and weighing many options, the Committee came to a broad consensus on the following interdependent state (CA) and local (SF) policy changes to achieve these goals.

1. Increase blue zones

To reserve more parking spaces for people with disabilities, 4 percent of metered parking spaces should be blue zones. This 70 percent increase would require the SFMTA to install at least 470 new zones. The Mayor's Office on Disability should reevaluate San Francisco's blue zone placement guidelines to enable zones in more locations. (SF)

2. Improve enforcement of placard misuse

The SFMTA should develop disabled parking placard enforcement improvements. This could include increasing the number of parking control officers that enforce placards, increasing stings, and other options. (SF) The DMV should make placard holder photos available to parking control officers. (CA)

3. Increase oversight of placard approvals

The DMV should upgrade its database to include information about the medical providers who certify placards, and should take steps to ensure that the providers are legitimate. The existing DMV placard application eligibility criteria should be clarified to ensure that placards are issued to people with a functional need for them. (CA)

4. Allow communities to remove the meter payment exemption

Based on experiences in other cities, requiring everyone to pay at the meter is the most effective way to reduce placard misuse and open up parking spaces. In Philadelphia, downtown parking availability increased by over 500 percent when placard holders started paying at the meter. The Committee recommends that this policy should only be allowed as an option in jurisdictions that offer accessible payment options. (CA)

5. Direct revenue to accessibility improvements

The SFMTA should work with the disability community to channel funds from metered blue zones into accessibility improvements that would enhance mobility for people with disabilities. (SF)

6. Allow communities to establish reasonable time limits

In order to help open up parking spaces, placard holders should have four-hour time limits at regular and blue meters, unless the posted time limit is longer. Placard holders should be able stay up to 30 minutes at green short-term loading zones, not including time spent getting in and out of the vehicle. Paid for by qualifying merchants, green zones are intended to support local business and reduce double-parking. At the state level, communities would have the option of establishing time limits for placard holders, but no shorter than four hours at general spaces and no shorter than 30 minutes in green zones. (CA)

In its November 19 resolution of support for the above six recommendations, the SFMTA Board of Directors directed staff to develop a discount program for low income people with disabled parking placards, should state law changes move forward allowing communities to remove the meter payment exemption. This additional requirement is in direct response to public feedback that low income people with disabilities who travel by private vehicle may be negatively impacted by the shift from free parking to meter payment.

The Accessible Parking Policy Advisory Committee recommendations report contains details about the committee's members, process, research, recommendations, outreach, and next steps. For more information, see SFMTA.com/accessibleparking.

Download the full report at:
SFpark.org/docs_accessibleparkingreport

Other accessible parking documents

Accessible parking video

This video shows the difficulties faced by people with disabilities in accessing parking, and profiles several of the Accessible Parking Policy Advisory Committee members.

View the video at:
http://youtu.be/FOW_U1li0AU

Accessible parking policies and practices in other jurisdictions

This document examines existing accessible parking management practices in twelve jurisdictions outside of San Francisco. It summarizes their strategies for disabled parking placard issuance, meter payment, time limits, enforcement of placard misuse, public education, and administration.

Download the full document at:
SFpark.org/docs_otherjurisdictions

Interviews with advocates and city staff in other jurisdictions

A summary of interviews with advocates and city staff in Philadelphia, Arlington, New York, Detroit, and Phoenix.

Download the full document at:
SFpark.org/docs_interviews

Accessible parking policy options evaluation

The Accessible Parking Policy Advisory Committee identified 19 potential policies and practices that they felt were worthy of further evaluation. This document contains an analysis of each idea according to the Committee's agreed-upon effectiveness and feasibility criteria. Sections include: blue zones, disabled placard issuance, time limits, meter payment, and enforcement.

Download the full document at:
SFpark.org/docs_policyoptions

Residential parking

Improving residential parking management could reduce circling and double-parking even more significantly than improvements to metered parking management. Only 9.6 percent of San Francisco's on-street parking spaces are metered, and it is often harder to find parking in residential areas than metered commercial areas.

As in some cities, San Francisco uses a residential parking permit (RPP) program which sets time limits for non-resident parkers to discourage commuters from parking in residential neighborhoods. Established in 1976, San Francisco's RPP program helps to address daytime commuter parking issues but it can still be hard to find a parking space in some areas during peak times. There are several reasons why:

- Parking demand, whether from residents or visitors, can exceed the finite supply of parking spaces, especially near commercial areas or in high-density residential areas.
- Peak parking demand may be in the evenings and/or weekends, when RPP restrictions are rarely in effect.
- Non-residents may overstay time restrictions.
- Enforcing parking time limits is more resource intensive than other approaches, making it more difficult to enforce RPP time limits adequately.
- Some residents choose to store their cars on-street rather than in their garages.
- Many residential areas co-exist with commercial business areas, creating potential conflict between parking for residential and business purposes.

This mismatch between supply and demand for parking in some residential areas has consequences for residents, visitors, and businesses, which include:

- Driver frustration. Searching for parking can be time consuming, frustrating, and degrade quality of life.
- Drivers circle for parking. Circling to search for parking wastes fuel and creates unnecessary traffic congestion, noise, air pollution, and greenhouse gas emissions, as well as more opportunities for collisions.
- Drivers park illegally. Some drivers choose to park illegally if they cannot quickly find an open space close to their destination. Illegally-parked cars may block fire hydrants, bike lanes, driveways, or sidewalks, creating quality of life, safety, and accessibility issues. When parked in bus stops or double-parked on transit routes, illegally-parked cars can also delay transit, making Muni slower and less reliable as well as causing congestion.
- Less density. Some residents oppose new development and greater density in their neighborhood because they think it will increase demand for the limited supply of on-street parking spaces, even if the development may be otherwise beneficial for the neighborhood and the city.

The SFMTA was awarded federal funding to investigate better methods for managing residential parking. The SFMTA will explore how it could evolve or change existing practices in San Francisco, doing work that will inform similar policy development in other cities.

On-street car share

Car sharing helps the SFMTA achieve its goals for managing parking and the overall transportation system in San Francisco. This section reviews the SFMTA's pilot programs dedicating on-street space to car sharing.

Car sharing helps cities achieve goals by reducing car ownership rates, parking demand, vehicle miles travelled, and greenhouse gas emissions, all while maintaining or improving mobility and access for people living and working in the city. So facilitating car sharing is an urgent issue for parking and transportation management.

Car share organizations report that one of their main constraints for expanding car sharing is the difficulty of acquiring parking spaces for car share vehicles. They typically rely on one-off leases with parking lots or garages, which often are not located in all parts of the city. Using on-street parking spaces as car sharing pods (i.e., where users pick up and drop off car sharing vehicles) can encourage car sharing by increasing its visibility, improving proximity to trip origins, and increasing the number of vehicles available. On-street spaces are also uniformly distributed throughout the city so car sharing organizations can expand in areas where they see the most opportunity for growth. As managers of over a quarter million on-street public parking spaces, the SFMTA is in a position to utilize on-street parking supply to facilitate and extend car sharing in San Francisco in support of the city's and the agency's goals.

Small-scale share pilot evaluation

In late 2011, the SFMTA implemented a pilot of on-street car sharing spaces under an agreement between the City Administrator's Office and City CarShare. Twelve test spaces were implemented in late 2011 through early 2012. Evaluation of the initial pilot after six months of operation showed that on-street car sharing spaces are technically feasible in San Francisco, and they can be quickly become well-utilized and productive. But converting parking spaces from general parking to dedicated car share is challenging, and community outreach and political support are needed for proposed car-share spaces to be approved. Commercial areas offer high visibility and accessibility, but may present enforcement challenges; enforcement and construction closures were operational issues calling for further refinement and coordination.

Download the full document at:
SFpark.org/docs_carshareevaluation

Large-scale pilot policy and program

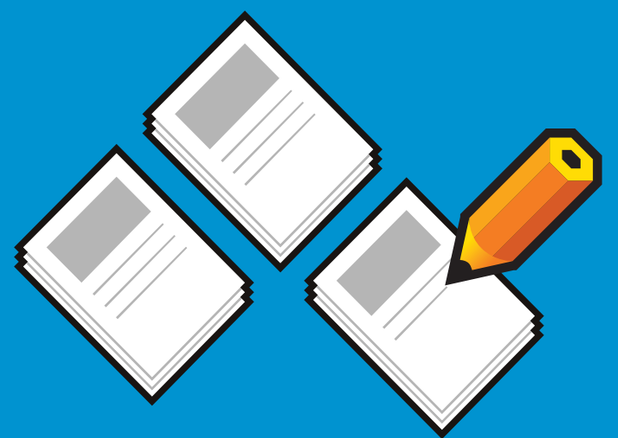
In July 2013 the SFMTA adopted a formal policy to facilitate car sharing in its off-street parking lots and garages, as well as approve an enlarged two-year pilot of on-street car share spaces to build upon lessons learned from the initial small-scale pilot. The enlarged pilot program will make as many as 900 on-street parking spaces available across all districts of the city for use by car share organizations over the two years of the pilot. Participation in the on-street car share pilot is open to qualified car share organizations (as defined in the San Francisco Transportation Code) who commit to further requirements for outreach, data collection, pod placement, and vehicle availability.

Download the full document at:
SFpark.org/docs_carsharepolicy

3.

ADMINISTRATION & CONTRACT MANAGEMENT

Implementing the SF*park* pilot project broke new ground technologically. As a result, project teams had to overcome unforeseen technological limitations of new and existing equipment, complicating the project's administrative oversight. The project's accelerated schedule also challenged municipal procurement, contracting, reimbursement, budgeting, hiring, and approval processes.



Implementation approach

To buy or to build?

For the SF*park* pilot project, the SFMTA had an ambitious vision for a relatively complex parking management approach and the system that makes it possible. To implement that vision, the SFMTA chose a particular path for project contracting and administration. Regardless of the contracting approach, a project with this degree of policy and technological complexity requires extensive administrative effort and expertise.

SF*park* contracting approach

The SFMTA had several broad options for contracting when considering how to accomplish the SF*park* pilot project. At one end of the spectrum, the SFMTA could have attempted to develop and manage the program entirely in-house, developing everything for the project with its own staff, such as using open source tools to build all of its own data acquisition and business intelligence tools, and implement the program entirely without contracted services or goods. At the other end of the spectrum, the SFMTA could have chosen to deliver the entire program through a turnkey approach, hiring a prime contractor to develop and manage the entire program.

The SFMTA used elements of both approaches, contracting some services but maintaining control of day-to-day management and design, in a way that fit the SFMTA's needs and capacity. Reasons for that decision include a desire to deliver the project expeditiously while cultivating and deepening the skills of SFMTA staff as well as its organizational capacity.

Building internal staff capacity

1. Developing some portions of the pilot project technology in-house was an opportunity to build SFMTA staff capacity and expertise for both technology and contract development and management.
2. Being heavily involved with the hands-on, day-to-day contract specification, procurement, and subcontract management process was a way to deepen the SFMTA's familiarity with various aspects of the SF*park* pilot technology.
3. Playing a strong role in contract and subcontract management was another opportunity to increase SFMTA staff capacity in a way that would have been minimal in a turnkey solution.
4. The SFMTA contracted out some key portions of the project. For example, the SFMTA wanted to employ known and proven experts for sophisticated IT development to plan and develop a data warehouse and business intelligence tool—the SFMTA did not have that skill set in-house. The SF*park* development process has been an opportunity to increase the SFMTA's overall information technology sophistication and begin to apply those lessons to other parts of our agency and operations.
5. To provide the necessary staffing levels for the large and temporary level of effort required to plan and implement the pilot project, the SFMTA augmented its internal staff with contractors who were part of the project team.

Building internal organizational capacity

1. The SFMTA chose to develop a data management platform of its own so that the SFMTA, rather than a vendor, would own and manage that platform. By creating this agnostic system, the SFMTA can now simply add or remove components such as parking meters, parking sensors, or other data sources.
2. Developing this system was a major organizational challenge, but it also enhanced the SFMTA's knowledge and ability to manage parking and the overall transportation system in the future.

Buying versus building

1. The SFMTA chose to purchase software tools rather than develop its own. While open source software tools were considered, extensive software development is not one of the SFMTA's core competencies, especially for data acquisition tools.
2. Understanding and interpreting parking and transportation data is a core part of the SFMTA's business. There was no off-the-shelf tool available to integrate multiple parking-related feeds (e.g., meter, sensor, pay by phone, and garage) from multiple vendors, so the SFMTA chose to develop those tools in-house by modifying existing software.
3. This more complex system was required to support the rigorous evaluation of the SF*park* pilot projects. This amount of data processing may not be necessary for other cities that pursue more operationally-oriented systems.
4. Whether buying or building, it is critical that all choices are consistent with the current technical standards as well as future strategic direction of your organization's IT group.

Project staffing

The right people for a complex project

The SFMTA needed people with the right abilities and skills to both develop and implement the project and to maintain and operate it in the long term.

Roles and responsibilities

Because of SF*park*'s complexity, implementing the pilot project required a larger and deeper variety of roles and skills than anticipated. For example, the effort required to plug all data sources into the data warehouse far exceeded our expectations.

Roles required to implement the SF*park* pilot project

- Executive director and advocate
- Program manager
- Project manager
- Parking sensor project manager
- Roadway sensor project manager
- Parking meter project manager
- Parking garage operations manager
- Parking garage implementation manager
- Pilot project evaluation manager
- IT system development manager
- Database administrator
- Business intelligence development manager
- Systems developer
- Procurement manager
- Parking policy analyst
- Ongoing rate adjustments analyst
- Administration and support
- Accounting and billing
- Grants accounting
- Data collection lead
- Project evaluation lead
- Customer service lead
- Product and brand manager
- Marketing, outreach, communications manager
- Legal support

Key skills that were required in the SF*park* team

- Project management
- RFP and contract development, procurement
- Vendor management, multivendor integration
- Geographic Information Systems (GIS) map development and data management
- Survey design, data collection
- Performance measurement and evaluation
- Information technology expertise: design and implementation of service-oriented architecture (SOA), knowledge of IT best practices
- Transportation planning and policy research and development
- Communications, marketing
- Knowledge of local government structure, neighborhood and merchant organizations
- Public speaking
- Writing, editing
- Business data modeling
- Business process engineering
- Requirements gathering
- Conflict resolution
- Phased implementation planning expertise
- Smartphone testing
- Screen design, user interface design

Contracts

Procuring necessary goods and services

Implementing the SF*park* pilot project required contracts with a variety of vendors as well as working with these vendors to confront project challenges together. In addition to this spirit of partnership, the project's new technology, variety of vendors, and aggressive schedule required intense contract management and oversight.

Contract management considerations

During procurement

- Clearly specify the deliverables and performance standards (ideally with financial incentives to achieve targeted performance), including the methodology for measuring them, in RFPs and contracts.
- Do not limit yourself with unnecessarily specific statements of work. Focus on the business deliverable rather than a specific technology implementation, as the technology will change.
- Relate payment to performance for both upfront and ongoing deliverables.
- Relate payment to delivery of functionality and not delivery of equipment.
- Rigorously field test and verify all vendor claims and performance in real-world tests during the selection process.
- Have prospective vendors submit sample project plans, support procedures, and service level agreements with their proposals.
- Avoid getting between a vendor and another agency. Contracts should be structured so that the vendor is directly responsible for any permitting required by other agencies.
- Anticipate that project contracts for unfamiliar and complex technology and services will require a large amount of legal support.

During contract management and delivery

- Include contingency that is adequate and appropriate for a new undertaking in a complex area.
- Always have "plan B and C" strategies.
- Rigorously field test and verify all vendor claims and performance in real-world tests during the formal acceptance of the goods or services.
- Require that all backup and redundancy/high-availability features be demonstrated as part of the acceptance process.
- Put in place data management and reporting to make it easy to manage performance-based contracts.


How to Pay
By Coin
By Credit or Debit Card
By SFMTA Parking Card
SFpark
Coin Return

Funding and finance

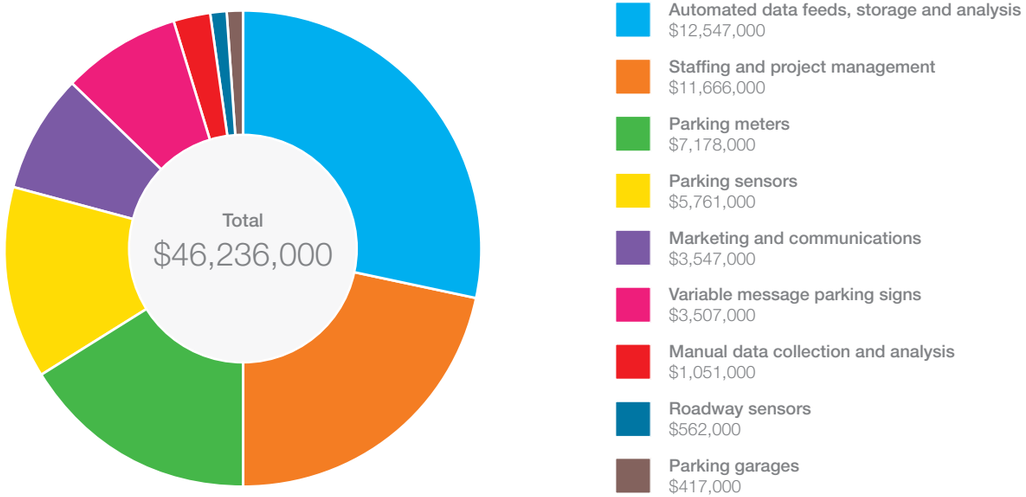
How much did SF*park* cost, and how will it save time and money for other cities?

The SF*park* pilot project was a federally-funded demonstration of a different approach to managing parking. The intent was for the SF*park* experience to show other cities what was possible, and to enable them to learn from and improve upon the San Francisco experience.

Costs of SF*park*

SF*park* was funded primarily through a $19,800,000 grant from the United States Department of Transportation, a $22,000,000 loan from the Bay Area's Metropolitan Transportation Commission, and local matching funds totaling $4,950,000.

SF*park* program costs
Through March 2014



Automated data feeds, storage, and analysis
Providing real-time data and making data-driven decisions about parking management required the collection, storage, and analysis of large amounts of data. To make this possible, the SFMTA purchased new hardware and software to store data, and the SF*park* technical team used that software to develop a somewhat custom data management system that forms the basis of SF*park* operations. This system receives data (both real-time and more static updates), processes and organizes and stores that data, and provides real-time data feeds.

That system also contains powerful analytical and reporting tools that enable a rigorous evaluation of the pilot. Much more importantly, however, these tools allow SF*park* analysts to operate the project (e.g., calculate demand-responsive rate changes), manage performance-based contracts, monitor the parking system, do ad hoc analyses to support SFMTA, and operate the SFMTA's parking system (e.g., maintaining a record of all meter configurations, which is the basis for many SFMTA business processes). With this system in place, analyses that once took months (or were impossible) can take seconds or minutes to complete, so SFMTA can now use data to make much more informed decisions and better manage transportation. In this sense, SF*park* is a powerful example of what the term "smart cities" can mean. This system was also designed to be readily expandable to support the same kind of data-intensive approach for other aspects of the transportation system so that SFMTA can make more data-driven decisions for things like public transit.

The technical team's consulting services included several essential tasks, including:

- Integration of data feeds from sensors, meters, roadway sensors, and garages
- Service and support for data feeds, including troubleshooting during the launch and operation of SF*park*
- Creation of complete inventory of meter data (including, among other things, rates, type, manufacturer, schedule, and installation date) for tens of thousands of parking spaces
- Pilot project evaluation support
- Support in developing reports and analytical tools for contract management and operations
- Addressing repeated technical issues with meters and sensors

Automated data feeds, storage, and analysis	$12,547,000
Business intelligence training Training for analysts on how to use the Oracle business intelligence analytical and reporting software	$23,000
Developer staff time BI development; integration of data feeds from sensors, meters, roadway sensors and garages; service and support for data feeds; creation of parking space inventory; pilot project evaluation support; address technical issues with meters and sensors	$6,519,000
Hardware (servers and storage) Servers and storage area network (SAN) for SF*park* data storage	$626,000
Software licenses License to use Oracle data management and analytical software	$5,379,000

The technical aspect of the project was more costly than expected, but it was an investment that the SFMTA can leverage going forward to better manage transportation. Also, as a federally-funded demonstration, federal funding largely paid for the development of a first-of-its-kind and award-winning data management system, proving what is possible in other cities. As other cities move in this direction, the SF*park* experience should help to shorten their timelines and lower their costs:

- Meter and sensor technology has improved, resolving many data quality and data transfer issues that cost SF*park* considerable time and money. Much of the SF*park* technical team's time was spent helping to resolve issues with vendor's equipment as we worked together to launch this first-of-its-kind project. For example, the SF*park* team wrote specifications for how the meter, sensor, and garage data vendors would send data in a way that would meet the needs of the project. These specifications are likely to be adopted (or minimally inform) as industry standards going forward, saving vendors and cities significant resources in the future.
- Integrating data from the first sensor vendor, Streetline, cost approximately $300,000 of the technical team's time (and delayed the project launch by many months). Streetline and their sensors were later replaced by StreetSmart because Streetline

could not meet contractually-specified performance standards.
- Because SF*park* was a pilot project that required the storage and analysis of large amounts of data for evaluation, the technical team built a larger and more sophisticated system than would have been necessary for a simpler operation.
- Because San Francisco has multiple meter vendors, the SF*park* technical team acted as the de-facto integrator of meter vendor technology. Where a city has only one meter vendor, this integration task would not be necessary.

To make it easier for other cities to pursue this approach, the SFMTA created a technical "how to" manual that complements this document and is aimed at IT managers in other cities. The intent of that document is to accelerate the schedule and reduce the cost replicating and improving on the SFMTA's work.

Download the full document at:
SFpark.org/docs_techmanual

Parking equipment, materials, and service

SF*park* was a first-of-its-kind program that used the cutting edge in parking technology. In many cases, SF*park*'s requirements pushed the limits of the capabilities of that technology, and required intensive testing and ruggedization by the SF*park* team.

Parking meters	$7,178,000
Credit card fees SF*park*-paid transaction fees for credit card payments at parking meters in pilot areas	$32,000
Enforcement officer vehicles New enforcement vehicles to enforce parking violations in pilot areas	$475,000
Installation materials Acquire materials necessary for parking meter and sign installation	$139,000
Production, installation, and data management Production of approximately 6,500 parking meters and their ongoing data management and communications costs	$6,532,000

Parking sensors	$5,761,000
Production, installation, and maintenance Production, installation, and maintenance of parking sensors for approximately 8,100 parking spaces in SF streets	$5,664,000
Testing Testing efficacy of parking sensors	$97,000

Roadway sensors	$562,000
Production Production of roadway sensors	$303,000
Installation Installation of roadway sensors	$259,000

Parking garages	$417,000
Hardware and software upgrades Purchase and installation of servers/racks for SF*park* garages	$110,000
Programming/data transfer Programming SF*park* pricing at garages; periodic rate adjustments; providing usage and payment data from garages to SF*park* servers	$276,00
Project management consultant Short-term consultant for program launch	$31,000

Manual data collection and analysis

SF*park*'s data collection efforts included the gathering of extensive amounts of non-automated data before, during, and after the project, including:

- Manual ("intercept") surveys of neighborhood visitors
- Double-parking
- Parking search time
- Occupancy
- Turnover

SF*park* hired two firms to collect and analyze this data: Ewald Wasserman for intercept surveys and Nelson/Nygaard for other data collection and support. The costs for this data collection and analysis is as follows:

Manual data collection and analysis	$1,051,000
Intercept survey data collection and analysis Intercept survey administration (questions of the street to drivers), data collection, and analysis	$157,000
Manual data collection, policy support, and evaluation support Manual collection of street and parking data, including: parking search time, double parking; policy and evaluation support	$894,000

Marketing and communications

Planning, implementing, and operating a new approach to managing parking required extensive design, communications, outreach, and marketing. The launch of the pilot project included:

- Branding as a special project under the SFMTA umbrella
- Flyering and outreach for every change to the street or to rates
- Press event at launch of program
- Ads on buses and bus shelters
- Hundreds of presentations to community and merchant groups

The SF*park* app displays a map showing parking availability and prices in SF*park* pilot areas. To avoid a potential patent dispute, the SFMTA purchased a license from a company, the cost of which appears below as "License to display real-time parking info."

Marketing and communications	$3,547,000
Administration and planning Advising SF*park*'s marketing and communications efforts, and website/app/map design	$283,000
Advertising Design and produce advertising for SF*park*	$182,000
Communications and public relations Support communications, including press releases, public outreach, and publications	$879,000
Garage signage/painting, marketing, and upgrades Assist with marketing strategy and design, produce signage and marketing materials for SF*park* garages	$548,000
License to display real-time parking info Obtain license from holder of patent regarding display of parking information	$212,000
Mapping for SF*park* Develop map API for SFpark.org	$53,000
Printed materials and signage Print advertisements, posters, communications signage, and other publications	$583,000
Support and on-call assistance Provide support to SF*park* project team with all aspects of marketing and communications	$26,000
Text message service for garage parking availability Implement text message service showing parking garage availability and pricing	$21,000
User experience, apps and maps Design all aspects of SF*park* customer experience, including app, maps, signage	$760,000

Staffing and project management

SF*park* required the dedicated work of a core project team over the course of seven years, from initial grant applications and planning to data analysis and evaluation, and also required the contribution of dozens of other SFMTA staff members.

The costs summarized below include work billed to the SF*park* program by SFMTA employees—work directly linked to the planning and implementation of the program, such as meter installation, rate adjustments, policy drafting, etc. This does not account for the relatively minor indirect costs included in SFMTA's administrative overhead, such as accounting duties and oversight by the SFMTA's executive team.

Staffing and project management	$11,666,000
Administrative Provide administrative and executive support for project implementation	$357,000
Meter Shop Install and maintain all SF*park* meters	$1,908,000
Off-Street Parking Division Consult on policy drafting, provide support for project implementation	$50,000
Project team Plan and implement SF*park* program	$2,386,000
Contracted project staff, technical analysts, and interns Project planning and implementation, policy and IT development, equipment testing, subcontract management and administration, and evaluation	$6,701,000
Sign and Paint Shops Consult on changes to streets and signage, provide support for project implementation	$174,000
Traffic Engineering Test new enforcement strategies, provide support for project implementation	$21,000
Miscellaneous printing and materials Printing and materials necessary for day-to-day functions of project implementation	$69,000

Variable message parking signs

Part of the grant money from the federal government was devoted to installing, wiring, and operating variable message signs to inform drivers of available parking at garages around the City. This involved purchasing and installing signs, running fiber-optic cable to those signs, and connecting the signs to the SF*park* off-street parking availability feed.

Variable message parking signs	$3,507,000
Staffing labor	$532,000
Materials, supplies, construction	$2,975,000

Cost savings and incremental costs

SF*park*'s use of advanced parking technology resulted in some cost savings of costs incurred for parking management before the program. In particular:

- Payment at meters by credit card reduces the cost of collecting coins at meters. This is calculated using a per-year estimate of reduced coin-collection costs from the coin-collection vendor, multiplied by the number of SF*park* meters and the length of time those meters were in operation.
- Increased use of Pay-By-Phone, in which customers pay the credit card fees, reduced the credit card fees incurred by the SFMTA. This is calculated as the credit card fee per transaction multiplied by the total number of Pay-By-Phone transactions, multiplied by the number SF*park* meters, multiplied by the percentage of Pay-By-Phone transactions that replaced credit card transactions.

Cost savings resulting from SF*park*, or costs that would have been incurred in the absence of SFpark	
Reduced coin collection at meters	$356,000
Saved credit card fees from Pay-By-Phone usage	$78,000
Rate updates at garages	$6,000
Total	**$434,000**

More broadly, many other cities have benefited from the federal investment in SF*park*. For example:

- SF*park* staff have advised other cities around the world as they considered new approaches to parking management, including New York City, Seattle, Berkeley, and Rio de Janeiro.
- SF*park* staff supported the planning of Los Angeles's ExpressPark program.
- Various cities have taken advantage of San Francisco's specification for new parking meters that uses lessons learned from the SF*park* pilot project in their Request for Proposals for new smart parking meters.

4.
EVALUATION

The SFMTA conducted a thorough evaluation of SF*park*, summarized in this chapter. 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 evaluation period, 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

The SFMTA conducted a thorough evaluation of SF*park*, summarized here. The full evaluation can be downloaded at the following link.

Download the full evaluation at:
SFpark.org/docs_pilotevaluation

SF*park* improved parking availability

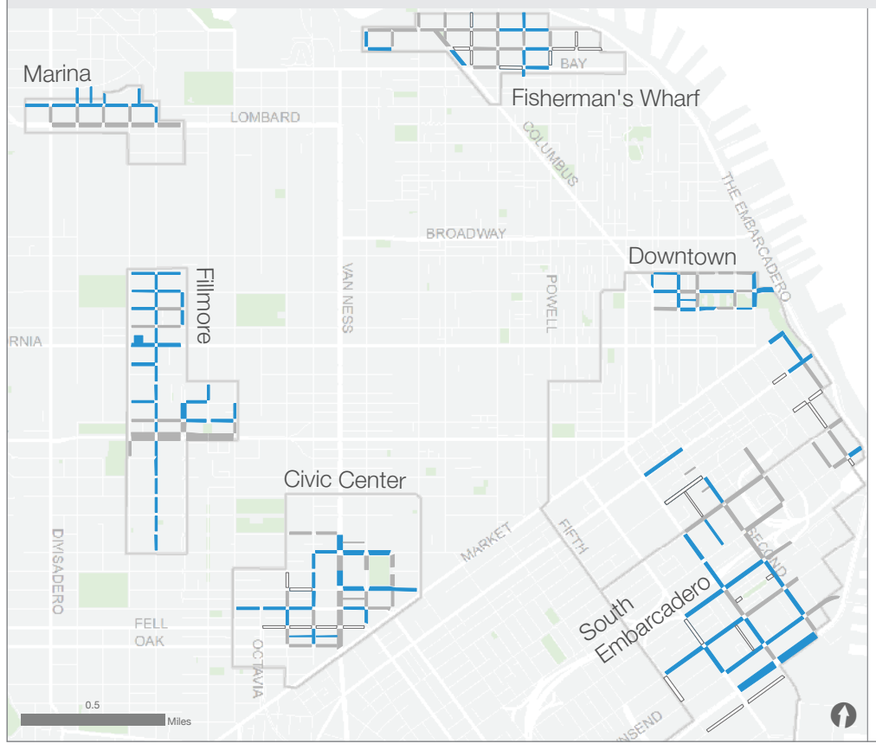
While the SF*park* pilot project had many goals, its primary focus was to make it easier to find a parking space. More precisely, the goal was to increase the amount of time that there was parking available on every block and improve the utilization of garages. Besides helping drivers, making it easier 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.

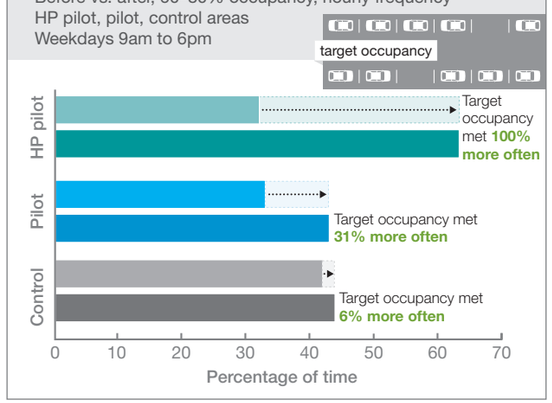
Improved parking availability

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



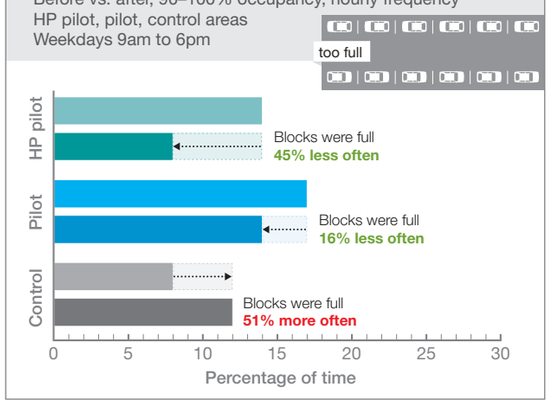
How often do blocks meet target occupancy?

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



How often are blocks too full?

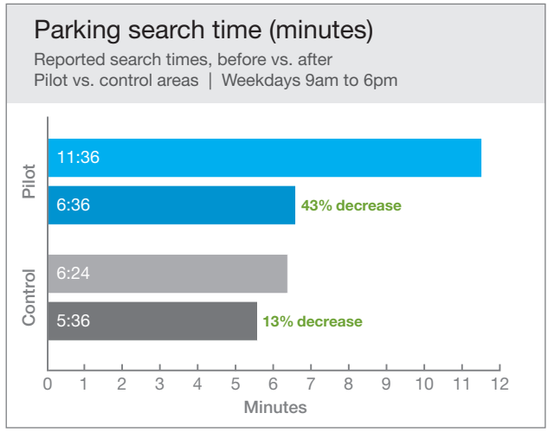
Before vs. after, 90–100% occupancy, hourly frequency
HP pilot, pilot, control areas
Weekdays 9am to 6pm



Secondary benefits

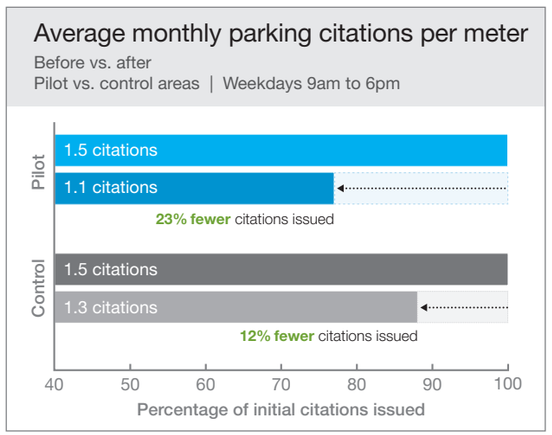
This section outlines the benefits of meeting occupancy goals and making sure that there are open parking spaces.

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.

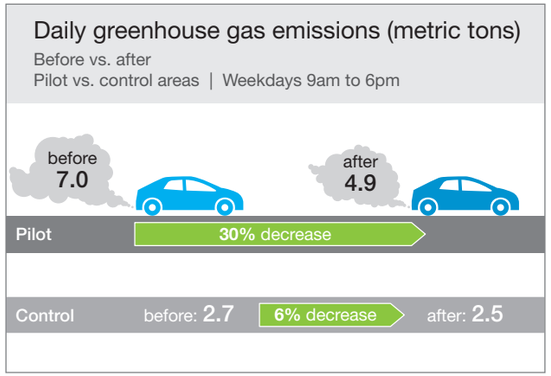


It is easier to pay and avoid citations. SF*park* also sought to create a parking experience that is simple, consistent, easy to use, and respectful. The pilot project improved the experience of parking by lengthening time limits and making it much easier to pay. Drivers surveyed before and after SF*park* 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 36 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.

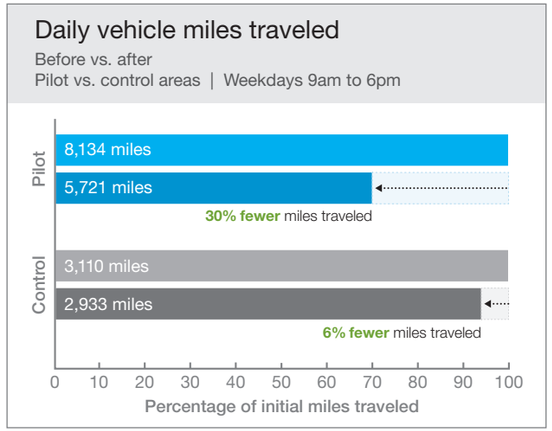


Peak period congestion decreased. SF*park* encouraged people to drive at non-peak times and improved parking availability when it mattered most. On-street parking availability improved by 22 percent during peak periods, compared to 12 percent during off-peak. In SF*park* garages, morning peak entries 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.

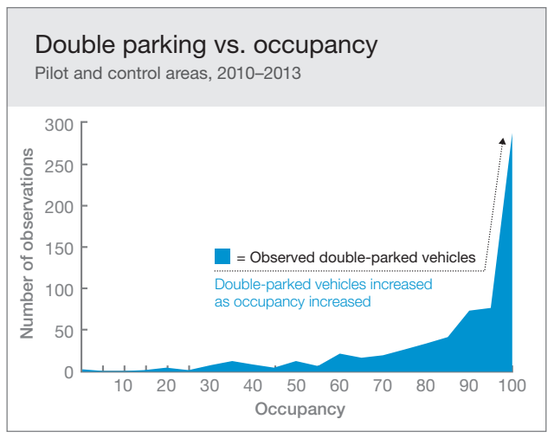
Traffic volume decreased. In both pilot and control areas, where parking availability improved, traffic volume decreased by approximately 8 percent, compared to a 4.5 percent increase in areas where parking availability worsened.

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 SF*park

*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 SF*park

*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 SF*park

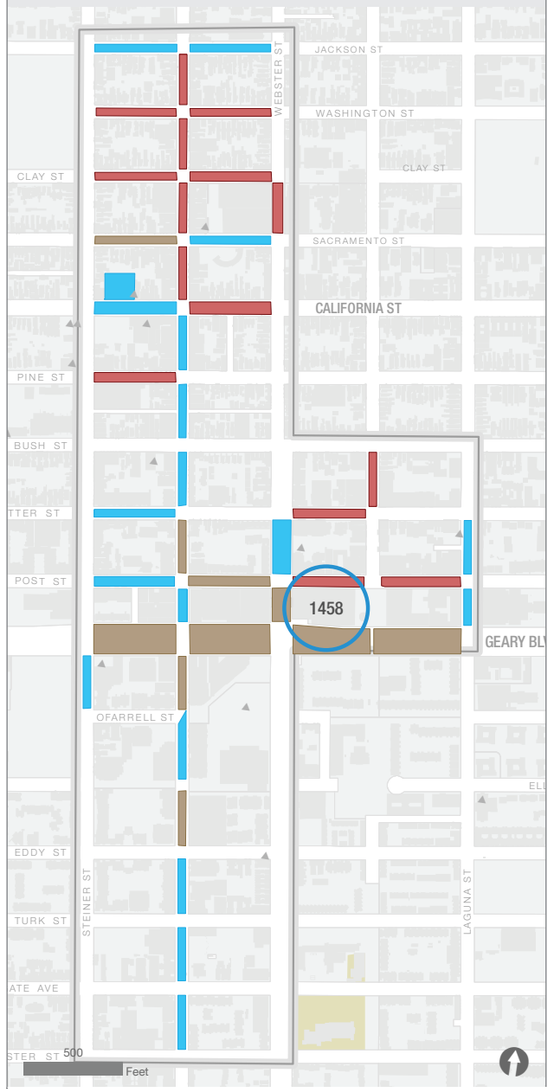
Rate change, before to after
Hourly rate for "After" shown

Hourly garage rates
- $1.00 or more decrease
- $0.01 to $1.00 decrease
- No change
- $0.01 to $1.00 increase

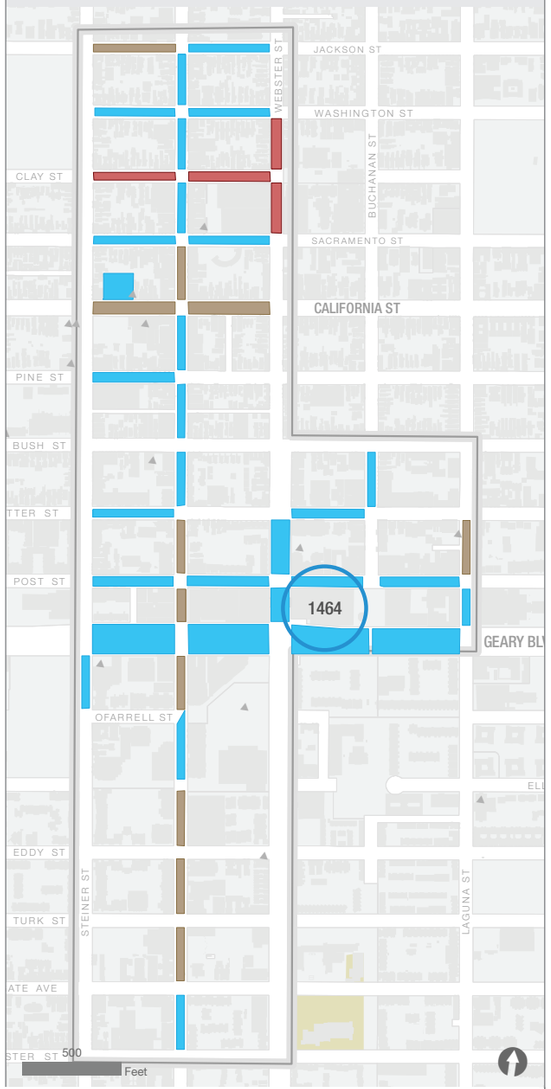
Hourly meter rates

$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

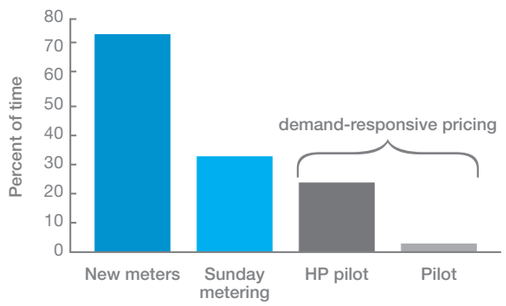
Demand-responsive pricing helps to improve parking management and optimize outcomes, but the starkest improvements come from whether or not (or when) parking meters are used as parking management tools. Though not the purpose of the SF*park* pilot project, one of the clearest findings of this evaluation 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



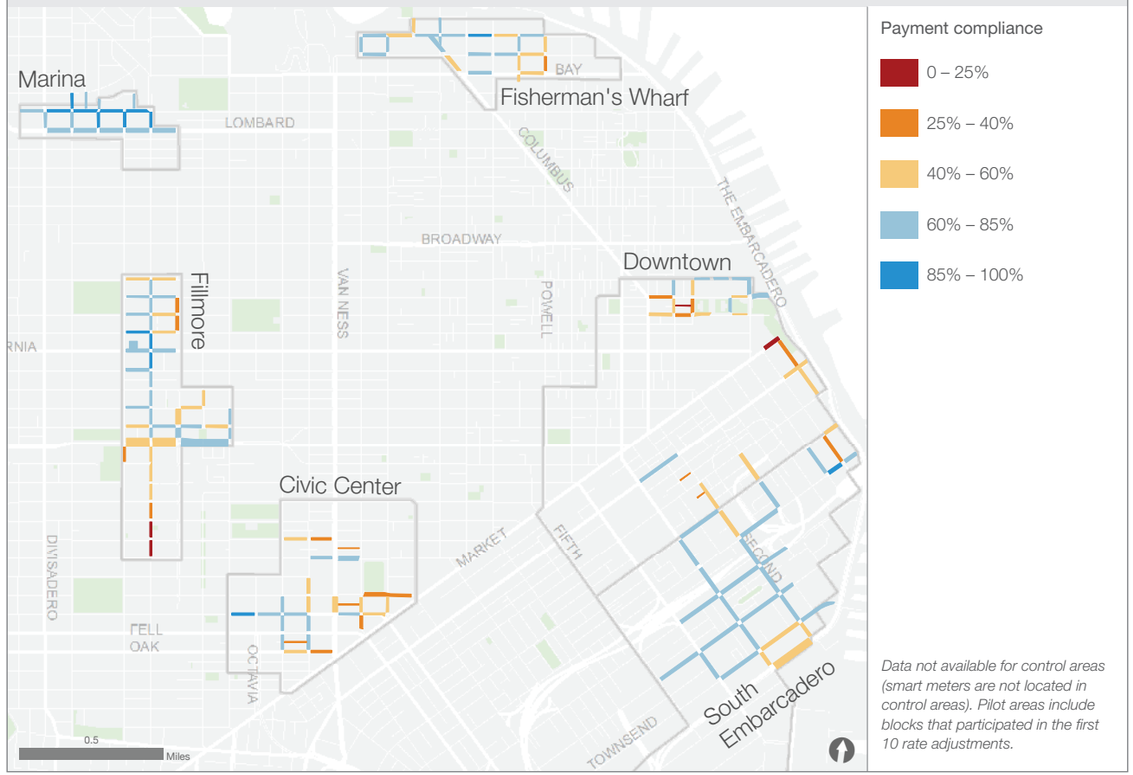
Payment compliance: findings and challenges

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.

Supply data: parking census

Understanding the parking we manage

Starting with the maxim that you can't manage what you can't measure, for the SF*park* project the SFMTA collected comprehensive data about San Francisco's publicly-available parking supply, both on- and off-street, including existing parking regulations. This data was critical for the planning, implementation, and evaluation of the SF*park* pilot project.

Reasons to collect a parking census

The importance of having accurate data about existing parking supply and regulations is hard to overstate. Until the supply data was assembled, the project suffered from its absence, especially during project planning. For example, early estimates of the number of parking sensors and meters for each SF*park* pilot area were significantly too low because the project team did not have ready access to accurate parking supply and regulation data in an electronic format. Project planning and procurements (e.g., quantities of goods purchased) were not as precise as they would have been if accurate supply data had been available at the beginning of the project.

Accurate parking census data was also critical for implementing and operating SF*park*. For example, final detailed implementation planning for the pilot project equipment (e.g., for installation of parking sensors and meters) could only be completed after knowing how many metered on-street parking spaces there were in each area and the regulations that govern each space. In San Francisco, as in many cities, the regulations of on-street spaces are often complex. This is particularly true downtown, where over the course of a day one metered parking space might be general metered parking, then a metered commercial loading zone, then an unmetered white passenger loading zone, and then a peak-period tow-away zone. San Francisco has hundreds of parking meter configurations. Having an accurate inventory of the regulations for each metered space was also necessary for establishing an automated database rather than manual approach to tracking, updating, and managing meter configuration data with parking meter vendors.

Gathering citywide parking supply data took place over six years starting summer 2008, with the regulatory data being continually updated and expanded since 2009. The large majority of data gathering for metered and off-street parking supply occurred from 2008 to 2009. The SFMTA finished counting legal unmetered on-street parking spaces on 100 percent of blocks in the city in spring 2014 (moving from the original 30 percent random sample).

The data collection effort surveyed all of San Francisco's publicly-available parking supply, including on-street (metered and unmetered) and off-street publicly available (but not private) garages and lots. This effort included:

- Translating existing documents (such as the City Assessor's parking tax records to determine the initial list of parking garages and lots) into the geographic information systems (GIS) database used to assemble the data
- Reconciling different parking-related databases within the SFMTA
- Extensive field surveys and site visits
- Entering the data into a database

The work was done primarily by interns and sub-contractors (approximately 3,000 person hours) and led by

SF*park* team members who assembled the database with the care, passion, and dedication this type of undertaking requires.

As a result of the census, for the first time the SFMTA has detailed information about the city's publicly available parking supply. To the best of our knowledge, no other major city has completed a city wide census of its parking supply. To maximize the benefit of this parking data, the SFMTA made it publicly available via datasf.org and SFpark.org.

Moving forward, there are several challenges related to the parking census, including:

1. Keeping the data up to date. The SFMTA is working to expand the data set and improve the tools and internal processes used to keep it up to date. This has highlighted the necessity and opportunity to streamline internal business processes to improve how the constant small changes to parking data, from legislation to implementation on the street, are tracked and captured in the SF*park* system.
2. Capturing temporary changes in parking supply. Parking spaces are often closed temporarily for construction projects, parades, etc. The SFMTA is attempting to increase the percentage of those types of events that are captured in the SF*park* system. This is important for providing real-time parking space availability data because ideally the data would not indicate that a particular block has many open parking spaces when in fact those spaces have been temporarily closed for a construction project. Besides improving the accuracy of the real-time data feed, capturing temporary parking space closure data allowed evaluation and analysis to be more precise.
3. Estimating the number of private parking spaces. The first priority for project planning and evaluation was information about the publicly available parking supply, but it will also be useful to have data on the city's private parking supply (e.g., private residential or commercial parking). The SF*park* team has developed a methodology it will use to develop an accurate estimate the private parking supply; gathering this data and making this estimate will be the next phase of the parking census effort.

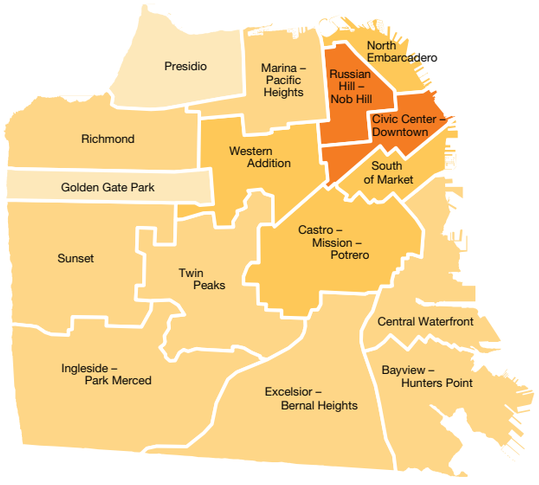
Parking census data is important not just for SF*park* and parking management, but also for many other current and future SFMTA and city projects and policies. These broader benefits include:

1. Knowing the parking supply. The SF*park* project team recently produced a map of the parking supply around a proposed bus rapid transit (BRT) corridor on Geary Boulevard. Instead of paying consultants to gather the data and produce parking supply maps on an ad hoc project-by-project basis, the SFMTA already had all parking supply data for the corridor on hand and could simply and quickly produce the maps. The SFMTA, other city agencies, and others working in San Francisco can now rapidly assess existing parking supply when planning and implementing projects.
2. Sharing parking information. Another benefit of having and sharing this parking data is that it can be the basis of new privately-developed web and mobile applications and other tools not yet imagined. The SFMTA and the people it serves will benefit as a result.
3. Enabling better demand management for existing parking. For additional demand management for existing parking beyond SF*park*, accurate parking supply data helps the SFMTA and the city think more strategically about where and how to use other transportation demand management strategies and to identify where there are opportunities for shared parking.
4. Supporting policy decisions. Accurate data about parking supply also informs civic conversations about parking, whether decisions about where to build new parking facilities, or the effect on the overall parking supply in a neighborhood if some parking spaces are reused for other purposes, whether dedicating some on-street spaces to make room for a bicycle lane or redeveloping a parking lot into housing or a park.
5. Enabling management of parking supply, not just demand. Perhaps most importantly, knowing the parking supply also enables the SFMTA and the City of San Francisco to not just manage parking demand via SF*park*, but also to set policies and goals related to the overall parking supply. In other words, by measuring supply, the City of San Francisco is now in a position to manage it, which is important because parking supply (and its fundamental relation to parking prices and demand) is a large determinant in how people in San Francisco and the region choose to make their trips (i.e., whether by car or transit).

Parking census summary: publicly available parking in San Francisco

Location	On-street		Off-street					
	Metered	Unmetered	Paid	Free	Customer	Permit	Spaces/sq mi	Total spaces
Bayview – Hunters Point	122	15,500	12,350	240	1,690	740	7,000	**30,650**
Castro – Mission – Potrero	2,929	30,200	6,920	80	3,400	3,560	12,530	**47,110**
Central Waterfront	293	10,600	7,370	0	2,270	6,510	7,730	**27,000**
Civic Center – Downtown	5,244	1,300	29,280	0	2,130	3,020	30,350	**40,940**
Excelsior – Bernal Heights	1,034	38,200	270	430	1,600	920	7,640	**42,470**
Golden Gate Park	0	4,000	1,120	900	0	230	3,800	**6,230**
Ingleside – Park Merced	576	29,100	2,570	650	6,150	4,200	6,590	**43,230**
Marina – Pacific Heights	1,614	14,200	5,030	1,030	1,740	840	9,370	**24,440**
North Embarcadero	2,488	2,400	11,000	30	950	970	10,350	**17,880**
Presidio	0	3,500	1,080	3,120	1,100	150	3,310	**8,910**
Richmond	1,556	16,900	860	880	1,770	320	6,130	**22,260**
Russian Hill – Nob Hill	4,052	6,200	10,490	0	1,520	200	17,550	**22,460**
South of Market	2,939	3,000	7,890	0	1,420	1,960	12,130	**17,160**
Sunset	1,134	31,000	210	40	620	360	7,090	**33,400**
Twin Peaks	282	24,400	370	130	390	1,190	6,810	**26,800**
Western Addition	2,036	18,300	5,090	0	2,950	2,240	12,050	**30,630**
Total	**26,299**	**248,700**	**101,900**	**7,530**	**29,690**	**27,410**	**8,610**	**441,530**

San Francisco neighborhood publicly available parking supply



Parking spaces per square mile

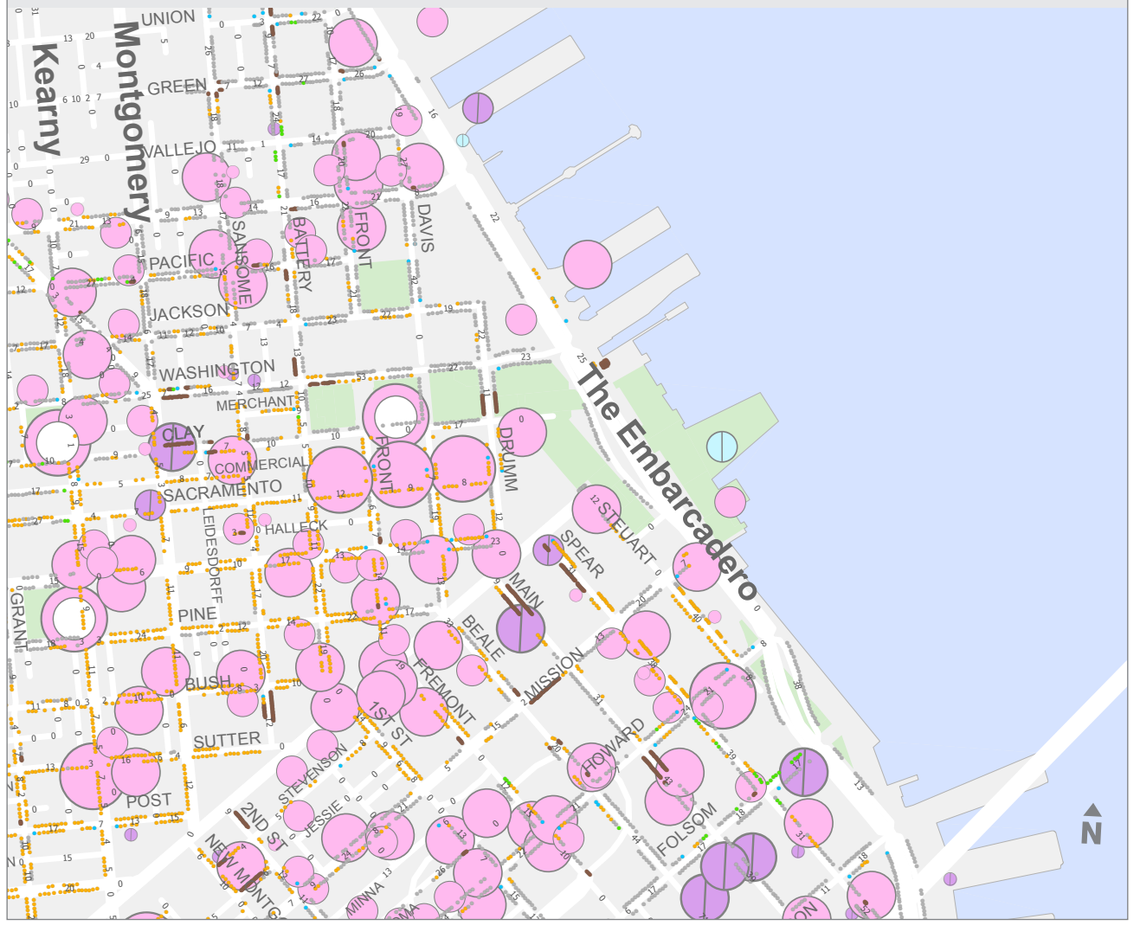
- < 35,000
- < 20,000
- < 15,000
- < 10,000
- < 5,000

1. Neighborhood boundaries drawn to reflect similar land-use patterns. Civic Center – Downtown roughly corresponds to the C-3 planning district.
2. 'Paid' is parking available on an hourly or daily basis for a price. 'Permit' is parking requiring some form of permission (e.g., employee only or company vehicles only). 'Free' is parking available without daytime cost or restrictions. 'Customer' is parking available to customers only.
3. Metered spaces were calculated from the Parking Space Inventory; off-street, motorcycle and inactive meters were not included.

The full set of GIS data is available here:
SFpark.org/censusdata

Download the parking census summary at:
SFpark.org/docs_censussummary

San Francisco parking census: **Downtown**



Metered spaces

On-street

- General metered
- Commercial loading
- Short term parking
- Motorcycle parking
- Disabled parking (unmetered)

Number of spaces

Off-street

2501–9000
1501–2500
501–1500
101–500
26–100
4–25

Type of Parking

- General paid parking
- Permit holders only
- Free parking lots
- Customer parking only
- SFMTA-managed

Download full city-wide census map at:
SFpark.org/docs_censusmap

SFMTA Municipal Transportation Agency

SFpark

Data collection plan

The data collected to evaluate the project

The SF*park* project collected an unprecedented data set to evaluate the pilot, including some from never-before available data sources. This data enabled a thorough evaluation of the pilot project and should be useful for other areas of transportation research.

Data collection

The following table summarizes the key datasets collected as part of the SF*park* project.

Data type	Sample data sets
Parking sensors	Parking session start/stop, sensor downtime
Motorcycle occupancy	Manually collected occupancy data (sensors were not used at motorcycle spaces)
Parking meters	Payment session/time, type, amount; meter downtime
Parking citations	Type, location, time, Parking Control Officer (PCO) badge number
Parking garage	Parking garage usage data by hour and by type of parker (hourly v. monthly)
Parking tax	All publicly available parking facilities in San Francisco pay a 25 percent parking tax. Parking tax receipts, aggregated to prevent identification of individual facilities, was provided by the City Assessor, to help evaluate changes in parking demand in private parking garages and lots.
Manual surveys	Manually collected data includes surveys of double parking, disabled placard usage, parking search time, parking occupancy in residential areas, and intercept surveys of people on street
Roadway sensors	Roadway sensors were installed at approximately 60 locations in the pilot and control areas. They provide traffic counts, average speed, and vehicle density.
Local public transit (Muni)	Data from automatic passenger counters (APCs) fitted on ~30 percent of the rubber-tired fleet.
Regional travel demand	Besides data from the Muni system, SFMTA gathered data from the region's highways (PEMS) and regional rail systems (BART)
Sales tax	Sales tax data from the City Controller.
Safety	Collision data from the state's SWITIRS reporting system
Exogenous factors	Fuel price, CPI, unemployment, and weather data

Notes about the data that was collected:

- The majority of the data points are linked to a specific geography or location (e.g., a parking event, meter payment, and citation all happen at a particular point in time and space), which facilitated sophisticated analysis and mapping of the data.
- The data collected typically reflects the following hierarchy or order for space and time and is gathered and stored at least at an hourly level. Data may be aggregated geographically and/or temporally to facilitate analysis:

Geographically	Temporally
Parking space	Hour
Block face	Day
Block	Week
Area	Month
District (e.g., Mission)	Quarter
City	Year

- To aid those using the data to evaluate the pilot project or do research, the project team developed data guides to describe data quality and availability (i.e., how good the data is), how to understand the data, and when the data set starts in time (e.g., October 1, 2010). All data sets have issues and the SFMTA has provided a transparent assessment of their quality.
- The data is stored in a structured rather than unstructured format. This data has been normalized (in the IT, not financial, sense of the word) and organized after doing a detailed analysis of the separate data entities and their relationships. Structured data is superior because it facilitates subsequent analysis, mapping, and export to other analytical tools.

The plan and methodology for the manual surveys are described in the SF*park* survey deployment plan, available at:
SFpark.org/docs_surveydeployment

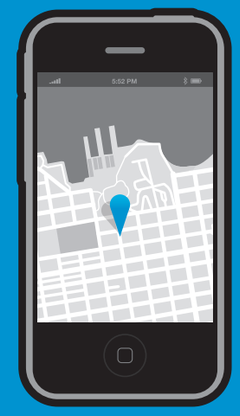
SF*park* study design

The SF*park* pilot project was planned to provide sound empirical data that the SFMTA, the US Department of Transportation, researchers, and other cities needed to evaluate this approach to parking management. Key aspects include:

- Use of "control" Parking Management Districts (PMD). Changes in travel behavior in two control areas were monitored so that they could be compared to changes to parking behavior in the pilot areas. Control areas had the same type and level of data collection and parking enforcement as the pilot areas, but without any changes to parking management or regulations (i.e., prices or time limits). The comparison of control and pilot areas was intended to help distinguish the impacts of SF*park* from broader citywide or regional trends (e.g., changes to fuel prices).
- Pilot areas of sufficient size. Collecting data in broadly defined pilot project areas was intended to allow the evaluation to determine how parking management policies change overall parking demand and travel behavior, and to reduce the risk that parking demand shifted undetected from one part of a district to another. To help evaluate the overall effect of parking management changes, pilot and control areas had parking sensors at each metered parking space to help assess changes in parking demand in the parking shed.
- Before/after data collection. To collect sufficient "before" data, at least eight weeks of parking demand data (and typically more) was collected before significant changes were made in pilot areas for parking technology or management policies. Following this initial period of "before" data collection, data collection continued from April 2011 (the formal initiation of the pilot project) through June 2013.
- Periodic price changes. Changes to parking prices were made no more frequently than every 30 calendar days (with the exception of special event pricing). This was intended to allow drivers to absorb new price information and have the opportunity to change travel behavior, and as well as to facilitate evaluation of price changes.

5. PARKING TECHNOLOGY

SF*park*'s real-time parking availability information and demand-responsive rate adjustments would not be possible without a suite of tools, many of which represent significant technological advances.



Parking space inventory tool

Asset management system with integrated parking data

SF*park*'s integrated asset management system allows the SFMTA to track its parking inventory and quickly create analyses of parking and related attributes.

Technology overview

While the parking census provided data critical for the SF*park* pilot project, the parking space inventory tool created an asset management system which was critical to the implementation and operation of SF*park*.

Previously, disparate databases focused on single subjects, such as tracking assets, parking regulations, or rates and hours of operation. Creating the SF*park* parking space inventory tool allowed the SFMTA to store information related to geospatial elements, asset management, operating schedules, and hourly rates (both current and historical) for the first time. This system also enabled the SFMTA to incorporate real-time data from parking sensor and smart meters, make frequent and large-scale changes to rates and operating configurations, and conduct in-depth analysis of all these aspects.

Since its implementation in 2010, the parking space inventory has become critical for both operations and analysis. Its functionality includes:

- Maintaining an inventory of all attributes related to a metered parking space, including unique space IDs, parking meter vendor and model, geographic location, hours of operation, regulations, and rates.
- Keeping track of who makes changes to these attributes and when.
- Associating sensor, meter, and citation data to the correct parking space and enabling advanced analytics of all parking data.
- Managing the rate adjustment process, communicating new rates and configurations to meters without sending field staff to update every meter, and reconciling multiple databases to ensure the proper rates are reflected on the street.
- Enabling pay-by-phone. Without a back-end system to integrate all parking space and meter data, pay-by-phone would simply not be possible.
- Ensuring that citations are only issued to valid meters by populating a list of valid meter IDs, which are then loaded onto enforcement's handheld devices.
- Enabling SFMTA staff to conduct ad-hoc analysis. Previous systems had a series of static reports, and new reports had to be developed by the database vendor. The parking space inventory allows staff to quickly create custom reports that may be necessary to respond to inquires.
- Enabling the SFMTA to make changes to large quantities of meters on specific days (e.g. Special Events pricing during Giants games). Previously, more dynamic policies were not possible because meters had to be updated manually.
- Generating a GIS shapefile daily to allow for up-to-date detailed spatial analysis in ArcGIS.

Meters and meter management systems

Parking meters with wireless communication

SF*park*'s new parking meters accept payment by credit card and phone, transmit payment data to a central server in real time, and allow new rates and display information to be programmed and deployed remotely.

Technology overview

Demand-responsive pricing has pushed cutting-edge parking meters to the limit of their capabilities. Below are some of the lessons learned about meter technology and contracting with meter vendors.

Technology

- Smart meter technology is still evolving and has limitations. Additional capabilities (such as conducting credit card transactions) require a more complex meter design than simple electronic meters, and consequently there are additional mechanical and electronic challenges.
- Meter management systems are not yet able to group meters in different ways for reporting purposes. This requires meter vendors to store data that is not directly relevant to meter operation (such as enforcement and coin collection routes) and keep it up to date. Based on the SF*park* pilot experience, the SFMTA's 2013 request for proposals (RFP) included this as a requirement, and vendors are developing the capability.
- Every new feature on smart meters has an impact on battery life which is difficult to predict and in tension with the limitations of solar recharging.
- Meter displays do not have room to convey all the restrictions in an area, and customers still need to check signs and stickers on the street. Meters can only display a limited number of different rates.
- The new smart meters have a more complex design than the mostly mechanical meters, and some components are sensitive.

Implementation

- There are a host of stakeholders who have to interface with the meters and the meter management systems in the back end (e.g., public, maintenance personnel, parking control officers, finance, customer service, adjudication, and coin collection). Current systems do not necessarily serve all users equally well, and changes to the systems to improve usability to one group may affect usability for another group.
- It is necessary to rigorously bench and field test new features and adjustments before implementation.
- Do not make significant changes in batches on the street that are too large to correct if there are issues.
- Even with smart meters, it is still cumbersome to program the meters to behave exactly as San Francisco's varied parking regulations require. All of the city's parking rules need to be clearly defined in a form that the vendor can understand. Cities considering implementing a demand-responsive approach to setting meter rates would likely benefit from first reviewing and simplifying their parking regulations. Establish standard naming conventions and organizational structures for meter data configurations at the beginning of the process; this is critical for smooth operations later on.
- There are financial considerations and rigorous security standards to comply with when accepting credit cards. Preparing for this requires expertise.
- New meter technology relies on cellular communications. If network coverage is inadequate, operations, reporting, and maintenance capabilities are compromised.

- Most smart meter technology relies on solar power to extend battery life. This presents a challenge for using these meters in parking garages and other shady locations.

Customer experience

- Customer expectations for usability are higher with smart meters. Making meter interfaces so easy to use that it is not necessary to read the instructions is difficult.
- There is a learning curve for customers when adapting to the user interface of new meters, especially multi-space meters.

Business of parking management

- Using smart meters involves new, ongoing expenses for communication and credit card transaction charges.
- Smart meters that accept multiple forms of payment introduce new policy questions. For instance, if a meter's coin slot is jammed, but it still accepts credit cards, should the meter still be enforced, or is it broken?
- It is no longer necessary to touch every meter in order to make a change to the entire system. This makes it much faster and more cost-effective to make citywide changes to the meters.
- Smart meters record exactly when payment is made, so they present an opportunity for analysis of payment trends. For instance, San Francisco can now analyze when and where customers pay for parking during the pre-pay period before meters officially start operating. That tells us about the demand for parking before the beginning of operating hours.
- The number and configurations of San Francisco's meter inventory is constantly evolving, and keeping that data up to date is a challenge. Meter vendors must maintain their own versions of the meter database.

Contracting for meters: lessons learned

- Payment should be based on functional meters. Factors for financial penalties must be clearly defined and easily measured. For instance, if there is a penalty for more than two percent of meters not working at a given time, make sure the contract clearly defines what "not working" means and how it would be measured.
- The more clarity and specificity in contract, including an extensive definitions section, the smoother the implementation process will be.
- Current smart meter technology includes a lot of programming and software. Include a knowledgeable technology professional on your team to help write your RFP.
- The input of the meter management, operations, and maintenance teams is essential when writing the RFP.
- Local vendor support before, during, and after implementation is critical.
- Small vendors sometimes struggle to produce enough supply to meet the demand of each of their clients, which can affect project schedule.
- The more meter vendors you have, the more complex the project becomes from an accounting standpoint. With multiple vendors, accountants must learn different payment systems, process additional payments, and manage multiple merchant accounts.
- Include the right to switch cellular network providers for meter communications and gateway providers in the contract with smart meter vendors.

Single-space meter installation by SFMTA Meter Shop

Single-space meter installation; Parking Control Officer with a multispace meter

Meter documents

Meter RFP
Based on experiences during the SF*park* pilot project, the SFMTA developed an RFP in 2013 to upgrade meters citywide in 2014. This RFP requires a more robust meter management system, and it provides greater detail in credit assessments and liquidated damages.

Download full document at:
SFpark.org/docs_meterrfp

Rate adjustment steps
This document includes a draft protocol for implementing remote meter rate changes. It describes the steps SF*park* takes to update parking meter behavior and displays via XML, including: file submission, programming, reconciliation, download to meters, and meter field check.

Download full document at:
SFpark.org/docs_rateadjustment

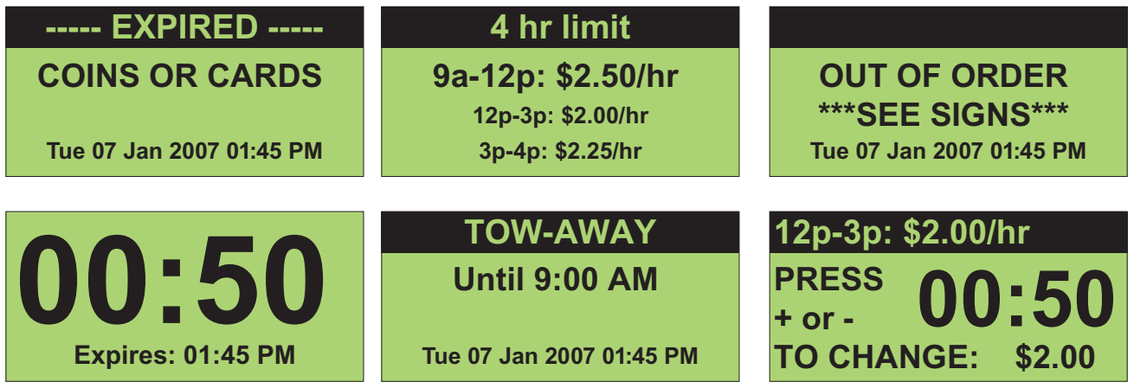
Meter parameters with longer time limits
This spreadsheet calculates the consequences of various default credit card start values and payment increments. For example, if the start value and payment increment are both set at 25 cents and the rate is $2.00/hour, a customer would have to press the “up” button 31 times to add sufficient funds to stay for four hours.

Download full document at:
SFpark.org/docs_meterparameters

Meter display programming
This document shows the meter display choices SF*park* made when it created multiple rate periods. Using several scenarios, it includes images of screens when the meter is idle, accepting payment by coin or card, paid, expired, tow-away, or outside of operating hours.

Download full document at:
SFpark.org/docs_meterdisplay

Sample single-space meter displays



Garage occupancy and payment data tools

Providing availability data and changing rates

San Francisco’s city-owned parking garages had some of the technical tools in place for demand-responsive pricing before SF*park* began. However, SF*park* places a different set of demands on the garages’ equipment, requiring a higher standard of accuracy and detail.

Technology overview

The current technology in San Francisco’s city-owned garages presents opportunities and limitations, both for payment (known as revenue control) and for occupancy data. Modern parking garages already count how many cars come and go using the gate arm system at entry and exit points. Payment stations accept credit cards and keep detailed track of payments, much like the new coin and card parking meters. Broadcasting this data to the SF*park* data warehouse, however, requires servers capable of handling a minute-by-minute data feed on garage computer systems.

Here are some lessons learned from implementing SF*park* at the garages:

- Make sure the garages have hardware and networks capable of broadcasting a streaming data feed to a central server. Be ready to address any privacy or encryption requirements.
- Check with your revenue control vendor to make sure they are capable of implementing your desired rate structure and have them demonstrate it to you.
- Data accuracy requirements are higher because rates are adjusted based on occupancy data. This includes counts of cars in the garage, records of entry/exit times, discount usage, etc.
- It was important to communicate with garage employees to explain the increased importance of data reporting and accuracy.
- Because errors can be introduced to any garage gate arm system while counting cars (for a variety of technical and operational reasons), periodic (eg, daily) manual occupancy counts are required to ensure data accuracy over time. This sometimes requires a cultural change within garage operators and employees.
- Charging different rates at different times of day requires more detailed revenue reports than garage operators typically generate. Consider the different information that will be necessary to make demand-responsive rate changes in the garages, the kinds of information that will be necessary to cross-check whether all monies due were actually collected, and how garage operators can update their reports to meet these needs.
- San Francisco’s garages traditionally charged one hourly rate throughout the day and charged customers in hourly increments. Introducing different rates at different times of day and allowing customers to pay in smaller time increments has added complexity to the payment process for operators.
- Smaller payment increments (e.g., charging in 30-minute rather than 1-hour increments) improve customer service, but if garages do not attract enough new customers, they may lose some revenue from customers who previously paid for time they did not actually park.
- Our current pay stations are not able to display different rates for different times of day. Instead, rate details are displayed on signs posted on or near the pay stations. Rate decals must be replaced for

Sample SF*park* garage with signage, lighting, and paint upgrades

each rate change. The rate change process could be streamlined in the future by using pay stations with variable message signs or LCD screens in place of these stickers.

- Our garages are not yet able to issue receipts that convey the new rate structure. Ideally, receipts should include the different rates a customer is charged during their stay, but current technology limits us to displaying a single rate.
- Existing revenue control software may limit the number of different rates and discounts a garage can charge. Early bird rates, daily maximums, off-peak discounts, and validations may be affected.
- Garage customers are accustomed to thinking about how long they park and less about what time of day they park. Outreach materials should help explain this shift to customers.
- To change rates at the garages involved in SF*park*, the revenue-control vendor must log into each garage's computer system separately. This requires that rate changes be undertaken on a garage-by-garage basis and limits the ability to roll out rate changes at multiple garages at one time. Connecting the garages to a central system would resolve this issue.
- Analyzing the fiscal and usage impact as a result of demand responsive pricing requires modeling for vehicle departure times and duration of stay for those vehicles versus volume of parkers per hourly rate.
- Demand-responsive and/or time-of-day rates may not interact well with existing audit and revenue control procedures at the garages. Audit procedures based upon simple single-rate, length-of-stay pricing will have to be updated.
- Data feeds from garages will be dependent upon the quality of the connection between the garage and the central server. Consider creating as secure and robust a connection as possible to minimize interruptions of the data feed.

Garage XML feeds

Garages send data to SF*park* via XML feeds: rows of time-stamped data separated into distinct columns. Delivery by XML is the easiest and most accurate way of delivering the large amounts of data (payments, entries/exits, discounts received, etc.) to the SF*park* data warehouse. Working with the vendor who maintained garage data, SF*park* developed several different XML feeds for different types of data (usage, payment, occupancy, and an overall statistics feed for auditing purposes). SF*park* also maintained data guides to describe all the categories of data received and rules for processing of the data.

Download the full garage data guide at:
SFpark.org/docs_garagedata

Parking sensors

A new technology that provides real-time parking availability data

The parking sensor is a new technology that automatically collects parking occupancy data. SF*park* used this data to calculate demand-responsive meter rates, provide real-time parking availability information, and evaluate the pilot projects.

Technology overview

The SF*park* pilot project relied on wireless in-ground parking sensors that detect when vehicles arrive and depart. Multiple vendors are currently developing sensor technology, but the basic operations are similar. One or two sensors are installed in each parking space. The sensors used in SF*park* had a magnetometer to detect changes in the earth's electromagnetic field and was calibrated to detect vehicles in the surrounding area. These sensors sent data through a mesh network via pole-mounted communications equipment.

SF*park* deployment

Parking sensors for the SF*park* pilot deployment were provided by StreetSmart Technologies (SST, now known as Fybr). The SFMTA paid for the installation of the magnetometer sensors and a monthly, per-space fee to receive data, and payments were tied to performance. The SFMTA did not own, operate, or manage that equipment, instead purchasing a data feed from the vendor.

The following table lists the sensor equipment installed in ten neighborhoods in San Francisco for the SF*park* pilot project:

Spaces with sensors	8,000
Total sensors (spaces have either one or two)	11,700
Pieces of pole-mounted networking equipment	300

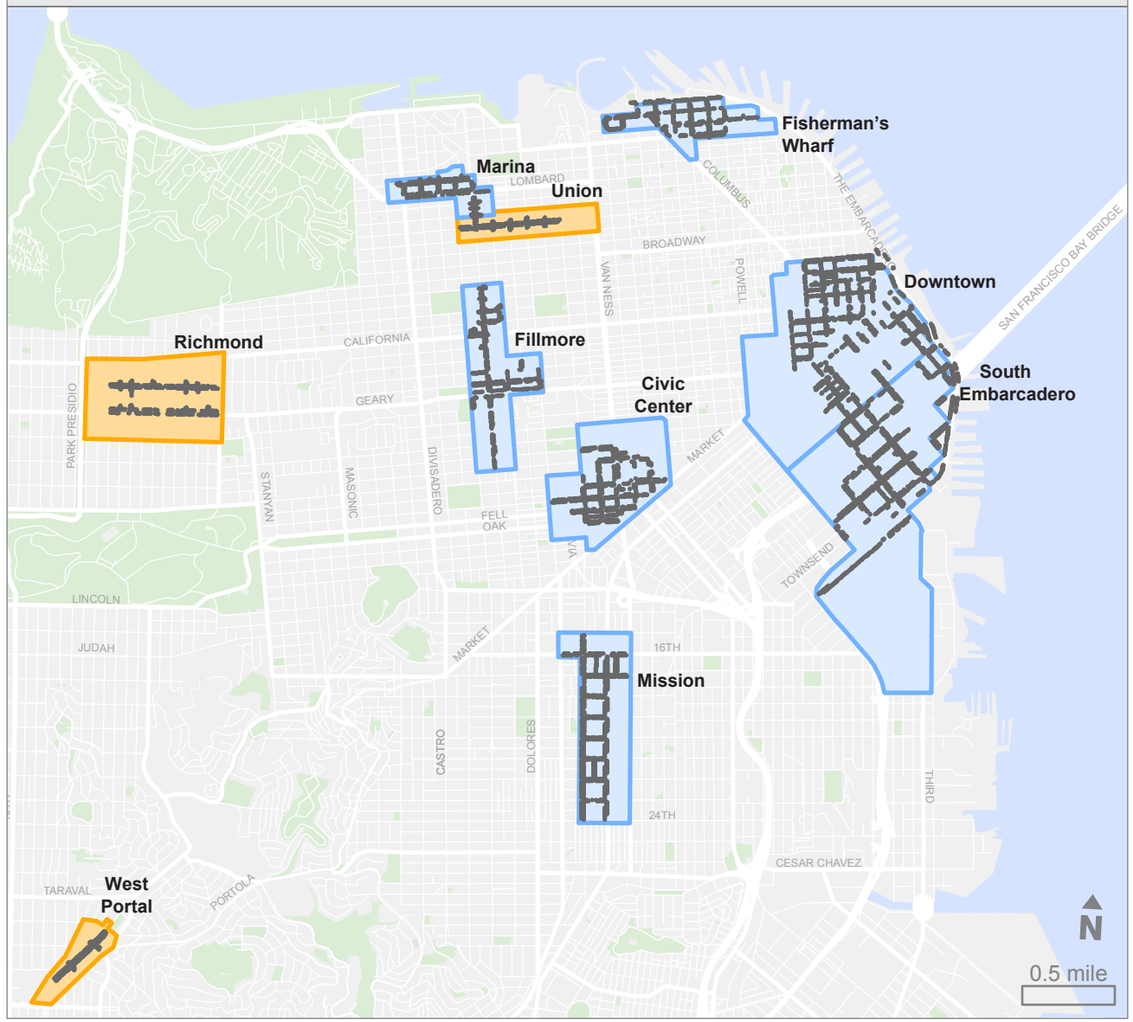
The SFMTA received valid data from all ten neighborhoods from April 1, 2011 through June 30, 2013 for control areas and through December 31, 2013 for pilot areas.

Issues encountered

A number of unexpected field issues posed challenges when deploying on-street parking sensors:

- Noise from the transit system's overhead power lines and other sources. Once the sensor network was deployed, SST noticed high levels of direct current electromagnetic interference coming from overhead transit lines and a variety of utility-related facilities (which provided alternating current interference). This electromagnetic noise varied from block to block and even from space to space, requiring some spaces to have two sensors.
- Early battery degradation. The sensor batteries were originally expected to last about five years, but specialized software designed to filter out some of the electromagnetic noise reduced this estimate to three years.
- Street construction. The SFMTA coordinated internally and with the San Francisco Department of Public Works to remove sensors prior to street paving and other street construction, but there were instances where some sensors were paved over or otherwise destroyed without notification.

Citywide parking sensor system



Parking Sensors · Pilot area · Control area

Operational control

Once the sensor network became operational, the SFMTA closely monitored the sensors' data transmissions. The SFMTA employed three methods to monitor the sensor data quality:

- Confirm that each space sends a message at least once a day.
- Track spaces that haven't sent a message for more than three days.
- Compare current levels of data flow to historical profiles.

Performance measures

The SFMTA manually gathered data to compare to the data received from the sensor feed in four measures to assess sensor performance: occupancy accuracy, turnover accuracy/timeliness, parking session accuracy, and latency. These performance measures were used to evaluate the sensors used in the SF*park* pilot project as well as in a trial of equipment produced by several other vendors. Additionally, vendor performance on the occupancy accuracy and turnover accuracy/timeliness tests was tied to monthly payments. These complementary tests helped determine what different uses the data would support.

Performance measure	What it measures	Application of data			
		Real-time data	Occupancy rate analysis	Parking session count analysis	Length of stay analysis
Occupancy accuracy	How reliably sensors accurately report the status of a parking space (vacant or occupied)	X	X		
Turnover accuracy/ timeliness	How reliably and quickly the sensors detect when vehicles enter or exit a space.			X	
Parking session accuracy	How well sensors represented what actually happens on the street.		X	X	X
Latency	How long it takes for messages from the sensor to be received by the SFMTA data warehouse.	X			

Contracting for sensors: lessons learned

Parking sensors are an emerging technology that is still early in the product development cycle. This list summarizes the lessons learned working with parking sensor vendors:

- There were many issues getting started. Mutual trust, clear standards, and common understanding of goals were critical for resolving them.
- Always field verify all information provided by vendors.
- Have a strong data organizational system. It is best for each device to have a unique ID for each parking space that is linked to a specific block and parking space number.
- Keep a detailed record of all meetings, due dates, and deliverables.
- Put specific performance standards in the contract and define exactly how they will be measured.
- Calculate billing on standards that are easy to measure yet complex enough to capture all the ways the data will be used. Be sure that accountants can understand them.
- If there are multiple deliverables, stagger payments and make them contingent on delivery of individual items in the contract.
- Make sure vendors program the devices to report their operational status on a regular basis (e.g., daily "heartbeats" are sent by sensors in SF*park*). If no one parks at a space for a full day, this report will show that the sensor is still working.
- Design the system to be as vendor-neutral as possible. This may require more planning upfront, but it provides more control and flexibility for changing vendors, if necessary.

Sensor documents

Sensor evaluation

This document describes the technology utilized for the SF*park* pilot, how the SFMTA measured parking sensor performance, and the results for sensors used during the SF*park* pilot and four emerging technologies.

Download full document at:
SFpark.org/docs_sensorevaluation

Parking sensor performance standards and measurement

This document outlines detailed field methodologies and contractual performance standards used during the course of the SF*park* pilot.

Download full document at:
SFpark.org/docs_sensorperformance

Parking sensor data guide

This document explains how the SFMTA collected and processed parking sensor data.

Download full document at:
SFpark.org/docs_sensordata

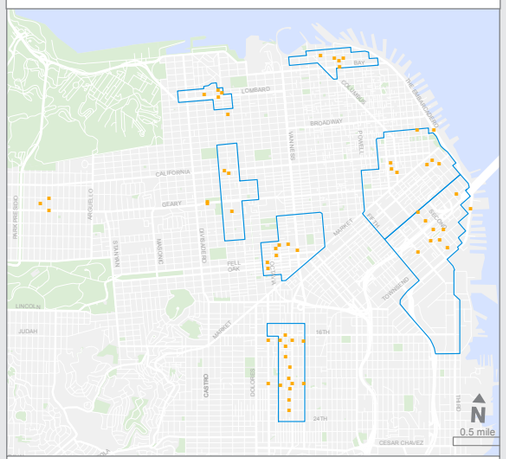
Roadway sensors

SF*park* used roadway sensors to measure how the pilot projects affected auto traffic congestion in neighborhoods near the meters. On sample streets surrounding SF*park* pilot areas, two roadway sensors were installed in every traffic lane. The sensors employed a magnetometer to sense when a car passes by, logging the average and median speeds, traffic volume, and occupancy (a measure of traffic conditions).

Unfortunately, the roadway sensor data was problematic. Over half of the data was either missing or contained error codes indicating that data was unusable. The SFMTA performed a detailed usability analysis and was able to use data from some locations for the evaluation.

The following map shows the deployment of roadway sensors in San Francisco:

Roadway sensor locations in SF*park* areas



Roadway sensor
SF*park* pilot area (excluding the Port)

Real-time data acquisition, data warehousing, and business intelligence tool

The technical foundation of SF*park*

The SFMTA collects data from many sources and analyzes that data to operate and evaluate the SF*park* pilot project, from adjusting rates and providing real-time parking availability data to evaluating the program components.

Technology overview

To operate and evaluate the SF*park* pilot project, the SFMTA employs a data warehouse that enables:

- Analysis of parking occupancy so that SF*park* can make data-driven pricing decisions.
- Provision of real-time parking availability information to the public.
- Operation and management of the city's on-street parking spaces.
- Performance monitoring of meter, sensor, and garage vendors.
- Evaluation of the SF*park* program as a whole.

While the SFMTA is the primary user, academics and other municipalities are interested in the data as well. The data warehouse and the associated transactional infrastructure follow the SFMTA's system standards and extend the agency's enterprise service oriented architecture to real-time or near real-time parking management, monitoring, and enforcement operations.

Purpose of the data warehouse and business intelligence tool

SF*park* uses its data warehouse and business intelligence reporting to:

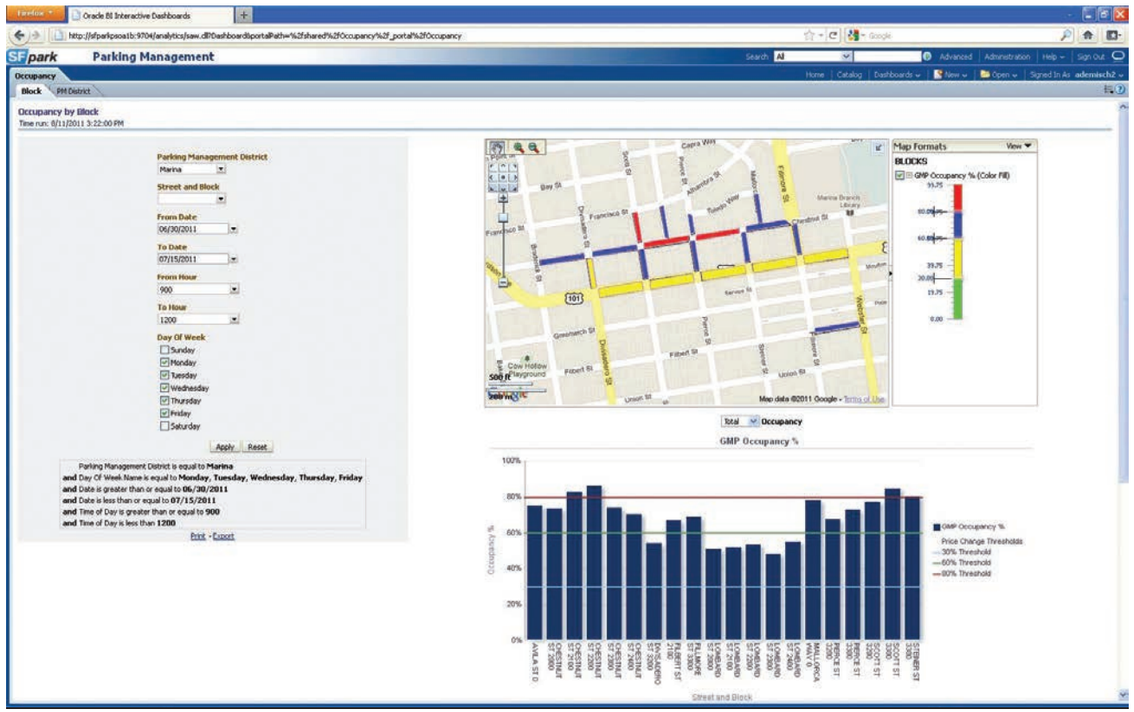
- Turn data into decision-making information that enables the SFMTA to proactively manage parking. It also hosts the data that assists drivers in the city by making parking easier and more convenient.
- Store data that is used to implement and evaluate SF*park*, from both manually and automatically collected sources.
- Normalize all incoming data.
- Identify any inconsistencies in incoming data, e.g., creating historical profiles to define normal levels of sensor data transmissions
- Provide an architecture that:
  - Is open, flexible, and scalable enough to accommodate likely future growth in magnitude and complexity of data, number of data sources, and type of data sources.
  - Is as simple as possible.
  - Allows for efficient and sophisticated search, analysis, and exportation of data.
  - Makes it as easy as possible to maintain the datasets.
  - Powers a web-based, front-end interface that the SFMTA uses to access and analyze the data. The front end provides:
    - Automated reporting of the data (i.e., via reports that can be pushed to decision makers).
    - Easy generation of ad hoc reports with no programming required.
    - Easy access for analysts to get data they need and easily combine datasets
    - Visual representation of data via maps, timelines, charts, and graphs.
    - Real-time alerts to assist vendor management.
    - Summary-level information with ability to access data details.

Lessons learned

Creating the technical infrastructure for SF*park*'s data needs was a large undertaking with many lessons learned:

- Don't do it yourself. Most internal IT organizations do not maintain the staffing levels or skill sets to implement the technology necessary for a SF*park*-style program. Bring on an experienced team to build the technical infrastructure and integrate it with existing systems.
- Make sure your technology implementation team is involved in the first stages of the project management life cycle, beginning with contracting and procurement, long before it comes time to purchase necessary data management hardware. Have that team work with your existing IT team to ensure that technology choices fit in with your organization's existing IT standards and direction.
- Don't let product vendors (sensors and meters) determine the technical infrastructure. Create a data system that can interface with multiple vendors and will provide maximum control over how the data is managed and turned into information. Insist that project plans be expressed in terms of business deliverables. Vendors will want to give you a construction plan, but you want a feature implementation plan.

Business intelligence tool automated report example



- Expect to spend much more time in requirements discovery, business process reengineering, and off-plan work than expected. None of the vendors had ever done this type of project before, so workarounds and detours were commonplace.
- The technological maturity of vendor products was much less than was anticipated.
- Most vendors did not have mature software development, testing, and change control procedures. In other words, they may make a change without sending out notification. Make sure to work with the vendor to find a solution that fits your needs.
- Sending and receiving an XML file typically required significant coding by vendors; it is not necessarily plug-and-play. There may be a lot of additional work to make sure everything connects properly. XML allows two users to agree on what to call a piece of data. It does not assure that both sides agree on what it means or how to use it.
- Look out for important business processes that are not yet in place. During integration testing, we uncovered a lot of business processes that did not yet exist, such as a way to track when the Meter Shop makes manual changes to the meters on the street.

Parking availability data feed/API documentation

The SF*park* real-time parking availability data feed is publicly available at no cost to application developers and others interested in the data. This data feed is provided as a REST service with data returned in XML or JSON format. SF*park* provides a document containing the information developers need to carry out testing for retrieving and displaying the parking availability data from the SF*park* data warehouse.

Download full document at:
SFpark.org/docs_api

Parking availability applications code

SF*park* uses the parking availability data feed for its own web and smartphone applications. These applications reflect SF*park* branding, point drivers to blocks and garages with open spaces, and provide rate information.

The code for these applications is publicly available at:
SFpark.org/appcode

Integrating SF*park* practices into existing processes

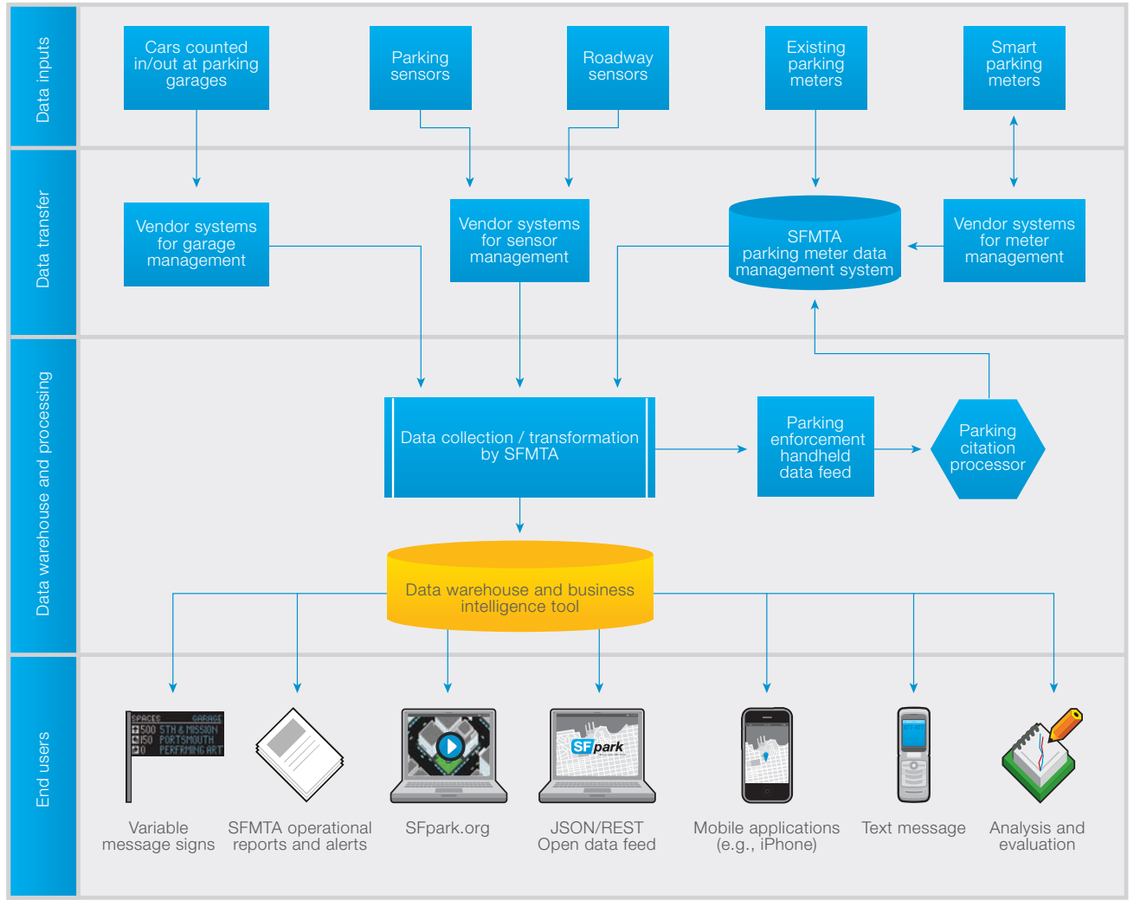
*Even before the SF*park *project introduced new data warehousing and business intelligence tools, the SFMTA had sophisticated processes for managing parking meter inventory and tracking revenue. Transitioning from these legacy systems to a more dynamic reporting and business intelligence system was essential for implementing SF*park *policies.*

The San Francisco Parking Meter Management System (SFPM) is an Oracle 10G database with a limited number of pre-built reports and a selection of management modules such as inventory, collections, counting, reconciliation, parking meter repair work orders, and administration. The SFMTA Meter Shop and Finance groups use this system to track parking meter inventory, revenues, maintenance information, and to perform reconciliation between physical coin collection and electronic audits.

SFPM is currently the system of record used for revenue reporting and tracking for all San Francisco parking meters. It is integrated with coin counting equipment, and the SFMTA relies on it heavily for tracking the performance of the coin collection contractor. This contractor retrieves data from an electronic lock management system, which is inserted into the SFPM database. Reconciliation between electronic records and coin sorter machine counts are contractually mandated to have a margin of error no larger than one percent.

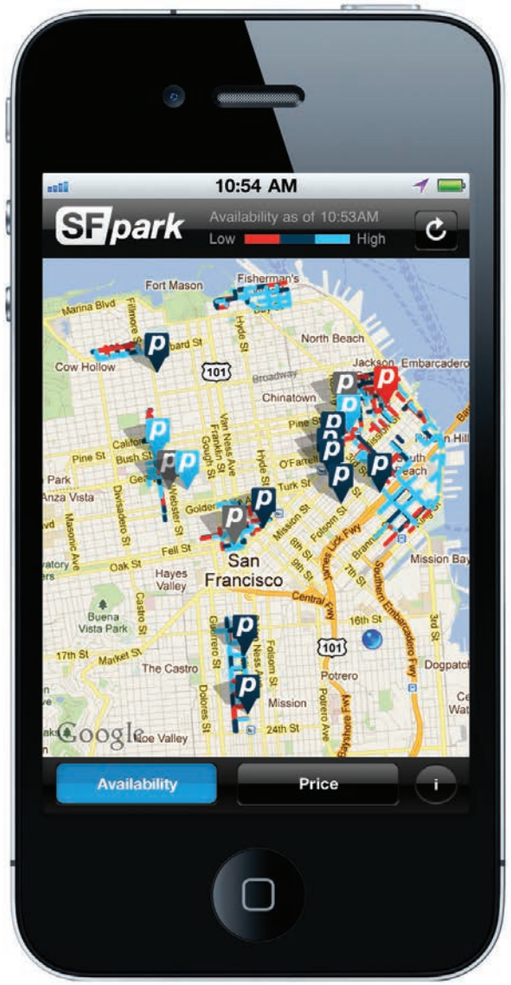
While appropriate for non-SF*park* operations, the SFPM cannot store, analyze, and report on complex meter rate and operating schedules, both current and historical, as well as other information necessary to implement and report on SF*park* policy performance. The SF*park* business intelligence database will need additional features before it can fully replace the SFPM.

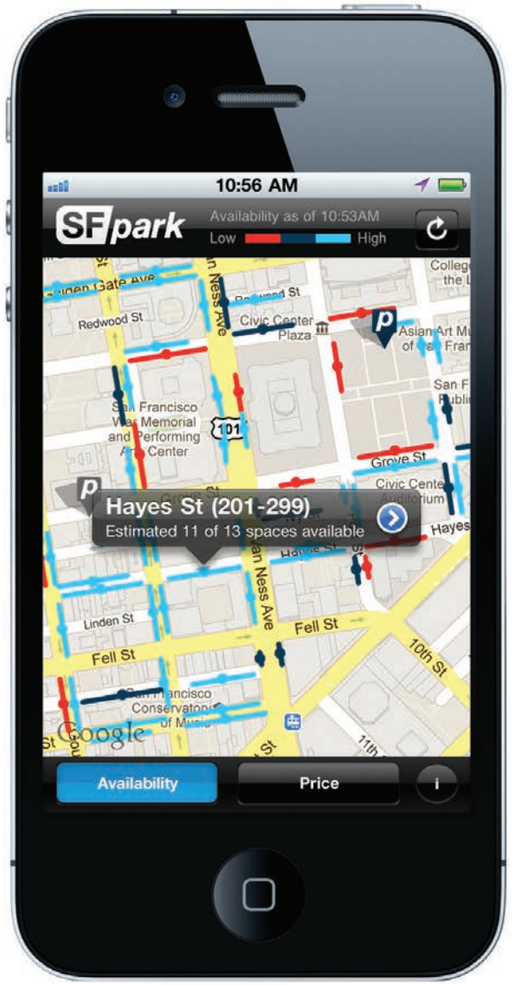
Data flow diagram

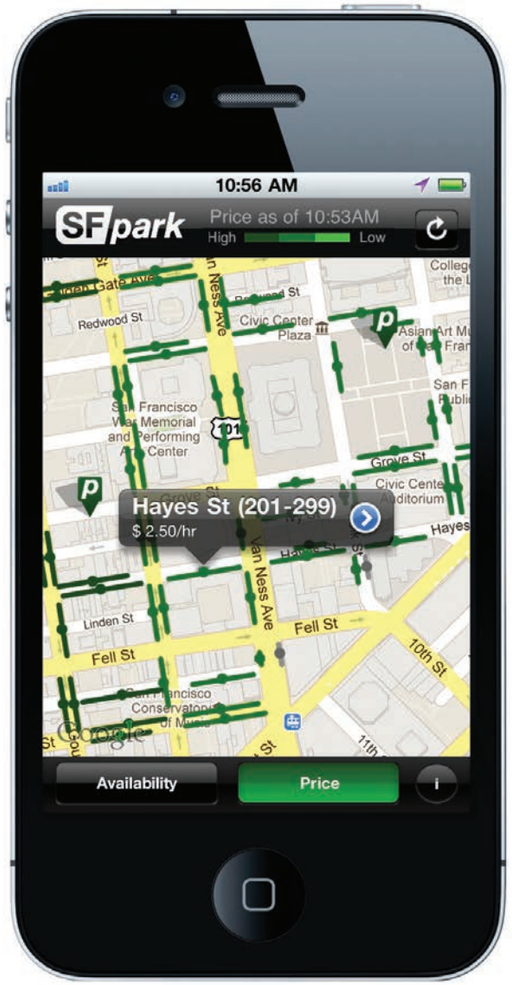


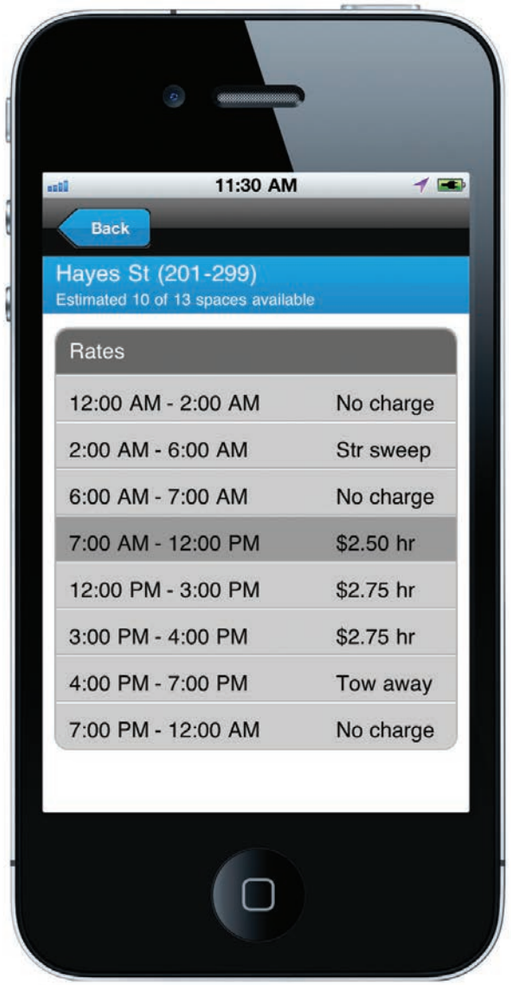
Mobile applications

SF*park* provided on- and off-street parking availability and rate information via iPhone and Android apps during the pilot period. When the sensors reached the end of their useful lives in December 2013, the apps no longer provided on-street availability but still displayed real-time rates and garage availability.





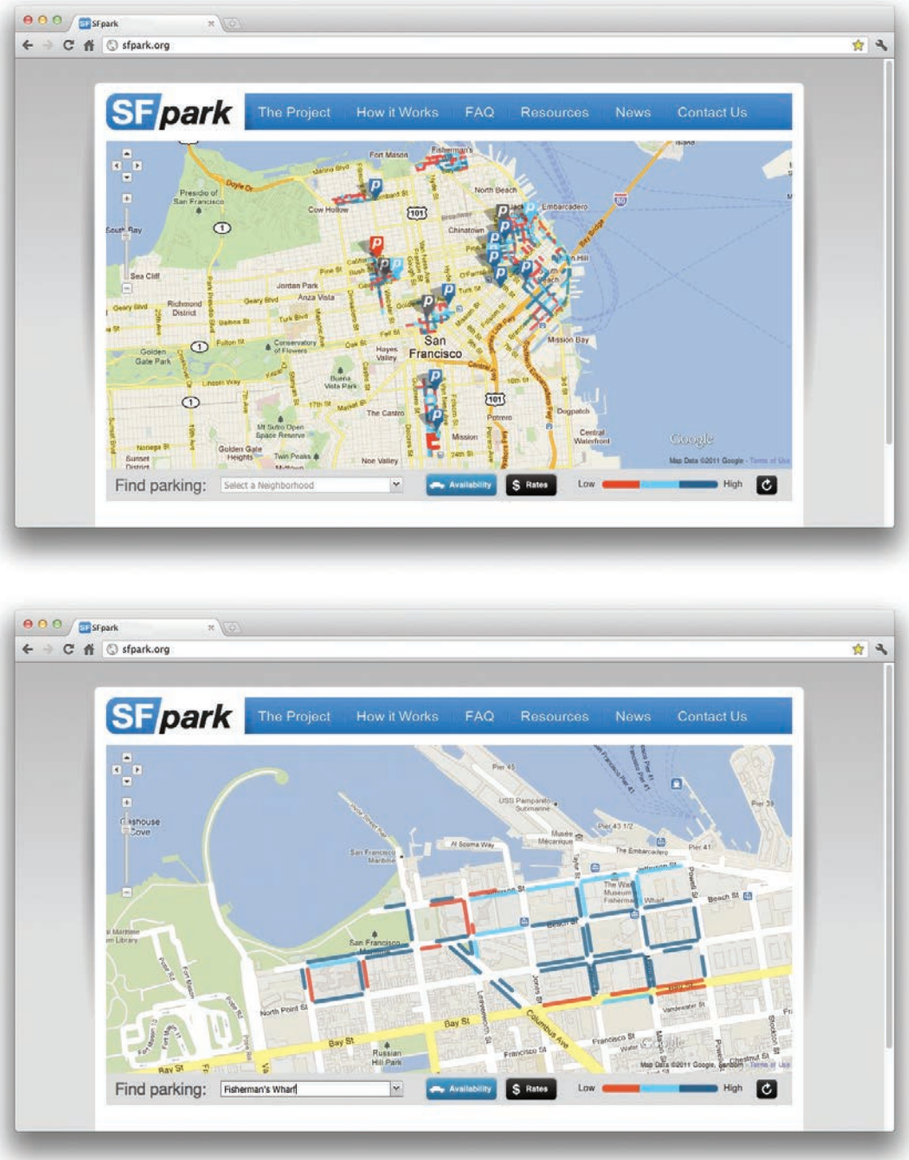


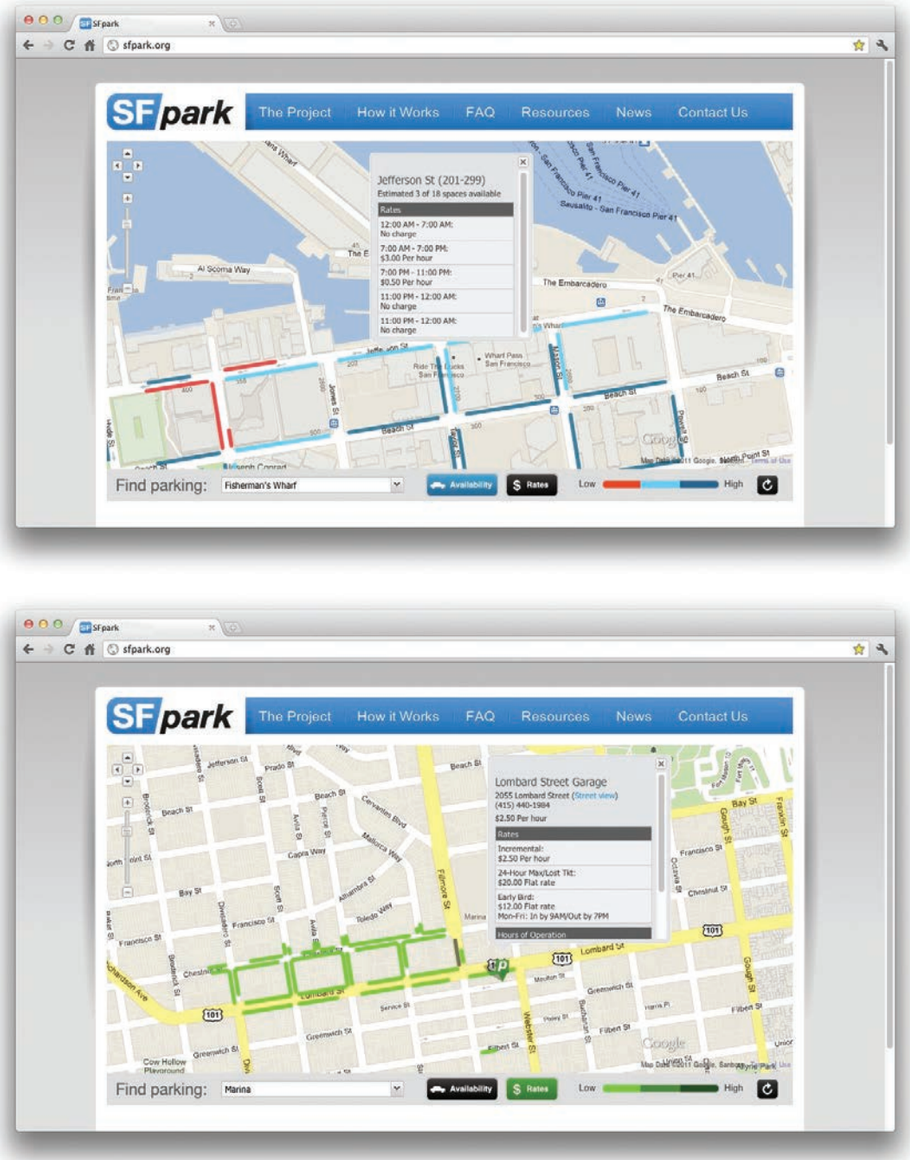


Screen shots of interactive parking map on SFpark.org

Web application

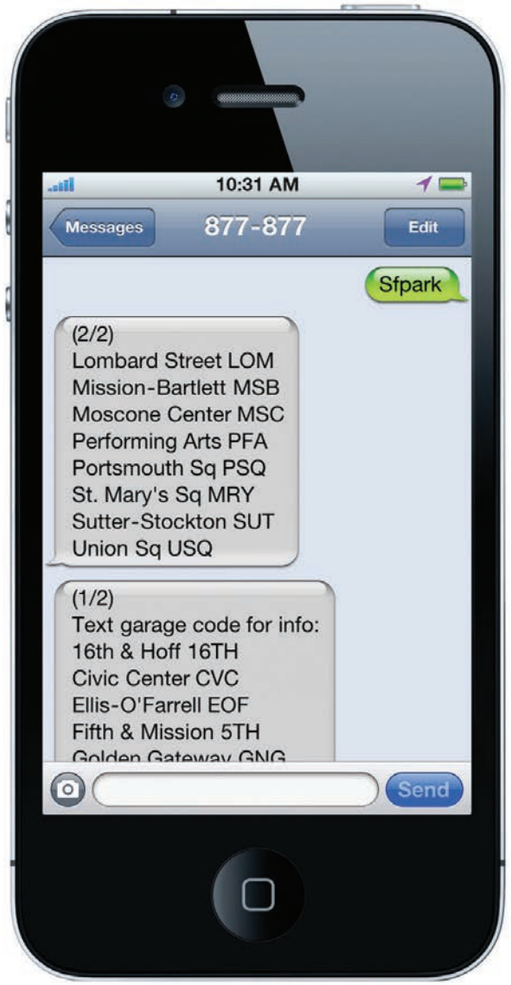
Customers could also access real-time parking availability and pricing information via SFpark.org.

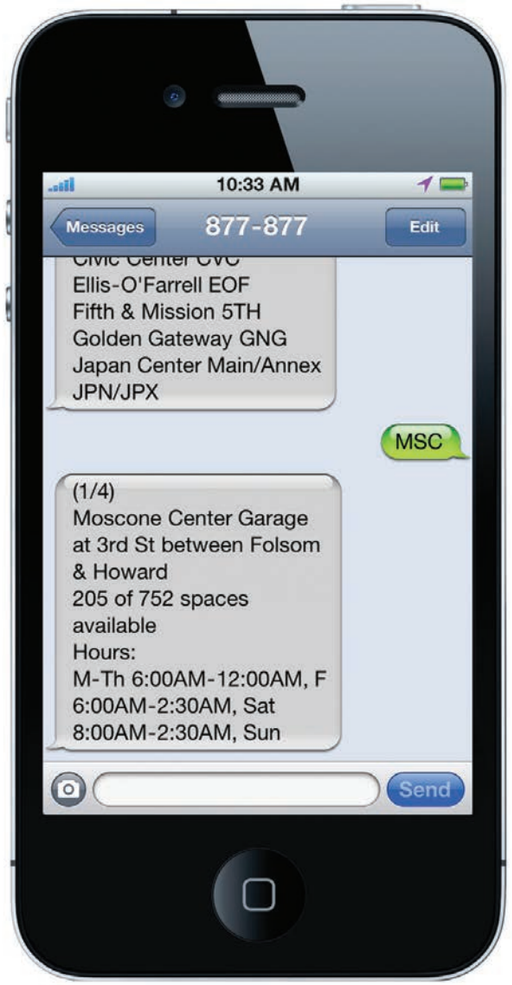


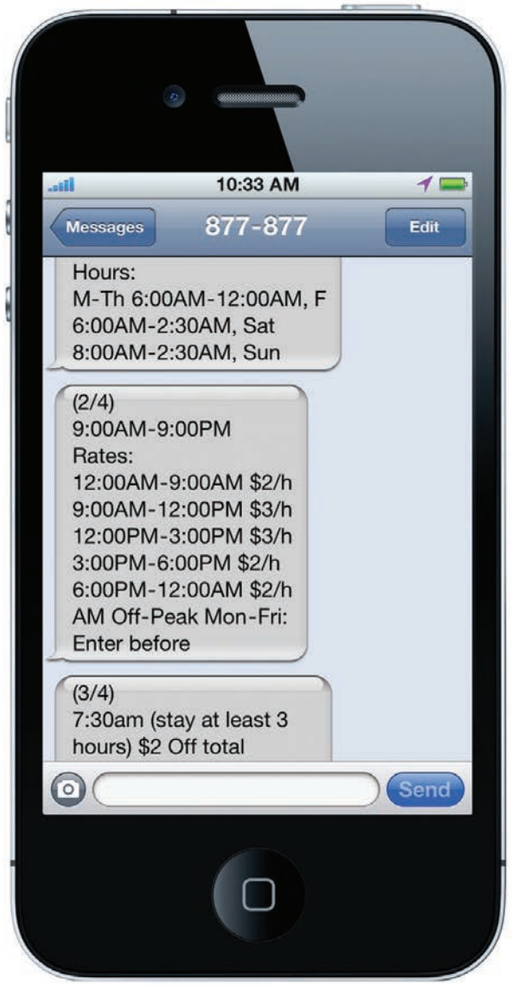


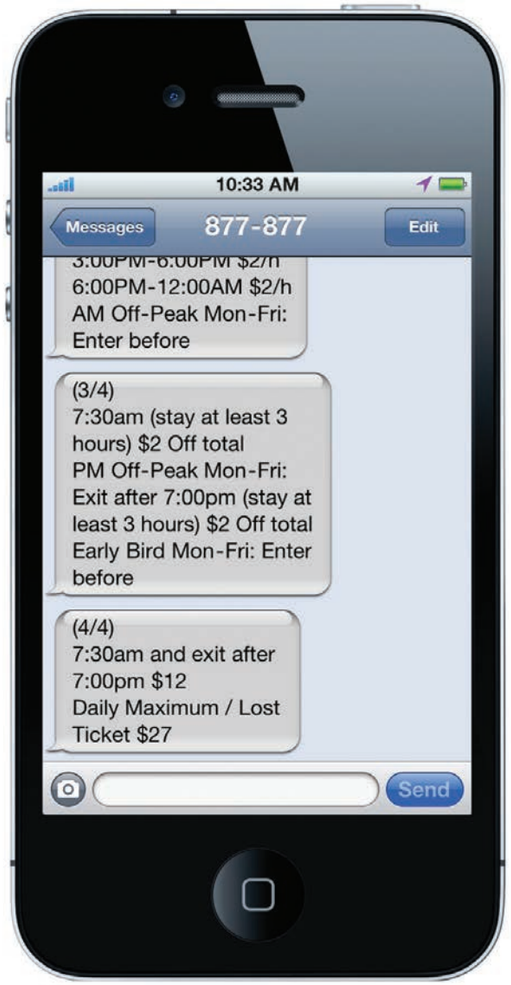
Text message

SF*park* also provided garage parking availability information via text message. The SFMTA discontinued this service after nine months due to low usage. People without smart phones or web access could, by then, receive parking availability information by calling the region's 511 system. Following is a sample text message script.









Parking guidance

Guiding drivers to available off-street parking

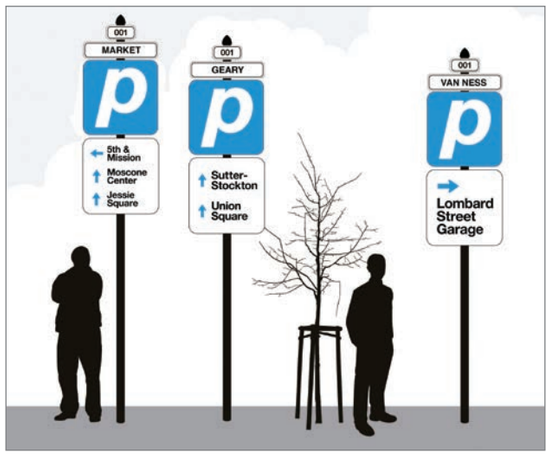
One goal of SF*park* is to match drivers with parking spaces to get them off the streets as quickly as possible. In addition to the parking availability apps, on-street wayfinding signage helps drivers find the city's often underutilized lots and garages.

Variable message signs

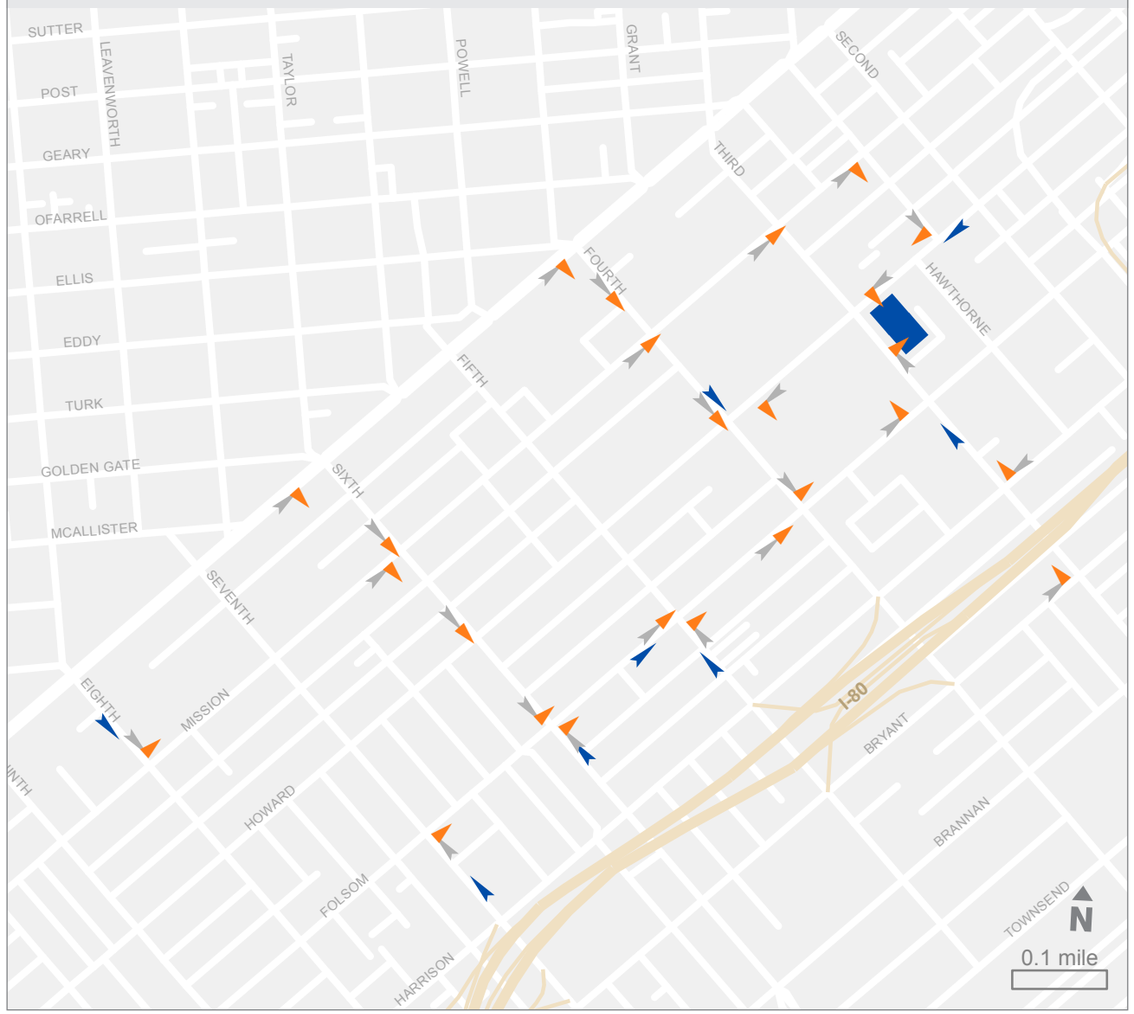
As part of the SF*park* pilot project, the SFMTA added nine variable message signs (to the city's existing five) that tell drivers approaching downtown which garages have availability. The sign type is consistent with the city's existing signs.

Wayfinding signs

The variable message signs are complemented by over 300 static directional wayfinding signs that help direct drivers to municipal garages and lots. All of the static signs were designed to match the look and feel of the rest of the SF*park* materials, especially the garage branding. In 2014, the signage system will be refined to make minor improvements and reflect changed traffic patterns. The SF*park* team also does an annual field check to make sure that that any damaged or destroyed signs are replaced.



Wayfinding signs for Moscone Center parking garage



Moscone Center parking garage
Suggested turn for Moscone Center
Static wayfinding sign, pointing in direction of traffic flow
Variable message sign, pointing in direction of traffic flow

6. COMMUNICATIONS

SF*park* required strong project communications strategy, planning, and execution. As a high-profile, public-facing project with dozens of customer touch points that fundamentally changed the way a city thinks about parking, establishing a user-friendly brand and providing well-designed materials—from meter decals and garage signage to the mobile apps and web experience—was critical to SF*park*'s success.

Communicating SF*park*

SF*park*. Circle less, live more.

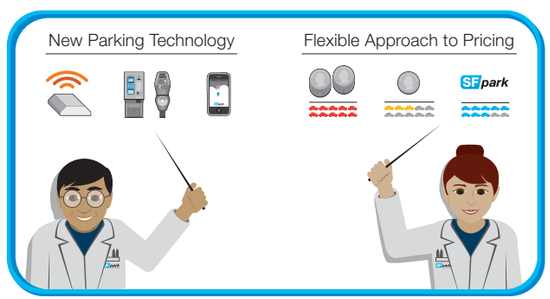
The SF*park* pilot project demonstrated new parking policy and technology and tested how they were received by SFMTA's customers. The SFMTA placed careful attention on framing the project and developing key messages for the project's outreach, communications, and advertising.

Framing and messaging

As with any major project, the SFMTA had to explain what problems SF*park* was addressing and how the pilot was intended to resolve these problems. A clear and stable internal understanding of that rationale made it easier for the project team to develop project materials and deliver a consistent message, as well as for stakeholders to understand the project's vision, goals, and approach.

Communications efforts around transportation projects are often focused around environmental or social benefits. However, these reasons often fail to motivate people to change their behavior, particularly when the change is seen as inconvenient. Effective communications for SF*park* had to take this into account. For example, a communications strategy that focused on driver convenience was more likely to be successful than one focusing on congestion management would have been.

This clear and compelling way of defining the issue and its solution allowed the project and the people representing it to have clear, successful, and consistent messages. Simple messages regarding the purpose and benefits of the project also allowed more focus on explaining the technology and ideas behind SF*park*, both of which were new and complex. The project FAQs (at SFpark.org/faq) show how the SFMTA has responded to many specific questions and criticisms.



The frame used for SF*park*

New technology and better parking management make parking in San Francisco more convenient.

Problem

Parking is a major concern in San Francisco, and it consistently ranks as one of the city's biggest quality of life challenges. Parking can be difficult because outdated parking management technology and strategies are similar to what was used when parking meters were introduced in the 1940s.

For drivers, the result is that it can be difficult to find and pay for parking. As drivers circle for parking, they contribute to congestion, waste time and fuel, increase greenhouse gas emissions, and slow down Muni.

We can do better.

Solution

New parking technology and management policies enable SF*park* to manage our limited parking supply more intelligently so that it is much more convenient to park. Better parking management benefits everyone—drivers, business owners, transit riders, bicyclists, and pedestrians—while reducing transportation-related greenhouse gas emissions.

San Francisco is a natural place for innovation and leadership on public policy issues. SF*park* uses innovative parking technology and management strategies to resolve our parking problems, one of our biggest quality of life challenges.

Overall message for SF*park*

San Francisco drivers often have a hard time finding a place to park. When people finally find a parking space, other regulations are often inconvenient—short time limits mean we sometimes can't park as long as they'd like, and we often can't pay the meter because we don't have enough quarters. San Francisco's parking experience is limited by antiquated parking equipment.

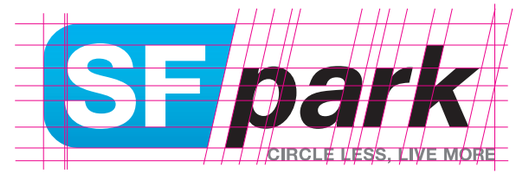
Using new parking technology and management strategies, SF*park* makes parking in San Francisco more convenient. The goal is to make parking easier to find (whether at the curb or in parking garages) and easier to pay for. These changes are positive for drivers—less frustrating circling for parking—and they are also better for everyone else; reducing the number of drivers circling for parking can improve Muni's reliability, reduce greenhouse gas emissions, and improve safety on city streets.

Key messages and talking points

1. SF*park* makes parking more convenient.
2. Reducing circling and double-parking benefits everyone.
3. SF*park* uses demand-responsive pricing to open up parking spaces on each block and ensure available spaces in city-owned garages.
4. SF*park* charges the lowest possible rate to achieve the right level of parking availability.
5. The SFMTA's primary goal with the project is not to raise parking revenue but rather to make the transportation system work better for everyone.

Branding and design

- Giving the project a name and creating a strong SF*park* brand distinguished the project as something new and different from the parking management approach that had been used for many years in the city.
- The SFMTA believed that a strong SF*park* brand was desirable to help the SFMTA improve the way that our customers relate to SFMTA parking management and the SFMTA overall.
- The goal of the SF*park* project brand and product design is for drivers' interactions with SF*park* to be simple, smart, easy to use, and convenient.
- Good user interface and visual design helps create the intended user experience.
- The brand's voice is deliberate: as clear, friendly, approachable, respectful, and transparent as possible.
- This branding was part of a deliberate decision to adopt a customer-centric approach to parking management.



Outreach

Open communication and transparency

Changing parking management or technology is a sensitive topic that requires multiple in-depth conversations with various stakeholders, including local government officials, SFMTA colleagues, neighborhood and merchant groups, and drivers.

Steps taken

Initial project introduction

While planning the project, the SF*park* project team had hundreds of meetings, both small and large, with community leaders and variety of stakeholders. Among all the outreach that was done for the project, it was particularly important to have initial one-on-one or small group meetings with community and group leaders. We typically went to that person's office to explain, in a friendly environment, the changes being planned as part of the SF*park* pilot project. These initial conversations were a good way to:

- Truly engage with San Francisco opinion leaders
- Have the time necessary to explain the project
- Listen to and understand their concerns
- Ensure they were aware of the project and its goals before they heard the SF*park* name for the first time in the news or from some other party
- Establish that relationship before presenting the project to the groups they represented

During that process, the SFMTA built support, credibility, and trust around the SF*park* project because those key stakeholders knew they could easily be in touch if they had additional concerns along the way.

Project changes

While implementing the various infrastructure or policy changes, such as parking sensor installations or adjusting meter rates or time limits, the SF*park* team typically uses the following steps. A comprehensive list follows (though not every step is taken for each change):

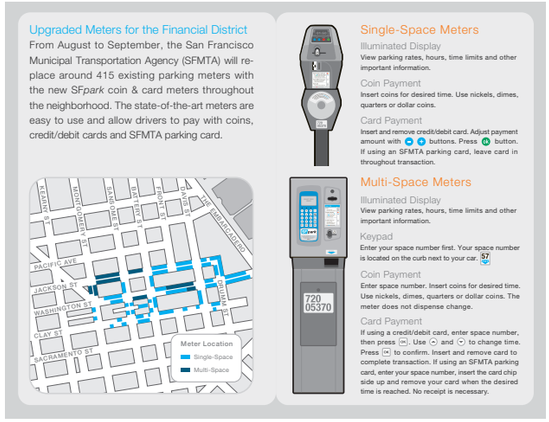
1. During planning stages
   a. Meet with policymakers
   b. Outreach to neighborhood and merchant groups via emails and/or presentations at their meetings
   c. Outreach to SFMTA stakeholders via emails and/or presentations to such groups as parking control officers (PCOs), parking meter repair personnel (PMRs) and customer service providers
2. One to two weeks before implementation
   a. Email relevant policymakers and offer to answer any questions in person or via email
   b. Email SFMTA stakeholders
   c. Distribute flyers to PCOs, PMRs and coin collectors to pass out to public as needed
   d. Email contacts from relevant neighborhood and merchant groups
   e. Do door-to-door outreach to merchants in affected areas, including flyers left for patrons
   f. For garages, place posters at prime locations and flyers given with receipts
   g. Update content on SFpark.org

3. Two days before to actual day of the change
   a. Press release
   b. Announcement via SFpark.org, email list, and social media

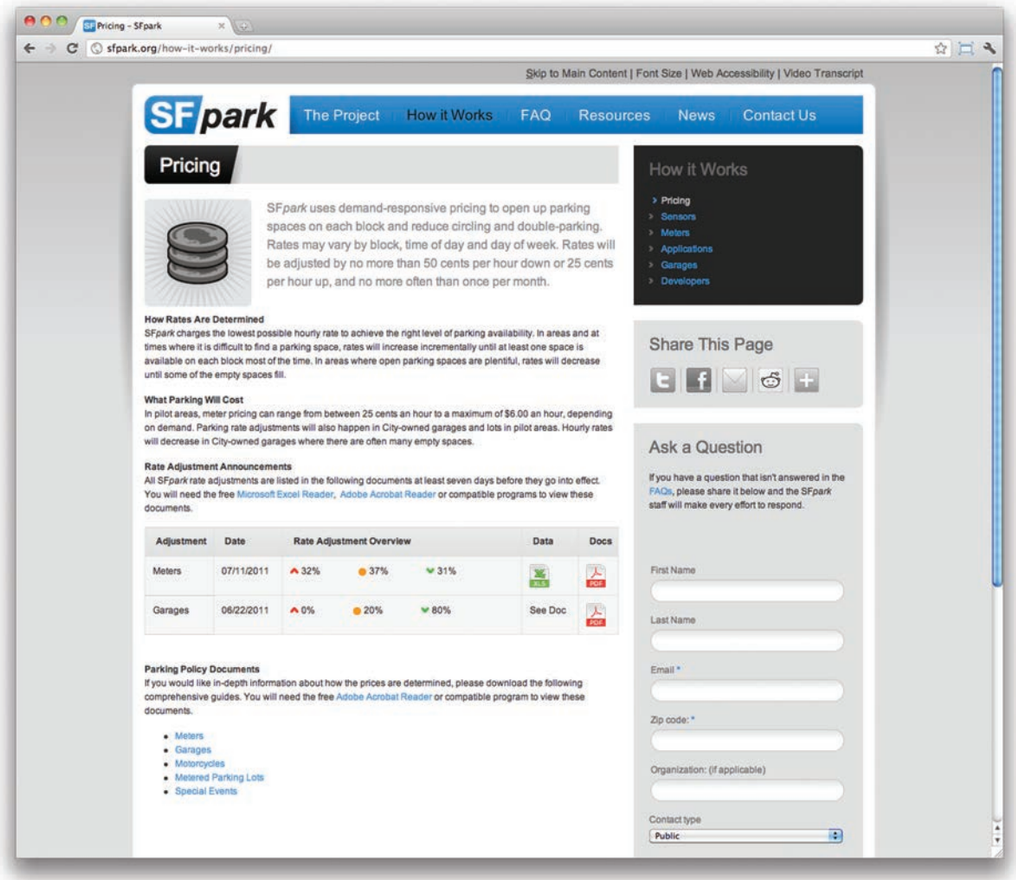
Ongoing outreach

After changes were implemented, the SF*park* team provided periodic project status updates for policy makers, which were available to the media and our customers.

Meter installation poster and flyer design



Rate adjustment page on SFpark.org



Sample poster and flyer for garage rate adjustments

SFpark Japan Center Garage

New rates effective August 17

Hourly

Midnight – 9am	$1.50/hr
9am – Noon	$2.00/hr
Noon – 3pm	$2.50/hr
3pm – 6pm	$2.00/hr
6pm – Midnight	$1.50/hr

Charged in 30-minute increments

Daily

Early Bird (Mon-Fri)	$12

*Enter **before** 7:30am and exit **after** 7:00pm*
Must enter and exit on same calendar day

Maximum/lost ticket (Mon-Sun)	$18
Motorcycle	$6

Monthly *Effective September 1*

Regular	$170
Regular M-F	$130
Reserved	$255
Carpool/carshare	$85
Motorcycle	$60

Off-Peak Discounts *New!*

Enter before 7:30am (Mon-Fri)	$2.00 off
Exit after 7:00pm (Mon-Fri)	$2.00 off

Valid only for hourly parkers
Must enter and exit on same calendar day
Must park for at least 3 hours

Garage upgrades

Facility upgrades
New signage, paint and lighting will make garages more welcoming and easier to use.

Demand-responsive prices
To attract drivers and make sure spaces are almost always available, rates at garages will be adjusted quarterly in response to demand. They may also vary by the time of day and day of week.

Off-peak discounts
Save money at this garage by parking when there is less traffic, before 7:30 am and after 7:00 pm. Driving "off-peak" eases congestion and helps Muni run faster.

Transparent pricing
All rate adjustments will be announced in advance on SFpark.org. To see how prices are set, visit SFpark.org/rates.

SFMTA | Municipal Transportation Agency

SFpark.org/garages

New upgrades for the City's 14 SF*park* garages

Facility upgrades
New signage, paint and lighting will make garages more welcoming and easier to use.

Demand-responsive prices
To attract drivers and make sure spaces are almost always available, rates at garages will be adjusted quarterly in response to demand. They may also vary by the time of day and day of week.

Off-peak discount
SF*park* offers a discount to encourage customers to drive and park when there is less traffic, easing congestion and clearing the streets so Muni can move faster.

Transparent pricing
All price changes will be announced in advance on SFpark.org. To see how prices are set, visit SFpark.org/pricing.

SFpark.org/garages

SFpark

Lombard Street Garage
New Rates

Hourly

Midnight – 9am	$2.00/hr
9am – Noon	$2.50/hr
Noon – 3pm	$2.50/hr
3pm – 6pm	$2.00/hr
6pm – Midnight	$2.00/hr

Charged in 30-minute increments

Daily

Daily maximum/lost ticket	$22
Early bird*	$15

**Enter before 7:30am and exit after 7:00pm M-F*

Monthly

Monthly	$220
Monthly (reserved parking)	$330
Monthly (carpool/carshare)	$110

Off-peak discounts *new!*

Enter before 7:30am M-F	$2.00 off
Exit after 7:00pm M-F	$2.00 off

Applies to hourly rates only
Must park for at least 3 hours

Motorcycle

Monthly	$40

SFMTA | Municipal Transportation Agency

SFpark

Meter Rate Adjustments

68% of rates will be lower or remain the same

Beginning late July, the SFMTA will adjust parking rates at SF*park* meters in pilot areas based on parking demand data from in-ground parking sensors. The SFMTA will continue to make data-driven rate adjustments at SF*park* meters about once every four to six weeks.

The goal of these adjustments is to find the lowest price possible that ensures that there is usually at least one parking space available on every block. More parking availability means less circling and double-parking, safer streets, reduced greenhouse gas emissions and more reliable Muni service.

Demand-responsive pricing

Parking rates will vary by block, time of day, and weekday vs. weekend.

- Where and when parking is hard to find, meter rates will increase by 25¢.
- Where and when parking demand is low, meter rates will decrease by 25¢ or 50¢.
- Where and when parking availability is about right, rates will stay the same.

SFMTA | Municipal Transportation Agency

Find SF*park* rates

Meters
SF*park* meters display the current hourly rate as well as rate information for the full day. When you add funds, the meter automatically adds the appropriate amount of time.

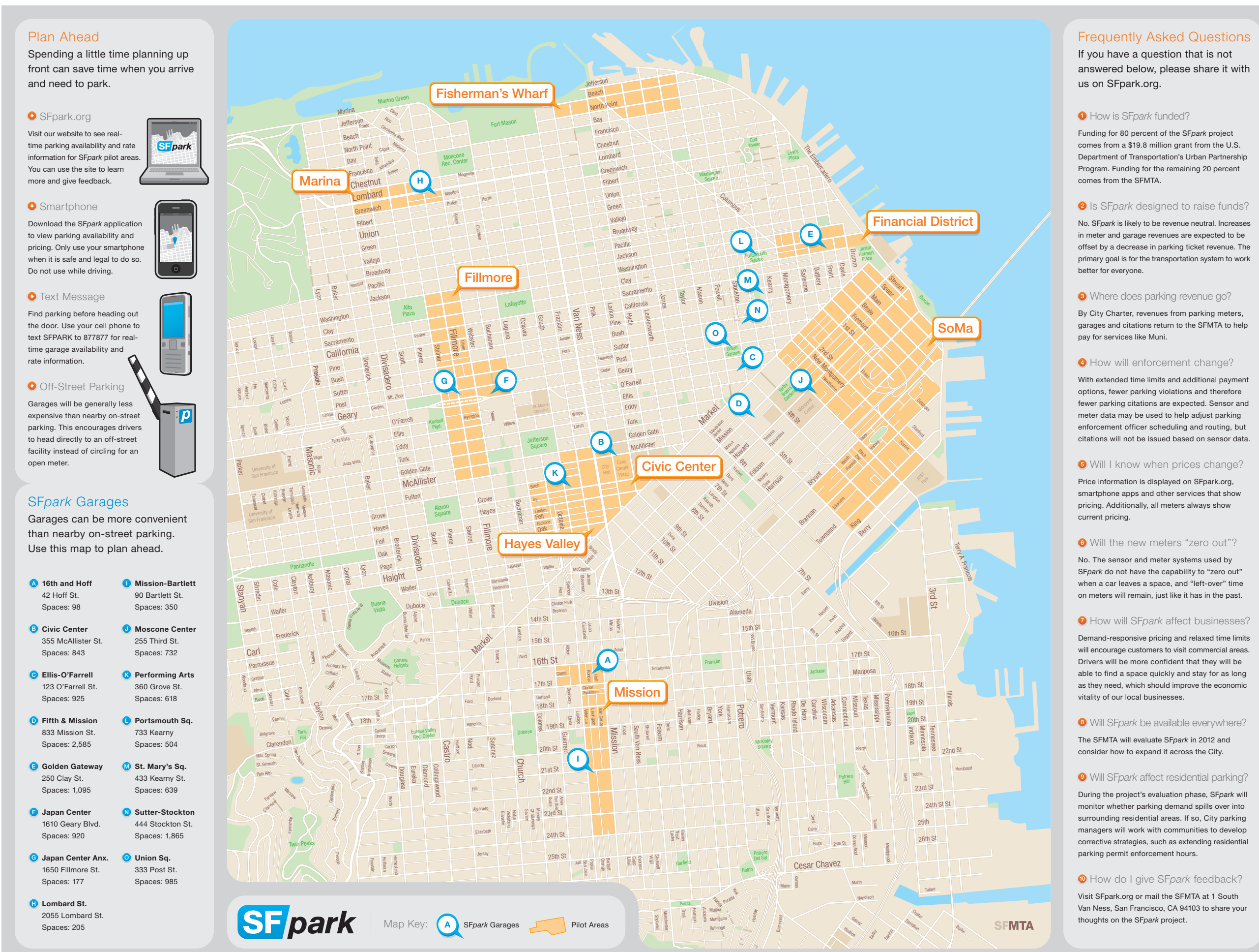
Apps
Download the SF*park* app at SFpark.org/apps to check real-time parking availability and rates on your iPhone. An SF*park* Android app is coming soon.

SFpark.org
Visit the homepage for an interactive map of current availability and rates. SFpark.org/rates features complete rate adjustment information including maps showing pilot areas and affected streets. All new rates will be posted at least seven days in advance.

The SF*park* Pilot Project

SF*park* is a federally funded pilot project that aims to make it easier to park in San Francisco, reducing traffic and other problems caused by circling and double-parking. This is done using smarter demand-responsive pricing and providing drivers better information about where to find parking. At SF*park* meters, drivers will have longer time limits and new meters that make it easy to pay. SF*park* garages will undergo facility upgrades that make them more convenient to use.

www.SFpark.org



Plan Ahead

Spending a little time planning up front can save time when you arrive and need to park.

SFpark.org
Visit our website to see real-time parking availability and rate information for SF*park* pilot areas. You can use the site to learn more and give feedback.

Smartphone
Download the SF*park* application to view parking availability and pricing. Only use your smartphone when it is safe and legal to do so. Do not use while driving.

Text Message
Find parking before heading out the door. Use your cell phone to text SFPARK to 877877 for real-time garage availability and rate information.

Off-Street Parking
Garages will be generally less expensive than nearby on-street parking. This encourages drivers to head directly to an off-street facility instead of circling for an open meter.

SF*park* Garages

Garages can be more convenient than nearby on-street parking. Use this map to plan ahead.

- A **16th and Hoff** — 42 Hoff St. Spaces: 98
- B **Civic Center** — 355 McAllister St. Spaces: 843
- C **Ellis-O'Farrell** — 123 O'Farrell St. Spaces: 925
- D **Fifth & Mission** — 833 Mission St. Spaces: 2,585
- E **Golden Gateway** — 250 Clay St. Spaces: 1,095
- F **Japan Center** — 1610 Geary Blvd. Spaces: 920
- G **Japan Center Anx.** — 1650 Fillmore St. Spaces: 177
- H **Lombard St.** — 2055 Lombard St. Spaces: 205
- I **Mission-Bartlett** — 90 Bartlett St. Spaces: 350
- J **Moscone Center** — 255 Third St. Spaces: 732
- K **Performing Arts** — 360 Grove St. Spaces: 618
- L **Portsmouth Sq.** — 733 Kearny Spaces: 504
- M **St. Mary's Sq.** — 433 Kearny St. Spaces: 639
- N **Sutter-Stockton** — 444 Stockton St. Spaces: 1,865
- O **Union Sq.** — 333 Post St. Spaces: 985

Frequently Asked Questions

If you have a question that is not answered below, please share it with us on SFpark.org.

1. **How is SF*park* funded?**
Funding for 80 percent of the SF*park* project comes from a $19.8 million grant from the U.S. Department of Transportation's Urban Partnership Program. Funding for the remaining 20 percent comes from the SFMTA.

2. **Is SF*park* designed to raise funds?**
No. SF*park* is likely to be revenue neutral. Increases in meter and garage revenues are expected to be offset by a decrease in parking ticket revenue. The primary goal is for the transportation system to work better for everyone.

3. **Where does parking revenue go?**
By City Charter, revenues from parking meters, garages and citations return to the SFMTA to help pay for services like Muni.

4. **How will enforcement change?**
With extended time limits and additional payment options, fewer parking violations and therefore fewer parking citations are expected. Sensor and meter data may be used to help adjust parking enforcement officer scheduling and routing, but citations will not be issued based on sensor data.

5. **Will I know when prices change?**
Price information is displayed on SFpark.org, smartphone apps and other services that show pricing. Additionally, all meters always show current pricing.

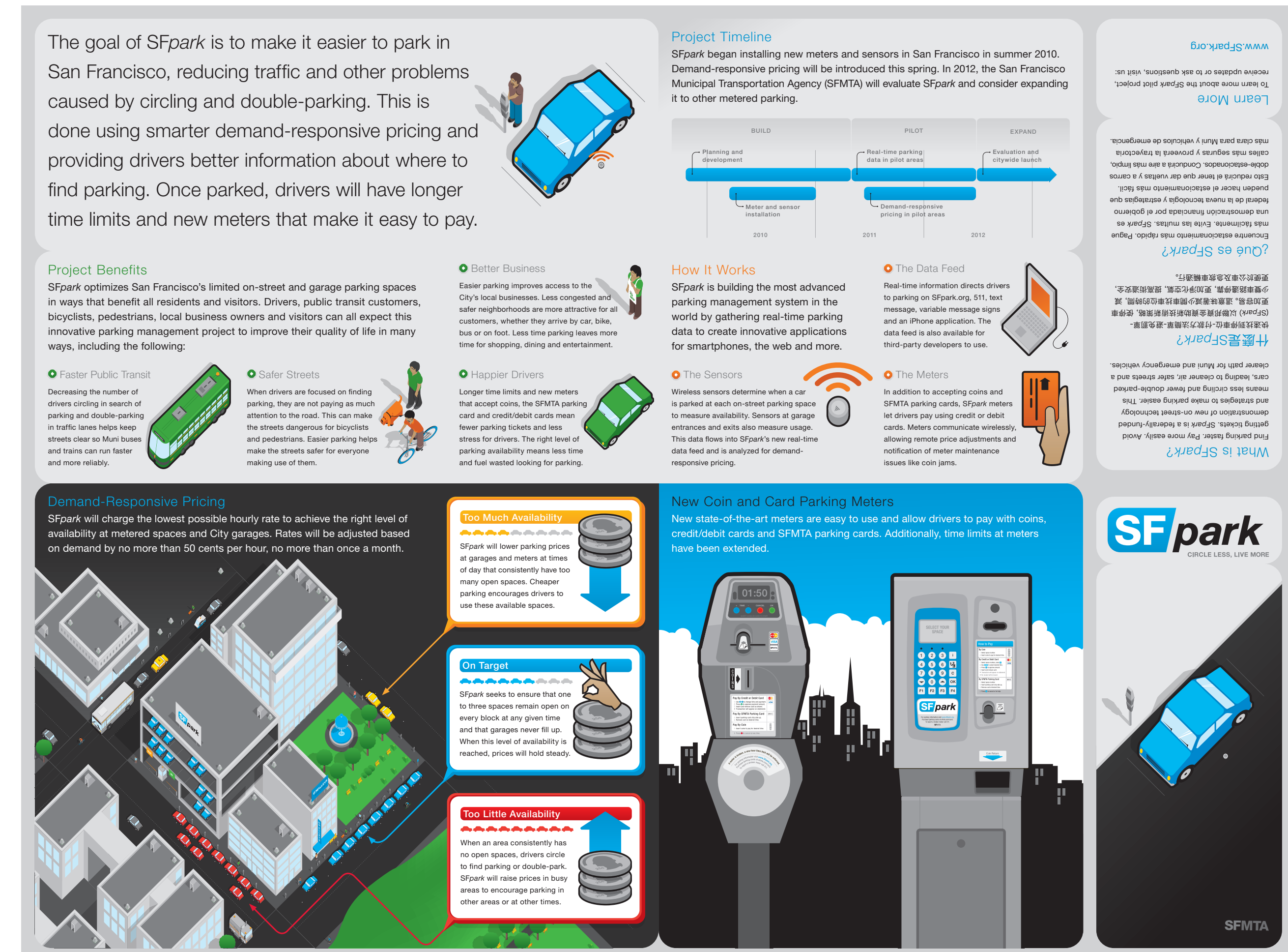
6. **Will the new meters "zero out"?**
No. The sensor and meter systems used by SF*park* do not have the capability to "zero out" when a car leaves a space, and "left-over" time on meters will remain, just like it has in the past.

7. **How will SF*park* affect businesses?**
Demand-responsive pricing and relaxed time limits will encourage customers to visit commercial areas. Drivers will be more confident that they will be able to find a space quickly and stay for as long as they need, which should improve the economic vitality of our local businesses.

8. **Will SF*park* be available everywhere?**
The SFMTA will evaluate SF*park* in 2012 and consider how to expand it across the City.

9. **Will SF*park* affect residential parking?**
During the project's evaluation phase, SF*park* will monitor whether parking demand spills over into surrounding residential areas. If so, City parking managers will work with communities to develop corrective strategies, such as extending residential parking permit enforcement hours.

10. **How do I give SF*park* feedback?**
Visit SFpark.org or mail the SFMTA at 1 South Van Ness, San Francisco, CA 94103 to share your thoughts on the SF*park* project.



The goal of SF*park* is to make it easier to park in San Francisco, reducing traffic and other problems caused by circling and double-parking. This is done using smarter demand-responsive pricing and providing drivers better information about where to find parking. Once parked, drivers will have longer time limits and new meters that make it easy to pay.

Project Timeline

SF*park* began installing new meters and sensors in San Francisco in summer 2010. Demand-responsive pricing will be introduced this spring. In 2012, the San Francisco Municipal Transportation Agency (SFMTA) will evaluate SF*park* and consider expanding it to other metered parking.

Project Benefits

SF*park* optimizes San Francisco's limited on-street and garage parking spaces in ways that benefit all residents and visitors. Drivers, public transit customers, bicyclists, pedestrians, local business owners and visitors can all expect this innovative parking management project to improve their quality of life in many ways, including the following:

Faster Public Transit
Decreasing the number of drivers circling in search of parking and double-parking in traffic lanes helps keep streets clear so Muni buses and trains can run faster and more reliably.

Safer Streets
When drivers are focused on finding parking, they are not paying as much attention to the road. This can make the streets dangerous for bicyclists and pedestrians. Easier parking helps make the streets safer for everyone making use of them.

Better Business
Easier parking improves access to the City's local businesses. Less congested and safer neighborhoods are more attractive for all customers, whether they arrive by car, bike, bus or on foot. Less time parking leaves more time for shopping, dining and entertainment.

Happier Drivers
Longer time limits and new meters that accept coins, the SFMTA parking card and credit/debit cards mean fewer parking tickets and less stress for drivers. The right level of parking availability means less time and fuel wasted looking for parking.

How It Works

SF*park* is building the most advanced parking management system in the world by gathering real-time parking data to create innovative applications for smartphones, the web and more.

The Data Feed
Real-time information directs drivers to parking on SFpark.org, 511, text message, variable message signs and an iPhone application. The data feed is also available for third-party developers to use.

The Sensors
Wireless sensors determine when a car is parked at each on-street parking space to measure availability. Sensors at garage entrances and exits also measure usage. This data flows into SF*park*'s new real-time data feed and is analyzed for demand-responsive pricing.

The Meters
In addition to accepting coins and SFMTA parking cards, SF*park* meters let drivers pay using credit or debit cards. Meters communicate wirelessly, allowing remote price adjustments and notification of meter maintenance issues like coin jams.

Demand-Responsive Pricing

SF*park* will charge the lowest possible hourly rate to achieve the right level of availability at metered spaces and City garages. Rates will be adjusted based on demand by no more than 50 cents per hour, no more than once a month.

Too Much Availability
SF*park* will lower parking prices at garages and meters at times of day that consistently have too many open spaces. Cheaper parking encourages drivers to use these available spaces.

On Target
SF*park* seeks to ensure that one to three spaces remain open on every block at any given time and that garages never fill up. When this level of availability is reached, prices will hold steady.

Too Little Availability
When an area consistently has no open spaces, drivers circle to find parking or double-park. SF*park* will raise prices in busy areas to encourage parking in other areas or at other times.

New Coin and Card Parking Meters

New state-of-the-art meters are easy to use and allow drivers to pay with coins, credit/debit cards and SFMTA parking cards. Additionally, time limits at meters have been extended.

Press relations

Getting the word out about SF*park*

Press relations efforts included events, press releases, and outreach to media. The SFMTA made announcements about SF*park* and other parking-related projects via SFMTA press releases, SFpark.org, opt-in email lists, and social media. As a result of these activities, the project has enjoyed significant local, national, and international media coverage.

SF*park* and parking-related media activities

Story	Month	Activities
SFMTA hosts the U.S. Secretary of Transportation to announce that SFMTA was selected to receive Urban Partnership Program funding for parking management	October 2007	Press release
SFMTA and Port of San Francisco bring smart parking meters to the Embarcadero	May 2009	Press release
SF*park* begins sensor installation in pilot areas	March 2010	SFpark.org announcement
SFMTA completes innovative citywide census of San Francisco parking	April 2010	Press release
SFMTA's SF*park* pilot project introduces new coin and card parking meters	July 2010	Press event Press release
SF*park* project to begin installing multi-space parking meters in the Civic Center on August 10	August 2010	SFpark.org announcement
SF*park* project to begin upgrading parking meters in the Financial District on August 23	August 2010	SFpark.org announcement
SFMTA's SF*park* project activates new multi-space meters in the Civic Center	September 2010	Press release SFpark.org announcement
SF*park* protects San Francisco bicycle parking inventory: SFMTA parking project installs new bicycle parking racks on unused parking meter poles	October 2010	Press release SFpark.org announcement
SFMTA lowers most SF*park* motorcycle parking rates	October 2010	Press release
SFMTA eliminates free parking for employees and city passenger vehicles	March 2011	SFpark.org announcement

Story	Month	Activities
Meter rates to change on the waterfront; schedule for Giants game special event pricing announced	April 2011	SFpark.org announcement
SFMTA announces improved SF*park* pricing strategy for city-owned garages	April 2011	Press release SFpark.org announcement
SFMTA expands time limits at SF*park* meters	April 2011	Press release SFpark.org announcement
SFMTA to add pay-by-phone convenience to parking meters	April 2011	Press release
SF*park* parking data soon available for app developers	April 2011	Announcement at Transit Camp West
Mayor Lee launches SF*park* project	April 2011	Press event Press release from Mayor's office SFpark.org announcement
SFMTA to adjust rates at SF*park* meters	June 2011	Press release SFpark.org announcement
SFMTA joins Supervisor David Chiu to introduce Tour Bus Parking Management Plan	July 2011	Press release SFpark.org announcement

SF*park* and parking-related media activities, cont.

Story	Month	Activities
SF*park* expands parking sensor program	July 2011	SFpark.org announcement
The SFMTA debuts SF*park* garage availability texting service	September 2011	Press release SFpark.org announcement
SF*park* implementation and lessons learned book now available	September 2011	SFpark.org announcement
SFMTA's SF*park* project to implement first on-street parking spaces for car-sharing	October 2011	Press event Press release SFpark.org announcement
SFMTA makes second rate adjustment at SF*park* meters	October 2011	Press release SFpark.org announcement
SF*park* releases Android app	November 2011	Press release SFpark.org announcement
SF*park* releases updated Citywide census of San Francisco parking	November 2011	SFpark.org announcement
SF*park* posts source code for its parking availability and pricing apps	November 2011	SFpark.org announcement
SFMTA offers tips for safe, convenient holiday shopping	November 2011	Press release SFpark.org announcement
SFMTA to adjust rates at car and motorcycle meters in SF*park* pilot areas	December 2011	SFpark.org announcement
SF*park* releases SFMTA tow-away data	December 2011	SFpark.org announcement
Mayor Lee & SFMTA launch new Innovative Pay by Phone parking meters	December 2011	Press event Press release from Mayor SFpark.org announcement
SFMTA SF*park* study shows 14 percent fewer citations, 27 percent more meter payments with new meters and longer time limits	January 2012	Press release SFpark.org announcement
San Francisco wins Sustainable Transport Award for SF*park*, Pavement to Parks	January 2012	SFpark.org announcement
SFMTA Releases 2011 Meter Rate and Policy Survey	February 2012	SFpark.org announcement
SF*park* announces 4th meter rate adjustment, new rate adjustment mailing list**	February 2012	SFpark.org announcement
SF*park* Pilot Project Wins Good Government Award	March 2012	SFpark.org announcement
SFMTA upgrades the SFpark.org online parking map using OpenGeo technology	March 2012	SFpark.org announcement
SFMTA lowers some SF*park* meter rates to $0.25 per hour	April 2012	Press release SFpark.org announcement
SFMTA continues to lower rates at many SF*park* garages	April 2012	Press release SFpark.org announcement
SFMTA offers tips for safe, convenient holiday shopping	December 2012	Press release
PayByPhone now available at SFMTA meters citywide	January 2013	Press release SFpark.org announcement
SFMTA to debut evening metering and event meter rates near AT&T Park on Monday, March 4	February 2013	Press release SFpark.org announcement
Committee makes recommendations to improve parking access in San Francisco	May 2013	Press release Press roundtable SFMTA.com announcement
Accessible parking forum to discuss proposed disabled parking placard and blue zone changes	October 2013	Press release SFpark.org announcement
SFMTA Board of Directors approves policy recommendations to improve parking access for people with disabilities	November 2013	Press release SFpark.org announcement
SFMTA offers tips for safe, convenient holiday shopping	December 2013	Press release

* *Mailings and social media postings not listed here.*
** *This was the last rate adjustment announcement sent to the full SF*park *mailing list, and the last listed here. SF*park *communicated the rest of its meter, garage, and motorcycle rate adjustments via SFpark.org and emails to the rate adjustment mailing list.*

Sample SF*park* press coverage

New York Times
- Making the Streets of San Francisco Easier to Park On, March 15, 2012
- Can Parking Policy Ease Congestion? July 1, 2008

NPR
- Need A Parking Space? Look In Your Hand, August 29, 2011

The Economist
- Spot prices—New systems will make finding parking spaces easier and help to reduce congestion, September 17, 2008

The Guardian
- Five innovative city programmes from North America, September 5, 2013

Atlantic Magazine
- 5 Great U.S. City Parking Apps, October 12, 2011
- Car Talk, April 24, 2010

Sustainable Transport Magazine
- SF*park*: San Francisco Knows How to Park It, Winter 2012

San Francisco Examiner
- San Francisco-owned garage rates offering better deals than street meters, November 26, 2012
- SF*park* hourly meters actually save motorists money, December 16, 2012

SFStreetsblog
- Shoup: SF*park* Yields Promising Results, Lessons for Demand-Based Pricing, August 7, 2013
- How Handicap Placard Abuse Threatens SF's Parking Reforms, August 31, 2012
- The 'Heart of SF*park*' Complete with Vehicle Sensor Installation, May 1, 2010
- San Francisco First City in the Nation to Count Its Parking Spaces, March 29, 2010

KQED
- SF*park* and the "Science of Parking", KQED Forum, March 27, 2012
- San Francisco's Parking Census, March 30, 2010

KALW FM
- Parking tips from SF*park*, August 31, 2011
- Interview with Donald Shoup and Jay Primus, October 29, 2010

Awards

Local, national, and international accolades

Publications, organizations, and government agencies around the world have recognized the SF*park* project, from its technology to its unique pricing policies, for its innovative solutions to urban parking management. The SFMTA is honored to have received or been selected as a finalist for the following awards for SF*park*.

2014 Oracle Spatial and Graph Excellence Award, Innovator category

Selected from a worldwide group of candidates, the SFMTA SF*park* project received this award for its unique system design that manages the entire demand-responsive parking pricing business lifecycle.

2013 Public Parking Program of the Year

At its 30th annual conference, the California Public Parking Association named SF*park* the Public Parking Program of the Year.

2013 Sustainia100 Top 10 Innovations in "Cities" category

SF*park* was recognized for its demand-responsive pricing strategy, extensive public data availability, and project knowledge sharing. Based in Copenhagen, Denmark, Sustainia identifies the most innovative sustainability projects, initiatives, and technologies from around the world.

International Parking Institute Top 10 Innovative US Parking Programs 2013

The International Parking Institute (IPI) ranked SF*park* as the No. 1 most innovative parking program in United States. Founded in 1962, IPI is the world's largest association representing parking professionals and the parking industry.

Harvard Kennedy School's Top 25 Innovations in Government 2013

Selected by a cohort of policy experts, researchers, and practitioners SF*park* was named an Innovations in American Government Award semi-finalist for its ability to "utilize data analytics to enhance government performance" and "achieve a broad suite of social benefits."

2012 Bay Area MTC Excellence in Motion Award of Merit

The Bay Area Metropolitan Transportation Commission (MTC) gave SF*park* an Excellence in Motion Award of Merit for "improving the quality of life for San Francisco residents and visitors by increasing the availability and predictability of parking." SF*park* and Sunday Streets shared the award.

7×7's Best of San Francisco 2012

SF*park*'s pricing and technology was recognized as a "Real-World Technology Innovation" by this San Francisco city culture magazine. Paul Davison writes "it's part of a broader movement of using sensors to automate things in the real world."

2012 ITDP Sustainable Transport Award

SF*park*, along with Pavement to Parks and recent bicycle improvements, earned San Francisco recognition at the 8th annual Sustainable Transport Awards, given by the Institute for Transportation and Development Policy (ITDP). This was the first year this award recognized a parking program.

2012 Living Labs Global Award

SF*park* won the Living Labs Global Award 2012 for the challenge offered by Santiago de Chile. That city sought new solutions to make its on-street parking more intelligent, unlocking environmental, traffic, security, and user experience benefits.

2012 MFAC Good Government Awards

The MFAC Good Government Awards—sponsored by the Municipal Fiscal Advisory Committee (MFAC), a project of San Francisco Planning and Urban Research (SPUR)—recognize outstanding performances by managers working for the City and County of San Francisco. The SF*park* team was chosen for implementing its groundbreaking program under tight time constraints.

2012 Excellence.gov Awards—Excellence in Innovation: Mobility

Created in 2001 by the American Council for Technology and Industry Advisory Council (ACT-IAC), the Excellence.gov Awards recognize government programs that use information technology to advance the business of government. SF*park* was a finalist in the Excellence in Innovation: Mobility category, which recognizes projects that use mobile computing to serve citizens.

2011 DoD SOA & Semantic Technology Symposium "Best of Show" Awards

The Department of Defense (DoD) Service-Oriented Architecture (SOA) & Semantic Technology Symposium Award focuses on information technology achievements. SF*park* was chosen as a finalist for its use of a service-oriented architecture to create real-time data feeds and make them publicly available.

2011 SF Weekly Web Award—Best Local Government Site

The reader-nominated SF Weekly Web Awards celebrate the best of San Francisco's digerati. From more than 37,000 votes, SFpark.org was a finalist in the category for Best Local Government Site.

Advertising

Launching the SF*park* pilot project

The ad campaign for the SF*park* pilot project launch included a simple message: go to SFpark.org for parking availability and pricing. When and where space was available, such as in bus shelter ads, insets outlined benefits to pedestrians and cyclists as well as drivers.


SFpark
CIRCLE LESS; LIVE MORE
BURRITOS
TORTAS · TACOS
TAMALES
EL TAPATIO
SFPARK.ORG
PARKING AVAILABILITY & PRICING
The Benefits of SFpark
Find parking faster. Pay more easily. Avoid tickets.
Less circling and fewer double-parked cars give us cleaner air and safer streets with less traffic.
no.1 Cleaner Air
no.2 Safer Streets
no.3 Quicker Transit
Learn more about the benefits of SFpark at SFpark.org
Brought to You By
SFMTA


SFpark
CIRCLE LESS; LIVE MORE
SFPARK.ORG
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The Benefits of SFpark
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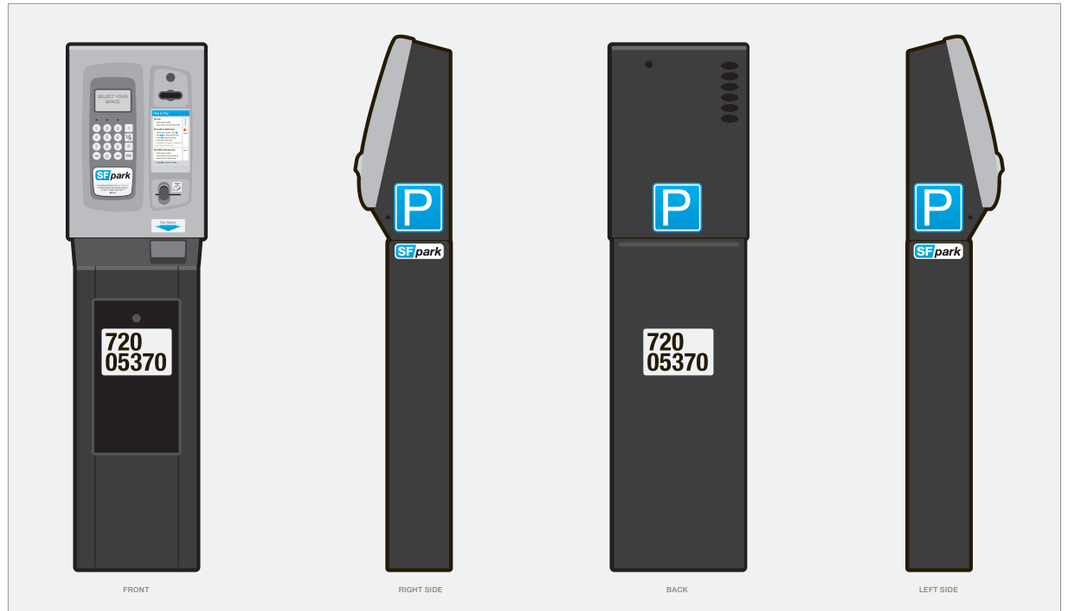
no.2 Safer Streets
no.3 Quicker Transit
Learn more about the benefits of SFpark at SFpark.org
Brought to You By
SFMTA

Wrapped bus parked at City Hall for SF*park* launch event

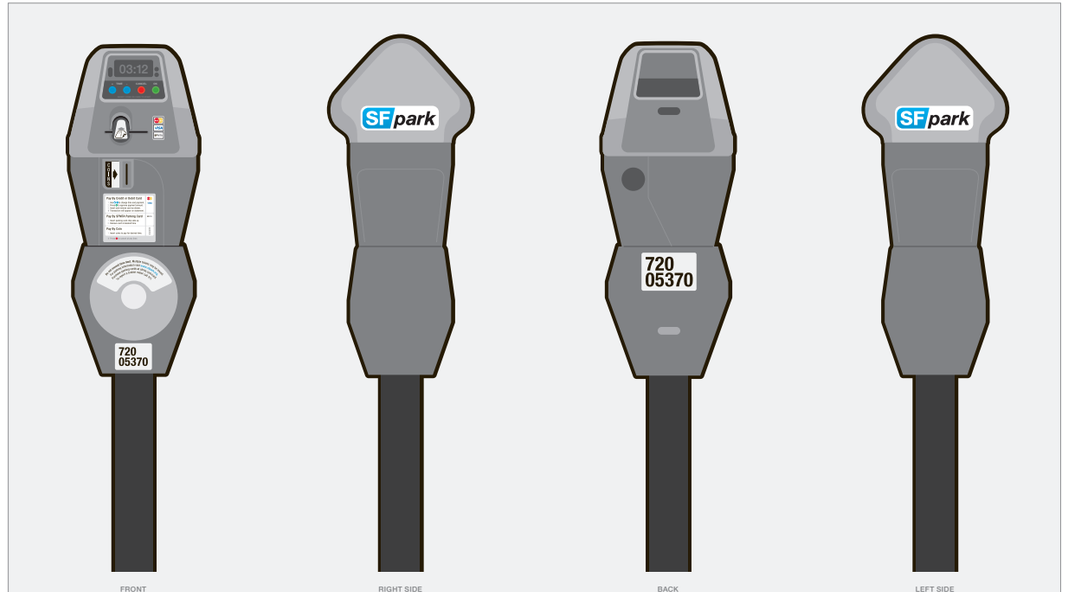
Signage and decals

Thoughtful design at every touch point

Signage and decals are important touch points when our customers use SF*park*. Their design was a critical part of having SF*park* feel simple, friendly, smart, and easy to use. Consistent visual design of all parts of the SF*park* system, from meters and garages to apps and the web, helped the brand and user experience hang together as a coherent whole.



SFpark | Duncan VM Pay-By-Space Meter Decals | 1



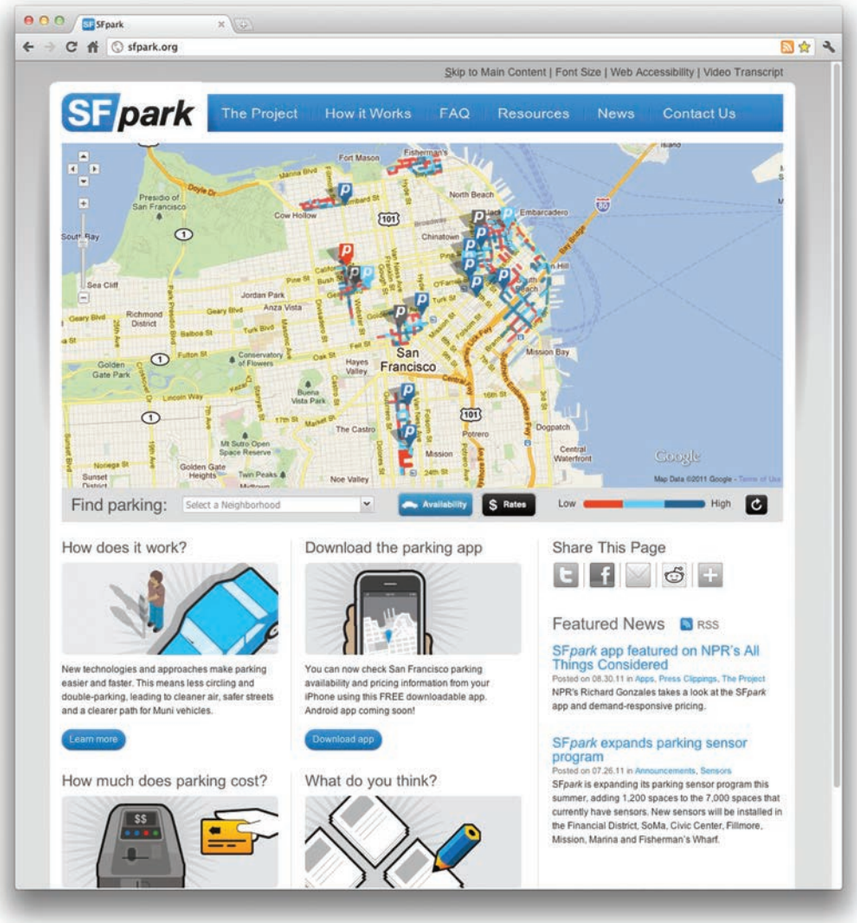
SFpark | IPS Single Space Meters | 2

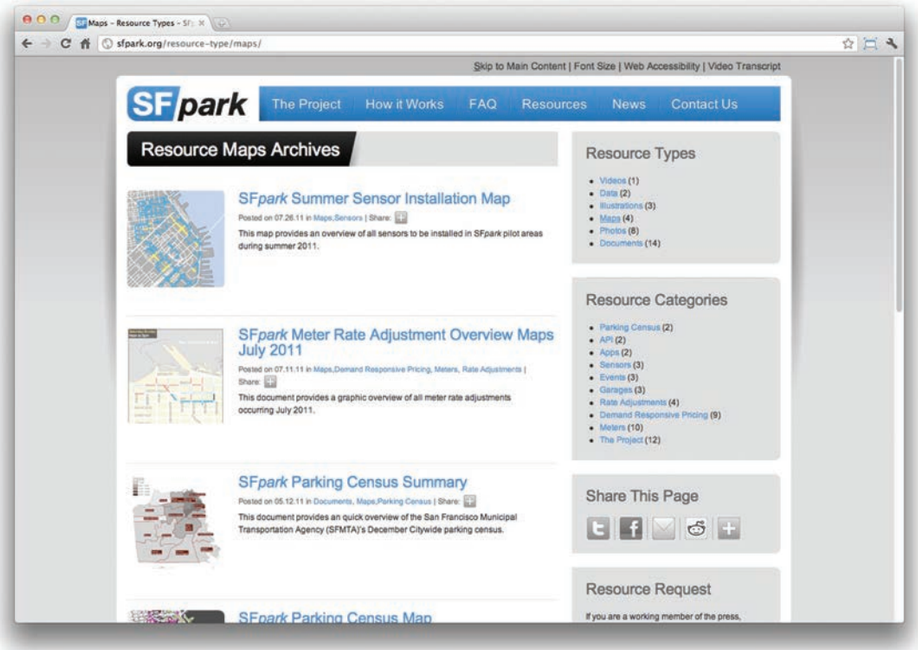
Directional signage, garage signage, and meter decal branding

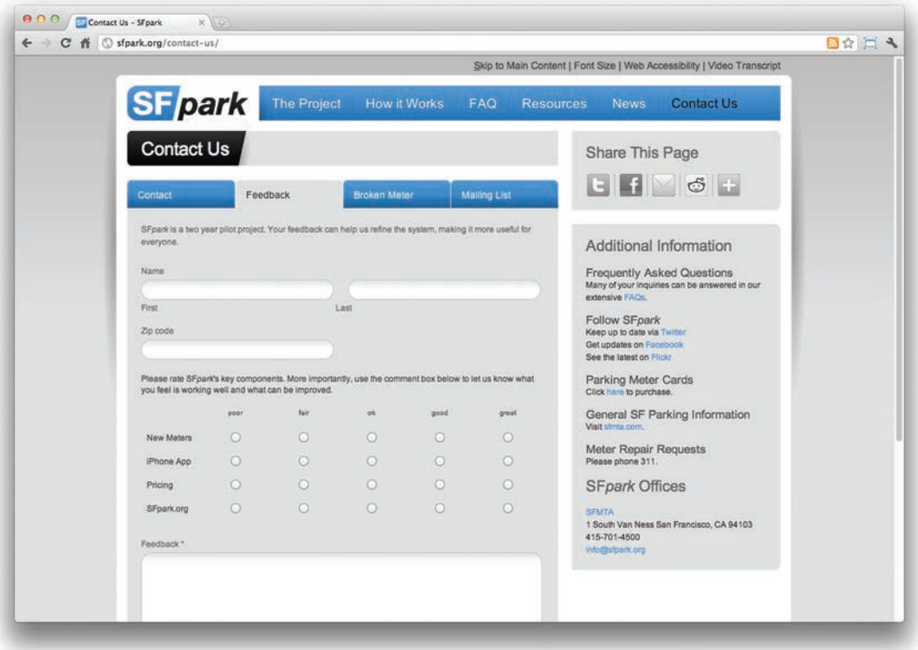
Web, social media, and apps

Extending SF*park*'s communication outreach

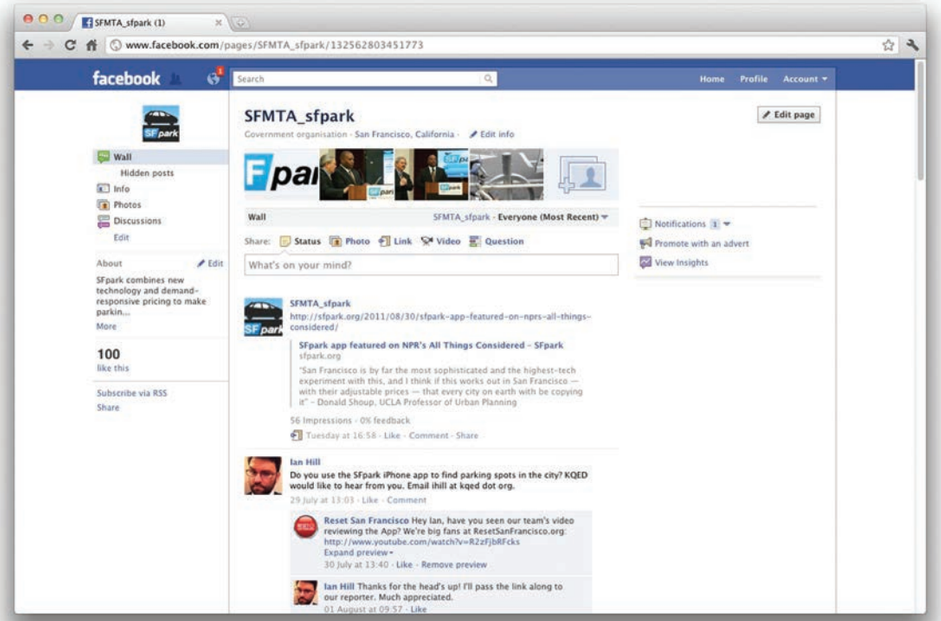
SF*park* uses the web, social media, and mobile apps to communicate with customers, provide project transparency, and deliver real-time parking information.

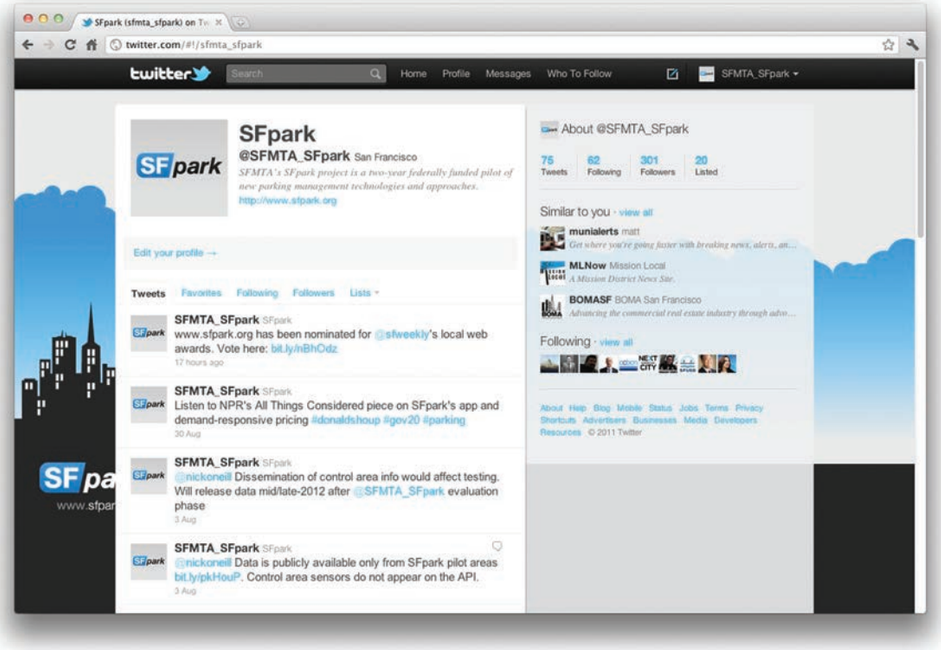


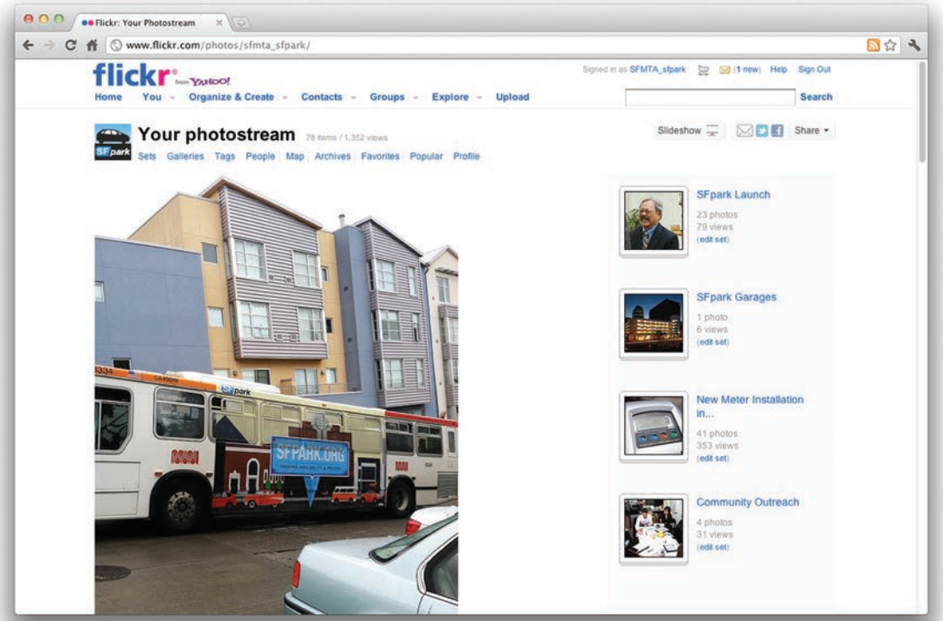


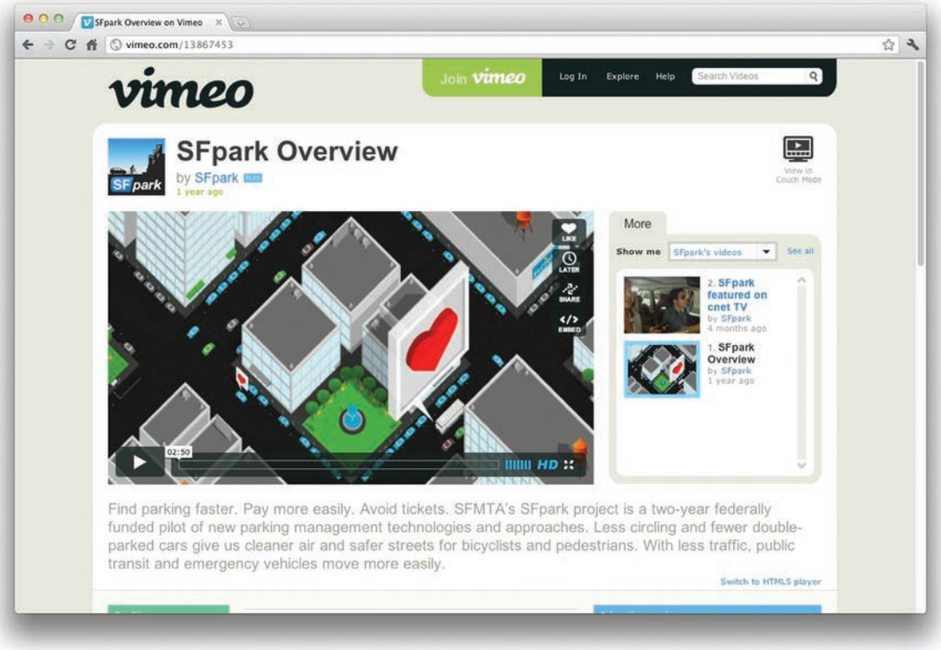


SF*park* social networking pages

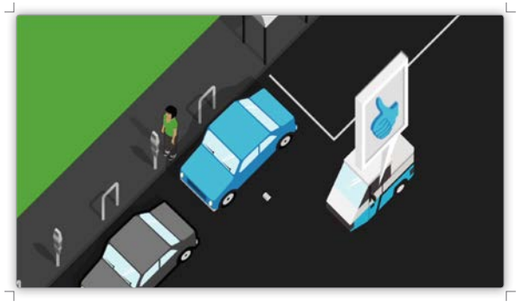


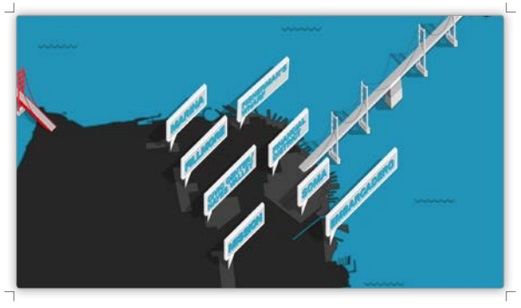


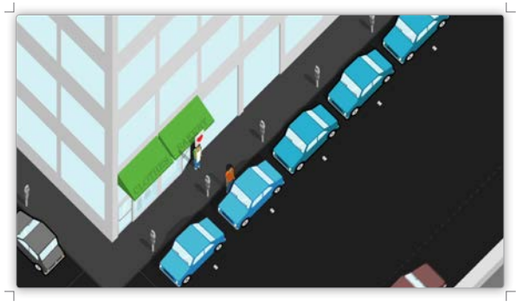




Stills from SF*park* overview video







Circle Less. Live More.

SFpark.org

SF*park*-related tweets during week of launch

RedfinBayArea Redfin Bay Area
Pay your parking meter with your phone. We've finally caught up to Finland. http://bit.ly/epIt8o

yhngchen Andy Chan
旧金山终于要普及电子停车了！每个街边车位安装一个感应器，司机从本周四开始就能在**SFpark**.org上下载应用，通过应用查到哪有空车位。这个计划的目的是让每个block都至少有一个空车位。如果停车的人多，就调涨停车费，直到司机去别处停车，需求少的地方就下调车费，直到该区停车越来越多

winterjane 上海冬大
旧金山终于要普及电子停车了！每个街边车位安装一个感应器，司机从本周四开始就能在**SFpark**.org上下载应用，通过应用查到哪有空车位。这个计划的目的是让每个block都至少有一个空车位。如果停车的人多，就调涨停车费，直到司机去别处停车，需求少的地方就下调车费，直到该区停车越来越多

StreetsblogSF Streetsblog
Just in time for this week's launch of **SFPark**, @Streetfilms MBA series focuses on the right price for parking http://bit.ly/hWeJgq

Elaine_0_0_ Elaine Tang
星期四終於開始啦～ Check out http://**sfpark**.org/2011/04/04/sfmta-announces-improved-**sfpark**-pricing-strategy-for-city-owned-garages/ via @**SFpark**

jackzhan Jack Zhan
In S.F. you can now park and go, paying by the auto sensor in the car & use app to check **SFpark**.org for spare park places around. wow...

cityforward City Forward
San Francisco MTA announces a new iPhone app that helps drivers find parking spots in the city http://bit.ly/fRxcQg

RobGee Rob Goo
Cool things happen when you open up your data! Take @SFMTA_sfpark parking app for instance. http://sfpark.org

UrbnDsgn URBN DSGN
@akcrook I do get the daily @GOOD an I love the idea of @SFMTA_SFpark. Thanks for sharing!

adrielhampton Adriel Hampton
"No **SFpark** hackathon, but check http://**SFpark**.org on 4/21 for the API" via @**sfmta_sfpark** #opendata #ef #transpo

TransportNation TransportationNation
Heads up - **#SFPark** to launch on Thursday. Dynamic pricing in San Francisco's busiest areas. Will it work? http://bit.ly/ehGlmt

UnionSquareSF VisitUnionSquareSF
@SFMTA_SFpark rolls out their new iphone app today to make parking less painful in SF http://sfpark.org/

Jay_Nath Jay Nath
Real-Time Parking Data Now Available Through **SFPark** App, Drivers Now Have a New Reason to Poke at iPhones http://bit.ly/fmgx6q

kristisan Kristi
Real-Time Parking Data Now Available Through **SFPark** App, Drivers Now Have a New Reason to Poke at iPhones: SFist - http://goo.gl/eWQfF

govloop Steve Ressler
On GovLoop: '**SFpark**' Opens Parking Data http://bit.ly/g2rw2R

fastcompany Fast Company
Launched last week, @SFMTA_SFpark Lets You Find Parking Spots Online (And Pay What They're Really Worth)

shanand Shanan Delp
a revolution in parking, maybe itunes.apple.com/us/app/**sfpark**/...

afinefellow Edward Fine
I can't wait to play with this. '**SFpark**' Opens Parking Data: wp.me/pyMr7-9S

gladysbaybay Gladys
Alright San Francisco! We need more of this innovative technology! http://**sfpark**.org/

SFCityAttorney Dennis Herrera
New @SFMTA_SFPark uses meter data to highlight open parking spots, offers API for developers http://bit.ly/g83rEB

mayoredlee Edwin Lee
Proud of **SFpark**.org pilot, a smart new innovation giving you real-time data to find open spaces around the City http://twitpic.com/4np96o

RareArtists Chris Powers
new SF parking scheme rolled out today http://**sfpark**.org/about-the-project/

RemacAsphalt Dennis Roberts
FHWA Deputy Administrator Helps Launch **Sfpark** in San Francisco: http://1.usa.gov/fwaLSa

SFEnvironment SF Environment
Today @mayoredlee launched **SFPark** pilot to better manage parking for cleaner air, improved safety & faster Muni: http://**sfpark**.org #SF

nanaze Nathan Naze
SFPark (@**sfmta_sfpark**) parking availability API. Sweet! http://goo.gl/gR6jT

vsgoliath David Gartner
@abc7newsbayarea says "The World is watching **SFpark**" click here for the video: http://bit.ly/g01pVL

melnut Melanie Nutter
SFMTA launches cool **SFPark** app. Boosts parking choice with congestion pricing while reducing carbon emissions & improving air quality

paijealexandra PAW
for those of you with vehicles "@bornreddy: Real-Time Parking Spot Notifications in #SF **sfpark**.org"

claudesilver claudesilver
Finally! Real-time parking availability for 8 SF neighborhoods — **SFPark** iPhone app: j.mp/eaqEIM

gov20 Gov 2.0 Aggregator
Real-time parking availability for 8 San Francisco neighborhoods. Download the **SFPark** app: http://j.mp/eaqEIM /via @SFMTA_**SFpark**

ahungryartist Mandy Baca
@SFMTA_SFpark This is amazing! How can I make this happen in Miami?

traffichappens Traffic Happens
FHWA Deputy Administrator Helps Launch **Sfpark** in San Francisco: http://1.usa.gov/fwaLSa

sal_castaneda Sal Castaneda
@BigDave469 Have you tried the **SFPark** app yet? If so, I'd love to hear your thoughts on it.

onwall Brandon
Celebrating a parking victory in the Fillmore thanks to @SFMTA_SFpark and their iPhone app.

docfranzke Dr. Stefan Franzke
tolle Innovation aus San Francisco für die Innenstädte http://bit.ly/htVYL3 #Parkraum optimieren

NotChunkHandler Chunk Bear
Find parking faster. Pay more easily. Avoid tickets. SFMTA's **sfpark**.org project: http://tinyurl.com/3y8n43g

PaulABarter Paul Barter
RT @**sfmta_sfpark**: **SFpark** is launching real-time parking availability and pricing info at **SFpark**.org tomorrow, April 21.

LAtweetz LAtweetz
Park It: Parking Inspiration? **SFpark** Program Launches This Week: Streetsblog's Streetsfilm takes a look at San F... http://bit.ly/hpxI2y

EricLiebermanRE Eric Lieberman
New blog post: Park It: Parking Inspiration? **SFpark** Program Launches This Week http://bit.ly/hcjsn3

dotBen Ben Metcalfe
For those interested in the launch of SF's **SFPark** scheme (shows you were there are open parking spaces) API doc is at http://bit.ly/fLM3ml

SFlocaljobs JobShoots
Now there's an app for S.F. parking spaces http://bit.ly/hR5Z0S #sf #news

j_square J^2 (Joshua James)
MT @ResetSF SFMTA announces iPhone app to find real-time street parking w/ #opendata. Great start for #gov20 http://bit.ly/sfparkapp

mattnelsons Matt Nelson
Much urban geekery @calstreets today-**#SFpark** launches real-time parking data, no cuts for Caltrain, no bike speed limit on #GGBridge & more.

frankfarm Frank Farm
congrats @SFMTA_**SFpark** on making real-time parking info for 7 SF hoods avail at http://**sfpark**.org & via iPhone app

derricks Derrick Schneider
Impressed by the initial **sfpark** outing (**sfpark**.org or **sfpark** on the App Store for real-time parking space availability in 8 sf areas)

augius Giuseppe Manzari
sfpark.org On/Off street parking e-management done the right way @**SFPark**

LinkedSF Linked San Francisco
Now there's an app for S.F. parking spaces http://dlvr.it/PHrs8

i_appinfojp_new iPhone Appinfo 新着アプリ
iPhone/iPad 新着アプリ情報！ ♪無料♪『**SFpark**』(ナビゲーション) | http://tinyurl.com/3f8vnyy #appinfojp_new

PinoleREOBroker Charlotte Saulter
Now there's an app for S.F. parking spaces: Parking in San Francisco? There's an app for that. The city today st... http://bit.ly/ijWDEg

SFBusinessTimes S.F. Business Times
BLOG Now there's an app for S.F. parking spaces http://bit.ly/g6LWfK #SFBT_BLOG

hnfirehose HN Firehose
Realtime Parking Availability+Pricing in SF via API: http://bit.ly/gZcGj3

Eyoung03 Eric Young
Now there's an app for S.F. parking spaces bizjournals.com/sanfrancisco/b… via @bizjournals

SFMTA
Municipal Transportation Agency

SFpark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SFpark