PARKING REFORMS

Urban and suburban parking reforms can reduce unnecessary cruising and related emissions, optimize land-use, encourage use of low-carbon transportation, and lower development costs, all while raising funds for streetscape and transit improvements.

OVERVIEW

Best Suited for:
Short term*
Urban, Suburban
**Pilot or initial roll out in certain area followed by full implementation.*

Parking reforms are designed to **efficiently use the existing parking supply and better balance supply and demand.** By reducing the time spent searching for parking, also known as cruising, parking reforms can reduce congestion and greenhouse gas (GHG) emissions**.** Parking reforms can also be designed to discourage driving to certain areas during peak periods and support safe and convenient access through walking, biking, and public transit.

In the United States, there are three to eight parking spaces for every car (Goldstein, 2015). In many cities, the area of required parking for a building exceeds the area of the building itself and the scale of land utilized for parking presents a barrier to walkable communities, transit-oriented development, and active transit. **Zoning changes can reduce the amount of land designated for parking and encourage walking, biking, and public transit.** For example, eliminating parking minimums decreases the number of parking spaces that must be included with new developments. Similarly, parking caps set a maximum number of parking spaces allowed for development projects. Unbundling parking from rent or ownership reduces costs for transit users and others without a car by allowing residents to only pay for parking if needed. Other strategies, such as shared parking facilities and in-lieu fee parking, aim to take advantage of varying peak demand timing for different destinations (such as a bank versus a church) to maximize parking efficiency. When implemented in conjunction with strategies that restrict free on-street parking and improve access to transit, these reforms can improve choice across transportation modes and reduce the number of unused parking spaces.

Smart parking systems use sensors to make the location and number of parking spaces easily identifiable to drivers to reduce cruising. Sensor-based technologies can also supply data to parking pricing programs. Demand-responsive or performance-based pricing programs involve setting parking prices based on the demand at given times to maximize use while maintaining a few open spaces (often with an aim of 70-85% use). This dynamic pricing model has been shown to reduce congestion and related emissions by both reducing cruising and encouraging walking, biking, and transit trips. When coupled with smart parking, dynamic pricing can increase ease of finding a parking spot. Furthermore, revenue from dynamic pricing, in-lieu fees, and parking benefit districts can be reinvested in the community for transit, streetscapes, and business improvements, which supports vibrant communities and safe streets.

With many different strategies available to reform parking, communities should choose what best fits their needs. ***Examples of parking reforms include:***

Zoning Changes
- Eliminating parking minimums
- Parking maximums
- Shared parking facilities

Smart Parking
- Meters
- Apps
- Sensors with lights or signage highlighting the availability of spaces

Parking Fees
- In-Lieu fee parking
- Demand or performance-based pricing
- Unbundling parking from rent or ownership
- Parking benefit districts
- Charging for parking (on-street and off-street)

Repurposing
- Low- and Zero-Emission Zones
- Open Streets

Did you know?
In California, researchers showed that unbundled parking contributed to a decrease in rent by around $200 a month and lower condo sale prices by around $43,000 (Manville, 2013).

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GHG REDUCTION POTENTIAL

This section provides an overview of GHG emission reductions associated with the strategy. It highlights key findings and relevant metrics from GHG modeling resources, peer-reviewed studies, and real-world applications.

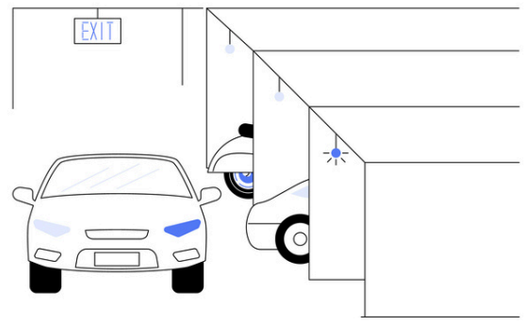
ELIMINATING EMISSIONS DUE TO CRUISING

Free or underpriced public parking encourages people to drive to their destination and once at the destination, to circulate to find an unoccupied spot (ITDP, 2021).

The pilot program of SFPark, a demand-responsive parking program in San Francisco, resulted in a 30% decrease in vehicle miles traveled (VMT) in SFPark areas (Jose, 2017).

In a 15-block radius in Los Angeles, researchers estimated that cruising resulted in an excess 950,000 miles in one year, which is equivalent to 47,000 gallons of gas and 730 tons of CO_2 emissions (Shoup, 2007).

A study examining cruising rates in numerous U.S. studies found that 4-6% of trips in Ann Arbor and 4.5-8.9% of trips in Seattle resulted in cruising (Weinberger et al., 2023).



In Cologne, Germany, after the installation of a Smart Parking overhead sensor system, test drives demonstrated that cruising time decreased by 45% (CleverCiti Systems, 2020).

REDUCING CAR RELIANCE

A 2021 study of affordable housing in San Francisco demonstrated that household car ownership increased with the availability of on-site parking. Decisions related to transportation mode were correlated with parking availability, indicating that reducing excess parking may lessen incentives for household car dependency given options for car-free and car-light modes, such as public transit and walking (Millard-Ball et al., 2021).

A study from New York City found that people with guaranteed parking at home were more likely to use a car for commuting to work even when both the origin and destination were well served by transit (Weinberger, 2012)

LIMITING PARKING SUPPLY AND UNBUNDLING PARKING COSTS

A study by the California Air Pollution Control Officers Association (CAPCOA estimates that reducing the total parking supply available at a residential site (without unrestricted street parking or other offsite parking) can reduce GHG emissions from resident vehicles by up to 14% (CAPCOA, 2021).

Unbundling or separating a residential project's parking costs from property costs requires residents to purchase parking spaces at an additional cost. Unbundling parking costs can incentivize public transit use and reduce vehicle use during peak periods, providing up to a 15% reduction in GHG emissions (CAPCOA, 2021).

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CO-BENEFITS

This section outlines the multiple co-benefits associated with the strategy, including safety benefits, local air quality improvements, and improved accessibility. Each co-benefit presents examples that demonstrate how the strategy enhances regional or community well-being while addressing emissions.

SAFETY

High car use in residential areas makes those neighborhoods less safe for walking and biking, especially for children, seniors, and people with disabilities who may be harder to see from a car. Behaviors like cruising for parking and double parking can have significant adverse effects on roadway safety for people walking and biking (Sha et al., 2024).

Removing on-street parking can allow communities to repurpose this space for uses that improve safety, such as protected bike lanes or expanded sidewalk space.

COST SAVINGS

Eliminating parking quotas reduces construction costs, particularly for new housing developments. Parking pricing reduces public subsidies for privately parked vehicles and generates revenue to support transportation infrastructure as well as other community and construction development projects.

The cost to construct a parking space is estimated to be $5,000 for surface-level parking and up to $50,000 for multi-level garages (Spivak, 2022).

Parking reforms, including eliminating parking minimums for multifamily housing near high-frequency transit, were implemented in Seattle, Washington in 2012. In the five years following this zoning change, researchers found that 40% less parking was constructed, saving around $537 million (Gabbe et al., 2020).

AIR QUALITY AND HEALTH

On average, U.S. drivers waste 17 hours annually cruising for parking. In New York City, this number is 107 hours. The extra time drivers spend cruising adds additional cars to the road, increasing roadway congestion and producing greenhouse gas emissions and other air pollutants (Cookson & Pishue, 2017).

> During the first two years of the pilot program, researchers estimated that SFPark, a demand-responsive parking program in San Francisco, reduced cruising time by 50% when compared to neighborhoods outside of the pilot (Millard-Ball et al., 2014).

RURAL COMMUNITIES

Rural communities can yield the same benefits from parking reforms as urban and suburban communities. For example, reduced construction costs from the elimination of parking minimums removes barriers for businesses to open. Over 900 towns with 100 to 5,000 residents have passed or implemented parking reforms town-wide or in the town center as of Summer 2024 (Parking Reform Network, 2024).

RESILIENCE AND ADAPTATION

Parking reforms can reduce the amount of space needed for parking, contributing to more dense developments which can help preserve open green space to mitigate flooding or heat impacts.

Surface parking lots contribute to the heat island effect, where urban areas become “islands” of higher temperatures due to pavement and other infrastructure absorbing the sun’s heat.

ECONOMIC GROWTH

Parking reforms reduce barriers for businesses to open. In Auburn, Maine, a town of 24,000 people, new restaurants opened after parking minimums were eliminated. The parking reforms allowed businesses to open in existing sites without constructing additional parking, reducing barriers to entry for a new business. (Spivak, 2022).

> After Buffalo and Seattle eliminated parking minimums, more than half of the new homes constructed would have been illegal under the previous parking mandates. Parking reforms encourage the construction of affordable and high-density housing, including reduced construction costs and barriers to renovate existing buildings into housing (Gould, 2023).

A study in Colorado modeled the impact of removing parking minimums in urban municipalities and found that this would increase housing supply and shift housing development opportunities towards infill and transit-oriented locations. The study found that removing parking minimums would lead to 71% more homes in transit-oriented areas, and 41% more homes overall in the urban areas studied (Sightline Institute, 2024[AP1]). [AP1]Sightline Institute (2024). Parking Reform Alone Can Boost Homebuilding by 40 to 70 Percent. https://www.sightline.org/2024/12/10/parking-reform-alone-can-boost-homebuilding-by-40-to-70-percent/

ACCESSIBILITY AND EQUITY

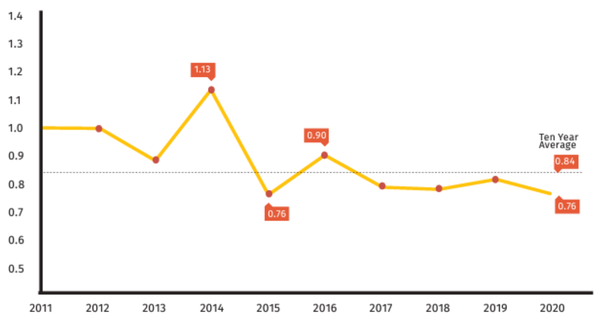
Setting lower parking minimums reduces development costs as less parking must be constructed. In turn, this increases the profitability of projects which encourages more affordable housing.

Required parking minimums disproportionately increase the cost to build low-income housing, since parking costs are the same for different sizes and types of housing. One study found that minimum parking requirements raise housing costs by 13 percent for families without cars (Shoup, 2020).

Requiring one parking space per unit in affordable housing developments increases rent by 12.5% on average (VIA Architecture, 2015).

> In California, researchers showed that unbundled parking contributed to a decrease in rent by around $200 a month and the cost of a condo by around $43,000 (Manville, 2013).

> After Minneapolis, Minnesota reduced the parking minimum requirement for multifamily housing, planners identified that developments included fewer parking spaces and rent prices in some areas dropped by almost 17% (Spivak, 2018).



The change in parking spaces per residential unit in Minneapolis from 2011 to 2020 (Source: ITDP, 2024)

Means-based discounts, subsidies, caps, and exemptions can help reduce the burden of parking cost increases (Portland Bureau of Transportation, 2020).

> Portland, Oregon implemented three-hour parking for the price of two hours for blue-zone accessible parking in certain metered areas (Portland Bureau of Transportation, n.d.).

> Austin, Texas offers an Affordable Parking Program that allows members of the service or entertainment industry to apply for a reduced-cost monthly parking pass in downtown garages (City of Austin, n.d.).

COST CONSIDERATIONS

The cost to implement parking reforms varies widely depending on the scale, scope, and location of the project.

Smart parking meters cost between $250-$500 each and **ultra-sonic parking space availability sensors cost $300-$500** per space to install (CBS58 News, 2017; Roos, 2017).

In less than 2 years of operation, a Smart Parking overhead sensor system in Cologne, Germany led to an 8% increase in utilization of existing parking spaces, reducing the demand for new or on-street parking, and allowed the city to realize a complete return on investment (CleverCiti Systems, 2020).

The median percentage of land used only for parking is approximately 26% in the downtown of American cities with populations greater than 500,000 people. In urban environments, space used for parking, particularly when parking is free, has a higher potential for tax revenue from other uses (Carpenito, 2023).

One study estimated that implementing a smart parking system in Houston, Texas would generate $82 million to $722 million in surface parking redevelopment value, which in turn would increase tax revenue by $575,000 to $4.7 million annually (Huntsman et al., 2018).

FUNDING OPPORTUNITIES

USDOT's **Strengthening Mobility and Revolutionizing Transportation (SMART) Grants Program** established under the Bipartisan Infrastructure Law (BIL), provides grant funding to eligible public sector agencies to carry out projects improving transportation efficiency and safety through smart technologies. Smart parking projects using sensors may be eligible.

FHWA's **Congestion Mitigation and Air Quality Improvement program (CMAQ)** provides a flexible funding source for States to meet the requirements of the Clean Air Act through transportation projects. Funding is available in certain current and former non-attainment and maintenance areas for projects that can include some parking management strategies.

FHWA's **Congestion Relief Program** established under BIL, provides competitive grant funding for programs that reduce congestion through pricing roadway use and parking, among other methods of decreasing congestion. This would have the benefit of encouraging other modes of travel that pollute less and take up less road space, while recapturing some of the value associated with road maintenance and construction from those who use the roads most.

FTA's **Capital Investments Program** funds transit capital investments, including heavy rail, commuter rail, light rail, streetcars, and bus rapid transit. CIG grants can be used to support public transit improvement potentially in concert with revenues from parking pricing programs.

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COMPLEMENTARY STRATEGIES

Enhanced commuter benefits for employees that walk, bike, or take public transit provide a viable alternative to driving and parking at work.

Coordinated transportation planning and parking reform are interconnected in shaping travel behavior, mobility, and reducing GHG emissions. When coordinated transportation planning integrates with parking reform strategies, it can encourage the use of alternative modes, such as public transit, biking, or walking, making driving and parking only one of several options for trips.

Free or reduced fare transit programs and parking reform are complementary strategies that, when implemented together help promote sustainable transportation, reducing GHG emissions. Free or reduced fare transit programs incentivize transit use, thereby reducing car dependence and demand for parking.

Parking reform strategies, such as smart parking, curb management strategies, and other on- and off-street parking solutions for freight deliveries, rely on freight digitalization technology to reduce congestion and time lost to circling and idling.

Parking reform initiatives, such as adjusting parking regulations, implementing dynamic pricing, creating dedicated loading zones, or other curb management approaches can influence the availability of curb space for commercial vehicles during non-peak hours. By reallocating parking spaces or implementing flexible parking policies that prioritize loading and unloading activities during non-peak times, communities can create more opportunities for off-peak deliveries without causing congestion or disrupting traffic flow.

Ride sharing can reduce the demand for parking infrastructure, as carpools and vanpools replace the need for multiple single occupancy vehicle parking spaces. As such, ride sharing can help improve the acceptance and effectiveness of parking reform strategies.

Parking requirements are often included within zoning codes. Zoning codes typically dictate how much parking must be provided for different types of developments, such as residential, commercial, or industrial. Coordinating parking reform with zoning reform can improve the efficiency of land designated for parking and encourage ease of access to walking, biking, and public transit.

View All Strategies

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CASE STUDIES

SFPARK - DEMAND RESPONSIVE PARKING PRICING

The San Francisco Metropolitan Transit Agency (SFMTA) manages SFpark, a demand-responsive pricing program, to improve parking availability in metered spaces and City-owned parking garages. The program began as a pilot project in 2011-2013, which was supported by Federal funding through USDOT's Urban Partnership Program and was formally implemented in 2017. Results over the last decade show that SFpark has resulted in lower average parking rates, more accessible parking, and reduced VMT and GHG emissions.

San Francisco demand-responsive parking pricing (Source: SFMTA).

PARKING REFORMS - PROVIDENCE, RI

Providence, RI has implemented a series of parking reforms to alleviate congestion and support transit-oriented developments (TOD). The city's downtown district and TOD overlay districts are exempt from minimum parking requirements and have maximums for residential land uses. Commercial and office projects that exceed 20,000 square feet must comply with a parking maximum (135% of the minimum parking requirements). Additional parking reforms in Providence help encourage bicycle use. For example, non-residential land uses that provide cyclists shower and locker facilities may reduce parking by four spaces. When 10 or more bicycles are provided for in a bike-share facility, parking requirements are reduced by 5%.

SEATTLE PERFORMANCE-BASED PARKING PRICING PROGRAM

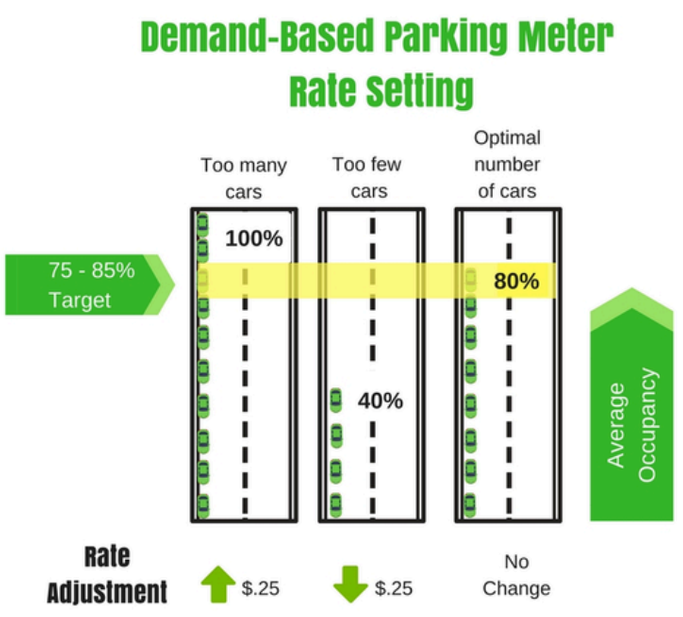
Since 2010, the Seattle Department of Transportation (SDOT) has managed a performance-based parking pricing program which adjusts rates, time limits, and paid hours of operation. To determine parking conditions, SDOT uses a model that predicts parking activity based on transaction data and adjusts pricing to achieve a target range of 70-85% on-street occupancy. The program has been shown to decrease GHG emissions and VMT (less circling = less congestion) and improve safety for pedestrians and cyclists (circling drivers = more distracted drivers).

NEW YORK CITY OPEN STREETS

New York City's Open Streets program focuses on creating public spaces by transforming streets into spaced for events, pedestrian and bike mobility, outdoor learning at schools, and more. The type of Open Street utilized dictates the vehicle use in the zone, either limiting access to emergency vehicles only in a full closure or designating use for pedestrians and cyclists but allowing limited local access at less than 5 miles per hour. As of Summer 2024, there are over 350 approved Open Street locations, with 41% located in underserved communities.

BALTIMORE DEMAND-BASED PARKING METER RATE SETTING

Beginning in the Summer of 2017, the Parking Authority of Baltimore City started using the demand for parking spaces to determine the hourly parking meter rate on blocks in Central Downtown, Mount Vernon, and 4 other areas. Meter rates are adjusted using data collected every 6 months with the goal of one or two available parking spaces per block, or a target of 75 to 85% occupancy. The program has provided benefits to businesses that rely on patrons being able to find a spot and reduced traffic congestion.



Baltimore demand-based parking meter rate setting (Source: City of Baltimore Parking Authority).

IMPLEMENTING PARKING PRICING:
WHAT TO READ NEXT

The Institute for Transportation and Development Policy developed Ideas to Accelerate Parking Reform in the United States, which describes different parking reform strategies with supporting statistics, case studies, and interviews. Several additional resources are linked in the Resources section below.

PARKING BENEFIT DISTRICTS

In parking benefit districts, funds collected from parking are allocated towards specific community projects, such as improving the streetscape. The designated use of funds to better the community can improve the appeal of paying for parking to residents.

From 2006 to 2011, a pilot study turned portions of West Campus, Austin, Texas into a parking benefit district in which a portion of the revenue from parking was reinvested into the neighborhood. In the first year of operation, the PBD raised $163,000 of which $40,000 funded new bike lanes, crosswalks, transit shelters, and benches (Urban Transportation Commission, 2010). Read more about the City of Austin's Parking Benefit District here.

PUBLIC ENGAGEMENT

Engaging the public through outreach campaigns is an important step to identifying community needs and facilitating smooth implementation of parking forms.

The SFPark pilot study organizers distributed pamphlets that explained the program to downtown workers, hung posters in garages, ran an ad campaign, and conducted one-on-one meetings with community groups and political leaders (SFMTA, 2014). Read more about community involvement in parking benefit districts in the Key Groups section of this guidance document: Parking Reform Network, Parking Benefit Districts: A Guide for Activists.

Hartford, Connecticut eliminated parking minimums and instated parking maximums in the downtown area in 2016. After the changes attracted new development projects and public support, they were enacted city-wide a year later (Bronin, 2018).

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RESOURCES

GENERAL RESOURCES

Parking Reform Network, Parking Mandates Map: This map highlights communities across the county that have implemented parking reforms with detailed information about each community and reform. There are options to filter results by scope and type of reform, land use, implementation stage, and population.

EPA, Steps for Implementing Parking Reforms in Urban and Suburban Zoning Codes (p. 16-20): This chapter of EPA's "Essential Smart Growth Fixes for Urban and Suburban Zoning Codes" explains different parking strategies and outlines an approach to implementation.

Oregon Department of Transportation, Implementing Parking Reform Guide: The information in this step-by-step guide is useful in Oregon and beyond. It includes tips for planners and governments to construct a plan, consider language, and engage with the community to best implement parking reforms.

Institute for Transportation and Development Policy (ITDP), Breaking the Code: Off-Street Parking Reform Lessons Learned: This guide provides information on parking reform strategies with seven case studies from around the globe.

ITDP, Ideas to Accelerate Parking Reform in the United States: This guide details different parking reform strategies and makes an argument supporting their implementation with statistics, case studies, and interviews.

TOOLKITS AND MODELING APPROACHES

National level

CMAQ Toolkit: This kit offers a variety of tools to support CMAQ implementation, including a parking pricing tool that links changes in pricing and parking utilization rate to traffic demand management.

CNT Interactive Tools: This library offers parking tools that model parking utilization in areas such as Washington, D.C., King County, Washington, and Bay Area, California.

State level

GreenTRIP Connect: This is a free online tool that calculates how right-sized parking, smart location, affordable homes, and traffic reduction strategies can reduce costs and emissions.

WORKING WITH COMMUNITIES

Parking Reform Network, Parking Benefit Districts - A Guide for Activists: While this guide is geared towards activists, it provides useful case studies, a detailed action plan, and information about key community groups.

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For more information visit the DOT Climate Change Center, https://www.transportation.gov/priorities/climate-and-sustainability/dot-climate-change-center