Policy Implementation Platform

Zero Emission Delivery City Climate Innovation Challenge

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Acknowledgements

The Los Angeles Cleantech Incubator (LACI) - in partnership with Climate Mayors, and C40 - developed the Zero Emissions Delivery (ZED) City Climate Innovation Challenge to spur the move to zero emissions delivery by piloting startup and private sector solutions among a national multi-city cohort committed to advancing transformative climate solutions. The cities selected to participate represent a diversity of geographies and a critical mass of populations across the U.S. They demonstrate the opportunity and willingness to create innovation “sandboxes,” where business models, pilot designs, and policies can be tested in different-sized cities, regulatory environments and political climates related to zero emissions delivery.

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PURPOSE AND OVERVIEW

Cities around the country are adopting zero emissions delivery (ZED) pilots to address challenges associated with last-mile delivery pollution and congestion.

This platform identifies policies and other levers that the public sector can use to shape the design of their ZED pilots, expand their impact, and help drive toward specific outcomes. Beyond the pilot use case, these policies and levers can make pilots more permanent, and scale them into sustainable programs that address broader geographies.

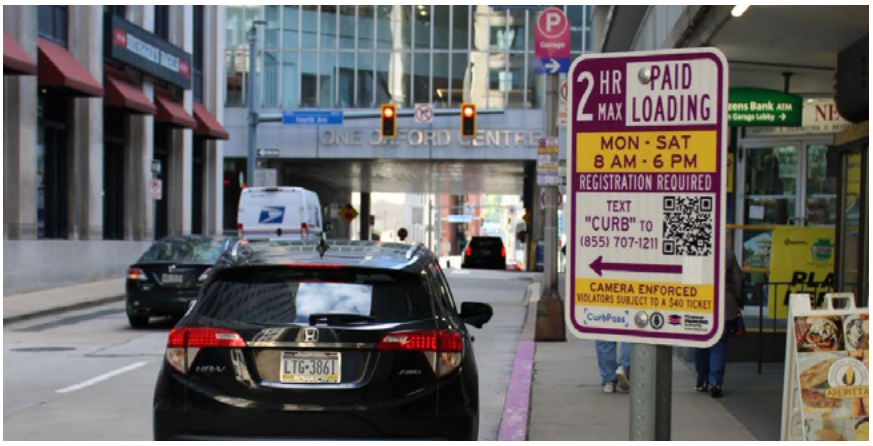
The platform is designed to be a component of the ZED Business and Policy Model toolkit, established through the LACI ZED City Climate Innovation Challenge cohort of cities. Participating cities are designing and implementing ZED pilots, which fall into one of the following four pilot types - Micro-freight Solutions, Zone & Curb Management Programs, Microdelivery Hubs & Delivery Efficiency, and Medium-Duty Vehicle Electrification. The platform is organized around these pilot types to demonstrate the efficacy of specific policies and levers toward achieving the outcomes and goals associated with each pilot type.

The platform also works to reinforce the overarching goals established through the LACI cohort:

- **Emission Reduction:** Greenhouse Gas (GHG) and carbon emissions reductions in participating cohort cities.
- **Fleet Transition:** Private sector transitions fleet to zero emissions vehicles.
- **Effective Communications:** Messaging to the community effectively communicates the benefits of ZED, without exclusively relying on carbon emissions and climate considerations.
- **Business Strength:** Sound business opportunities and business model foundations are a foundation of strong and lasting ZED public-private partnerships.

The platform is designed to assist the cities as they seek to support their pilots through policy means and bridge the transition to more permanent programs if proven successful. The platform is also intended to provide general guidance for cities outside of the cohort looking to test policies in the design and implementation of their own ZED pilots, in addition to understanding ways to create a policy environment friendly to ZED business models and partnerships.

The list of policies and levers identified in this platform are not intended to be an exhaustive list. Instead, it should be referenced as a menu of options to potentially leverage in support of these specific ZED pilot types. The LACI cohort represents many of U.S. cities' best practices for ZED pilots and programs, which should provide insightful lessons to other cities seeking to make progress on their own ZED goals.



Source: City of Pittsburgh

CONTEXT & LANDSCAPE ASSESSMENT

ZED CITY CLIMATE INNOVATION COHORT PILOT TYPOLOGY

There are a diverse range of approaches that a city can take when building their ZED pilot, which they will ultimately design based on their unique priorities and ZED goals. Cities participating in the LACI cohort are developing and implementing pilots which fall into one of four pilot types:

Microfreight Solutions

Pilots designed to encourage delivery companies and drivers to adopt lightweight, microfreight and zero emissions vehicles for last mile delivery.

Zone & Curb Management Programs

Pilots focused on restricting curb access in the interest of improving safety, reducing idling and emissions, and improving efficiencies at the curb.

Medium Duty Vehicle Electrification

Pilots developing and incentivizing infrastructure deployment to support microhubs and shorten delivery distance to reduce emissions and vehicle miles traveled.

Microdelivery Hubs & Delivery Efficiency

Pilots focused on building the infrastructure necessary to facilitate the transition from internal combustion engine (ICE) medium duty vehicles to zero emissions delivery vehicles.

This platform is organized around these pilot types in order to help cohort and non-cohort cities understand the applicable policy strategies that may support their specific ZED pilots. This section elaborates on each pilot type, with case study examples from the cohort cities.

MICROFREIGHT SOLUTIONS

Microfreight Solution pilots establish the necessary infrastructure and networks for commercial enterprises to transition their traditional ICE delivery vehicles to zero emissions vehicles. These pilots might include a rebate and/or giveaway for zero emissions vehicles, or production of supportive infrastructure, including charging stations, bike lanes, and zero emissions vehicle lanes.

Washington, D.C. is developing two separate pilots, both of which leverage microfreight solutions:

- Test electric micro-freight vehicles and delivery microhubs to replace truck drivers in a designated area.
- Transition food delivery drivers from gas mopeds to electric low-speed vehicle alternatives (e.g. e-bikes).

ZONE & CURB MANAGEMENT

Zone & Curb Management pilots regulate curb usage to encourage the use of zero emissions vehicles, or to reduce congestion and delivery inefficiencies. Three cities in the cohort are implementing Zone and Curb Management Pilots:

Pittsburgh, PA* is deploying Smart Loading Zones (SLZ) to manage curb space, increase delivery efficiency, and decrease congestion and emissions.

Santa Monica, CA* created dedicated zero emissions vehicle loading zones in a one-square-mile pilot area. Parking spaces were marked by signage and monitored by video cameras.

Miami-Dade County, FL* will deploy SLZs, using automated enforcement through automated license plate reader (ALPR) technology. The initiative seeks to incentivize the use of zero emissions vehicles at SLZs in Miami.

MICRODELIVERY HUBS & DELIVERY EFFICIENCY

Microdelivery Hub & Delivery Efficiency pilots are focused on last-mile deliveries, and leverage localized delivery logistics sites and other technologies to transition last-mile delivery vehicles from ICE to zero emissions vehicles (ZEVs). Two cities in the cohort are implementing Microdelivery Hubs & Delivery Efficiency pilots:

Portland, OR will deploy a microhub to facilitate the transition from large box trucks to zero emissions cargo vans and e-cargo trikes, serving the densest part of the city.

New York, NY* will provide convenient, secure, and efficient package delivery services to reduce package theft and delivery truck trips. The initiative seeks to reduce GHG emissions, package theft, and congestion.

MEDIUM-DUTY VEHICLE ELECTRIFICATION

Medium Duty Vehicle Electrification pilots are an effort to build the necessary charging infrastructure to transition commercial delivery fleets to zero emission vehicles. Two cities in the cohort are implementing Medium Duty Vehicle Electrification pilots:

Oakland, CA* will deploy charging infrastructure at an “anchor tenant” location, providing charger access to other small businesses in the community. These chargers will leverage battery energy and solar storage capacity as well as traditional grid connectivity to test the financial viability of battery and storage models.

Los Angeles, CA* is planning to deploy electric truck depots in underdeveloped commercial real estate properties in South/East Los Angeles. These depots will be modular and scalable, avoiding many issues related to permitting, construction, and activation processes. The initiative seeks to provide support to commercial fleet operators interested in transitioning to electric vehicles (EVs).

* An asterisk indicates pilot projects funded by LACI.

REGULATORY LIMITATIONS

In the United States, federal and state preemption can limit the ability of local governments to pass policies and deploy levers to support ZED programs.

Preemption refers to the supremacy of federal or state agency regulations over municipal agencies. European countries have a similar structure, wherein regulations are implemented from the top down. In the European context however, federal governments tend to implement aggressive emissions reductions regulations, allowing for more ZED-friendly policies at the local level than in the United States.

In the United States, cities are prohibited from "adopt[ing] or attempt[ing] to enforce any standard relating to the control of emissions from new motor vehicles or new motor vehicle engines" [1] through the Clean Air Act. Similarly, the Energy Policy & Conservation Act (EPCA) preempts state and local laws and regulations "relating to fuel economy standards or average fuel economy standards for automobiles." [2] And the Federal Aviation Administration Authorization Act (FAAAA) preempts state and local laws "related to the price, route, or service of any motor carrier... with respect to the transportation of property." This means that cities and local governments are unable to dictate the types of vehicles freight companies use, and effectively limits their ability to impose direct restrictions on freight carriers.

However, there are creative policy designs that can allow cities to incentivize or disincentivize certain vehicle fuel types, and other levers to support the deployment of ZED strategies. Examples can be found in the Policies & Levers section.

POTENTIAL CHALLENGES

As cities work to deploy and support ZED pilots with the policies and levers at their disposal, they may face some challenges and obstacles.

The policies and levers outlined in this platform will help mitigate and overcome these challenges, but some examples of the potential obstacles include the following:

Navigating political pressure and roadblocks:

Cities will need to work with their elected officials, stakeholders and local communities to cultivate buy-in for ZED pilots, policies and levers, as there may be political opposition to these strategies depending on the local context. ZED policies can be easily politicized, with some critics framing these initiatives as prioritizing climate over economic concerns.

Availability of charging infrastructure and ZEVs:

While the market has expanded in recent years to offer an increasing diversity of ZEV options, cost parity remains a challenge. ZE cargo vans and larger vehicles can cost up to three times that of a traditional ICE version up-front, although the total cost of ownership may be lower given reduced fuel costs and maintenance costs.[3] Electrification of fleets will also depend on availability of charging infrastructure - which must either be provided by the public sector, or developed by the private sector and is an additional expense to transitioning companies.

Behavioral modification:

The ways that goods delivery providers will react to policies and levers deployed by cities will vary across supply chains, and will be influenced by other actors within and beyond the logistics sector. Carriers may respond with mode shift or shift to EVs, but it is also possible that they will absorb pricing costs into the bottom line, pass it on to their customers, or cut labor by outsourcing to contractors.

1. https://scholarship.law.columbia.edu/sabin_climate_change/59/ (Amy Turner, 2020)
2. https://www.mdpi.com/2071-1050/14/8/4701 (Maxner, Chiara, Goodchild; 2022)
3. CALSTART, 2024 https://calstart.org/wp-content/uploads/2024/01/ZIO-ZET-2024_010924_Final.pdf

MAXIMIZING POLICY IMPACTS

As cities develop policy strategies to support ZED pilots, there are several key opportunities to enhance the impact and effectiveness of their efforts:

Stakeholder Collaboration: Engaging partners like Business Improvement Districts (BIDs), local businesses, regional planning organizations, and delivery companies can strengthen coordination and broaden impact.

Stakeholder Engagement: Building trust and buy-in from residents is critical. Effective engagement at every step in the process from pilot design to implementation and evaluation can increase accountability and support, making ZED policies and levers more durable.

Strategic Messaging: Carefully crafted messaging - especially emphasizing public health, reduced congestion, and quality of life - can broaden appeal and reduce opposition, drawing from successful European models.

Data Collection: Utilizing policies and levers to collect meaningful data allows cities to track progress, ensure transparency, and make data-informed decisions for future improvements.

External Funding: Tapping into state and federal funds, philanthropic contributions, and support from utilities can offset costs and build programs sustainability, particularly in states focused on achieving carbon reductions. Financial support can also be gathered through partnering with nonprofits (like LACI) to help cities pilot more quickly.

MESSAGING, STAKEHOLDER OUTREACH & PUBLIC EDUCATION

Stakeholders represent important potential allies or opponents for cities interested in deploying ZED policies and levers. By engaging with carriers, receivers, and residential communities, policymakers can work to identify shared goals, and better understand the distribution of benefits and burdens of business as usual in the delivery ecosystem. This will help to build more efficient policy strategies and design.

Stakeholder Engagement & Education Campaigns. Early and frequent engagement with stakeholders and civic leaders can help cities to identify points of friction within the existing delivery model, and help to inform the design of ZED policies and levers. This is also an opportunity for the city to provide more information and education on the intention behind ZED policies and lever implementation, creating more awareness and buy-in from important stakeholders.

Intentional Messaging. Framing ZED policies and levers around safety, noise reduction, air quality, and public health can help to avoid politicization of these initiatives. This messaging has been effective in European cities implementing ZED policies, and can help to make the connection to the direct benefits of ZED pilots, policies, and levers.

POLICIES & LEVERS

There are a variety of policies and levers that cities have at their disposal to help advance their ZED goals and enhance progress made through ZED pilots.

The policies and levers identified in this section were selected due to their relevance for the LACI cohort pilot types outlined in the previous section, and are organized by the following categories:

- Pricing Tools & Rebates
- Access Management
- Supportive Land Use and Zoning
- Innovative Procurement Mechanisms
- Regulations / Restrictions
- Enforcement Mechanisms

POLICIES & LEVERS AT A GLANCE

Through independent assessment and cohort participant feedback, policies and levers were identified as most relevant to each of the four pilot types.

The policies and levers assigned to each pilot type can work together to help achieve the primary goals of each pilot type, and may be used in tandem to amplify their impact.

Microfreight Solutions

Fleet/ Vehicle Class Pricing
Rebates
Road Fees
Zero Emissions Delivery Zones (ZEDZ)
Non-profits as a Procurement Partner
Municipal Procurement
Reporting Requirements

Cohort example: Washington, D.C.

Zone & Curb Management Programs

Fleet/ Vehicle Class Pricing
Zero Emissions Delivery Zones (ZEDZ)
Permit Access Management
Zoning Regulations
Non-profits as a Procurement Partner
ALPR Assisted Enforcement
Active Enforcement

Cohort example: Pittsburgh, PA, Santa Monica, CA, and Miami-Dade, FL

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Microdelivery Hubs & Delivery Efficiency

Fleet/ Vehicle Class Pricing
Permit Access Management
Zoning Regulations
Mutualized Land Use for ZED Operations
Non-profits as a Procurement Partner
Indirect Source Rules (ISR)

Cohort example: Portland, OR and New York, NY

Medium Duty Vehicle Electrification

Rebates
Road Fees
Non-profits as a Procurement Partner
Municipal Procurement
Reporting Requirements

Cohort example: Oakland, CA and Los Angeles, CA

PRICING TOOLS & REBATES

Cities can implement pricing mechanisms - such as dynamic pricing models and targeted rebate programs - to influence the behavior of goods delivery providers and incentivize the adoption of zero emission delivery solutions.

Fleet / Vehicle Class Pricing - Within dedicated zones, cities can impose fees on specific vehicle types or sizes such as commercial or for-hire vehicles, effectively managing access and incentivizing the use of low- or zero emission vehicles.

It is important to make the distinction between fleet / vehicle class pricing and fuel type regulation. Due to federal preemption (and policies like the Clean Air Act and Energy Policy and Conservation Act), cities are unable to dictate which vehicles are used based on emissions, so it is important that these pricing systems do not constitute an explicit ban on ICEs.

Rebates - Cities can offer rebates to delivery logistics companies that transition to zero emission vehicles, reducing upfront costs to encourage adoption of sustainable fleet options. These can be structured to support vehicle purchases, infrastructure development, or operational costs, accelerating the shift to cleaner logistics practices.

This policy option is most relevant and actionable for cities with municipal utilities, which they can leverage to offer EV rebates.

Road Fees - Cities can impose direct charges for using specific roads, encompassing various methods like tolls, or per-mile fees. These can be used as incentives to encourage (or discourage) the use of certain types of vehicle usage or to help reduce congestion.

Similarly to fleet and vehicle pricing, cities should be very intentional with their language when implementing road fees so as not to trigger any legal concerns around emissions regulations. There is legal precedent for cities to leverage these types of pricing tools.

Rebate Case Study: “Fee-bates”

“Fee-bates” refer to a system combining fees with rebates to create revenue neutral incentivizes for specific behaviors. An example is the San Pedro Bay Ports Clean Truck Fund (CTF) Rate, which charges a $10 fee per twenty-foot equivalent unit (TEU) for traditional ICE trucks entering the port.

These funds are collected to offer incentive funding of $150,000 toward eligible zero-emissions truck purchases servicing the San Pedro Bay port complex, among other ZE transition initiatives.

Source: City of Pittsburgh

ACCESS MANAGEMENT

Cities can implement access control policies and levers that regulate vehicle entry to specific urban zones based on criteria such as emissions standards, noise levels, vehicle size, or operational time windows, supporting zero emissions delivery solutions.

Zero Emissions Delivery Zones (ZEDZ) - Cities can designate specific curbs as zero emissions delivery zones, and prohibit ICE vehicles to park or idle in these areas. Cities could choose from a variety of ZEDZ designs: Voluntary Restricted Access Zone, ZEV Microhubs, ZEV Parking Spots & Loading Zones, or Mandatory Restricted Access Zones. Each type can be beneficial for a city's specific needs and context.

This policy is still relatively new to the U.S. with only a few examples - Santa Monica implemented a Voluntary Restricted Access Zone, Los Angeles opted for ZEV Parking Spots & Loading Zones, and Portland, OR has deployed a Mandatory Restricted Access Zone.

Permit Access Management - Cities can offer permits (including certifying fuel type) to provide privileged access to the right of way. Permit access management may require collaboration between different city agencies to ensure compliance with the policy.

Zero Emissions Delivery Zone Designs

Voluntary Restricted Access Zone: A specific area that is designated for ZEVs only, but compliance is voluntary for urban freight and delivery businesses.

ZEV Microhubs: A drop-off / pick-up location that serves a small service area and can be targeted to different types of ZEVs.

ZEV Parking Spots & Loading Zones: Reserved spaces that provide valuable curbside access only to ZEVs.

Mandatory Restricted Access Zones: A defined area in which ICE vehicles are prohibited or charged for entry; violators are penalized.

SUPPORTIVE LAND USE & ZONING

Cities can utilize land use and zoning oversight to strategically allocate space for the development of zero emissions delivery infrastructure, including electric vehicle charging stations, micro-distribution hubs, and zero emissions vehicle depots, ensuring integration of sustainable logistics within urban planning frameworks and enhancing system efficiency.

Mutualized Land Use for ZED Operations - Cities can use zoning, land use and other urban adaptation methods (e.g., brownfield development, climate resilient infrastructure) to incentivize mutualized use of land (e.g., EV charging stations sited at microhub and/or logistics facilities) to enable efficient, collaborative management of infrastructure and land. This can be structured through leveraging city-owned land, or by incentivizing privately-owned land for ZED operations purposes.

Zoning Regulations - Zoning is one of the most powerful tools that local governments have to incentivize certain types of development, including placement of charging stations. Cities can rezone land to encourage businesses to implement ZED-friendly logistics operations, including microhubs, and delivery facilities, among other examples.

Examples of zoning regulations at a city's disposal include:

- *Zone for Electric Vehicles* - ensure that charging is an allowed land use in as many zoning districts as possible, and allow charging as an accessory use that doesn't require more than a planning permit.
- *Parking Requirements* - require a minimum percentage of parking spaces in new construction to include charging infrastructure.
- *Zoning Ordinance Update* - examine land use mix and determine which zoning classifications to prioritize for explicit permission for different types of charging.

INNOVATIVE PROCUREMENT MECHANISMS

Cities can strategically utilize their procurement authority - through infrastructure investments, fleet acquisitions, or land assets - to drive the adoption of zero emissions delivery technologies, fostering market demand for sustainable solutions, and incentivizing private-sector innovation.

Leveraging Nonprofits as a Procurement Partner - Procurement can be a tedious and challenging process to navigate for cities working with the private sector. To bypass this, cities can leverage nonprofits to accelerate procurement by executing contracts, or accept funding to deliver programming (e.g. LACI's ZED City Challenge). This pathway allows cities to expedite the contracting and procurement process, and ensures contracts with private sector businesses that meet their specific needs.

Municipal Procurement - Cities can leverage their buying power to build demand in private markets by favoring zero emissions technologies where feasible. Cities can use innovative procurement mechanisms like "piggybacking" on existing government contracts, working through unsolicited proposals, among other examples to identify and procure zero emissions technologies and/or vehicles.

This lever is especially relevant for cities and agencies seeking to update their fleets to electric vehicles, as this transition can indicate broader interest and demand to the market.

REGULATIONS / RESTRICTIONS

Cities can implement regulatory frameworks and spatial constraints that optimize urban infrastructure usage, mitigate emissions, and facilitate the seamless integration of sustainable logistics technologies.

Indirect Source Rules (ISR) - Cities and or other regulatory agencies can enforce ISRs to regulate air pollution from mobile sources that interact with facilities, buildings and structures that attract mobile source emissions activity.

This is still a relatively new regulatory avenue for cities, with only two standing ISRs (San Joaquin Valley Air Quality Management District, and South Coast Air Quality Management District) and New York City actively seeking to implement an ISR to regulate warehouses.

Reporting Requirements - Cities can require businesses and logistics operators to report emissions data and provide transparency on the sustainability of their operations. This can also include reporting on the percentage of zero emissions vehicles in their fleets.

ENFORCEMENT METHODS

Enforcement mechanisms can be used to reinforce the rules and regulations that cities implement.

Active Enforcement - Cities can deploy traditional enforcement personnel to monitor ZED zones, and ticket or warn individuals or companies that are out of compliance with the rules and regulations instituted by the city in relation to ZED. This can be in the form of parking tickets for improper use of the curb, violations of an ISR, or other violation of ZED rules.

ALPR Assisted Enforcement - Depending on state and local law, cities can use artificial intelligence (AI), computer vision, ALPR, cameras, and other technology to track permit compliance, monitor parking-duration, and track vehicle location. There are different potential models for cities to use of ALPR Assisted Enforcement - Nominal, Directed, or Automated.

- **Nominal enforcement:** ALPR technology monitors the curb and collects data without any enforcement.
- **Directed enforcement:** ALPR technology notes violations and alerts city personnel to go ticket.
- **Automated enforcement:** ALPR technology monitors the curb for violations, and tickets vehicles that are out of compliance with ZED rules.

POLICIES & LEVERS: APPLICATION & ANALYSIS

As cities develop policy strategies to support their ZED pilots, they need to understand the impact and feasibility of each, in order to determine if and how they will help to achieve their desired outcomes and goals.

This section will identify which policies and levers are most applicable to each policy type, and assess their feasibility and impact.

Certain policies and levers are more relevant to each of the specific pilot types than others. In this section, the policies and levers that are most closely aligned with helping to achieve the outcomes of each of the four pilot types were assessed for their general feasibility and level of impact. These assessments are a product of a cohort-wide facilitation process, in which participants evaluated each policy and lever for their feasibility and impact based on their experiences and input.

It is important to note that cities using this platform will need to assess the feasibility and impact of these policies and levers for their unique context, taking into consideration their resources, political ecosystems, regulatory restrictions, and other factors to ensure a comprehensive and accurate evaluation. The assessments provided in this section are intended to provide general guidance as cities consider which policy and lever strategies to employ.

IMPACT / FEASIBILITY RUBRIC

This rubric provides general guidance as to how the impact and feasibility of each policy lever was assessed via the corresponding ratings systems, providing insight for a city into the general level of ease (or difficulty) in employing a specific policy lever.

Policy Impact & Feasibility Assessment

Impact (Effectiveness or Benefits): Assesses how significantly the policy achieves the intended goals of the pilot type.

3 - High Impact	Likely to produce widespread and measurable progress toward pilot's desired outcomes.
2 - Moderate Impact	Benefits are noticeable, but may be limited in scale, duration, or depth.
1 - Low Impact	Benefits are marginal, or unclear.

Feasibility: Assesses how practical and achievable the policy is to implement, considering factors like cost, legal requirements, infrastructure and capacity.

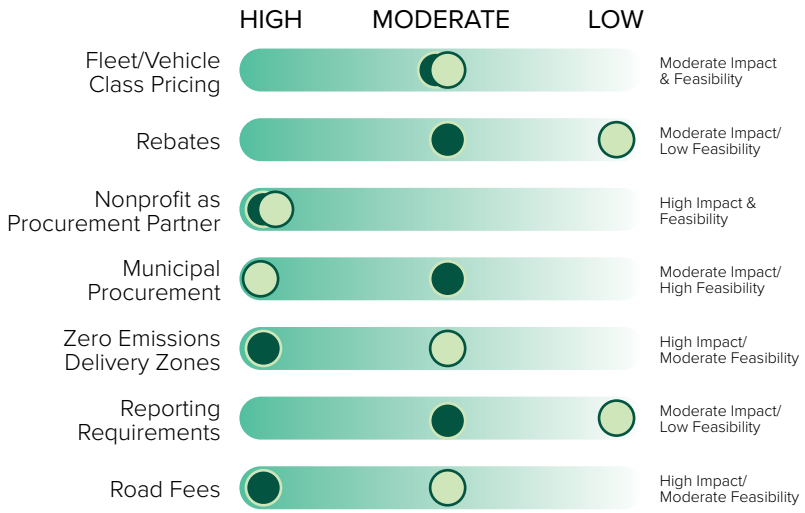
3 - High Feasibility	Easy to implement with minimal barriers. Clear path, support, and resources exist.
2 - Moderate Feasibility	Some challenges to implementation, but possible with adjustments or increased support.
1 - Low Feasibility	Difficult to implement due to major barriers (cost, regulations, etc.)

Feasibility of each policy lever is especially sensitive to each unique city context. Cities should consider factors like these when evaluating the feasibility of a given policy or lever:

- Political will or support
- Required costs or resources
- Existence (or lack) of necessary infrastructure
- City / department's authority, and public perception.

MICROFREIGHT SOLUTIONS

POLICY & LEVER ASSESSMENT



Key policies and levers for Microfreight Solutions:

- Fleet/ Vehicle Class Pricing
- Rebates
- Road Fees
- Zero Emissions Delivery Zones (ZEDZ)
- Non-profits as a Procurement Partner
- Municipal Procurement
- Reporting Requirements

APPLICATION & ASSESSMENT: Washington, D.C. Pilot

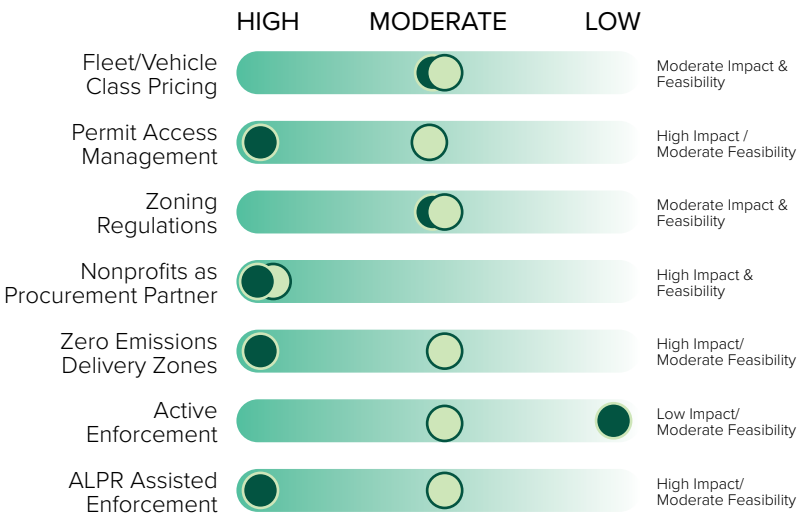
Pilot Desired Outcomes	Pilot Metrics
Improve Safety: Reduce truck related crashes, make bike lanes safe for microfrieght and electric low speed vehicles	• Collision Rates
Fleet Transition: Increase number of deliveries made by microfreight vehicles and food deliveries by electric low speed vehicles	• Truck VMT • Private logistics operator fleet transitions
Traffic Reduction: reduce truck congestion on urban streets	• Congestion rates • Reduced double parking
Sustainability: reduce emissions related to freight and food delivery	• Carbon / GHG emissions reductions
Behavior Change: facilitate conversion from gas scooter use among food delivery drivers to zero emissions alternatives	• Number of zero emissions scooters used for food delivery • Feedback Surveys

In the case of Washington, D.C.'s moped replacement pilot, the most impactful and feasible policies and levers to deploy are:

- **Nonprofits as Procurement Partner:** ease the procurement process for electric low speed vehicles, without posing feasibility challenges
- **Municipal Procurement:** help to influence the behavior change that the pilot is seeking to influence, without posing a feasibility challenge
- **Zero Emissions Delivery Zone:** reduce congestion, double parking, and delivery related emissions, but feasibility will hinge on the political will of leadership in the City and their ability to coordinate across departments
- **Road Fees:** assist the City in meeting their traffic reduction goals, but may be unpopular with residents and City leadership

ZONE & CURB MANAGEMENT

POLICY & LEVER ASSESSMENT



Key policies and levers for Zone & Curb Management:

- Fleet/ Vehicle Class Pricing
- Zero Emissions Delivery Zones (ZEDZ)
- Permit Access Management
- Zoning Regulations
- Non-profits as a Procurement Partner
- ALPR Assisted Enforcement
- Active Enforcement

Impact Feasibility

APPLICATION & ASSESSMENT: Pittsburgh Pilot

Pilot Desired Outcomes	Pilot Metrics
Sustainability: Decrease emissions from unnecessary idling and circling	• Carbon / GHG Emissions Reductions • Idling Reductions
Traffic reduction: Reduce parking-caused traffic and double parking, increase parking turnover for local businesses	• Avg Park Duration • Avg Double Park Duration
Efficiency improvements: Reduce dwell time, and increase delivery efficiencies	• Avg Dwell Time • Avg Delivery Time
Improve safety: Reduce collision incidents for pedestrians, cyclists and other curb users	• Collision Rates

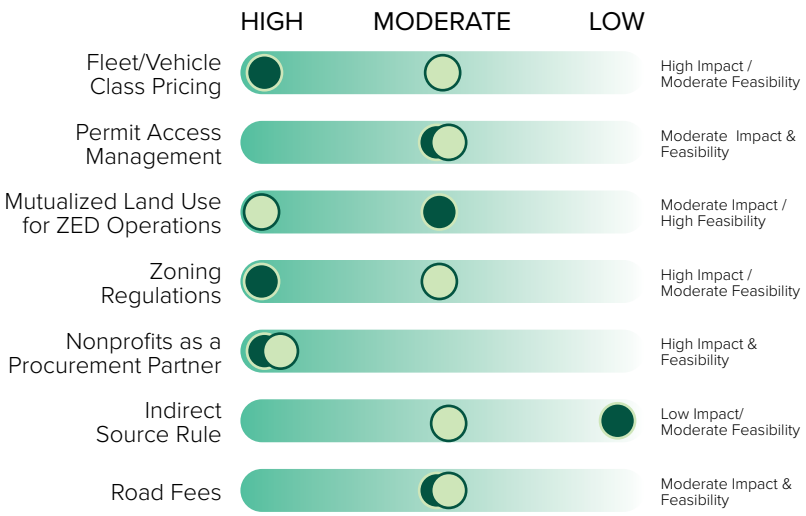
In the case of Pittsburgh's Smart Loading Zone pilot, the most impactful and feasible policies and levers to deploy are:

- **Nonprofits as Procurement Partner:** reduce the cost of technology procurement, and enable partnerships with other private sector companies
- **Permit Access Management:** improve delivery efficiencies, and limit double parking, helping to improve safety outcomes without posing feasibility challenges
- **ALPR Assisted Enforcement:** relatively low cost enforcement solution, which is unrestricted in its ability to automatically enforce parking violations.

For a generically evaluated pilot, a Zero Emissions Delivery Zone would be a highly impactful and moderately feasible lever to deploy. However, in the case of Pittsburgh, the City found that there were an insufficient number of zero emissions vehicles that would be eligible to utilize the curb, making this option infeasible for the City.

MICRODELIVERY HUBS AND DELIVERY EFFICIENCY

POLICY & LEVER ASSESSMENT



Key policies and levers for Microdelivery Hubs & Delivery Efficiency:

- Fleet/ Vehicle Class Pricing
- Permit Access Management
- Zoning Regulations
- Mutualized Land Use for ZED Operations
- Non-profits as a Procurement Partner
- Indirect Source Rules (ISR)

Impact Feasibility

APPLICATION & ASSESSMENT: Portland Pilot

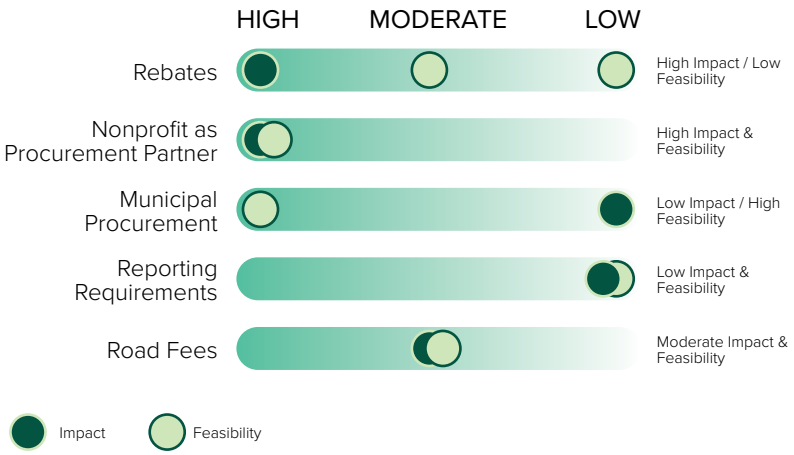
Pilot Desired Outcomes	Pilot Metrics
Behavior change: Facilitate zero emissions deliveries through consumer and logistics provider behavior change	• Number of unique users & transactions • Feedback surveys • Parcels delivered • Delivery miles reduced
Sustainability: Decrease emissions through mode shift	• Carbon GHG emissions reductions

In the case of Portland's Microdelivery Hub pilot, the most impactful and feasible policies and levers to deploy are:

- **Nonprofits as Procurement Partner:** reduce the cost of pilot implementation to the City, and enable the City to partner with technology providers and other private sector companies
- **Fleet / Vehicle Class Pricing:** can change behaviors of delivery companies, and incentivize them to deliver through microhubs, without requiring many city resources or political will
- **Mutualized Land Use for ZED Operations:** provides infrastructure necessary to support microdelivery hubs by leveraging City owned land at relatively low cost to the City
- **Zoning Regulations:** allowing microdelivery hubs to be located in dense, delivery rich areas can help reduce delivery related GHG emissions, without posing feasibility challenges

MEDIUM DUTY ELECTRIFICATION

POLICY & LEVER ASSESSMENT



Key policies and levers for Medium Duty Electrification

- Rebates
- Road Fees
- Non-profits as a Procurement Partner
- Municipal Procurement
- Reporting Requirements

APPLICATION & ASSESSMENT: Oakland Pilot

Pilot Desired Outcomes	Pilot Metrics
Pilot uptake: High demand for and consistent usage of charging infrastructure	• Number of unique chargers & transactions • kWh usage
Cost effectiveness: Battery and solar energy models are adopted by businesses offering EV charging infrastructure due to its cost efficiency	• Energy costs using battery & solar energy lower than traditional grid connectivity

In the case of Oakland's Medium Duty Electrification pilot, the most impactful and feasible policies and levers to deploy are:

- **Nonprofit as Procurement Partner:** reduce the cost to the City for deploying charging technology, among other resources
- **Road Fees:** incentivize pilot uptake in the areas around charging infrastructure, while the revenue generated could help to offset the cost of the pilot

Source: Unsplash, juice_world

GLOSSARY OF TERMS

Policies: procedures and regulatory processes available to city governments to manage and oversee various aspects of the City's residents and operations. This can be inclusive of ordinances, resolutions, departmental policies, etc.

Levers: powers outside of official regulatory process (projects, programs, processes) that cities can leverage to influence the City's residents and operations. These are more informal uses of power, inclusive of procurement, internal operations, etc.

Dynamic Pricing Model: adjusts parking rates in real time based on demand and other factors such as time of day, day of the week, or special events.

Preemption: federal law or state law takes precedence over local or municipal law in cases of conflict based on the Supremacy Clause of the Constitution.

Urban Adaptation Methods: strategies cities use to adjust to the impacts of climate change, both current and expected, while also seeking to exploit potential benefits.

Internal Combustion Engine (ICE): an engine that generates power by the burning of gasoline, oil or other fuel with air inside the engine (traditional gas powered engines).

Medium Duty Vehicle: refers to the weight of the vehicle, but generally includes box trucks, delivery vans, and some types of buses and utility vehicles.

Micro-Freight Vehicles: this category of vehicles includes cargo bikes, e-bikes, drones, delivery robots, etc. which can make last mile deliveries in urban areas.

Delivery Microhubs: a logistics facility where goods are bundled inside urban area boundaries that serve a limited spatial range, and allows a mode shift to low-emission vehicles or soft transportation modes for last mile deliveries.

Automated Enforcement: for the purposes of this document, this term refers to ALPR technology that monitors the curb for parking violations, and tickets vehicles that are out of compliance.

Automated License Plate Reader (ALPR): a system, typically using cameras and software, that automatically captures and reads license plate numbers.

Cargo Vans: a single unit van with an enclosed cargo area (e.g. Amazon delivery trucks).

E-cargo Trikes: an electric tricycle specifically designed for carrying cargo or passengers.

Computer Vision: a field of artificial intelligence that enables computers to "see" and interpret images and videos, much like humans do.

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