



MENSA

Transitioning to smart meters can have wide effects on municipality parking.

METERS

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Shoppers, business owners, visitors, and even residents in cities and towns across the U.S., all face the same persistent, driving-related problem: finding an available parking spot. Recent surveys from around the country have shown that regardless of a municipality's location, some of the top complaints of all drivers relate to parking.

Insufficient parking, not only in terms of the number of parking spaces but also in how those spaces are used, can have many negative effects on a municipality. Drivers endlessly searching for parking can result in gridlock at best, and accidents at worst. There's also the matter of increased carbon emissions, because individuals are driving more or idling as they hunt for a spot. Finally, and often paramount in the minds of city officials and business people, a community's deficient parking system can result in lost productivity and economic opportunities. Some in the public may wring their hands over whether or not parking is free, but this tends to distract from what is nearly always the larger issue: can a driver simply find an available parking space?

Fortunately, for those municipalities suffering from parking and congestion issues, technological solutions have finally arrived. There is a rather simple technology that can make parking systems more efficient: parking meters that accept credit cards. Known as smart meters, these meters give municipalities more control over parking rates and offer the ability to better manage supply-and-demand issues related to on-street parking and parking structures.

Thanks to these meters, payment becomes a convenience rather than a hindrance to the parker. This is true even—or perhaps especially—when rates far exceed the typical \$1 or less per hour, which is becoming a common occurrence in cities across the country.

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A more balanced parking system

A combination of easier access and low parking fees tends to increase the already high demand for on-street parking. Most drivers expect to pay less for on-street parking than for space in a parking structure. After all, the on-street space is perceived simply to exist with little effort while a parking structure requires land, construction, and financial resources to provide. For their part, drivers typically prefer the convenience and visibility of on-street parking to parking in a structure. And because parking structures are pricey to build, the parking rates there can be higher than those charged for on-street spaces.

The idea that parking structure spaces should cost more because they are more expensive to provide than on-street spaces isn't a viable one. This is because the demand for the less expensive, higher level of service—on-street parking—is significantly higher and the supply is essentially finite. Smart meters that accept credit cards can effectively address this problem.

Because users often don't possess the necessary change to feed a coin meter, charging more than \$1 per hour is problematic for municipalities. Smart meters offer a certain level of convenience that coin meters can't, while providing a city or town the ability to monitor use and raise on-street parking rates easily and remotely. The rates charged for on-street parking can reflect—and address—actual demand.

Higher rates for on-street parking mean more drivers will use nearby parking structures, which will lead to a more balanced parking system, as the strain on a municipality's on-street parking—preferred because of its convenience and visibility—will be relieved and structure parking will be better used. This will lead to fewer drivers endlessly searching for parking and less road congestion.

There are two major varieties of smart meters: the multi-space meter and the single-space meter.

Breaking it Down

Multi-space meters come in one of three varieties: pay-and-display, pay-by-space, and pay-by-plate. Each of these meter types has its own advantages, disadvantages, and unique operating procedures. Ideally, one multi-space meter covers six to 10 (sometimes more) parking spaces. This may be viewed as a benefit to the streetscape while it reduces the amount of equipment in the field requiring service and consolidates revenue collection points. Variations in operation are significant and should be considered.

Pay-and-Display

Patrons purchase time from the meter, return to their vehicles, and display their receipts on the dashboard. The receipt contains detailed information on when the parking was purchased and when it expires. Enforcement is completed by visually checking each vehicle for a valid receipt. Pay-and-display can be implemented without marking the parking spaces, although signage is needed to instruct patrons to pay the meter.

Pay-by-Space

Patrons park in a numbered space, enter the space number into the meter, and pay for their desired parking time. Enforcement is done by checking a list of paid spaces. This can be done by printing a list of paid spaces from the meter or using a handheld unit to view the paid spaces. Pay-by-space requires each space to be numbered and marked. It is common to allow users the ability to add parking time from other meters by re-entering their space number.

Pay-by-Plate

Pay-by-plate is the latest method of tracking parking payments at multi-space meters. The Pittsburgh Parking Authority recently implemented the largest installation in the U.S., with more than 500 pay-by-plate meters. Users enter their vehicle license plate numbers at the meter and pay for their parking time. Enforcement is accomplished by using license plate recognition (LPR) cameras and software (the units are either vehicle-mounted or handheld). This greatly increases the efficiency of

enforcement, as payment and enforcement can be integrated to allow enforcement officers to use the LPR cameras to automatically scan, read, and verify payment while driving. Once the system identifies a non-paid license plate, it tells the officer to stop, verify the data, and write a ticket.

Costs

The initial investment for a basic multi-space meter averages around \$8,000 to \$10,000, assuming payment by coin and credit card. Other payment options include paper currency, tokens, smartcards, or by cell phone. Adding paper currency increases the cost by several thousand dollars and increases maintenance costs. Because of these issues, this option is generally not recommended.

Ongoing operating costs should be considered. The most significant cost is a monthly fee to maintain data communications and a hosted management system to monitor each meter. This fee varies, but is generally \$50 to \$60 per meter per month. Receipts for multi-space meters typically come in a roll, and more will be used with the pay-and-display options. Meter batteries have a typical three-year life when operating in a solar configuration. Other costs include street signage to direct users to the meter.

Smart single-space meters are typically implemented as an upgrade to existing single-space meters that do not accept credit cards. Operational changes from an existing system are minimal, with each meter displaying the payment status for visual enforcement. The cost per upgraded meter is about \$500 to \$600. This assumes using existing poles and lower meter housings.

Ongoing operating costs include a monthly fee for data communications and management system of about \$6 to \$8 per meter per month. A small additional fee is typically charged by the meter vendor for each credit card transaction. This is in addition to the normal credit card transaction fees charged by the credit card processor to accept credit cards. This cost varies based on use and may be negotiated based on anticipated use through a higher monthly fee per meter. This separate fee is not typically charged by multi-space meters. No receipt paper is required for single-space meters. Each meter typically includes a small solar panel to provide a small charge to the battery. Battery life is usually expected to be three years.

Municipalities have had success with both varieties. Choosing one or the other—or implementing both—comes down to whatever option best fits that community's parking needs.

Increased Revenue, Decreased Citations

By installing smart meters, many U.S. cities have made their parking programs more convenient, efficient, and profitable. For example, Columbus, Ohio, conducted a pilot program involving single-space meters that ran for almost eight months. During this test period, these meters

reported an impressive uptime of 99.53 percent. Credit card use increased each month, eventually accounting for 34 percent of the transactions. Overall, when compared to the previous three-year average, meter revenue increased nearly 27 percent, while the average credit card transaction was twice the average cash transaction.

Los Angeles installed smart single-space parking meters to supplement its coin meters. The city reported a meter revenue increase of nearly 50 percent, with credit card payments making up more than a third of that amount.

Portland, Ore., became one of the first communities to install cashless multi-space meters in 2001. Using roughly 900 meters, the city saw meter revenue increase by 40 percent without a rate increase. Meanwhile, total operating costs increased 77 percent. The increase in operating costs was directly attributed to credit card processing fees and monthly service fees associated with the new meters. The end result was an increase in net revenues of 35 percent (or \$1.8 million) between the base year (FY 2000-01) and the fully installed and stabilized year (FY 2004-05).

San Diego replaced more than 300 single-space coin meters with cashless multi-space meters. The switch resulted in a near 25 percent increase in meter revenue.

Aside from revenue increases, municipalities implementing smart parking meters benefit from having reduced collection times, as meters need to be emptied less. In San Diego, for example, collections decreased by more than 72 percent.


One potential drawback, particularly for cities in need of revenue, may be a reduction in parking citations. San Diego saw a 22 percent decrease in tickets after installing multi-space meters. In Denver, citations dropped by roughly 5 percent, while in Columbus, the decrease was just more than 16 percent.

These decreases in citations can be overcome by improving enforcement techniques, such as using automatic license plate recognition equipment or providing enforcement officers with increased mobility to speed the process of checking each vehicle.

Other costs include added fees for processing credit cards. These fees are typically based on a small per-transaction fee plus a percentage of sales. Variables include the type of card, transaction amount, and card issuer. The fees have created a competitive market and should be shopped carefully.

Effective and Efficient

Communities across the country are plagued by inefficient parking systems that result in circling vehicles, congestion-choked streets, high carbon emissions, on-street parking shortages, negative effects on local businesses and, perhaps most important of all, driver frustration.

By implementing smart meters, a municipality can take a proactive step in managing parking and make parking systems function more effectively and efficiently. 



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