REIMAGINING PARKING MANAGEMENT: A NEW YORK STATE MUNICIPALITY STARTER GUIDE

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ACKNOWLEDGEMENTS

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EXECUTIVE SUMMARY

Parking reform offers a major opportunity to New York's municipalities to help tackle climate change, improve accessibility, and deliver a host of wider economic and quality of life benefits.

For decades, car-centric planning and policy has over-supplied and subsidized parking, incentivizing ever greater car use over alternatives and occupying vast swaths of valuable land. By reversing this process, municipalities can encourage the use of more sustainable alternatives, reduce congestion, lower the cost of housing, and even generate municipal revenues. Although parking reform can be a contentious subject, a growing recognition of the urgency of addressing climate change, changes in working patterns created by the COVID-19 pandemic, and new transport related technologies all open new opportunities to act.

This report provides a practical guide for leaders and citizens who are ready to pursue local parking reform. It draws on existing research and interviews with officials from across the State and includes:
- Evidence on the benefits of parking reform.
- A menu of policy solutions to manage the supply and demand for parking.
- Illustrative examples of parking reform in action.
- An implementation roadmap.

Every municipality will have its own challenges and opportunities when it comes to parking reform and this guide aims to provide the full range of the interventions available to meet them. These both reduce the supply of parking and encourage alternatives to driving. This guide also provides inspiration on how solutions might be combined and a flexible framework to help municipality leaders design and implement reform.

This report was produced for the New York State Energy Research and Development Authority (NYSERDA) and supports New York State's clean energy agenda.

Section 1:

INTRODUCTION & BACKGROUND

WHY PARKING?

For the past 70 years New York's cities, like those across the country, have been built around the car. Zoning regulation, transit planning, commercial and residential development, and tax policy have all helped make driving the most convenient option. Parking has been a key part of this story. Whether provided for free on-street or required off-street, huge swathes of land across the state and country have been allocated to storing our cars, subsidizing their use in the process. Just like the rapid expansion of our network of highways, the emphasis on parking provision has reshaped America's cities, encouraging low density sprawl and turning downtowns into parking "craters."

This has both incentivized car use, creating a vicious cycle in which parking encourages driving, demanding ever more parking, while also making alternatives unviable or unattractive. In doing so, it has helped make the U.S. one of the most car reliant countries in the world, contributing to the country's outsized greenhouse gas emissions. New York is no exception to this. The State's transport sector accounts for 36% of its emissions, with passenger vehicles and trucks accounting for the majority. Reforming parking policy, reducing both the provision of parking and the demand for it, therefore offers a major opportunity for New York's municipalities to help reduce emissions, fight climate change, improve air quality and health outcomes.
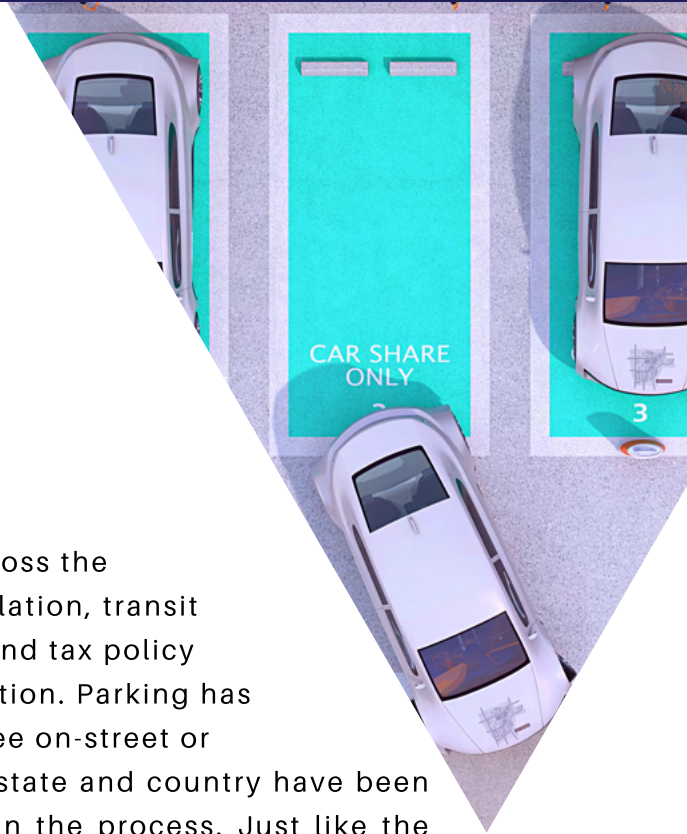
WHY PARKING?
(CONTINUED)

In addition, parking reform also offers a range of wider benefits to communities. These include:

- Creating new revenue raising opportunities through parking pricing or taxation which can be reinvested into sustainable transit options
- Transforming public spaces, increasing the wellbeing of citizens and attracting new visitors
- Reducing the cost of development and increasing housing affordability
- Helping tackle inequality in accessibility and residential segregation

While parking management is a state and country wide challenge, local municipalities are uniquely placed to address it. Local leaders and residents hold the levers required to make change, whether it is amending development requirements, investing in local transit, or simply working with local businesses to encourage the sharing of parking. One size will not fit all and only individual cities and counties will be able to identify the solutions that will work best for them. However, this report aims to enable this change by providing local leaders with the case for reform and good practice to inform local strategies.

NYSERDA

The New York State Energy Research and Development Authority'S (NYSERDA) mission is to advance clean energy innovation and investments to combat climate change, improving the health, resiliency, and prosperity of New Yorkers and delivering benefits equitably to all.

To achieve this, the Authority promotes energy efficiency and the use of renewable energy sources across New York State. These efforts are key to developing a less polluting and more reliable and affordable energy system for all New Yorkers. Collectively, NYSERDA's efforts aim to reduce greenhouse gas emissions, accelerate economic growth, and reduce customer energy bills.

NYSERDA works with stakeholders throughout New York including residents, business owners, developers, community leaders, local government officials, university researchers, utility representatives, investors, and entrepreneurs. NYSERDA partners with them to develop, invest, and foster the conditions that:

- Attract the private sector capital investment needed expand New York's clean energy economy
- Overcome barriers to using clean energy at a large-scale in New York
- Enable New York's communities and residents to benefit from energy efficiency and renewable energy

DELIVERING NY CLEAN ENERGY AGENDA

New York has adopted a nation-leading clean energy agenda that calls for 100% clean power by 2040, sets New York on a path to carbon neutrality across all sectors, and advances climate infrastructure build-out already underway. The Climate Leadership and Community Protection Act ("Climate Act") sets these and other new standards into law, codifying New York's goal to achieve 70% renewable energy by 2030, and reducing greenhouse gas emissions 85% by 2050, with additional new legislative authority and regulatory milestones reached in 2020 to accelerate progress.

As the State's primary clean energy agency, NYSERDA is key to implementing this ambitious agenda, and has identified decarbonization of transportation as a key priority. While much of this progress will be delivered through the transition to electric vehicles, it will also require complementary policies that aim to change behavior and reduce overall car use. Local parking reform has an important role to play here, both in reducing dependence on cars and catalyzing the creation and take up of clean alternatives which are accessible to all New Yorkers.

NYSERDA's Strategic Plan, Toward a Clean Energy Future: A Strategic Outlook for 2021-2024, provides further information on New York's climate plan, including multi-year objectives, ongoing programmatic efforts, and strategic areas of focus for 2021 through 2024.

POLICY BACKGROUND

MORE PARKING MEANS MORE DRIVING

For decades, cars have been given primacy in urban planning. Municipalities have consistently invested in roads and parking at the expense of other forms of transport, often claiming this is necessary based on projections of rising car usage.[1] Policies have included rigid minimum parking requirements, free on-street parking, and low taxation of private parking lots. The results speak for themselves: U.S. households on average own more than 2 cars each, and a 2011 study conducted by the University of California, Berkeley estimated that the country had an average of 3.4 parking spaces per vehicle, equating to 800 million spaces.[2]

Since the 1990s however, the planning and policy community has increasingly come to recognize the impact that free, subsidized, or mandatory parking has had on both car usage and the urban landscape. In place of the historic assumption that the increase of parking spaces follows demand, it is now widely accepted that by reducing the cost of driving, parking provision also induces its own demand.[3]

As importantly, there is growing evidence from city-level studies that parking management leaders and city leaders' have the power to either exacerbate or reverse this process. For example, a comparative study of nine medium size U.S. cities in 2016 found that an increase in parking provision from 0.1 to 0.5 spaces per person was associated with an increase in automobile mode share of 30 percentage points. Crucially, the study's authors were able to demonstrate that the available evidence met all of the Bradford Hill criteria used in epidemiology to infer causality.[4]

Similarly, a forthcoming quasi-experimental University of California, Los Angeles (UCLA) study of the provision of parking to affordable housing tenants has found that parking causes ownership, with buildings allocating at least one parking space per unit having more than twice the car ownership rates of buildings with no parking. The same study found no correlation between parking supply and employment status.[5]

While it is always difficult to prove causation when it comes to complex, interconnected systems, these findings are supported by much wider evidence on the impact of road investment on driving. Just as with parking, the relatively high investment in roads in the U.S. has increased the convenience and reduced the cost of driving and has done so at the expense of alternatives. It has long been apparent to parking management leaders that this did not simply meet rising demand, but instead contributed to a never-ending cycle of more roads inducing more driving and requiring yet more roads.[6] As early as the 1930s observers watched New York City's masterbuilder Robert Moses "open the Triborough Bridge to ease congestion on the Queensborough Bridge, open the Bronx-Whitestone Bridge to ease congestion on the Triborough Bridge and then watching traffic counts on all three bridges mount until all three were as congested as one had been before."[7]

Parking's negative effects are, therefore, twofold. Firstly, it consumes huge amounts of urban space, increasing the cost of development and encouraging sprawl. For example, in Los Angeles County, 200 square miles, or 14% of all incorporated land, is dedicated to parking.[8] Secondly, it actually contributes to increased driving which increases emissions, reduces air quality, and even raises congestion in some cases. These effects are not felt

equally. Wealthier households are more likely to drive and own multiple cars and so gain the most from policies which subsidize car ownership while poorer families, who are more likely to use public transit, are forced to take on a disproportionate share of the burden through higher taxes or higher housing costs.

PARKING IS NEVER FREE

Despite the common conception, parking itself is never actually free. In fact, a 2012 survey of 12 major U.S. cities found that a single above ground parking space cost an average of $24,000 per space to construct, while an underground space cost $33,000.[9] This does not include the opportunity cost of not using the land for alternative uses which, as the diagram below highlights, can be significant. Drivers, whether at home, work, or elsewhere, rarely face this cost directly. In fact, in the U.S., they are able to park for free at the end of 99% of their trips.[10] Even if the costs of parking are ultimately paid for through higher taxation or housing costs, when it comes to deciding on whether and how to travel, residents rarely, if ever, face the full cost of driving.

There is strong expert consensus that tackling this implicit subsidy, and the incentive it creates to drive, should be a priority of any parking reform aiming to reduce driving and encourage the use of sustainable alternatives.[11] This may mean charging for parking, increasing its scarcity, or simply giving residents the choice of not paying to have a parking space at home. Cities' experiences bear this out. A 2018 review of Arlington's "Transport Demand Management" (TDM) program, which requires new buildings to introduce a range of measures to reduce car usage, found that unbundling parking costs was a critical measure of the program and was the most consistent predictor of lower driving rates. In addition, they found a strong relationship between workplace parking fees at work and the use of alternative modes of transport and shared vehicle use.[12]
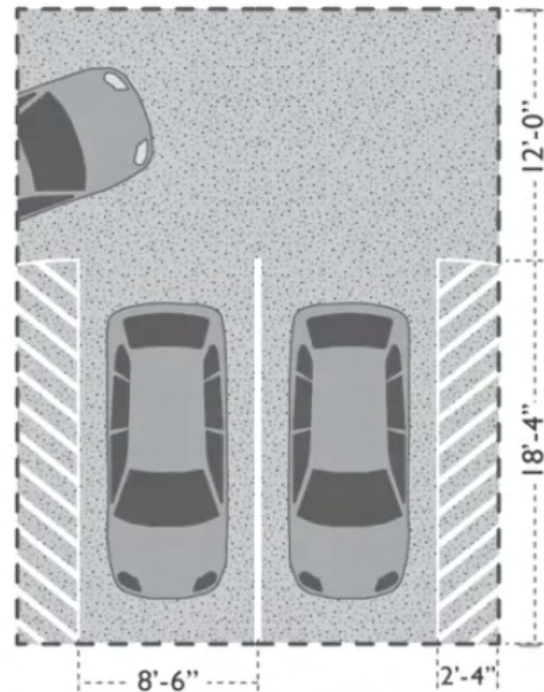
THE OPPORTUNITY COST OF USING LAND FOR PARKING

Living Space Vs. Parking Space

Bedroom
12' x 15'

Bedroom
9' x 13'

Closet

Bath

Closet

Utility

Closet

Living Room
12' x 15.75'

Kitchen

Dining Area
6.5' x 9.5'

25'

27'

12'-0"

18'-4"

8'-6"   2'-4"

size for 2 bedroom apartment: 675 FT²

size for 2 parking spaces: 650 FT²

Sources: Transportation Cost and Benefit Analysis II – Parking Costs Victoria Transport Policy Institute (www.vtpi.org)
Graphic Adapted from Graphing Parking (https://graphingparking.com/2013/07/23/parking-across-cascadia/)
Image compiled by Portlanders for Parking Reform - https://pdxshoupistas.com/ - @pdxshoupistas

PPR

CASE-STUDY: ARLINGTON, VA

Since the 1970s Arlington County, Virginia, has pursued an integrated approach to transportation and development policy, seeking to boost the County's economy while increasing the use of transit, ridesharing, walking and cycling[13] The results were impressive: between 1980 and 2013, Arlington's population grew by 38% and employment by 35% with virtually no increase in road infrastructure and or vehicle traffic.

The County achieved this by combining a wide range of interventions which created walkable, mixed use 'Urban Villages,' offered residents and commuters a wide range of transit options, and provided information and incentives to make it easy for people to switch away from cars.

A large focus has been on encouraging developers to take action to mitigate the effect of new buildings on car use. To achieve this, developers are offered greater flexibility in building form, use and density if they also implement TDM policies, which reduce car usage by occupants. This includes reducing parking provision for single occupant vehicles while increasing provision of bicycle storage and priority parking for car-pooling or van-pooling. Developers and employers are also encouraged to provide information to employees on alternatives and access to incentive schemes.

A SYSTEMIC ISSUE REQUIRES A SYSTEMIC RESPONSE

While important, reducing the supply or increasing the cost of parking cannot be implemented in isolation. Parking is part of a much larger and highly interdependent transport system in which changes often have unintended consequences. Parking management leaders must carefully consider the local parking demand and supply context, what the available transit alternatives are, and how changes will affect citizens and their choices in this context.

This includes recognizing that disjointed or isolated parking reforms are as likely to create new problems. For example, removing off-street parking in a city where on-street parking is free may simply overcrowd on-street parking and quickly generate complaints. It also requires a recognition that even while parking does incentivize driving, simply removing it without providing alternatives to drivers is unlikely to lead to behavior change in the short term and is more likely to elicit anger. These alternatives may be new and improved public transit options but they could also include policies to support cycling, new tech-enabled ridesharing options, or reducing travel overall through remote working.

Finally, it requires an in-depth understanding of actual demand for and supply of parking, both at the city and neighborhood level. While city residents often worry that they face a parking shortage, researchers regularly find that these perceptions are unfounded and that peak occupancy is well below both actual supply and required minimums.[14] Identifying and demonstrating where this is the case will be key. While gathering and analyzing this data, parking management leaders should also keep in mind that their aim is to change local mobility choices and reduce demand for parking rather than simply providing the parking required by the status quo.

OPPORTUNITIES

Although parking reform raises complex and difficult questions, change is possible and the benefits are potentially significant. Not only have major cities outside the U.S. long taken alternative approaches, actively restricting parking and discouraging driving, a growing number of U.S. municipalities have successfully begun to follow suit. These examples, drawn on heavily in this report, highlight the wide range of strategies that cities can pursue as well as the benefits that may accrue to their citizens. Given the emotive response that parking policy often evokes, quantifying and demonstrating these benefits will be critical to successfully implementing reform. These include:

- Raising revenue for the locality by charging for on-street parking or increasing taxation of off-street parking. This can be recycled back into the urban landscape or alternative transit options.
- Increasing footfall to businesses by increasing turnover of car parking spaces in busy commercial districts.
- Creating new public spaces by repurposing parking, including creating new opportunities for businesses, community enterprises and cultural activities. This can improve the urban landscape for residents while also attracting new visitors.
- Increasing the flexibility of commercial land use by moving away from rigid parking requirements based on assumed levels of car usage. This, in association with appropriate zoning policies, can catalyse new businesses and housing redevelopment and enable quicker repurposing of vacant or "zombie" properties.

- Lowering the cost of development, including residential housing costs, by unbundling parking costs.
- Improved health outcomes due to improved air quality and increased cycling and walking.

The effects of the COVID-19 pandemic have also created new opportunities to make the case for parking reform and its benefits. While we have seen an increase in car usage relative to public transit, there has also been a dramatic increase in remote working and a new demand for outdoor activities. This has included the repurposing of parking spaces for use by restaurants in many cities, demonstrating the potential of permanent land use reforms. The recovery from the economic shock the pandemic has caused has also created new demand for policies which will help re-energize growth and enable new businesses to replace those that have been lost.

These changes build on the positive effects that technology has already had in recent years, with new ridesharing and vehicle-sharing options expanding rapidly across the country and offering convenient, more efficient alternatives to private car use. Similarly, GPS technology has enabled the creation of smart parking in cities like San Francisco which adjusts pricing in response to real time demand. Looking forward, the transition to electric and potentially autonomous vehicles will create even more opportunities to reduce the amount of parking required.

RESEARCH METHODOLOGY AND SOURCES

This report combines the latest academic evidence and real-world good practice on what works in parking reform. It is based on a combination of desk-based research on existing evaluations of the effects of parking provision and active parking management, as well as extensive interviews of researchers in the field and municipal leaders and planners. While our focus has been on the experiences of cities in New York State and neighboring states, we have also drawn on national and international examples where relevant.

Throughout the project we have focused on three key research questions:
- What is the full range of parking reform policy options?
- What are examples of good practice and how were they successfully implemented?
- What are the main considerations city leaders should take into account when embarking on a program of parking reform?

Our answers to these questions are set out in the following sections. This is intended as a practical guide for those leading change in their communities and so we have attempted to ground all of our findings and recommendations in the realities of city politics, recognizing the constraints that politics and budgets can impose while also proposing strategies that may help overcome them.

Section 2:

MENU OF PARKING MANAGEMENT SOLUTIONS

This section of the report provides a menu of feasible parking management practices and related policy options based on existing research and relevant case studies of municipalities from around the world. These solutions can be pieced together to form a comprehensive parking management plan that meets local transportation needs and development objectives, while working toward the State's emissions reduction goals.

While many of these strategies have already been covered in other publications, this report collates a wide range of solutions in one place to allow for ease of comparison. The parking interventions have been broken down by supply responses, intermediate responses, and demand responses. These categories can be fluid, but generally follow a set of basic guidelines: **supply responses** include solutions that repurpose existing parking and disincentivize new parking; **demand responses** refer to solutions that change behavior to reduce the need for parking; and **intermediate responses** impact both supply and demand simultaneously.

Links to additional resources on the solutions can be found in Annex I.

Supply Responses

Residential/ Commercial Parking Minimum Elimination

Increasing Taxation On Parking

Maximum Parking Caps

Reducing Street Width Requirements

Repurposing Existing Structures

Transportation Demand Management Plans

Unbundling Parking Costs

Intermediate Responses

Electric Vehicle (EV) Interventions

Green Street Programs

Information Campaigns

Park and Ride

Shared Parking Contracts

Demand Responses

Commercial Cash-Out Programs

Demand-Responsive Parking Pricing

Public Transit & Micro-Mobility Improvements

Residential Parking Permits

SUPPLY RESPONSES

RESIDENTIAL PARKING MINIMUM ELIMINATION

Many municipalities set minimum requirements for off-street parking for new residential developments which is intended to reduce on-street congestion. These are set as a number of spaces per new dwelling and range from 0.5 spaces in denser areas to as high as two spaces in less dense locales.[15] Despite its good intentions, this enforced bundling of housing and parking can increase the cost of housing, reduce density, and lower the marginal cost of car ownership. A final effect may be an increase of overall congestion and air pollution. Removing parking requirements in growing municipalities reverses these effects, ensuring homeowners take into account the full cost of car ownership when comparing the tradeoffs with alternatives. This change can be applied to new developments only or to existing developments, allowing for "in-filling." Overall, this approach is a market orientated, low-cost policy which directly addresses a key cause of the over-supply of parking, increases personal choice, and has secondary positive effects on house prices and density. However, as it mainly affects decisions over car ownership, rather than specific journeys, it is likely to only have a significant effect in areas with nearby and reliable transit alternatives (i.e., close to city centers or public transit stations). It is also likely to face significant opposition in less dense cities due to fears of increased demand for on-street parking and increased housing density.

COMMERCIAL PARKING MINIMUM ELIMINATION

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INCREASING TAXATION ON PARKING

Current taxation systems often disincentivize developers from adding value to existing buildings, as doing so may increase property tax assessments.[16] This means that communities are incentivized to maintain parking structures, even if they are not in use, since they do not have a heavy tax burden and may generate some revenue. For this reason, raising overall taxation of parking spaces can be used to incentivize communities to get rid of underused parking lots. Also, even if they are revenue negative, parking structures may provide a tax shelter for nearby businesses. If facilities are being

SUPPLY RESPONSES

used for that purpose, municipalities may increase taxation to try and extract as much value as possible from the parking structures. Additionally, municipalities may consider applying higher tax rates on non-permeable structures that can cause undue burdens to sewer systems (encompassing many parking lots). Passing legislation that increases taxes on parking lots can be politically challenging, due to likely opposition from local businesses and parking lot developers.

MAXIMUM PARKING CAPS

Parking maximums (or parking caps) refer to a set upper limit on parking supply, either at individual sites or in a particular neighborhood/development. They are often only used on certain kinds of parking, such as long-term, single-use, free, or surface parking, depending on planning objectives. This solution can be applied in areas with limited land and high congestion (e.g., pedestrian environments or central business districts), that also have transit access. By setting an upper bound on the number of spaces permitted in a defined area, municipalities can control the amount of land devoted solely to parking, while giving developers the option to provide less parking than the maximum permits. Additionally, municipalities can increase tax revenue through the redevelopment[17] of parking lots through parking maximums.   Like many other solutions, the policy only works to reduce driving when paired with alternative forms of transportation. In order to win over businesses and developers worried about the reductions in parking, studies on the economic impact of improved density[18] and the actual parking already supplied vs. demand could help to win over opponents.

REDUCING STREET WIDTH REQUIREMENTS

Many municipalities require wide residential streets in order to ensure a significant supply of on-street parking. This practice provides a hidden subsidy for car ownership since many households would not choose to pay for the additional parking spaces if they were unbundled. Residential parking spaces often take up 25-45% of the street and up to 10% of the land in a development.[19] Research has shown that minimum street width requirements are[20] not a technical necessity based on safety concerns, or a reflection of market demand for parking.   By basing street width requirements on traffic demands and street access instead of parking considerations, as well as making street parking optional for residential streets, municipalities can eliminate excess parking spaces, increase the availability of developable land, and reduce the cost of infrastructure. Without the width requirements and corresponding infrastructure costs, developers could[21] use the additional space for alternative means, likely leading to increased housing affordability.   The policy complements the use of alternative forms of transport by allowing space that would be used for parking to be applied to bike lanes and sidewalks. Before changing local regulations, the effects of reduced street width on accessible parking spaces warrants further exploration (e.g., in areas being redeveloped).

SUPPLY RESPONSES

REPURPOSING EXISTING STRUCTURES

COVID-19 has hurt businesses across the State. With people traveling less and working from home more, many parking surfaces/garages have been left empty. Programs in many communities have converted existing parking spaces to multi-purpose spaces, including coworking offices, bars, and shops for small businesses as a means to repurpose parking space, attract tourism, and develop the local economy.[22]

Besides serving as a tool to promote economic development, these initiatives have transformed parking spaces into more productive uses of land. While reduced free public parking can be met with dissatisfaction from local communities, replacing existing parking (even after the pandemic) with spaces that congregate potential customers and promote local businesses can help garner excitement and support from the community. Redesigning existing structures can present technical/structural challenges (e.g., occupancy rate issues, layout concerns, etc.), and stakeholders may need to secure potential tenants before projects begin in order to avoid any potential turnover costs for owners.

TRANSPORTATION DEMAND MANAGEMENT PLANS

These plans set out how developers and/or building owners/users will lower private car usage, either by reducing the number of journeys or by shifting journeys to alternative options. In addition, private organizations, including a number of large universities, have introduced their own voluntary transport demand plans with similar aims. The policy aims to deliver reductions in parking demand and car usage in ways that are best suited to the location and usage of the building. These initiatives force developers to take into account the wider costs of driving that new developments cause while leaving them free to address them in a flexible and tailored way. The policy is less likely to change developer behavior and more likely to generate opposition in areas where existing transit alternatives do not exist, either by creating undeliverable requirements or by incurring costs on developers for facilities which will not be used.

SUPPLY RESPONSES

UNBUNDLING PARKING COSTS

Unbundling policy refers to renting or selling parking separately, instead of including spaces automatically with residential/commercial units. Where parking is bundled, car ownership and driving have been found to be significantly higher.[23] Under unbundling programs, occupants only pay for the parking they need. This practice helps to increase flexibility, since pricing for parking can be continuously adjusted to meet market demand (if parking is leased and not sold). The policy can be enacted by: unbundling parking from commercial office spaces; making parking optional when developers sell buildings (can differentiate pricing for residents vs. non-residents); itemizing parking costs in lease agreements to help renters understand their true costs; and creating informal processes for unbundling by creating secondary markets for unused spaces (i.e., building managers could create a list of unused spaces to rent out to non-occupants). By separating the costs of parking spaces from residential/commercial agreements, the number of parking spaces needed can be reduced as new developments match the creation of spaces to market demand. This policy has proven effective at limiting car use and congestion by encouraging residents to opt for alternative means of transportation instead of paying for parking. Enacting unbundling policies may require changes to local minimum parking requirements. If parking minimums are not reduced or eliminated, developers may have little incentive to unbundle parking (i.e., there would likely be an oversupply of parking that could not easily be rented). Some developers have expressed concern that unbundled parking requirements could even affect their ability to secure loans, since they may have trouble earning enough revenue from parking spaces to make loan repayments. [24]

ELECTRIC VEHICLE (EVs) INTERVENTIONS

Municipalities will need a wide-ranging strategy if they are to incentivize the uptake of EVs in a way that is accessible and equitable. To do so, cities must improve the infrastructure required for the economic use of EVs and remove (or at least reduce) some of the factors preventing drivers from purchasing these cars (i.e. vehicle costs, long charging times, and the need for charging infrastructure). In addition to taking part in state-wide programs that aim to increase the availability and convenience of EVs and charging stations (e.g., rebates for public/private EV purchases, and rebates for charging station construction), there are a range of options that cities can take to encourage faster adoption of EVs.[25] These include upgrading city-wide technology to speed up EV charging time, engaging in P3s (Public-Private Partnerships) with utilities to add charging infrastructure, and adopting EV-specific ordinances that set aside a percentage of new parking to be dedicated to EVs.[26] With an aging electric grid in many parts of the State, municipalities may face engineering bottlenecks as more car owners switch to EVs. Determining the charging technology to rollout may also create a barrier to decision making. Additionally, having to pay for parking as well as the price of electricity to charge a vehicle may make public charging stations too expensive for many residents.

GREEN STREET PROGRAMS

Converting surface on- and off- street parking to green infrastructure is an effective policy solution to help mitigate GHG emissions associated with single driver occupancy vehicles. The presence of more vegetation throughout a municipality in what would otherwise be used for parking lots can help reduce overall emissions through the green area's absorption of carbon.[27] As it is also primarily used to improve water and sewer management, the program has several environmental co-benefits. Broadly referred to as "green infrastructure projects," this parking intervention strategy provides an attractive alternative to traditional concrete (or "gray") infrastructure by making paved and hard surfaces vegetated or permeable. A subcategory of green infrastructure is green parking and streets/alleys, which encompasses retrofitted (existing and underused) parking lots, roadways, and mediums. Local governments primarily install green streets in the public right-of-way, but green alleys and parking lots can be installed on both public and private land. Several cities throughout the U.S. have already taken up green infrastructure projects, with most starting with pilot programs before evolving into jurisdiction-wide programs. A through-line connecting these successful programs is an associated communication strategy and engagement with the public and other governmental (sometimes private) partners to get the project off the ground and an accurate cost-benefit analysis and tracking system for measurement of economic, environmental, and social results. Green infrastructure projects do not have an inherent effect on car use or offer a guaranteed transportation alternative. These initiatives can involve collaboration by multiple local agencies that do not always work closely together, such as transportation, environment, stormwater, and public health. Additionally, they require ongoing maintenance, which can be difficult to plan, implement, and fund.

INTERMEDIATE RESPONSES

INFORMATION CAMPAIGNS

Even if demand responses provide people with adequate incentives to switch from car use to alternative mobility options, people may not change their behavior. Many residents may be unaware of driving's negative impact on the local environment and may also have negative views on using public transportation (e.g., on its reliability, efficiency, cleanliness, and safety). In order to support the scalability of demand responses, municipalities can launch informational campaigns to encourage residents to change their behavior. These campaigns can range from "low-tech" options, such as billboards/ advertising on public infrastructure (e.g., bus stations, buses, benches, etc.), to "high-tech" app-based or mobile advertising. Successful campaigns have emphasized information on mobility alternatives (including discount schemes), convenience and real-time travel information. Though many municipalities are familiar with these campaigns, measuring their effectiveness can be challenging. Additionally, since public perception can change frequently, continuous campaigns may be needed to continually promote alternative transit, which can be resource-intensive.

PARK AND RIDE

Small- to mid-size cities frequently find it difficult to cover all passengers' needs through their public transportation networks. Park and Ride solutions offer a way to satisfy a city's transportation needs in a sustainable manner. The main objective is to facilitate parking lots where private transportation users park their own vehicles and commute via public transportation. As a result, usage of public transport increases, traffic congestion and air pollution decrease, mobility around a city improves and commuters can reach their destinations in a stress-free way, saving time and money.[28] City authorities around the world have begun offering this intermodal urban mobility solution and have typically seen increased transportation efficiency. These initiatives can also reduce on-street parking while generating revenue to balance maintenance costs. Initial capital investments are often needed to construct facilities and this solution only works in areas with functioning public transit networks (access to reliable and efficient systems).

INTERMEDIATE RESPONSES

SHARED PARKING CONTRACTS

Shared parking is a parking management tool that communities can employ when setting parking requirements. Within these agreements, parking spaces are shared by more than one entity at the discretion of the approving body (which may be public or private). Depending on the circumstances of the municipality, shared parking arrangements may allow for reductions for private sector, non-residential, and residential uses and substantial declines in parking without major conflicts during peak parking demand hours. Because outright elimination of off-street parking requirements is often politically difficult, shared parking agreements provide an incremental approach. This parking strategy optimizes parking capacity by allowing complementary users to share spaces, while also reducing overall development costs by permitting developers to provide less on-site parking. The reduced need for land devoted to parking may incentivize the creation of more walkable areas, thereby increasing visitorship to central business districts. Many municipalities have implemented shared parking provisions in zoning codes and the language, requirements, and restrictions of these provisions vary from community to community. Developers may become incentivized to build extra parking to lease through shared parking agreements if parking demand is high, but this can be addressed by placing a cap on shared parking in any single development.

INTERMEDIATE RESPONSES

DEMAND RESPONSES

COMMUTER CASH-OUT PROGRAMS

Employers often offer employees free parking for commuting. This practice encourages many employees to drive alone to work. In a parking cash-out system, employers provide the option to take a benefit of equivalent monetary value (e.g., public transit, another tax-free commute alternative, or taxable cash) instead of the subsidized parking. Typically, employers incur no additional costs, employees are granted more choice in selecting their benefits, and overall driving is reduced as fewer employees choose to drive.[29] Policymakers can engage with local employers (focusing on larger employers to begin with) to encourage them to adopt cash-out programs, as they will help to reduce demand for driving and parking. Employers that own their parking spaces, or that are locked into bundled lease parking agreements, may resist the adoption of the policy since their parking costs are fixed regardless of whether their employees use the spaces (in these cases, municipalities can still engage to see if employers are willing to enter into shared parking contracts).

DEMAND-RESPONSIVE PARKING PRICING

Many municipalities often provide on-street metered parking lots in their downtown. However, the price is usually set lower than the equilibrium market price, leading to excess demand and congestion. By introducing demand-responsive parking pricing, the supply and demand of parking can become balanced (e.g. raising rates during periods of peak demand for parking and lowering rates during less busy times), while also allowing a portion of parking to remain vacant. Calibrating pricing to maintain occupancy rates around 85% may also reduce congestion by way of lowered "cruising" (wasteful driving to search for a vacant lot).[30] Technology for demand-responsive parking pricing implementation is already well established with previous instances of the policy showing that even with the initial capital investments needed to introduce new parking equipment (e.g., sensors for data collection), the net effect on municipal budgets is revenue-neutral or positive.[31] While higher parking costs can face pushback from drivers, highlighting the increased parking availability, reduced congestion, and increased funding for alternative mobility improvements can help to overcome the concerns. In order to ensure that low-income households maintain access to downtowns, robust alternative mobility options are essential. Additionally, businesses may object to the increase in metered parking pricing, since they may perceive the higher prices as a disincentive for customers to visit. Businesses can be brought on board by underscoring how the policy helps to increase the number of overall visitors through an increase in parking turnover.[32]

PUBLIC TRANSIT & MICRO-MOBILITY IMPROVEMENTS

Municipalities can reduce congestion, private vehicle use, and parking demand by encouraging residents to use alternative transportation. These alternatives can include improving public transit (i.e., buses, street cars, rail, etc.), the introduction of shared bikes/e-bikes/scooters, and improved walking and cycling conditions (e.g., curb extensions, designated bike lanes, changing facilities, pedestrian/cyclist signaling, open streets, etc.). Funds for these improvement projects can be raised from implementing complementary parking management solutions and can be used for capital investments to improve the capacity, regularity, accessibility, and safety of existing infrastructure. In tandem, these initiatives can reduce driving while providing residents with lower congestion and increased mobility options. When developing transportation projects that receive State or Federal funding, the mobility of all users must be considered.[33] Before implementing shared bikes/e-bikes/scooter programs, the potential for increased accidents, storage needs, accessibility concerns, and the limited ability for people to travel significant distances on these modes of transportation should be taken into consideration. Furthermore, municipalities must make sustainable plans for the ongoing maintenance and operations costs of all public transit programs.

RESIDENTIAL PARKING PERMITS

Many municipalities provide residents with on-street parking for free. Some municipalities have a residential parking permit policy but the permit fee is often free or cheaper than the market price (cost of off-street parking). Since the cost of residential parking is a major cost of car ownership, providing free or inexpensive on-street parking is a subsidy for car owners. The introduction of a residential parking permit policy with market price fees can disincentivize car ownership.[34] Also, it can reduce cruising and congestion if the number of registered cars decline and is balanced with the on-street parking supply. To gain public support, it is important to make concessions to residents (e.g., grandfathering in existing residents to pay current low prices for a period of time) and return the increased revenue to the community (e.g., parking benefit district). Improving alternative mobility options and providing incentives to use them along with this policy can be effective in encouraging residents to shift from car ownership to alternative mobility options. Local municipalities need State approval before adopting a parking permit system, but the price of the permit can then be set by the local government. High permit prices can disproportionately impact low-income households that are dependent on care use, so equity considerations should be taken into the design of any permit program.

DEMAND RESPONSES

USING PARKING MANAGEMENT SOLUTIONS TO MEET LOCAL GOALS

The solutions outlined in this Section illustrate the breadth of policy options available to municipalities as they aim to update local parking management practices to support the development of more holistic transportation plans. While it is not an exhaustive list, the table below highlights reforms that policymakers can apply to meet local goals. Instituting multiple complementary solutions in tandem is the most likely way to achieve desired initiatives.

SAMPLE POLICY OBJECTIVES

	Reduce Downtown Congestion	Improve Public Transit Options	Optimize Use of Lots & Garages	Lower Property Development Costs	Reinvigorate Business Districts	Increase Budget for Local Govt.
Residential Parking Min Elimination				✓		
Commercial Parking Min Elimination			✓	✓	✓	
Increasing Taxation on Parking	✓		✓			✓
Maximum Parking Caps			✓	✓	✓	
Reducing Streeth Width Requirements		✓		✓	✓	
Transpo Demand Plan	✓	✓	✓	✓	✓	
Unbundling Parking Costs	✓	✓		✓		
EV Interventions		✓				
Green Street Programs					✓	
Information Campaigns	✓	✓			✓	
Park and Ride	✓	✓	✓			
Repurposing Existing Structures			✓		✓	✓
Shared Parking Contracts			✓	✓	✓	
Commuter Cash-Out Programs	✓	✓	✓			
Demand Responsive Pricing	✓		✓		✓	✓
Public Transit Improvements	✓	✓			✓	
Residential Parking Permits	✓					

Section 3:

APPLYING POLICY SOLUTIONS

ILLUSTRATIVE EXAMPLES

The purpose of this section is to illustrate how the right set of parking policy solutions will vary across different municipal circumstances, characteristics, and planning objectives. The parking and transportation challenges faced by a municipality are inherently shaped by its distinctive geographical, historical, social and economic characteristics. In terms of parking policy solutions, what may work for a particular locality may not necessarily be as directly applicable or as effective in another.

The municipality types described here are fictitious examples but the descriptions of their characteristics and how they may relate to each policy solution are drawn from research and interviews conducted with experts and practitioners across the State. The set of suggested policy solutions described for each fictional municipality is designed to help readers understand that the types of policies that may be most applicable to them are not only dependent on local context but also on the wide array of local objectives.

CITY A: SURPLUSVILLE

BACKGROUND

Surplusville is a large sprawling city of several hundred thousand residents. In the 1990s, it was a hub of economic activity primarily driven by a booming manufacturing sector. To accommodate the rise in Surplusville's population, the city's urban area quickly expanded; roads were widened, new suburban housing projects with minimum parking requirements were developed; and new highways were quickly constructed. Plans for constructing a bus public transit system were drawn up, but delayed. With cheap gas available, urban sprawl expanding, and the lack of transportation alternatives, the majority of Surplusvilles' citizens chose to purchase a car and drive. In response to this, large public and private parking garages were erected in the downtown commercial areas and free on-street parking was made available.

The 2008 financial crisis severely impacted Surplusville's manufacturing sector and although the city council recently laid out an economic redevelopment plan, the city has yet to fully recover. With recent demographic trends showing a slight decline in the city's population, traffic congestion is no longer an issue but the many downtown parking garages remain in operation. Although the city now enjoys a well-connected affordable bus transportation system, Surplusville's citizens still mostly choose to drive. However, the city is conscious of environmental concerns related to air pollution and GHG emissions and is willing to enact parking reforms to address these concerns.

SUGGESTED POLICY SOLUTIONS

1. Commercial Parking Minimum Elimination
2. Increasing Taxation on Parking
3. Repurpose Existing Structures
4. P3 Partnership
5. Reducing Street Width Requirements
6. Park and Ride

POLICY DESCRIPTION

Given Surplusville's robust bus transit system and sufficient public parking supply, eliminating minimum parking requirements in its commercial areas is a good option to promote bus transit use and accelerate the redevelopment of its business districts. Shifting residents away from driving to alternative mobility options is key to the municipality's goal of addressing air pollution and climate change.

However, even if the local bus system was improved, Surplusville's citizens may not choose to use bus transit as parking remains oversupplied due to the city's minimum parking regulation. These requirements disincentivize developers from redeveloping the commercial area by increasing costs and reducing development flexibility. Real estate developers business groups and affordable housing advocates are likely to strongly support this policy change. Furthermore, given the municipality's excess parking supply, eliminating parking minimums should not generate significant local opposition.

To complement this policy, Surplusville could increase the tax rate on commercial parking lots. This incentivizes developers to convert underused parking spaces into more commercially valuable facilities. While this promotes parking reduction, the tax revenue could also be used to improve alternative mobility options, leading to further shifts away from driving.

As public parking garage contracts become available for renewal, the city should aim to repurpose these facilities, particularly those located in valuable areas. This ultimately reduces parking supply and revitalizes the city center.

For example, as part of the redevelopment plan, the city could partner with local businesses to convert public garages into a multi-purpose space, including co-working offices and shops for small businesses. The municipality could also implement a 'road narrowing' project and identify areas where cycling and pedestrian walking infrastructure could be improved. With little traffic congestion and wide roads, the city can maximize this opportunity to build new cycle lanes, expand pedestrian walkways and reduce the number of lanes available for vehicular driving. Additionally, with Surplusville's robust bus transit system, adding Park & Ride facilities to the bus terminals or stations located in the suburbs provide an attractive alternative to driving directly to downtown.

CASE STUDY: BUFFALO, NY

Buffalo is the first major U.S. city to eliminate minimum parking requirements in its entirety. Buffalo achieved this policy change by adopting the Green Code[35] in 2017 to encourage a walkable urban environment, promote mixed-use developments, and reverse sprawling development patterns.

Recent research[36] into Buffalo's development pattern in the first two years after parking deregulation shows the positive effect of the regulatory reform. Compared to the period before with previous minimum requirements, 21% (502) fewer total off-street parking spaces were provided. Additionally, 47% of major developments provided fewer parking spaces than previous parking requirements. Furthermore, mixed-use developments introduced 53 % fewer parking spaces than the requirements.

CITY B: SUNNYDALE

BACKGROUND

Sunnydale is a small and relatively affluent town located in a beautiful part of the countryside. With a riverfront walkway, well-maintained gardens and a picturesque downtown area, Sunnydale experiences seasonal peaks of activity in the summer when tourists descend into the area.

With good rail connections, the city just barely copes with the summer spikes of activity without seeing increased traffic congestion or the need to make more parking available. It does, however, struggle with visitors who drive and cruise for the best parking spots, which can lead to spikes in traffic and cause increased emissions.

The construction of a new convention center on the outskirts of Sunnydale to attract businesses is forecast to bring increased visitors more regularly to Sunnydale throughout the year. However, this threatens to overwhelm Sunnydale's roads and current parking capacity, especially during the summer.

To combat congestion, some local businesses want more parking to be built while cycling and walking advocacy groups support calls to price on-street parking. Previous attempts to implement on-street parking pricing met strong resistance; a large factor was the perceived visual disturbance of standard parking meter designs. Thus far, the town has resisted calls for widened roads and more parking in the downtown area.

SUGGESTED POLICY SOLUTIONS

1. Policy solution:
2. Demand-Responsive Parking Pricing
3. Information Campaigns
4. Public Transit and Micro Mobility Improvements

POLICY DESCRIPTION

Given the seasonal fluctuations in parking demand, Sunnydale should consider demand-responsive parking pricing as an effective way to actively manage parking demand and reduce congestion. Building new parking spaces that would only be utilized in the peak summer season is costly and an inefficient use of space. Instead, pricing parking fees based on several parking demand factors (such as area, time, and season) can efficiently mitigate the fluctuating parking demand and reduce congestion due to cruising.

Combining this policy with the threat of fines for parking violations will increase parking turnover and attract more customers to local businesses. Also, Sunnydale may have an opportunity to raise additional revenue; these funds could be used to improve alternative mobility options, including walking and cycling.

Demand-responsive parking pricing systems can be complex and expensive to implement. Sunnydale could consider a simple pricing structure initially to speed up implementation and allow pilotting. For example, the municipality can introduce multi-space meters to minimize the visual disturbance on the streets. Also, if local businesses are concerned with visitor reduction due to parking costs, the city can adopt a progressive price structure (the parking price for each successive hour increases). With this parking price design, the city can increase parking turnover while short-term visitors would still only have to pay a minimal or eliminated parking fee.

To complement demand-responsive pricing, Sunnydale should also consider smart parking solutions to improve public information on reforms.

Similar to implementing parking fees, this primarily serves to reduce cruising that causes increased traffic congestion and vehicle emissions.

This may be an app-based solution that provides visitors with real-time information about available parking options. The city should also work with local hotels and businesses to help provide parking information, and cycling and walking route maps to visitors and employees. To mitigate the induced parking demand impact caused by the construction of the new convention center, Sunnydale can work with its business center to introduce a dedicated bus route from the convention center area to the downtown city area.

CASE STUDY - PARKING PRICING: BERKELEY, CA

Berkeley implemented the pilot parking management project, goBerkeley[37], in 2012 to streamline the use of the available parking supply. Based on the collected on-street parking occupancy data, the city set two types of parking pricing zones; the premium zones with higher demand and higher fees and the value zones with lower demand and lower fees. The parking price is adjusted to reach the target occupancy rate (65 – 85%).

The project results show that parking management can increase available parking spaces, reduce cruising, and increase revenue. The percentage of parking blocks with the occupancy rate above 85% in the premium zones declined from 37% to 25% in downtown. Also, 78% of drivers surveyed reported finding parking is easy, an increase of 41%.

CITY C: FLUORISHFORD

BACKGROUND

Fluorishford is a central economic and cultural hub with a world-renowned university and medical campus. Bordered by a lake and nearby hills, Fluorishford is a relatively small city characterized by narrow roads and dense urban housing. The university and medical campuses are located on the edge of the city's urban area and have good bus links to the downtown commercial district and cultural center. The city has thus far resisted efforts to expand roads and increase car infrastructure largely because real-estate is so valuable in Fluorishford.

The city eliminated minimum parking requirements in the downtown area decades ago and invested in improving bus links and services. However, future demographic trends forecast upward pressure on Fluorishford's housing, road, and parking capacity. Though the downtown is dense and walkable, an increasing number of commuters are likely to commute in from dispersed, surrounding areas. With little interest in road expansion projects, the city is focused on maximizing available road capacity and shifting trips away from private car use. Additionally, the city council has very good relationships with the university and medical campus; all stakeholders understand the need to consider transportation demand holistically and to find mutually beneficial sustainable solutions.

SUGGESTED POLICY SOLUTIONS

1. Commuter Cash-out Programs
2. Transportation Demand Management Plans
3. Public Transit & Micro-Mobility Improvements
4. Park & Ride
5. Shared Parking Contracts

POLICY DESCRIPTION

Since commuters account for a significant part of parking demand, a commuter parking cash-out program could be the best solution to address the future parking shortage problem. Employers adopting a parking cash-out policy offer their employees an option to take a benefit of equivalent monetary value, such as cash and transit free pass, instead of providing subsidized parking. Given the robust alternative mobility options available, many employees are expected to switch from driving alone to using alternative modes. The cash-out program can meet the future parking demand by reducing commuter parking demand without giving up its sustainable transportation system.

To encourage employers to adopt a parking cash-out policy, requiring them to submit a Transportation Demand Management plan could be an effective option. However, since all stakeholders already recognize the value of sustainable solutions, providing additional incentives to choose alternative mobility options could provoke more effective, practical results.

For example, Fluorishford can invest in walking and cycling infrastructure improvements to make alternatives to driving more attractive.

The city can also subsidize car sharing, carpooling and bike sharing for employees choosing to cash out. For commuters lacking access to transit, the city can consider the development of a Park & Ride facility by building parking close to transit centers surrounding the downtown area. Furthermore, shared parking could be an efficient policy to meet peak demand without increasing parking supply. For example, the parking facilities of the university and offices are mainly used on the weekdays, while shoppers seek parking mainly on the weekends. With potential opportunities to meet different peak parking demands with under-utilized parking facilities, the municipality can encourage parking owners to make shared parking contracts.

CASE STUDY: ITHACA, NY

The Downtown Ithaca Alliance launched a comprehensive transportation benefits package program, Go Ithaca,[38] as a pilot program in 2016, based on the contract with the city of Ithaca. The program provides transportation benefits, discounts, and resources to employees, employers, and residents to support people in commuting in a sustainable way. The benefits include subsidized carshare, free transit pass, and free access to a carpooling network. The employers joining the program can gain the transportation benefits package they can provide to their employees. In return for the benefits, the employers are required to adopt at least one transportation/commuter benefit to their employees from the menu of options, including parking cash-out.

CITY D: TINYVILLE

BACKGROUND

Tinyville is a small affluent town mostly composed of suburban homeowners who commute to nearby larger cities for employment. The town has a small quaint downtown area that is popular among local and regional residents on the weekend.

Since bus service is infrequent due to low ridership, most residents depend on automobiles as their main transportation. While the town is very walkable, it still experiences traffic congestion during the weekend. On the other hand, the parking spaces of the few Tinyville office buildings sit empty on the weekends as they are exclusively provided for employees.

Local community leaders are passionate about reducing the town's greenhouse gas emissions and improving sustainability. They believe that even as a small town, Tinyville's residents should try to shift as many trips away from private vehicle use as possible. Increasingly, they are also concerned about the air pollution impact of the many weekend visitors.

SUGGESTED POLICY SOLUTIONS

1. Shared Parking Contracts
2. Public-Transit & Micro-Mobility Improvements
3. EV interventions

POLICY DESCRIPTION

Given the increased parking demand and underutilized business parking spaces on the weekends, shared parking contracts could be an efficient way to meet peak demand on the weekends without increasing parking supply. In this case, the spare business parking lots could be opened up to the general public during the weekends. To promote parking sharing, the city should act as a facilitator between different business interests and encourage the property owners to make shared parking contracts. Also, the city can promote sharing by providing benefits for shared parking. One example is relaxing the minimum parking requirements for the shared parking facility.

POLICY DESCRIPTION

To complement this policy, Tinyville could also invest in improving cycling and pedestrian infrastructure. Though shared parking contracts are a good option to make the most of limited parking space, some users may have to walk more from the shared parking facility to their destination. To mitigate the policy's negative impacts, the city can improve signage and support initiatives that enhance the pedestrian walkway experience infrastructure such as local art murals or greening the walkway. Also, given the small town size, improved cycling and pedestrian infrastructure should encourage more local residents to cycle and drive.

In addition, Tinyville should consider introducing EV infrastructure in its city center. Given the low frequency of the bus service, it will probably be challenging for residents to switch from driving to taking up alternative transportation use. In this regard, EVs can provide a more environmentally friendly option. To encourage residents and visitors to use EVs, the city can install EV chargers in public parking spaces and subsidize parking or EV charging. Also, if shared parking contracts improve the efficiency of parking management and results in excess parking space, these spaces can also be converted to EV-friendly parking infrastructure.

CASE STUDY: SAN BUENAVENTURA (VENTURA), CA

Ventura created a parking benefit district (PBD) to solve parking and traffic problems. Within the PBD, the zoning ordinance[39] permits shared parking between land uses with different peak parking demand periods for all on-site parking. Shared parking is allowed to satisfy 100% of the minimum parking requirement for each land use.

WHAT IS THE RIGHT SET OF REFORMS?

As this section hopefully demonstrates, the right set of policy solutions will vary across different munipalities. Every municipality faces different parking and transportation challenges shaped by their unique characteristics. Therefore, it is crucial to consider these factors before selecting the right set of parking policy solutions. We hope the illustrative examples described here provide some inspiration and guidance for municipal leaders and planners.

Note that the policy choices described here is only one part of an implementation roadmap (explained in the following section). Other implementation considerations will impact the feasibility and scope of parkign reform.

Section 4:

IMPLEMENTATION ROADMAP

Once the need for an active parking management plan and the possibilities of parking management interventions are made clearer to local leaders, the final planning consideration is to devise an implementation roadmap. Drawing on interviews with parking, mobility, and special projects' stakeholders across New York State and the country, this section of the report aims to guide local leadership in all steps associated with executing sound sustainable parking interventions within their communities.

Successful implementation of parking reforms is critical, because failure will only perpetuate some of the myths and preconceptions regarding parking supply and demand and of residents' preferred means of travel that already exist. Therefore, accurately defining the municipality's parking management strategy and building effective teams to carry out needed reforms is critical to success.

This section defines the key steps of a parking management implementation roadmap, listed in suggested chronological order of application. While not meant to be used as a one-size-fits-all solution, this roadmap offers a range of general considerations for local leadership and relevant stakeholders. Spanning the identification of desired reforms to the pinpointing of financial resources to securing stakeholder buy-in, these starting implementation tools are a useful addition to any municipality's parking management tool-kit.

STEP 1.
Commit to a Parking Management Plan

Creating substantive shifts in parking management is a long-term effort that does not occur overnight. Committing to a new parking management plan is an essential first step, demonstrating intent and initiating conversations with the community on what this means.

As noted in Section 1 of this report, most policy changes in parking management are initiated locally, which puts mayors' offices and other locally elected officials on the front line of reforms. While it may be clear to most that the benefits of parking and mobility interventions are significant, gaining public support from constituents and businesses can pose a real challenge. This may be particularly true for municipal residents who have come to rely heavily on subsidized parking.

A commitment to a new parking management plan can be an effective tool to bring together local leaders around a concerted, unified effort to improve the municipality's parking management issues. Such synergy is key to building the relationships, knowledge, financing, and overall momentum necessary to deliver a system that works for everyone.

STEP 2.
Identify Objectives and Co-Benefits

On top of helping the State achieve overarching carbon neutrality goals, parking management can also address many economic, social, and environmental health goals for the municipality. These include both direct parking management related objectives and wider co-benefits, such as:

1. Reducing congestion, traffic of which can be eliminated through efficient parking management.
2. Revenue generating for reinvestment into funding existing parking facilities, sustainable transit improvements, or other important projects.
3. Facility cost savings for the public and private sector as well as developers and consumers.
4. Alternatives to driving and service quality, to include micro-mobility options.
5. Increasing the walkability of public spaces and the wellbeing of citizens, thereby creating more livable communities.
6. Optimizing land use and reducing the cost of housing and business development, while also helping preserve green space and other valuable ecological resources.
7. Making facility location and design more flexible, as architects, designers and planners are provided more ways to address parking requirements.
8. Reducing stormwater management costs, water pollution, and heat island effects by way of reducing total pavement areas and incorporating greener design features.
9. Maximizing the use of parking areas for public parking and mixed use development.
10. Supporting equity objectives by improving travel options for residents without privately owned vehicles and through increased affordability for lower-income households.
11. Evaluating and meeting current and future parking needs efficiently.
12. Attracting new residents into the municipality.
13. Attracting new visitors through improved tourism accessibility.

Once local leaders, in consultation with the community, have agreed upon the ways in which parking reform can and should benefit its constituents, the path to effect those changes—to include the specific interventions needed to achieve goals—will appear much more navigable.
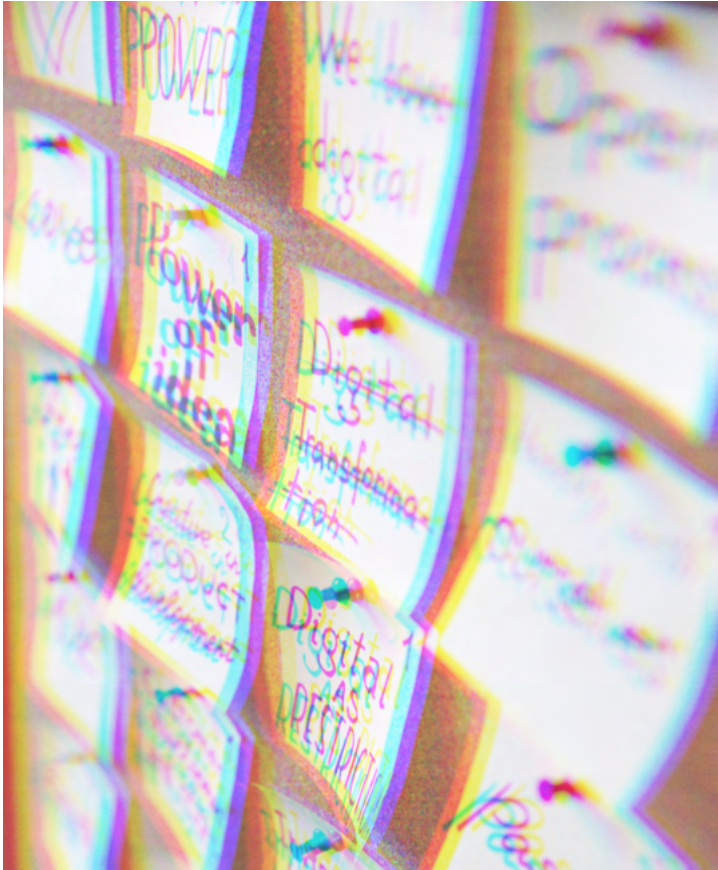
STEP 3.
Make the Case for Reforms

A solid foundation of both quantitative and qualitative supporting evidence for parking interventions is necessary to inform stakeholders of a locality's current parking and mobility trends, how desired reforms will help the community reach its broader goals, and to dispel any lingering misinformation or bias.

Such evidence-based information should be collected into a centrally located project library accessible to all parking management leaders and regularly updated with links to best practices, white papers, videos, talking points, and other tools. This trove of information can then be continually referred

to and relied upon as parking management leaders, newbies and veterans alike, move through their own versions of this roadmap. As we'll see in Step 8, many of these data-based considerations can and should be measured upon implementation of reforms to monitor and evaluate success and ensure that parking interventions are fulfilling their intended purpose. Within this library, localities can include several data-based considerations that support evidence for reforms:

1. Greenhouse Gas (GHG) and Congestion Inventory: A GHG emissions inventory is one of the first and most important steps in the local climate action process. [40]This local inventory is an accounting and analysis of all carbon dioxide-equivalent (CO_2e) emissions resulting from the day-to-day operations of municipal government. By evaluating how municipal-level CO_2e emissions from parking facilities, vehicle fleets, and public transportation systems contribute to the State's overall vehicle-related emissions, parking management leaders can set realistic goals and track progress toward reducing energy use and emissions. It will also help to pinpoint areas to focus efficiency efforts, such as through EV charging stations and shared parking networks. Particularly if not attempted previously, a GHG emission inventory may appear a daunting process for some localities. A helpful starting tool is New York State's regional GHG emissions inventory study which can help visualize the area's emissions by sector and source and identify appropriate emission targets.

2. Mobility Equity Analysis: In many cases, parking management does not adequately consider low-income and marginalized communities' access and affordability of existing mobility systems. To establish one that aims to benefit all constituents, NYS municipalities should work toward an intimate knowledge of the current mobility policy and investments—or lack thereof—prioritizing the needs of marginalized groups. Through an analysis surveying indicators such as affordability, accessibility, and safety of parking and mobility infrastructure; pollution levels and health outcomes; and economic opportunities between high- and low- income earners,[41] local leaders can better prioritize parking modes to address issues of historical discrimination while maximizing benefits for the entire local community.

3. Parking Space/Land Use Inventory: An inventory of existing public and private parking, to include block-by-block on-street and off-street spaces by type, will provide a better understanding of a municipality's existing parking situation. Inventoried areas may be categorized by parking space time limits, parking fees, restrictions, loading zones, popular business areas, enforcement trends, shared parking arrangements, and other relevant provisions that affect the use of the parking.[42] Throughout this process, parking management leaders may find it useful to survey the main users of the parking spaces (are they primarily used by employees, visitors, or commuters?). Facilities dedicated to specific uses, such as at a bank or an apartment complex, should also be noted to help facilitate analysis as to whether parking spaces can be shared with nearby facilities under the right conditions.

4. Parking Occupancy Survey: After a parking space inventory is prepared, it will be additionally useful to conduct a block-by-block parking space occupancy survey. This can be done using observable data from parking meters and surveillance cameras as well as hired help to determine the number of vehicles parked at any given time of day, to include peak periods of activity and daily turnover rates. Capturing the number of cars parked along each block-face and in off-street parking facilities at various times of the day will help a locality determine whether areas of town are experiencing an over- or under- supply of parking and the reasons for any imbalances. While a parking garage vacancy rate of 10 to 15 percent is common, consistently higher vacancy rates may be a sign of parking over-supply.

5. Agency Stakeholder Coordination: Parking management is a holistic endeavor requiring communication between a municipality's varied mobility and sustainability minded agencies to include the Parking Authority, Public Transportation, Planning, Zoning, and others. This coordination between agencies to achieve parking management solutions will therefore ensure that constituents are offered plenty of sustainable and reliable methods of travel to replace private vehicle ownership. Likewise, information regarding all inter-mobility considerations to include available EV charging, transit services and routes, micro-mobility options, street light technology, and important pedestrian connections relevant to the locality should also be collected, analyzed, and shared with stakeholders.

6. Landscape of Best Practices: Upon acquiring the full scope of emissions, equity, occupancy, land use, and mobility data for a given area, learning the best practices and deployment of tactics of other municipalities (many of which are provided in this text) can help contextualize solutions and provide interconnected ideas for achieving desired goals and co-benefits. Notably, this may also include anecdotal information, crucial to understanding the characteristics of every municipality as well as the parameters of their parking policies.

Within a centrally located project library accessible to all internal municipal stakeholders, parking management leaders can illustrate all of the above-mentioned supporting evidence elements through helpful communication tools such as talking points, graphics, maps, and case studies. This data may also be used to judge against evaluation benchmarks later in the implementation roadmap to ensure that parking policy interventions are fulfilling their intended purposes.

STEP 4.

Pinpoint Financial and Resource Limitations & Opportunities

Understanding average expenditures associated with various reforms' capital and operating costs—as well as their revenue generability—can help municipalities evaluate the best suited starting points for their parking management plan. For instance, while the installation of interventions such as demand-responsive smart meters, attendant fees for shared parking facilities, and satellite- or camera- based location tracking technologies may be expensive at the outset, these are highly enforceable and price adjustable systems with the potential to raise needed revenue for the municipality over time. On the other hand, interventions such as the reduction of street width requirements or the encouragement of commuter cash-out programs may not cost a municipality much at all to start, but typically won't facilitate the same kind of revenue generation.

Particularly in the wake of COVID-19 when many cities and towns are facing significant financial challenges, municipalities with very limited budgets may want to begin with parking management solutions with minimal upfront and operating costs. However, if funding sources and grants can be identified and collected, planners may look to more ambitious projects with bigger payoffs.

For these reasons, it is important for local leaders to recognize financial limitations as well as possible resources that can fill parking management gaps. These discoveries can be achieved through: (**1**) detailed financial models reflecting current parking costs and revenues, (**2**) ongoing revenue generation as a result of interventions, and (**3**) State, Federal, and private sector funding sources. As noted below, a locality has many opportunities in parking and mobility management for grant acquisition, tax-incentives, revenue raising, and private sector financing that do not negatively impact the municipal budget.

(**1**) **Financial Models:** To ascertain costs and revenues associated with parking management, two types of standard financial models are typically utilized, of which virtually all municipalities and their advisors will already have an intimate knowledge. While information included in these budgets and projections may span various hands and agencies, parking management leaders should work to centralize this data and share it amongst stakeholders for the most accurate estimates of costs and revenue generation of approaches. Certainly, all parking management financial models may receive assistance from municipalities' existing internal resources and financial advisors, where applicable.

- **Capital Program Development:** Development costs of parking reforms, including "hard" upfront costs and "soft" costs of implementation, are a first big hurdle for municipalities. The former may include fees associated with equipment purchase, installation, and construction, while implementation costs may entail program development, planning, and design; costs of clearances and approvals; or costs of soliciting and reviewing bids. A budget analysis of parking meter replacement with pay-and-display machines, for example, should take into

account the capital costs of acquiring and installing new equipment as well as costs associated with new signage and pavement markings.

- **Program Cash-Flow Model:** All parking programs, once developed, will have ongoing operational costs and revenue flows. A fiscal comparison of these inputs and outputs, best organized in parking management leaders' multi-year cash-flow statement, will provide an estimate of the net revenue that programs will generate. It can also help determine the changes in cost and revenue generation for reforms such as car sharing, reduced parking standards, a P3 app to incentivize public transit, and more, occurring over a period of years.

(**2**) **Revenue Generation:** Once pilot parking reform programs are launched, with proper planning, operating costs of upkeep and other required improvements over time may be largely funded through program revenue generation. These increased revenues are a key appeal for parking reforms and can also be distributed for investments in related mobility and development initiatives for the community. For example, demand-responsive metered parking may not only cover capital costs of the new machinery and upkeep the program itself, the continual revenue generation it collects can be put toward the municipality's maintenance of existing parking garages or for its green streets programs. Particularly in the wake of COVID-19, municipalities across the state will likely welcome steady revenue streams that can be invested back into the community.

(**3**) **State, Federal, and Private Sector Funding:** As for the work of lifting parking initiatives off the ground, Federal and State grants, tax incentives, and private sector opportunities are helpful resources to tap into once specific costs and revenues associated with parking reforms are clear. Below, find a starting point of considerations to suit and expand any New York-based locality's parking management portfolio:

- **Federal Funding:** For many decades, the Federal Value Pricing Pilot Program (VPPP) allocated millions in federal grants to various congestion-related pricing programs in the United States. California's GoBerkeley and SFpark programs, as well as New York City's DriveSmart and ParkSmart

programs are all previous recipients of VPPP fundings for initial capital parking management investments. Since 2012, no direct grant funds have been authorized to municipalities; however, in its place, the 2015 Fixing America's Surface Transportation Act (FAST ACT), signed by former President Obama, is a potential federal funding source from which municipalities across the country may pull. Specifically, the Advanced Transportation and Congestion Management Technologies Deployment (ATCMTD) grants established under the FAST Act invest in programs that incorporate advanced transportation and congestion management technologies into their mobility and parking management plans to reduce congestion and improve mobility.[43] In 2020, $60 million in total grant money was authorized under ATCMTD.

CASE STUDY: SAN FRANCISCO & BERKELEY, CA

SFpark and goBerkeley are demand-responsive "smart parking" programs, which adjust their meter and garage pricing throughout the day in order to meet demand. This demand-responsive pricing framework incentivizes drivers to park in underused off- and on-street parking spaces, thereby freeing up parking spaces throughout the city and reducing congestion. While initial investments for SFpark and goBerkeley were made possible via the VPPP, the program's operations costs are paid for and maintained by SFpark and goBerkeley's revenues. Through funding from the VPPP, "smart meters" for on-street parking were installed throughout San Francisco and Berkeley, allowing the city's transportation agencies to control meter price settings by way of a controlled network rather than manually changing meter settings every time. These "smart meters" were also used to actively track the demand for on-street parking across the city and to adjust rates throughout the day (ranging from $1-$8/hr for San Francisco, and $1-4/hr for Berkeley). The revenue generated was recycled back into the municipalities' respective programs to ensure that all meters remain high functioning and up to date.

- **Opportunity Zone Funding and Tax Incentives:** Offered through the Tax Cuts and Job Acts of 2017, Opportunity Zone (OZ) initiatives are another parking management resource, particularly useful for localities aiming to attract more long-term private investments into low-income areas. Localities can apply for and use OZ resources for parking reforms in lower-income neighborhoods to entice more business development and job creation in the area while simultaneously addressing equity concerns related to mobility.[44] New York State is an active participant of the Opportunity Zone community development program, with over 514 approved and designated tracts eligible to receive OZ funding and state- and federal- level tax incentives.[45] Individuals and corporations may apply to receive these OZ incentives for parking program development so long as positive and sustainable economic results are demonstrable.

- **State-level funding:** As for New York State funding sources, several avenues support municipalities' parking management projects to make communities more sustainable, walkable, and equitable. Below, find a sampling of the resources available across various NYS agencies for which parking management leaders may apply:

  - **The New York Power Authority (NYPA)'s "Smart City" Grants:** NYPA will provide up to $360,000 in "Smart Cities" grants annually for municipal projects that invest in energy efficient technologies to elevate the sustainability and quality of life of communities. Such projects may include real-time parking management and smart street lighting controls.

  - **NYSERDA's Charge Ready NY Grants:** NYSERDA provides $4,000 per installed electric vehicle (EV) charging port for installation of qualified Level 2 EV charging equipment. These ports may be installed at public or private locations that provide utility, workplace, or multi-unit dwelling (MUD) charging stations.

  - **NYS Department of Environmental Conservation's Office of Environmental Justice (OEJ) Grants:** OEJ offers competitive grants to support and empower communities as they develop and implement solutions to address environmental issues and health hazards. This may include projects that help build community consensus and improve public outreach and education.

  - **NYS Department of Environmental Conservation's Municipal Zero-emission Vehicle (ZEV) Rebate and Infrastructure Grants:** The Municipal ZEV Rebate provides rebates to municipalities of any size to purchase or lease eligible new zero-emission vehicles for fleet use.

  - **NYS Department of Environmental Conservation's "Climate Smart" Communities Grants:** The program provides 50/50 matching grants to any NYS municipality for eligible climate mitigation and adaptation projects. Funds are available in two project categories: implementation projects related to the reduction of greenhouse gas emissions outside the power sector (transportation, methane, and refrigerants), and climate change adaptation projects.

  - **NYS Parks and Recreation's Consolidated Funding Application (CFA):** Funds are available for municipal parks, historic preservation, and "complete streets" projects, with a maximum award of $600,000.

  - **NYSERDA's "NY Prize" Grant:** Prize money of up to $100,000 is available to localities working to modernize New York State's electric grid, to include improvement of the Amtrak microgrid. These grants are eligible to communities that reduce costs, promote clean energy, and build reliability and resiliency into the grid.

- In addition to traditional state and federal funding sources, **public-private-partnerships (P3s)** are another potential mechanism for municipalities to employ a range of innovative parking and mobility services. Parking management partnerships with the private sector may be for programs including car- and bicycle-sharing networks, trip-planning apps, and cash-out policies that residents can flexibly and conveniently use at a range of prices.

In the case of parking cash-out policies, an employer can provide employees the choice to keep a parking space at work or to accept a cash payment and relinquish the parking space. These policies are helpful for not only reducing congestion and emissions, but also for incentivizing new modes of locality transportation. The U.S. Environmental Protection Agency (EPA) and the Department of Transportation (DOT)'s voluntary National Standard of Excellence for employer-provided commuter benefits [46] aims to incentivize these cash-out policies to provide further taxable income for a community, leading to increased tax revenue and potential additional revenues for the parking management program.[47]

STEP 5.
Select Sound Solutions

Once a municipality's data is gathered and financial constraints and possibilities for revenue generation recognized, it's time to refer back to the earlier identified goals that local leadership aims to effect through parking management and the menu of interventions laid out in Section 2 of this report. Becoming familiar with the full menu of parking management strategies available and the benefits they provide is critical in selecting the most appropriate solutions for a given community.

If, for instance, the reduction of traffic congestion and pollution is a primary goal, discovered through the community's latest GHG inventory, local leaders may want to consider incorporating demand-responsive parking pricing meters, improving public transportation and micro-mobility options throughout the area, setting up a park-and-ride facility on the outskirts of town, or unbundling parking costs. On the other hand, if equity concerns are primary and leaders are eager to lower property development costs—and therefore housing rents and associated fees—the municipality may want to pose reforms such as the reduction or elimination of residential parking minimums, maximization of parking caps, or development of shared parking contracts throughout the area.

The key is to intimately understand the need for and goals associated with reforms—as laid out in Section 2—and the municipality's ability to gather the resources necessary to lift them off the ground. Certainly, selected parking solutions should be coordinated with a community's overall strategic vision in mind. While there may be several possible solutions to a parking problem, some may support strategic objectives while others contradict them. For example, both increased taxation on parking and cash-out programs can address parking congestion problems; however, one approach better supports a community planning objective of greater alternative travel mode usage. A strategic, holistic vision and solution selection strategy is often best achieved through consultation with other public officials, followed by the wider public.

Once parking management strategies and their benefits are well understood, bringing internal and external stakeholders into the decision-making process is critical to moving the community towards a re-imagination of parking management.

STEP 6.

Acquire Stakeholder Buy-In

Stakeholder engagement and buy-in is a critical step to parking policy implementation as inter-agency and inter-community allies and their synergistic activities are critical to influencing policy.

As seen in Section 3 of this report, parking management reforms are holistic in nature and span many areas of responsibilities and expertise to include those overseen by the municipality's parking authority, zoning department, transportation demand management, mobility planning organization, mayor's office, sustainability team, and more. Within these agencies, some policymakers may view holistic and proactive parking arrangements as a loss of jurisdictional capacity and push back against proposed interventions. However, with inspired leadership from the mayor's office and ample community outreach to business owners, landowners, employees, residents, and developers, among others, the benefits of a coordinated parking management plan will speak for themselves.

Once relationships and networks across varied government departments are established and championed by a unifying force, preferably in the mayor's office, city council, or another prominent stakeholder in the community, the next practical step is to map out engagement with community and business stakeholders.

Parking reform can be a sensitive topic, particularly for business owners associating sales revenue with parking accessibility outside their doors, commuters wary of riding public transit for fear of arriving to the office late, or residents and visitors who prefer on-street parking close by the businesses they frequent. For these reasons, key targeted audiences for engagement of parking management must include:

1. Individual businesses and their districts, associations, and lobby groups
2. Private and public sector employers
3. Constituent groups (across all demographics and geographies) and their respective associations

Upon identifying target audiences, parking management leaders may begin to have honest and open discourse with stakeholders regarding the consequences of reforms, harkening back to the supporting evidence collected for reforms in Step 3 of the Implementation Roadmap. As purported by several parking and mobility experts we have spoken with across the country, the best avenues to influence stakeholders will be through: (**1**) surveying their needs, (**2**) clearly explaining incentives of desired initiatives with related data points, and (**3**) repeatedly engaging with targeted audiences to address concerns and communicate why policy changes are necessary.

It may also be a helpful practice to distribute educational materials highlighting informative statistics and stories supporting the parking intervention in question. Reasons and effects of reforms can also be presented at the municipality's town hall meetings, through municipality newsletters, and in articles and opinion editorials placed within the city's local paper. More on parking management communication strategy can be found in Step 7.

CASE STUDY: COPENHAGEN, DENMARK

Copenhagen was met with fierce opposition when it first pedestrianized its streets. Until 1962, all streets and squares of Copenhagen had been used for vehicle traffic and parking. Businesses feared that eliminating parking space minimums would therefore reduce the number of shoppers frequenting their businesses. However, the opposite happened. Pedestrianization of Denmark's 1.15 km-long main downtown boulevard facilitated a traffic-free environment which incentivized greater walkability and development of more pedestrian spaces in the city, resulting in increased financial revenue for businesses. Overall increase in stopping and staying activities in Denmark has increased by 400% from 1968 to 1996.[48]

STEP 7.
Development of Parking Management Organizational Infrastructure and Terms

As a community's stakeholders are enlisted to the effort of parking management, it helps to get organized and build mutually beneficial infrastructure and terms to facilitate the process and regulation of parking management reforms. This organization will vary for the unique needs and agency composition of localities. However, for many, the development of a parking benefit district (PBD), similar in functionality to a business improvement district
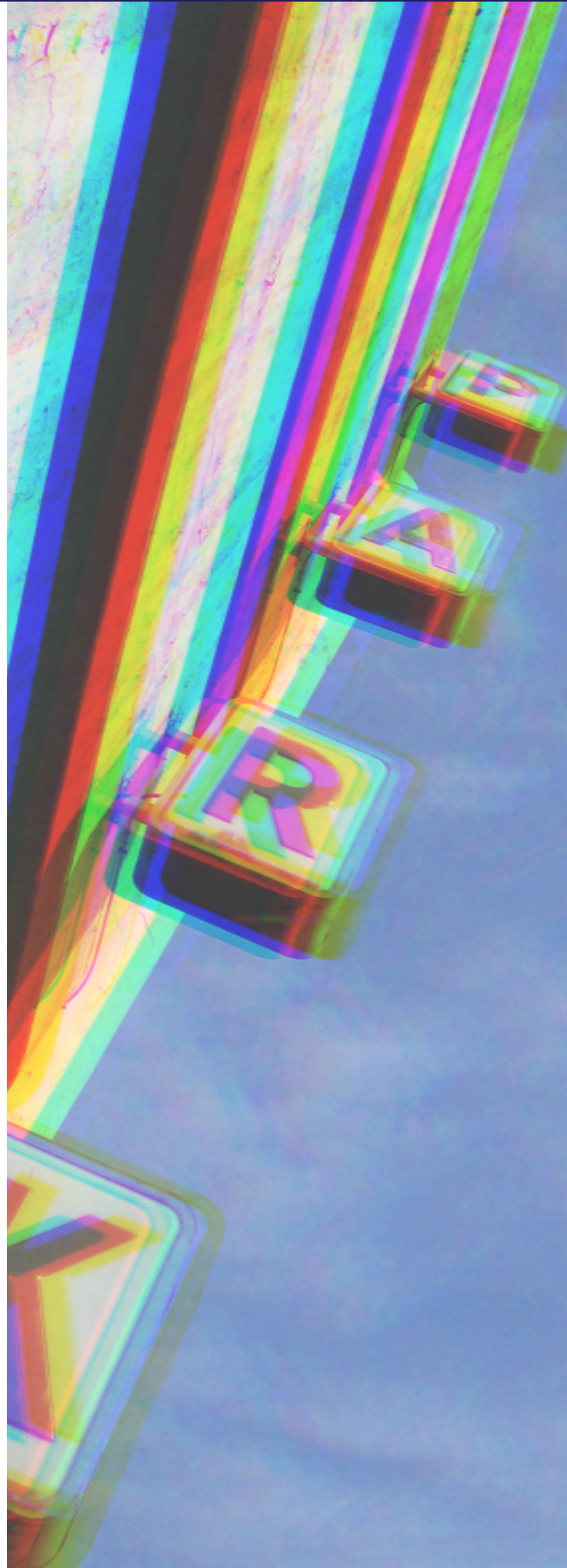
(BID) of which many local leaders may already be familiar, is a key tool to execute parking interventions in a holistic manner and reap shared benefits.

Throughout the United States, PBD ordinances have not only provided additional sources of funding for public and transportation-related improvements, they've also increased sales tax revenue and reduced traffic congestion through improved management and maintenance.[49] Particularly as local governments pinpoint sources of funding amidst the COVID-19 pandemic, they may want to consider organizing as a PBD. PBDs have a variety of management structures, ranging from public to private sector management, or can include public-private hybrid models with entities such as municipalities, development authorities, and business improvement districts.

Within PBDs, revenues from parking management initiatives such as meters, app membership fees, and residential parking permits are pooled within the district to cover the costs of parking management and to invest in continued land use improvements such as green space planting, sidewalk and street repair, and street lighting. The development of such districts begins with the involvement of key stakeholders (e.g. inter-agency representatives, businesses, developers, land owners, and residents) deciding on the parking and mobility projects to be jointly funded and players' management responsibilities. These ordinances will typically require a legally binding agreement and administrative permits approved by the local governing body.

PBDs can also allow for pooled resources to cover the costs of shared parking networks between public and private entities, including low-cost sensors and parking management software that tracks parking spaces in real time. To obtain a shared parking network permit, a signed agreement between property owner(s) of the off-street parking spaces must be submitted to the benefit district as a third-party beneficiary. Should a municipality's zoning codes not allow for shared parking, the city may still permit it through a special use permit upon satisfaction of certain criteria.

CASE STUDY: SACRAMENTO, CA

When the new Sacramento Railyards soccer stadium (35,000 capacity) was built, rather than undertaking a new parking lot dedicated exclusively to stadium users, developers turned to nearby parking lots. Recognizing that these garages were already able to accommodate the 35,000 stadium visitors, they made connections for a shared parking network of publicly owned and largely underused parking lots in the block-by-block vicinity. This decision was supported by the City of Sacramento's move to remove minimum parking requirements for the Central Business and Arts & Entertainment District in 2012. [50]

STEP 8.
Communicate the Need, Goals, and Plan!

Once the organizational tools necessary to achieve reforms are agreed upon by stakeholders, parking management leaders must communicate the need, goals, and corresponding plan for interventions to the public.

As was the case when first engaging inter-agency stakeholders, parking solutions are most effective when framed as an added convenience and benefit to constituents and the general public. Therefore, the development of a positive and cohesive parking management communication plan should be one that pulls evidence points from the database built in Step 3 of the Implementation Roadmap and focuses messaging in a way that clearly speaks to constituents' needs. To this end, municipal public affairs and communications teams can help pull together compelling and strategic messaging campaigns for external audiences. Additional strategy building efforts such as polling and focus groups can achieve even deeper insights into the psychology behind parking in a given locality and shed light on the type of evidence-based messaging that will best influence constituents' opinions. [51]

An example of perceptions that may hinder use of alternative modes to transportation is the notion that public transportation is beneath one's economic means or is unsafe. How can communicators design campaigns that shift the culture around negative mindsets toward alternative transit and begin to normalize the use of public- and shared- mobility solutions?

Because people often react emotionally to a reduction of mobility options, it's critical that parking policy solutions are presented as "replacement" and "improvement" interventions. For example, local leaders can communicate that variable pricing revenues will be used to fund wider transport improvements and allow for quicker travel times for commuters and business deliveries alike. By focusing on perks of alternative modes of transit that provoke a greater emotional appeal to audiences (i.e. reduced congestion on early morning commutes rather than a city's overall reduction of emissions), local leaders will likely achieve greater support for reforms.

Once effective descriptions of reforms are agreed upon by parking management leaders, plans can be shared with the community through various modes of communication. These may include ad campaigns posted throughout social media, public transit stops, and billboards; in-person and radio interviews with the local media, opinion pieces and open letters in the local paper and city newsletters; educational pamphlets printed and shared with residents through local businesses and multi-housing developments, as well as through simple word-to-mouth communication.

Effective communication of parking management also includes making the routes, rules, and pricing information around parking and mobility management as clear as possible to residents and visitors.

This can be achieved through clearly designed and placed LED signage that reduces confusion and frustration for drivers, public transit rides, and pedestrians alike. By partnering with the municipality's business associations, public and private facilities, and other cultural institutions to improve street signs and other mobility related information, local leaders can improve the psychological effect of travelers, making them feel more at ease and in control of the town's parking management situation.

Changing people's behavior, habits, perceptions in order to effect more convenient and accessible parking and mobility solutions is not an easy task; however, with a little bit of prior planning and design-based thinking, it's an achievable—and worthy—one!

CASE STUDY: CHICAGO, IL

Chicago's "Ride On" campaign provides an example of an effective education campaign in a very large transit market. The regional transit system of Chicago is the nation's third largest, with ridership of more than two million people each day on bus and rail services in six counties. However, the Chicago region is also the nation's third-most congested. This is partially attributable to low rates of transit usage by young adults in the Chicago area.
In January 2015, Chicago's Regional Transportation Authority (RTA), in conjunction with the Chicago Transit Authority (CTA), and Metro and Pace Suburban Bus launched a multi-disciplinary "Ride On" campaign to increase awareness and ridership of public transportation in the Chicago region. The campaign draws on constituents' emotional response, reminding commuters of the compelling reasons to opt for public transportation, such as saved income from parking fees to reduced traffic to increased ability to multitask-ability while traveling.[52]
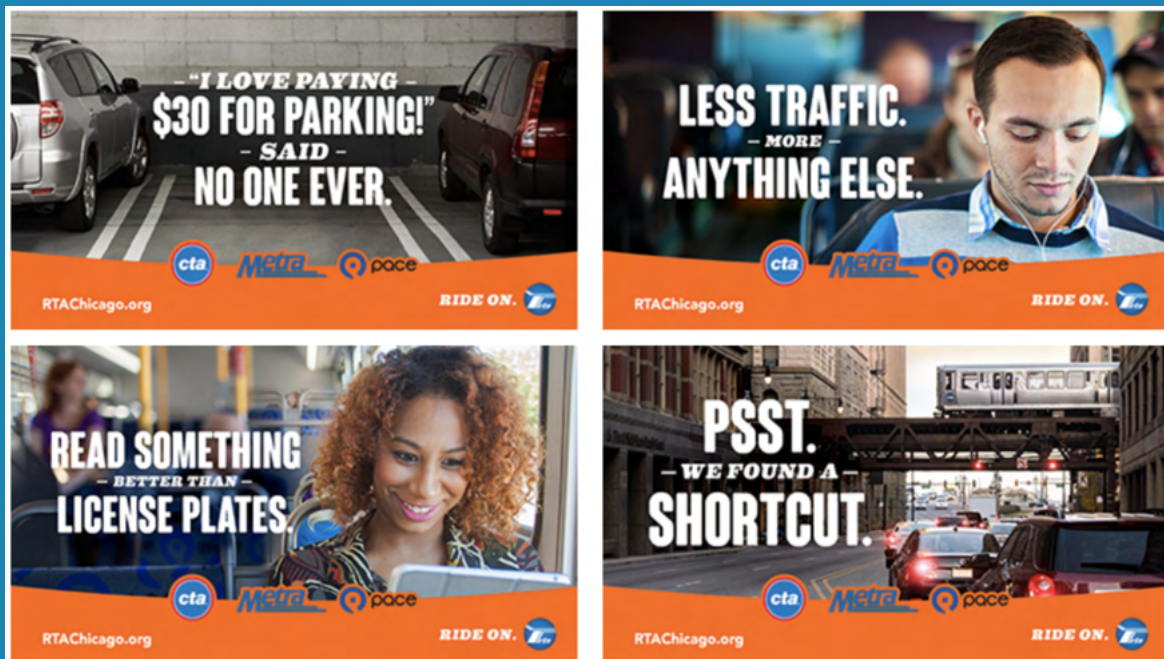
STEP 9.

Monitor & Calculate Metrics of Success

The effectiveness of parking interventions is fundamental to their continued support and investment. Therefore, parking management leaders must continually monitor and assess the impacts of implemented reforms in order to judge system-wide performance and communicate their effects to stakeholders. More importantly, parking management leaders should aim to ensure that interventions are meeting the core objectives laid out in Step 2. Assessing parking management programs by way of benchmarks of success will help support continual fine-tuning of programs and to dispel misguided anecdotal accounts of program results.

There are a number of ways in which parking reform successes can be monitored and measured over time:

1. Reduced emission levels: Declining GHG emission levels are an important indicator of successfully executed parking interventions. Local-level GHG inventories, continually and reliably conducted before and after parking reforms, can help estimate associated emissions and air pollution reductions tied to parking management interventions of the time frames of interest.

2. Reduced congestion and peak-period traffic: A reduction in congestion and peak-period vehicle traffic speeds may indicate that associated cruising levels related to drivers circling the block for available parking is also in decline. As reductions in vehicle congestion and emissions is the overarching State-level goal for parking reforms, progress supporting these aims should be deemed fundamentally successful.

3. Reduced Vehicle Miles Traveled (VMT): A short-term outcome of parking measures that successfully disincentivizes driving may be a decrease in overall VMT for

the municipality. This metric may be monitored and evaluated through record and assessment of tax revenues associated with a municipality's VMT tax, if applicable. A decrease in overall VMT tax revenue likely indicates that constituents are driving private vehicles less and traveling more through other public, shared, and micro-mobility alternatives.

4. Higher usage rates of existing parking infrastructure: Higher overall parking space usage may indicate that a municipality's existing parking spaces are being occupied more optimally and that the area's parking supply better reflects its parking demand. An increase of monthly parkers in off-street lots may also be a sign that casual on-street parking is being allocated for short-term visitors while longer-term travel needs have been effectively rerouted to off-street parking lots.

5. Increase of shared- and micro- mobility users as well as public transit users: The increase of shared, micro-mobility, and public transit users across the municipality, tracked by the local transportation demand office, may indicate that constituents have become more accustomed to alternative modes of travel. An uptake may also be an indicator that public, shared, and micro-mobility modes have become more accessible and convenient for residents to use.

6. EV chargeability of the municipality: Growing EV chargeability and EV station usage throughout municipalities, particularly within multi-unit developments and private and public sector workplaces may be a sign of increased EV accessibility and EV vehicle investment as a whole. Such trends will likely also be reflected in a reduction of the locality's GHG emission inventory.

7. Reduced number of parking spaces in new Mixed-Use Development (MUD) projects: If unbundling policies were introduced in the municipality, a decline in overall parking land-use inventory may indicate that local residents forwent vehicle ownership in favor of alternative modes of travel. This benchmark should be evaluated against average rent prices across communities in question, which should also be reduced as parking fees are unbundled from housing costs.

8. Municipality-wide parking space reduction and redevelopment: Removing residential and commercial minimum parking requirements is key to preventing parking over-supply in municipalities. Once parking minimums are reduced or eliminated and garages and facilities are redeveloped for other purposes, many municipalities' existing supply of parking will still be ample in serving the municipalities' needs. Thus, an overall reduction in parking spaces included in new developments could suggest more effective usage of existing parking spaces and of shared parking networks.

9. Equity improvements throughout the municipality: Existing demographic data can help parking management leaders map census tracts based upon income, education, race, linguistic isolation, and age, which should then be used to ensure parking reforms are making the community more equitable over time. Through the Environmental Justice Screening and Mapping tool (EJ SCREEN) developed by the U.S. Environmental Protection Agency (EPA), policymakers can study area-specific indicators spanning air quality, traffic proximity and volume, income levels, and walkability of neighborhoods in order to continually track and analyze vulnerable community centers.[53]

Parking intervention outcomes will manifest across the municipality gradually over time, making it critical for leaders to measure progress continually. If desired outcomes are not observed immediately, this does not necessarily indicate failing reforms, but rather that trends should be studied further to determine true cause-and-effect relationships. In addition to the above-mentioned success measurements, local leaders should continue communicating the wide-ranging goals and positive results of parking interventions with all affected groups while receiving and analyzing feedback as often as feasible. This constant flow of information will help ensure long-term improvement and success of programs.

STEP 10.

Stay Flexible &
Plan for the Unexpected

Even with a comprehensive parking management strategy, policymakers will run into unanticipated issues that force them to adapt to new and changing situations. The global pandemic of 2020 was such an unanticipated event that virtually no municipality was prepared for. This public health crisis resulted in critical reductions in tourism, ushered in a transformed working environment, and led the international community into an economic recession. At the micro-scale, it also greatly impacted municipalities' budgets, thereby stunting parking management efforts.

In the case of New York City, alternate side parking regulations were suspended in the wake of COVID-19 to accommodate medical emergencies, resulting in long-term street parking.[54] Many cities have also suspended parking meters,[55] and in most cases, parking revenue remains at an all time low. In San Francisco, SFpark program revenue is 75% lower than it was pre-COVID-19.

The pandemic has also popularized a "take-out" and "dasher" culture. Accommodating these short-term parking trends will be a new challenge for municipalities in the coming years. With the number of essential workers across industries also significantly reduced, parking enforcement has become a delicate issue for many local leaders.

Furthermore, public health concerns have increased private vehicle usage. Young consumers that once relied on public transportation are now moving out of cities into the suburbs and purchasing private vehicles for the first time.[56] All of these shifting patterns require flexibility in parking management and policymaking to accommodate for the as yet undetermined long-term consequences of the global pandemic.

Unanticipated events provide an important lesson for everyone to stay flexible and come as prepared as possible.

Remembering that no municipality operates on an island is also helpful. Chances are that others are facing similar issues. Simple steps such as communicating with nearby cities and towns to hear their best practices and insights may be the breakthrough needed to successfully overcome the unexpected.

STEP 11.

Reiterate Road-Map
From Step 2

The Implementation Roadmap's destination is now reached, and yet the journey is never ending. With the continued dedication, attention, and assessment of programs by local stakeholders, there will always be opportunities to continue improving upon an existing parking management system. As parking and mobility trends and associated local and State-level objectives evolve over time, leaders may find it useful to continually revisit steps here and Sections throughout this report to ensure mission success.

Annex I:

LINKS TO ADDITIONAL POLICY SOLUTION RESOURCES

Supply Responses

Residential/Commercial Parking Minimum Elimination

- **The Pseudoscience of Parking Requirements, 2020 (Donald Shoup, Zoning Practice)**
- **People Over Parking, 2018 (American Planning Association)**
- **The Trouble With Minimum Parking Requirements, 1999 (Donald Shoup, Transport Research)**
- **Minimizing Parking and Maximizing City, 2010 (Institute for Transport and Development Policy)**
- **Repealing Minimum Parking Requirements in Buffalo, 2017 (Daniel Hess, Journal of Urbanism)**
- **Minimum Parking Requirements and Housing Affordability in NYC, 2011 (Furman Center)**
- **From Minimum to Maximum: Impact of the London Parking Reform on Residential Parking Supply from 2004 to 2010, 2012 (Zan Guo and Shuai Ren, Urban Studies)**

Maximum Parking Caps

- **Limiting Parking Supply, 2010 (Kit Un, Metropolitan Area Planning Council)**
- **There's No Such Thing as Free Parking, 2015 (Tom Vanderbilt, Slate)**

Reducing Street Width Requirements

- **Amnesty or Necessity? Street Standards as Parking Policy, 2012 (Zhan Guo et al., Mineta Transportation Institute)**

Repurposing Existing Structures

- **Parking Structure Design Trends (Nathan Walsman, Schaefer)**
- **From Bars To Pod Homes; How Underused Car Parks Are Being Transformed, 2019 (Gareth Rees, The Guardian)**
- **10 Ideas For Repurposing City Car Parks, 2019 (The Agility Effect)**
- **Neglected Parking Garages Are Being Given New Purpose, 2019 (David Kidd, Government Technology**

Transportation Demand Management Plans

- **San Francisco Transportation Demand Management Program**
- **Cambridge Transportation Demand Management Program**
- **Boston University TDM Offer to Employees**
- **Seattle Commute Trip Reduction Program**

Unbundling Parking Costs

- **Contemporary Approaches to Parking Pricing (US DOT Federal Highway Admin)**
- **Unbundling Parking Costs Is a Top Way to Promote Transportation Options, 2018 (Mobility Lab)**
- **Unbundled Residential Parking (Washington State Department of Transportation)**

Intermediate Responses

Electric Vehicle (EVs) Interventions

- **Qualified Charging Equipment and Networks (NYSERDA)**
- **6 Innovations That Are Powering the Rollout of Electric Vehicles, 2019 (Bloomberg Cities)**
- **Electric Revolution: How Are Cities Overcoming EV Range Anxiety, 2019 (Chris Teals, Smart Cities Drive)**
- **City of Rochester Electric Vehicle Charging Stations**
- **How To Drive Electric Vehicle Uptake In Your City, 2019 (C40 Knowledge)**

Green Street Programs

- **Green Infrastructure Toolkit (Georgetown Climate Center)**
- **Kingston, NY Midtown Parking Lots Green Infrastructure Upgrade**

Park and Ride

- **Park and Ride System: Is it Defining Better Future For Urban Commuters, 2020 (Shailendra Sinhasane, Mobisoft)**
- **NYC Park & Ride Study, 2012 (Rensselaer)**

Shared Parking Contracts

- **Creating a Parking District (Minneapolis Metro Transit)**

Demand Responses

Commuter Cash-Out Programs

- **Parking Cash Out: Implementing Commuter Benefits as One of the Nation's Best Workplaces for Commuters, 2005 (US EPA)**
- **Transportation Benefits of Parking Cash-Out, 2017 (Greenberg et al., Portland State University)**

Demand-Responsive Parking Pricing

- **Parking and the City, 2018 (Donald Shoup)**
- **goBerkley Pilot Program, 2014 (City of Berkley)**

Public Transit and Micro-Mobility Improvements

- **Planning and Policy Models for Pedestrian and Bicycle Friendly Communities in NY State, 2007 (University of Albany)**
- **NY State Transportation Alternatives Program Projects**

Residential Parking Permits

- **Market-Based Rates for Residential Parking Permits (Planning and Development in Vancouver)**

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