



Building healthy cities in the doorstep-delivery era

Sustainable urban freight solutions from around the world



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June 2021

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With support and input from Bloomberg Associates

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The authors would like to acknowledge the following for their valuable insights:

Seattle, WA: Andisheh Ranjbari, manager, University of Washington, Urban Freight Lab
Washington D.C.: Laura MacNeil, transportation planner, District Department of Transportation; David Lipscomb, transportation planner, District Department of Transportation
London, U.K.: Bruce McVean, assistant director, City of London, City Transportation
Paris, France: Laetitia Dablanc, Logistics City chair, University Gustave Eiffel

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Introduction

Around the world, cities have undergone more than one year of COVID-19-related lockdowns and stay-at-home requirements. The pandemic has dramatically changed the daily lives of citizens and how we move people and goods within cities.

What has become clearer during this time is that deliveries, and workers along the full supply chain of goods, are essential to everyday life, and to keeping businesses afloat and supporting economic recovery.

But about [90 percent](#) of the world's transport energy continues to rely on fossil fuels. What does that mean within cities? With increasing demand for e-commerce delivery, we will see more vehicles on the road — the [World Economic Forum](#) predicts that this demand will result in 26 percent more delivery vehicles in inner cities by 2030. In turn, without effective intervention, that is expected to lead to a rise in both emissions and traffic congestion of more than 30 percent in most populous cities around the world.

The opportunity for cities

As cities look beyond emergency or temporary measures to respond to community needs, they must develop their local economic recovery and transportation plans with climate resiliency, equity and safety concerns in mind to create vibrant, healthy, and sustainable societies in the medium- and long-term. This will help create the cities we want and need. Taking action to manage urban freight has the potential to significantly impact city life in multiple ways:

Reduced air pollution and carbon emissions:

Improperly managed urban deliveries contribute significant emissions due to idling, traffic congestion, and inefficient curbside use.

Improved road safety: Many cities in Europe and North America have already committed to "[Vision Zero](#)" strategies that aim to "eliminate all traffic fatalities and severe injuries, while increasing safe, healthy, equitable mobility for all." Those strategies include speed management, roadway design and curbside management, and are often complementary to other city land use and transportation plans.

Economic recovery: Supporting local and small businesses is critical to cities' economic recovery. Urban freight planning can and should be done in a way that helps the local business sector survive and thrive.

Environmental and social justice: Freight infrastructure such as package fulfillment centers and sorting warehouses are often located in communities of color. This results in poorer air quality and health implications such as higher rates of cardiovascular diseases and infections like asthma and bronchitis, and lung cancer. While planners should reconsider how the location of these facilities are chosen, developing more efficient and cleaner urban freight systems will also help reduce the negative impacts on communities of color and low-income communities.

The good news is that effective interventions exist within the purview of cities to mitigate the potential social and environmental impacts of urban freight and help local businesses and communities thrive. Many of these initiatives have been successfully implemented for over a decade around the world. Others are newly being tested or have been seen as too bold — until now. More can and should be done to advance and apply these solutions at a wider scale and turn pilots into permanent practices — especially as cities look for innovative solutions to this new doorstep delivery reality.

So, how are some cities already innovating? This report for city planners and policy-makers summarizes **six solutions** cities around the world are already piloting to address urban freight challenges and **four bold new ideas** that represent the kind of innovative thinking required by cities going forward. These 10 initiatives may serve as models for other jurisdictions.

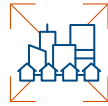
How to use this report

Applying and adapting these solutions will vary from place to place. Considerations should be given to planning scale, the desired outcomes for your community, and the policy actors required for successful implementation.

Defining planning scale: Not all solutions are integrated into a city's built form in the same way. Some target an individual location or street, while others can be implemented city-wide or can span multiple municipalities in dense metropolitan areas, like Greater London or Greater Paris areas, where planning can happen on a regional level. The planning scale describes the geographic level at which a solution is implemented.



Neighborhood: solutions that are site specific and could be incorporated into site planning, district planning, or municipal by-laws.



City-wide: solutions that are implemented across the whole city and could be integrated into official municipal plans.



Regional: solutions that span more than one city and would require regional planning and coordination between multiple municipalities.

Defining policy impacts: Understand the impact of each proposed planning solution based on impact indicators or the ability to achieve public policy objectives. Assessing solutions across these indicators shows just how comprehensive and complementary a solution can be to other city-building initiatives. A solution can be considered transformational if it addresses multiple indicators.



Social equity: improves the quality of life for communities more negatively impacted by urban freight activities.



Road safety: reduces the risk to the public of traffic-related injuries due to high vehicle activity around pedestrian areas.



Support for local & small business: allows local businesses to be competitive with large corporations and e-commerce giants.



Air pollution & carbon emissions: reduces the harmful effects of urban freight on human health and the environment.



Revenue generation: policy solution offers revenue-generation capabilities or is revenue-neutral.

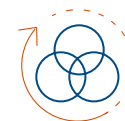
Defining policy actors: The movement of goods transcends political boundaries and requires coordination among a broad range of actors. Cities have the planning authority to regulate, manage and plan for where and how freight activities take place (local roads, public realm, built form and land use). But cities can sometimes move forward faster when they work with business and other levels of government, saving much sought-after municipal resources at the same time. These indicators show the kind of coordination and support required to execute policy and planning initiatives successfully.



City-led initiatives: changes in government laws or regulations are required.



Inter-governmental planning: vertical collaboration between levels of government (municipal, regional, state, or federal) is required.



Cross-sectoral partnerships: collaboration between two or more organizations across the public or private sectors is required.



Cities around the world are already piloting and implementing intersectional, urban freight solutions that, if scaled up or more widely adopted, serve to build healthier and more vibrant communities. Here are some of the most effective and promising examples that are ready to be put in place today.

URBAN FREIGHT SOLUTIONS

Managing parcel volumes

1. Delivery microhubs



Photo: Ville de Montréal/Arrondissement Ville-Marie

Multiple couriers were involved in Project Colibri in Montreal, which used a microhub to shorten the final delivery distance.

Challenge: A new business model for the transportation of goods between producers, distribution centers and consumers is needed, due to population growth and rising land costs, combined with customer demand for faster delivery and increasing congestion.

Solution: **Delivery microhubs** are a type of urban consolidation center located between major suburban warehouses and final delivery destination points.

Why: The additional mid-way delivery point means shorter delivery distances to the final destination, [making a shift](#) to more nimble, low-carbon vehicles such as electric vehicles and electric-assist cargo bikes possible. That shift is necessary to prevent and combat an increase in vehicles, congestion and freight-related emissions, with shipping times now trending towards same-day or one-day shipping and customers more likely to buy fewer items in a single purchase online compared to when they shop in-store, according to research from the University of California.

Taking Action

Identify an available and accessible space

Consider zoning changes and costs of land acquisitions

Define a long-term financial model

Identify the business audience using the service

Develop partnerships with low-carbon courier companies

City spotlights: Yokohama, Japan; Paris, France; Montreal, Canada; London, U.K.

In Yokohama, Japan, a cooperative of 300 shops supported by the Yokohama City Government established a [cooperative delivery system](#) to address congestion and air quality problems in the Motomachi shopping district. The microhub pilot successfully ran from 1999 to 2001 and was made permanent in 2004. Truck carriers deliver parcels to a consolidation center located 1km from the district, where people-powered carts pick up parcels for delivery to shops. Twenty truck carriers have joined the system, paying around US\$1.50 for delivery or pick up of each parcel.

In 2013, Paris opened its first urban distribution microhub called the [Beaugrenelle “logistics hotel”](#). The Beaugrenelle facility is a two-floor 3000m² building where packages under 30kg (66 lbs) are processed for delivery by clean vehicles. With the ability to handle 6,500 parcels a day, it reduced driving distances by 52 percent, noise from delivery vehicles by 8 percent, and cut delivery related CO₂ emissions by half. In 2018, Paris launched a second facility, the [Chapelle International logistics hotel](#), a 41,500m² four-floor urban logistics hub built on top of an abandoned railway to allow for multi-modal consolidation by road or rail. Commercial uses at Chapelle International go beyond logistics and the building includes data centers, offices, sports facilities, and an urban farm. The close proximity of these consolidation centers to residential neighbourhoods required a change in the Paris zoning ordinance to reintroduce commercial facilities from the city outskirts back into the city center.

In Canada, sustainable mobility company Jalon MTL, in collaboration with the City of Montreal, launched a one-year pilot titled [Project Colibri](#) in 2019. The city provided a vacant bus depot to be used as a consolidation space for delivery trucks to unload packages to be delivered by zero-emission e-cargo bikes to their final delivery destination. Five couriers are participating in this pilot including Purolator, one of Canada’s leading courier companies.

In December 2020, the City of London approved a microhub called the [Last Mile Logistics Hub](#) to reduce congestion and emissions in central London. The City will transform 39 spaces in an underused parking garage into a parcel consolidation hub for final delivery by e-cargo bikes. Amazon Logistics was chosen out of 10 couriers in a competitive bid to operate the Last Mile Logistics Hub allowing them to take 85 delivery vehicles off the road each day, which will eliminate 23,000 delivery trips every year. Amazon Logistics will be able to serve all deliveries within a 2km radius of the hub using zero-emission vehicles which covers all of the City of London as well as some parts of the central London sub-region.

For implementation:

- Choose the right drop-off/pick-up location. For greater success, the microhub should be in an accessible building or structure (new or existing), in an area with a high demand for deliveries from businesses and households, and three miles or less from the final destination.
- Land-use designations could limit the availability of feasible microhub locations, which are designated as commercial facilities. In areas designated for residential use with a high volume of deliveries to households, consider a zoning change to enable mixed land use.
- Considerations should be made of land acquisition or rental costs and how that affects the financial viability of the project.
- Running a microhub requires considerations about how it will operate, including its financial model (e.g. public financing or fee-for-use), which company will lead operations, and which businesses can use it.
- The chance of microhub's success increases when courier companies and businesses are involved in its design and operation. Develop partnerships with courier companies that use small clean vehicles to complete last-mile deliveries to collectively advance shared interests and common goals.





URBAN FREIGHT SOLUTIONS

Managing parcel volumes

2. Parcel lockers



Photo: Urban Freight Lab

Parcel lockers, like the Belltown Parcel Locker in Seattle, provide a contactless method for parcel deliveries.

Challenge: The rise of online shopping means parcels are becoming a bigger segment of urban deliveries, leading to longer unloading times and, when left on individual doorsteps, an increased risk of missed or stolen packages.

Solution: **Parcel lockers** are very small storage units located close to the final delivery point in urban or rural areas, which can be conveniently accessed by customers. They can be placed in residential or commercial buildings, or in public spaces.

Why: Parcel lockers provide a way to deliver parcels more efficiently. Couriers can reduce unloading times, the time spent looking for parking and time spent occupying parking spaces by delivering packages to one secure location instead of several doorsteps. During the COVID-19 pandemic, parcel lockers also offer a contactless method for parcel deliveries, which can be especially important in low-income, racialized, and retirement communities, which have been disproportionately impacted by the pandemic. Parcel lockers also reduce the risk of missed deliveries — when a customer is not at home to receive their items — that require couriers to return on another day.

City spotlights: Seattle, U.S.

In Seattle, Washington, the [Urban Freight Lab](#) at the University of Washington [piloted a parcel locker](#) in 2018 at the Seattle Municipal Tower which reduced delivery times by 78 percent and resulted in zero missed deliveries. The pilot used a common carrier system which means the locker may be used by any retailer, carrier and goods purchaser allowing smaller local businesses to gain the same benefits that larger corporations like Amazon and UPS get with their branded single carrier lockers. It was located in a commercial space to increase delivery density, reduce the time spent by couriers at the curbside, and provide a secure delivery location.

Taking Action

Identify viable sites in delivery dense areas

Identify a common carrier vendor

Work with building managers and city departments for approvals

The initiative is a public-private partnership between retailers, freight carriers, parcel delivery companies, a locker provider company, real estate company CBRE, and the City of Seattle Department of Transportation. Funding for the project came from the US Department of Transportation through the Pacific Northwest Transportation Consortium, a consortium of transportation research universities in the region, and the Seattle Department of Transportation.

The success of the Seattle Municipal Tower parcel locker led to the US Department of Energy funding the Urban Freight Lab to do a larger study, which includes evaluating the efficiency of three more common carrier parcel lockers across Seattle, including the [Belltown Parcel Locker](#) placed in a public parking space operated by Urban Freight Lab member REEF, the largest operator of mobility, logistics hubs, and neighborhood kitchens in North America.

For implementation:

- Parcel lockers could be located in residential, commercial, or public spaces. Identify viable sites by targeting areas that could benefit from increased delivery density, specifically looking at areas that could benefit from reduced dwell time of delivery trucks.
- Common carrier parcel lockers allow more couriers to use the system, maximizing convenience for locker users, reducing delivery times for couriers, and reducing emissions in the city. Identify a common carrier vendor to install, operate, and maintain the parcel locker.
- Engage relevant actors when studying the feasibility of a parcel locker to optimize its use and safety. Work with residential and commercial building managers, and city departments to get approvals for parcel locker installations.

Business spotlight: Scaled deployment of parcel lockers

E-commerce platform Amazon has parcel lockers located in [900 U.S. cities](#) and [100 Canadian cities](#). This speaks to the widescale deployment needed for parcel lockers to lead to a significant improvement in cities. Enabling common carrier lockers would allow more businesses to participate in the parcel locker network and bring the benefits to thousands more businesses and people.





URBAN FREIGHT SOLUTIONS

Reducing impacts from delivery vehicles

3. Curbside management tactics

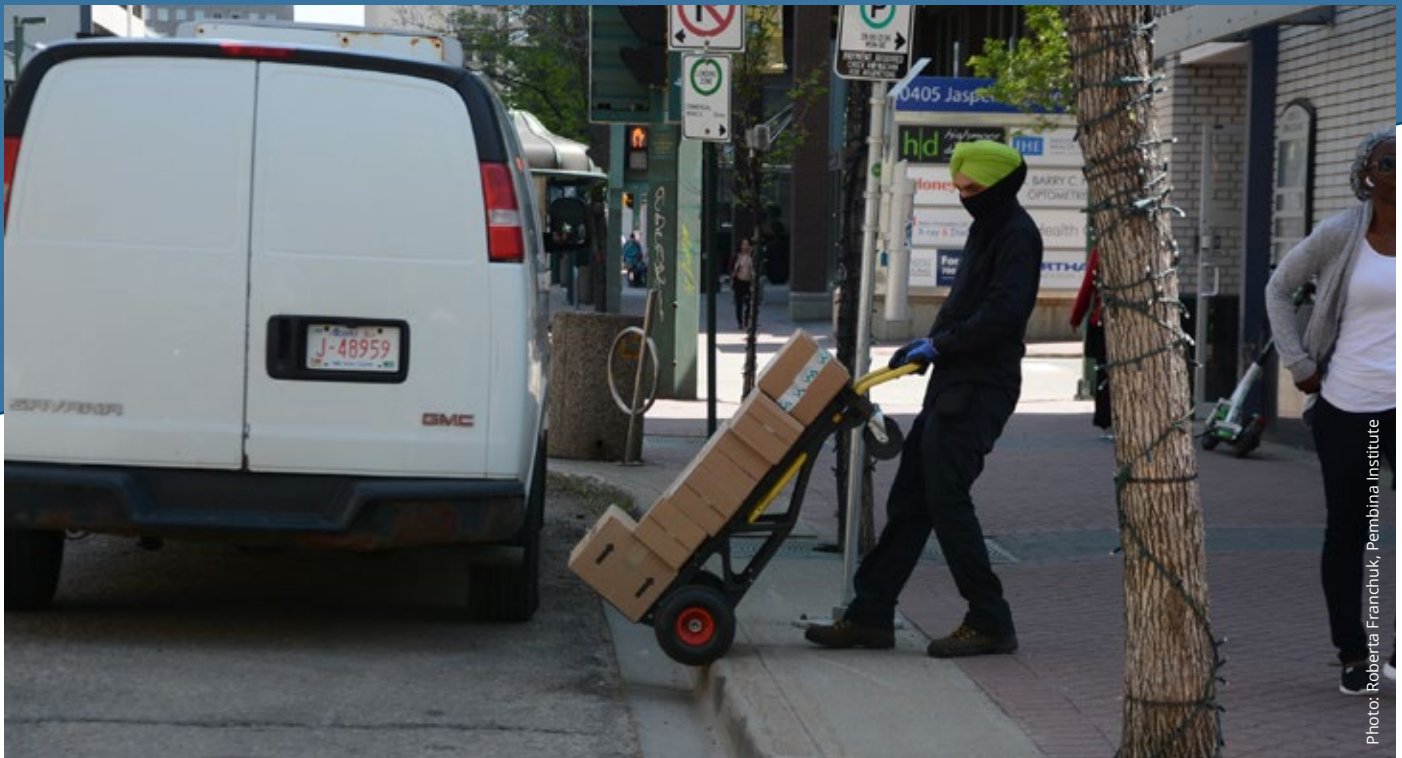


Photo: Roberta Franchuk, Pembina Institute

Increased competition for the curbside means increased traffic, congestion and safety risks.

Challenge: Parking violations such as double or illegal parking and longer cruising times of freight vehicles as they find loading spaces lead to more congestion, higher air pollutant emissions, and a higher risk of traffic-related injuries.

Solution: **Curbside management tactics** are essential as competition for the curb grows. Under this umbrella, there are three main strategies that could be combined or applied independently to manage activity at the final destination of last-mile deliveries: 1) allowing for deliveries during off-peak hours; 2) establishing and pricing courier loading zones; and 3) regulating the kinds of vehicles, such as allowing cargo bikes, in loading zones.

Taking Action

Amend or create new regulations

Establish financial or non-financial mechanisms

Provide loading zone access to smaller or zero-emission delivery vehicles

Why: In dense urban centers, curbside space is in high demand not only by delivery vehicles, but also other road users including ride-sharing vehicles, cyclists, buses, taxis, garbage trucks, emergency services, food trucks, and construction workers. Increased competition for the curbside means increased traffic with more delivery vans and trucks cruising streets looking for a space to park, increased congestion, and more safety risks for pedestrians. Now

more deliveries are going directly to customers' homes instead of businesses, making this a challenge in residential neighborhoods, too. Pricing parking spots in popular courier zones helps prioritize parking access to couriers and reduces carbon and air pollution by reducing vehicle idling and parking search times. To reduce the likelihood of congestion and traffic-related injuries, cities can try to reduce truck volumes on the road during peak hours by allowing for smaller delivery vehicles like cargo bikes to park in vehicle loading zones, or by enabling trucks to complete deliveries during off-peak hours when there is less activity on the road overall. Off-peak deliveries also help reduce air pollutants by allowing trucks to complete their deliveries faster.

City spotlights: Zaragoza, Spain; Eindhoven, Netherlands; Region of Peel, Canada; Washington, D.C., U.S.; City of Toronto, Canada; New York City, U.S.

Most recently, as a COVID-19 response measure, both Zaragoza, Spain and Eindhoven, Netherlands, implemented off-peak tactics. In Zaragoza, loading and unloading [hours were extended](#) to 24 hours per day for businesses; in Eindhoven, [delivery hours were extended](#) to 24 hours per day for supermarkets to alleviate congestion from distribution of groceries.

In 2019, the Smart Freight Centre conducted an [off-peak delivery pilot](#) in Ontario's Peel Region between March and August. They shifted approximately 1,600 deliveries to 14 retail stores in the region to off-peak hours between 7 p.m. and 7 a.m. Compared to day-time deliveries, off-peak deliveries were 18 percent faster, emitted 11 percent less greenhouse gases per kilometer, and reduced air pollutants by up to 15 percent. A follow-up study on the topic is currently underway.

When it comes to freight zone pricing, the District Department of Transportation (DDOT) in Washington, D.C., implemented a [commercial loading zone pricing scheme](#) in 2015, which decreased the number of double-parking violations and non-truck parking in loading zones by more than 50 percent. Although the pricing scheme was initially met with pushback from delivery companies after it launched as a pilot in 2007, companies were eventually willing to pay the curbside fee once they realized the efficacy of the program (e.g. increased parking reliability, time savings for loading and unloading). DDOT recognizes in its Commercial Loading Zone policy that curbside pricing can also be used to achieve environmental goals, noting that commercial loading zones should be established and managed in such a way that mitigates congestion and improves air quality simultaneously.

In 2015, the City of Toronto implemented [courier loading zones](#) to provide designated curbside space for "short-stop deliveries" with a maximum stop time of 20 minutes. The city was required to change its municipal code in order to make the delivery parking zone enforceable by law.

Providing cargo bikes with [preferential curbside access](#) can also be effective. Also in 2019, New York City announced a [program](#) that would allow e-cargo bikes to park in existing commercial loading zones that are usually reserved for trucks and vans. The program was implemented as part of New York City's efforts to improve road safety, tackle congestion, and reduce transportation GHG emissions.

For implementation:

- Curbside management tactics do not require equipment or new infrastructure, they can be implemented simply by creating or amending regulations, such as allowing deliveries in off-peak hours.
- Establish financial (e.g. Washington D.C.) or non-financial mechanisms (e.g. Toronto) to prioritize curbside use for commercial vehicles such as preferential pricing at loading zones.
- Improve the range of how commercial loading zones are used either by creating dedicated commercial loading zone areas and/or enabling smaller zero-emission delivery vehicles to access the same areas as courier trucks.





URBAN FREIGHT SOLUTIONS

Reducing impacts from delivery vehicles

4. Low-emission zones (LEZs)



The City of Santa Monica has partnered with a cleantech incubator to pilot the U.S.'s first voluntary zero-emissions delivery zone.

Challenge: Older vehicles present significant air quality concerns in cities. Improving air quality is critical but doing so across political or large geographic boundaries is challenging when policies require large-scale adoption from businesses and the public.

Solution: **Low-emission zones (LEZs)** are defined areas within cities where the use of emitting vehicles is regulated through restrictions or financial charges. LEZs provide a way for cities to pilot urban mobility solutions to tackle air pollution and congestion in a designated zone rather than across a whole city.

Why: Typically used to manage air pollution from all vehicles in a particular zone, both passenger and freight, several jurisdictions around the world have begun piloting [zero-emission zones for freight \(ZEZ-F\)](#) specifically, combining that zone with financial and policy incentives that encourage the deployment of zero-emissions commercial vehicles. LEZs can also play an important role in addressing

Taking Action

Foster support from residents and local businesses

Define boundaries and vehicle types

Define your policy approach

Ramp-up the policy or widen the zone incrementally

Ensure low-impact alternatives for residents, businesses exist

Communicate public benefits

environmental justice inequities by targeting air pollutant emission reductions in communities that need it the most. A 2017 study from the University of Washington found that, on average, communities of color were 2.5 times more likely than white communities to live in an area with traffic-related nitrogen dioxide concentrations above the World Health Organization guideline. Reducing urban freight emissions not only presents opportunities to improve health of citizens overall, but it also presents an opportunity to reduce historic environmental inequities in our cities by targeting high risk neighborhoods.

City spotlights: City of Rotterdam, Netherlands; Shenzhen, China; City of Santa Monica, U.S; Greater London, U.K.

Under the Netherlands' national climate plan, the City of Rotterdam and 36 of the largest cities in the Netherlands will be required to [implement a ZEZ-F](#) by 2025. Since January 1, 2020, the LEZ in Rotterdam bans the most polluting trucks from entering the zone, with no restrictions on passenger cars or vans. To support the development of zero-emissions goods movement sector, Rotterdam offers a combination of educational programs and financial subsidies to support couriers in the transition.

Low-emission zones are part of an air [quality improvement strategy](#) for Shenzhen, China's leader in freight vehicle electrification. By the end of 2019, the city of more than 12 million had 10 "green logistics zones" and 77,500 battery electric commercial vehicles on the road. Shenzhen has six financial incentives to support zero-emission freight adoption, such as purchase and infrastructure subsidies, and three non-financial incentives that permit zero-emission freight vehicles in zero-emissions zones.

In the U.S., the City of Santa Monica partnered with the [Los Angeles Cleantech Incubator](#) in April 2020 to pilot a [zero-emissions delivery zone](#) for one to three years. This zone, within which businesses can participate voluntarily, is used to pilot a technology, information, and policy ecosystem that includes: green mobility technologies such as e-cargo bikes and electric delivery vehicles, innovative curbside management practices such as prioritization and digital bookings of curb spots, instrumentation to measure and collect data on air pollution and congestion, and innovative business models that support the development of last-mile solutions in the zone.

Finally, the U.K.'s Greater London area has one of the largest [low-emission zones](#) in the world with coverage of 2,650 km². Medium- and heavy-commercial vehicles that do not meet the emissions standard in the LEZ pay a daily charge of US\$119-357 to drive within the zone. Central London has also adopted a [22km² ultra low emission zone \(ULEZ\)](#) which incorporates a US\$14.88 charge for smaller vehicle types such as cars and motorcycles and has reduced air pollutants by almost half. On October 25, 2021, the ULEZ will expand to cover more of the Greater London area. According to the [Mayor of London's Transportation Strategy](#), the city plans to implement a zero-emissions zone in Central London by 2025 with plans to expand to larger zero-emission zones as soon as 2040.

For implementation:

- To ensure the longevity of the LEZ beyond political cycles, foster support from residents and local businesses.
- Define clear boundaries for the LEZ and the vehicle types enforced in it. Target high congestion areas or population areas where the safety, environmental, and/or health risks are highest.
- Define the policy approach and enforcement model. For instance, will the LEZ ban all vehicles or high-emitting vehicles? Will access be tracked by vehicle registrations or an automated license plate reader?
- It is recommended to introduce LEZs incrementally and grow them progressively over time, either by increasing the strictness of policies or by increasing the geographic coverage of the zone, to reduce resistance to adoption.
- Provide residents and businesses with attractive low-impact alternatives to receive the same level of service. Ensure that the LEZ supports walkability and public transit for residents, and that businesses have access to cost-competitive low-emitting safer last-mile delivery solutions.
- To maintain public support, consistently communicate the public benefits of the LEZ and ensure equitable adoption such that residents and smaller businesses are not at a disadvantage relative to larger businesses or other areas in the city.





URBAN FREIGHT SOLUTIONS

Reducing impacts from delivery vehicles

5. Zero-emission vehicles (ZEVs)



Zero-emission vehicles include battery-electric vehicles such as e-bikes, plug-in hybrid electric vehicles, and hydrogen fuel cell vehicles.

Challenge: Over half of the world's population lives in cities, and the number of vehicles required to service urban areas is significant, leading to rising greenhouse gases and air contaminants. However, high costs and the lack of supportive policies have resulted in slow adoption of zero-emission commercial vehicles.

Solution: **Zero-emission vehicles (ZEVs)** are defined as vehicles that produce zero tailpipe emissions. These include battery-electric vehicles (including e-bikes), plug-in hybrid electric vehicles, and hydrogen fuel cell vehicles. Given the readiness of current technology, the transition to ZEVs can start with ZEV adoption in urban delivery vehicles. Lessons learned can then help pilot efforts to electrify vehicles in the regional and longer-haul sector.

Taking Action

Develop a technology roadmap

Adopt a ZEV sales mandate

Introduce financial incentives

Invest in charging infrastructure

Build partnerships with industry on charging infrastructures

Why: Zero-emission vehicles produce zero tailpipe emissions and the switch to such technologies would lead to significant reductions in fuel consumption and subsequent emissions. Data collected by New York City shows that air emissions from trucks and buses in high poverty neighborhoods are 70 percent higher than in low poverty neighborhoods. ZEVs offer an opportunity to provide clean air solutions to neighborhoods, including neighborhoods disproportionately affected by pollution, without having to implement a LEZ.

City spotlights: City of Rotterdam, Netherlands; State of California, U.S.

In the Netherlands, the City of Rotterdam developed a zero-emission city logistics by 2025 [roadmap](#) to transition freight transport in the city to zero-emission vehicles. The strategy includes a tailored approach for each freight segment (fresh produce, general freight, waste, express/parcels, facilities/service, construction) and across alternative fuel types (battery electric, hydrogen electric, hybrid electric, biofuels).

In June 2020, the California Air Resources Board adopted a [new state-wide sales mandate](#) for medium and heavy-duty vehicles starting in 2024. The requirement starts at five to nine percent of truck sales to be ZEVs in 2024 based on vehicle class and ramps up to 40 to 75 percent in 2035. This mandate is estimated to put 300,000 zero-emission trucks on the road by 2035.

For implementation:

- Develop a technology roadmap that describes which ZEV technologies best fit commercial vehicle uses in the city, for instance which alternative fuel types are best suited for each vehicle size.
- High purchase costs are a significant barrier to ZEV adoption. Introduce financial incentives that make ZEV vehicles cost competitive with traditional combustion engine vehicles such as purchase rebates.
- Invest in charging infrastructure that enables fleet operators that adopt ZEVs to recharge at convenient times and locations.
- A collaborative effort is needed to deploy charging infrastructure. Build partnerships with industry on infrastructure buildout, consulting with relevant stakeholders in the goods-movement and electricity distribution sectors.
- Support a ZEV sales mandate for commercial vehicles which requires a certain percentage of vehicles sales by a specific date to be ZEVs.

Business spotlight: Rolling out ZEVs

Global furniture retailer IKEA has committed to fulfill all home deliveries and services requests across [30 markets using zero-emission vehicles](#). Shanghai was the first city to reach this goal with IKEA, performing 900 daily deliveries using zero-emission vehicles.

Fashion retailer [H&M teamed up with Dutch delivery service Fietskoeriers.nl](#) to deliver online orders in 30 cities across the Netherlands using bicycles at the same price and speed as normal deliveries.





URBAN FREIGHT SOLUTIONS

Supporting local economies

6. Digital support for main street



Photo: Adobe Stock image

Retailers recognize that a strong post-pandemic recovery requires pairing brick-and-mortar locations with online shopping.

Challenge: Many local and small businesses were not equipped with the adequate digital platforms, supply chain and logistics infrastructure, or right-size facilities and space, to quickly pivot to online shopping and accommodate curbside pick-up in response to the pandemic.

Solution: Digital support for main street through new government and private-sector initiatives, such as those that help create and enhance businesses' online presence and access digital logistics platforms and delivery options in order to compete with larger companies with established e-commerce resources.

Taking Action

Develop partnerships on e-commerce solutions

Consider direct funding

Support training and job creation

Partner with local courier companies

Why: The local retail sector is important to the vibrancy, sense of place and economy of any city. There is still a role for brick-and-mortar stores post-pandemic, it just looks different. Retailers recognize that thriving post-pandemic depends on complementing brick-and-mortar locations with online shopping. As a result, many large businesses are repositioning stores to act as fulfillment centers. For example, consumer electronics retailer [Best Buy designated 340 of its stores as online fulfillment centers](#), improving its competitiveness for fast deliveries. Meanwhile, many small and local businesses have closed. Helping small and local business expand their reach to meet new markets and adjust to the new realities of doing business in the doorstep delivery era is critical to cities' economic recovery, and growth going forward.

City spotlights: Ontario, Canada; New York; Baton Rouge, Louisiana

In June, 2020, the Province of Ontario and Government of Canada provided a combined CAD\$57 million to the [Digital Main Street](#) Digital Main Street platform, that supports the digital transformation of Ontario's 22,900 businesses and generates more than 1,400 jobs for students. This funding supports the launch of online stores for businesses that did not have the capacity to do so, a CAD\$2,500 grant administered by the Ontario Business Improvement Area Association to help businesses adopt new technologies and digital marketing, and offers support with online business models. This initiative supports delivery companies such as Toronto-based Mile1, as a way to help retailers have their goods delivered quickly. The federal government also partnered with e-commerce platform Shopify to launch the [Go Digital Canada](#) resource hub for small business.

In October 2020, the State of New York announced [Empire State Digital](#), an initiative that works with global e-commerce companies to accelerate the digital transformation of small businesses in New York State. Participating partners (Shopify, Square, Clearbanc, and Etsy) offer specialized solutions such as education, free resources, marketing support, and discounted pricing that help small businesses grow their online presence. In December that year, the program was expanded into a second phase with new partners (Ritual and PayPal) targeting restaurants and food services.

In Baton Rouge, Louisiana, electric bike and scooter ridesharing company Gotcha launched a delivery service during the COVID-19 pandemic called [TO GO](#) that let restaurants, grocery stores, and other local businesses rent a sit-down scooter for US\$15 a day to deliver goods to customers. Allowing businesses to rent their own clean delivery vehicles lets them cut out third-party vendors that charge 20-30 percent per order. The service was started in Baton Rouge and expanded to other cities in the U.S. where Gotcha operates.

For implementation:

- Partnerships with the private sector, not-for-profits and industry associations are needed to offer e-commerce platform solutions for small businesses.
- Businesses, especially small or independent enterprise, need financial support for this transition. Consider allocating specific funding to support their digital transformation.
- Support training and job creation for students and new grads with digital literacy skills to increase the human capital available for digital adoption.
- Partner with local courier companies to finance affordable and clean delivery options for small businesses.

Business spotlight: Bikes for Business

In the U.K., [Bikes for Business](#) is a project backed by Transport for London that aims to convert 15 percent of business deliveries in Central London to cargo bike deliveries. This industry-led initiative was timed to launch in tandem with the introduction of Central London's Ultra Low-Emission Zone in 2019.





Widely implementing solutions already available will transform our cities. But so will bold, innovative thinking. As future-looking ideas crop up, it is increasingly important to evaluate models based on community impact — not only technological possibility. Here are several examples of the kind of reimagining that can and must be done to tackle urban freight.

BOLD, NEW IDEAS

Waterway logistics hubs

What: Waterway logistics hubs are distribution centers that float on inland waterways such as rivers, lakes, or canals. Operating like a microhub boat that follows a set route along the waterway, parcels are delivered to the hub and are sorted on board for cargo bike couriers to pick them up for the last-mile delivery to their destination.

Why: Integrating waterways into logistics infrastructure allows cities to reduce the pressure of rising parcel volumes on their road networks. They take advantage of unused water space to enable more reliable service by delivering packages faster and providing more flexible delivery and pick-up times. Besides reducing congestion and improving reliability, waterway logistics hubs can also reduce freight transportation emissions by taking delivery trucks off the road, using smaller, cleaner delivery vehicles, and running the floating hub on clean or renewable fuels.

Testing grounds: In 1997, courier DHL launched the [first floating distribution center on Amsterdam’s canals](#) to improve DHL’s operations in the city. It was part of a

multi-modal supply chain made up of the canal boat hub, and electric vans and cargo bikes that made the last-mile deliveries in the city. When it launched, the boat took 10 delivery vans off the road, saving 120,000 liters (31,700 gallons) of fuel every year and was still able to increase the number of deliveries made from five to six deliveries an hour to [17 deliveries an hour](#). In 2018, the boat was replaced with one with an electric motor to align with Amsterdam’s zero-emissions-by-2025 target.

Driven by severe inefficiencies in New York City’s highway-based freight system such as congested interchanges and degrading highways, the [U.S. Coastal Service launched as a shipping start-up](#) that views the New York Harbor as an underutilized asset in the city. The company offers waterway logistics services that bypass the limitations of the road networks. One of the services offered is door-to-door delivery of palletized (stackable) freight, where most of the delivery trip happens on water, and the last-mile delivery is done using electric box-trucks. This practice reduces door-to-door delivery to only a few on-road zero-emission miles.





Underground delivery tunnels

What: The use of subsurface tunnel networks that link logistics hubs with residential and commercial buildings. Such a system could enable the delivery of packages around the clock without congesting city roads.

Why: Use of underground tunnels could improve safety by taking vehicles off the road and reduce truck traffic and emissions from idling in traffic. Not having to share the road with other vehicles means that activity can happen around the clock without delays or interruptions, enabling faster delivery. Cities that want to leverage existing infrastructure networks and explore underground delivery tunnels would need to undergo the necessary planning and engineering studies and consulting processes.

Testing grounds: Underground delivery tunnels were being explored as part of the [project in Toronto's Quayside waterfront district](#) before it was cancelled in 2020. Underground tunnels were going to be used in combination with electric delivery dollies to deliver packages and transport storage items and waste between buildings throughout the day.

In the U.K., start-up company, [Magway](#) raised US\$1.4 million in 2020 to pilot a zero-emission delivery system in the City of London. Using a network of underground pipes and delivery pods magnetically levitating on a railway, Magway reports that it can take 90 percent of delivery vehicles off the road while delivering packages faster and 70 percent cheaper than road deliveries.



E-commerce tax and sustainable shipping fees

What: A tax or fee on goods purchased online that have high-carbon delivery methods. A flat rate or percentage fee could be applied at check-out for online purposes and then be ramped up the farther that the product is sourced from the destination or the faster the product is expected to arrive at its destination.

Why: A tax on e-commerce can simultaneously encourage shopping from local retailers while reducing trip lengths and minimize resulting air and greenhouse gas pollutants. Reducing or waiving the tax or offering discounts for deliveries made sustainably (in cleaner vehicles or using slower delivery methods) would push businesses to adopt cleaner methods to incentivize consumers to opt for low-impact delivery options when available. Taxation or mandatory fees would prompt quicker and more transformative change but may be harder to pass, while voluntary fees may not see a significant impact. Alternatively, businesses can give customers the option to voluntarily opt-in for sustainable shipping at check-out. When designing an e-commerce tax, considerations should be given to how the tax applies to different businesses (e.g., local vs. multinational businesses), possible exemptions to certain groups, and ways to encourage a more sustainable delivery system.

Testing grounds: In 2018, a [proposal](#) was put to the French Senate for a tax on e-commerce deliveries, which would be scaled according to distance travelled. For delivery distances less than 50 km, goods would be taxed 1 percent, for distances between 50 to 80 km it would be 1.5 percent, and for distances greater than 80 km it would be 2 percent, with a minimum tax of €1.00 per online order. Deliveries made using modes that do not consume fossil energy like electric vehicles or cargo bikes, however, would be exempt from the tax. As of March 30, 2021, the bill had not been approved. A revised bill is reportedly being developed that would calculate and show delivery costs on online purchases. That bill is expected to be brought forward later in 2021.

International package delivery company [UPS offers a carbon neutral shipping option](#) to counteract the negative impacts of shipping on the environment. UPS charges flat fees of 5 cents per package for ground (standard) shipping, 20 cents for air (expedited) shipping, and 75 cents for international shipping. The fees are added to the bill for each package shipped, which businesses could pass on to customers who want to choose sustainable delivery options.



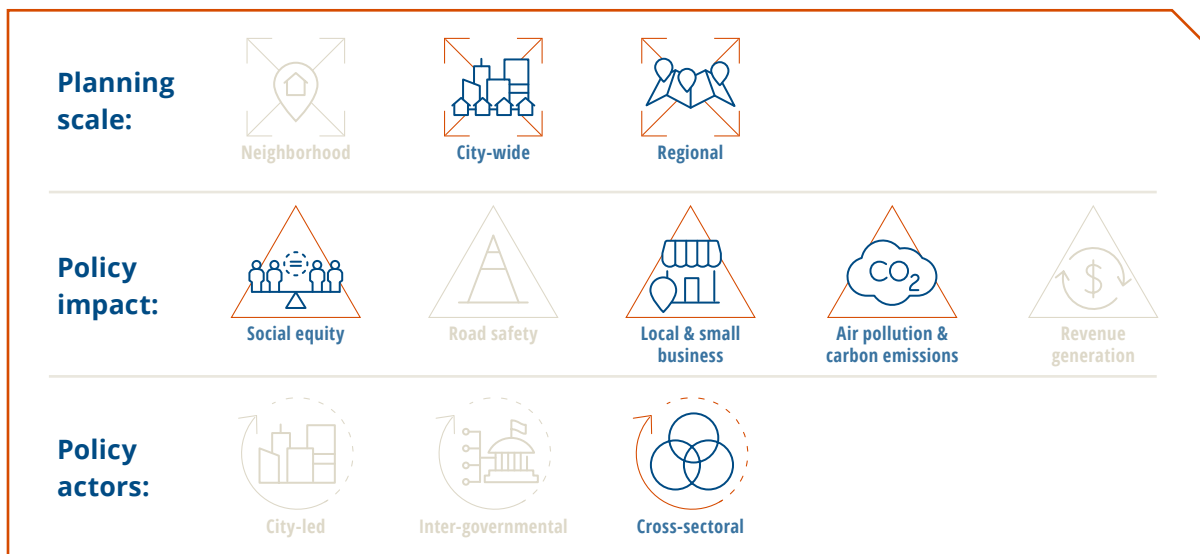
New warehouse and supply chain models

What: Digital tools and platforms that allow small businesses to reach more customers by decentralizing, automating, and digitizing their supply chain.

Why: To future proof the small business sector, businesses need to innovate with transformative, digital plans for their entire supply chain. New models that offer businesses more transparency and cooperation with tech innovators and other actors in the supply chain are increasingly important for their competitiveness, as they can enhance and increase their interactions with customers and optimize processes and service offerings. As economies reopen, governments should consider how best to help accelerate this transformation for main street businesses.

Testing grounds: Flowspace is an online warehouse management platform that allows shop owners to ship products from thousands of warehouse locations across the U.S. without having onsite warehouse space of their own. [Flowspace](#) selects the best courier to transport the goods to their destination and takes care of selecting, packaging, and shipping the product. By working with decentralized fulfillment warehouses, businesses do not have to worry about storing inventory or running out of warehouse space and can deliver from a warehouse close to them, thereby reducing delivery time and costs.

REEF Technology turns underutilized real estate into dynamic logistics hubs through 4,500 locations that serve 70 percent of North America’s dense urban areas. REEF operates [modular distribution trailers](#) that are available on-demand to allow nearby retailers to store inventory, even refrigerated or frozen goods, for delivery by last-mile partners using e-cargo bikes. This model is being [piloted in Miami](#) as a partnership between the City of Miami, the Downtown Development Authority, Miami Parking Authority, REEF Technology and DHL. The four e-cargo bikes used in this pilot will reduce emissions equivalent to taking 31 passenger vehicles off the road every year.



Ready for pick-up

Cities are the common ground where people, businesses, and goods meet, giving city planners the opportunity to shape these interactions and the impacts of city activity on its residents. What has become increasingly clear in recent times is that an increased demand for e-commerce delivery urgently requires forward-thinking planning, in order to prevent further environmental and health impacts on our cities and to ensure the resilience of a local economy.

A well-designed goods movement system that combines equitable public policy with low-emissions technology, and which holds business, regulators, and consumers accountable to improve their environmental performance, is the best path forward to mitigating the rising impacts of urban freight.

This report identifies six solutions, already being piloting around the world and ready for wider implementation, and four new ideas, representing the kind of bold action cities need now. Taking steps to

manage urban freight can have significant positive impacts on city life, from reducing air pollution in vulnerable communities to boosting economic recovery. The path forward must include a combination of solutions that meets the unique needs of individual communities but should represent inclusive, sustainable innovation — not technological innovation for its own sake. Therein lies the challenge for cities in a post-pandemic world. And with that, consider this package of solutions now ready for pick-up.





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