

SMART-PBOT project

Technical Report: Carrier Interviews

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1. Interviews performed

In 2023, Portland was awarded a U.S. Department of Transportation SMART grant to pilot a Zero-Emission Delivery Zone (ZEDZ). Funding for this Stage One SMART grant will allow PBOT to trial changing three to five truck loading zones into “Zero-Emission Delivery” loading zones in downtown Portland. The Urban Freight Lab (UFL) was approached by PBOT to assist in their SMART grant implementation by providing subject matter expertise on the topics of urban freight, curb management, and freight decarbonization. The UFL team created a questionnaire and interview guide to inquire about current carrier operations, current and future fleet composition, and loading activities of carriers operating in the City of Portland.

The selected organizations were identified as carriers or organizations that make deliveries into the proposed Zero-Emission Delivery Zone (ZEDZ) in downtown Portland. The UFL reached out to over 20 different organizations spanning different business sectors and company sizes, from large national parcel carriers to regional wholesale distributors to small delivery companies. Ultimately, only four organizations responded to requests for interviews. Between June and August 2024, the UFL conducted these interviews. Table 1 provides an overview of the companies interviewed and their main business activities. Company and organization names are omitted from this report to anonymize the respondents.

The goal of the interviews was to understand the parking behaviors and fleets of individual companies. In particular, the interviewers focused on understanding the current delivery operations in the Portland area, the related parking and routing behaviors of their delivery drivers, fleet composition, and the challenges they face in performing deliveries in the study area.

Each interview was 1-hour long and was guided on a questionnaire reported in the appendix. The questionnaire was developed into three sections.

- Organization - Describe their main business activities, logistics network and fleet composition.
- Routing, parking, and payment behaviors - Description of typical drivers’ operations in the City of Portland and specifically downtown, including routing and parking behaviors, as well as use of paid parking and citations.
- Future scenarios - Companies were asked about zero-emission vehicles and implications of the ZEDZ on operations.

The following sections provide the main results of the interviews, including a description of the logistics network infrastructure, delivery operations and curb use behaviors. The final section provides the key lessons learned.

Table 1. Description of interviewed businesses

ID	Business sector	Business description	Interview date
1	Wholesaler - office supplies	Wholesale supplier of office, janitorial and technology items	6/17/2024
2	Government	Large government fleet	6/26/2024
3	Wholesaler - janitorial supplies	Wholesale supplier of maintenance and janitorial items	7/11/2024
4	Parcel carrier	Large global parcel delivery company	8/14/2024

2. Interview results

2.1. Infrastructure

Table 2 reports the main information on the logistic networks, typical customers, service area, and fleet composition of the interviewed organizations. The companies differ in size, reflected in the type and extension of their logistic networks.

Company description. Companies 1 and 3 are large, national office supply and janitorial/maintenance suppliers, respectively. They provide business to business (B2B) services, supplying their products to a variety of offices, multifamily buildings, cleaning businesses, and public organizations (e.g., schools/school districts). Organization 2 operates a large and diverse municipal fleet across a variety of use cases and services ranging from law enforcement to road maintenance to social services and administrative purposes. Company 4 is a national parcel carrier serving residents and businesses.

Fleet composition. The interviewed organizations use large truck trailers, box trucks, sprinter or panel vans, and passenger vehicles to perform pick-ups and deliveries. Vehicles are typically internal-combustion engine (ICE) or diesel-based. Some organizations reported that the fleet ownership scheme is transitioning towards rental/leasing vehicles as opposed to ownership as a way of replacing older vehicles or ones that require maintenance, or towards outsourcing delivery through other means. Only one company was actively operating electric vans in the Portland area and one company used third-party services to provide limited e-cargo bike deliveries.

Table 2. Infrastructure and fleet composition of interviewed organizations

ID	Logistics network structure	Typical customers	Service area	Fleet composition
1 – Wholesale - Office	Several warehouses around US source direct to consumer shipments, with primary warehouses in Kent, Washington that services Pacific Northwest region (3 trips/day).	Majority of deliveries made to office customers.	<ul style="list-style-type: none"> • United States • Portland area served from regional warehouse 	Private fleet owned in Washington. 3 rd -party carrier model in Oregon so numbers vary depending on the size of the logistics company. Typically, a mix of: <ul style="list-style-type: none"> ○ Sprinter/panel vans ○ Larger trailer (53') for furniture or delivery to multiple carriers ○ Cargo bikes
2 – Large Government Fleet	Decentralized network: vehicles operate from the homes (of the vehicle operator) or publicly owned facilities where they park following their usage.	Any government or public institutions, mail services, social services, etc.	Portland regional area	~850 vehicles, some vehicle-attached assets: <ul style="list-style-type: none"> • All owned • Will use rental cars sometimes if owned vehicles are undergoing maintenance. • Largest vehicles are box trucks and vans used to perform specific services. • Majority of fleet is smaller light-duty vehicles.
3 – Wholesale - Janitorial	One warehouse is located at the edge of Portland/Gresham. Other warehouses in Oregon and around the US to serve other areas.	Public schools and school districts in Portland, companies that perform cleaning services for businesses.	<ul style="list-style-type: none"> • United States • Portland area served from regional warehouse 	8 diesel box trucks <ul style="list-style-type: none"> • 3 16' Isuzu • 1 20' Isuzu • 1 20' Long Nose International • 3 26' [unknown brand]
4 – Global Parcel Carrier	Their Portland-based distribution center is located in the East Columbia neighborhood.	Business and residential customers	<ul style="list-style-type: none"> • United States • Portland area served from regional warehouse 	Up to 230 vans from the regional distribution center. Majority diesel vans with some electric vans.

2.2. Delivery operations and curb use behaviors

Route characteristics. The number of routes varied across carriers operating in the City of Portland/greater Portland area daily, ranging from less than 10 routes/day to over 200 routes/day from a single warehouse location. Delivery routes ranged from one to two stops for some government vehicles to 10 to 25 stops for wholesale deliveries to over 200 stops/day for parcel deliveries. Parking dwell times range between 5 to 20 minutes, with longer dwell times (20 min or longer) associated with larger deliveries like furniture or pallet-sized orders or multiple deliveries made from one stop.

Challenging areas. Some of the more difficult areas to operate in include:

- Downtown: Construction impacts, one-way roads, reported less available zones/parking, which Seattle-based operators suggested as a result of light rail expansion and construction, near McCoy building and courthouse.
- Local neighborhoods: Navigating a large truck to make deliveries to schools or multifamily residences.

Delivery times. All companies interviewed made no mention of specified delivery times, reporting specified shifts for their delivery drivers and allowing them to work at their own pace. Company 1 reported the use of an early morning (5 a.m.) distribution center large truck delivery to 3rd party delivery services, but all other deliveries or operations are performed during an assigned shift. Company 4 specified average start and ending windows that vary based on day, route, and season (see Table 3 for details).

Parking choice and curb use. All companies, except the parcel carrier, reported that their drivers specifically prioritize parking at Truck Loading Zones. None of the interviewed groups reported their drivers using paid parking areas. Some companies reported that some buildings have loading docks and will prioritize using those when they're more accessible or makes more sense to do so, but there are issues associated with loading docks such as they may be occupied. Buildings that most often have a loading dock are government buildings or public institutions such as schools. It was noted by Company 1 that there are very few loading docks that can accommodate large vehicles, though further details were not provided. It was advised by Company 1 that Portland should require the construction of loading docks for new developments.

Some Seattle-based companies noted the increase in light rail construction has resulted in the loss of truck loading zones, becoming sparser within the city. It was also noted that construction and tight roads in the downtown area can be a hindrance to operations.

Citations. The companies reported rarely receiving citations, if any, during a given year. Some noted the lack of enforcement around non-commercial vehicles usage of truck loading zones.

Table 3. Typical delivery and parking operations of interviewed businesses in the study area

ID	No. routes	Dwell time	No. stops/deliveries per route	Time	Parking choices	Citations/year
1 – Wholesale - Office	The number of routes was unknown by the interview ee.	Typically, < 5 minutes. 15 minutes for large product delivery.	5-10 stops	8 am to 5 pm	In order of priority: 1) Truck Loading Zones or loading dock 2) Curb or off-street 3) Alleys 4) Double park	The number of citations/year was unknown by interviewee.
2 – Large Government Fleet	2-3 delivery specific routes	10 minutes	1-2	Vehicles in use all day.	In order of priority: 1) Curb 2) Loading dock 3) Alley 4) Double park	Very few, 0-1/year
3 – Wholesale - Janitorial	7-8 routes	Typically 2-5 minutes. Some are 10-15 min.	21-26 stops	8:30 am to 4 pm	In order of priority: 1) Curb 2) Truck Loading Zone or loading dock 3) Off-street 4) Double park	Very few citations, 0-1/year
4 – Global Parcel Carrier	Up to 230 routes	Between 1-20 min/stop. Some stops serve multiple customers.	250 stops/route on average	Hours vary but typically (9:45-11:45AM departure) to (6-10pm return)	1) Curb 2) Loading docks or other legal loading 3) Alleys	The number of citations was not provided by interviewee.

2.3 Zero-Emission and Sustainable Operations

Companies 1-4 stated there are corporate or government goals around sustainability and lowering emissions but varied in specificity regarding deliveries or fleet composition and maturity of implementation. Companies 1 and 3, the wholesale distributors, described

small-scale piloting and experimentation with fleet electrification at the national level but nothing at the Portland regional level. Neither reported knowledge of near-term or immediate plans to scale or advance these pilots, but both were aware of the Portland ZEDZ pilot. They disclosed that if leasing or renting electric vans were needed to maintain current customer service levels (eg needed to access loading areas for current delivery routes) and customer satisfaction, they would be open to these changes.

Organization 2 represents a government agency that has carbon and sustainability goals but has limited demonstrations to date mainly due to lack of funding for new vehicle purchases.

Company 4 represents a global parcel carrier that has set an operational net-zero carbon goal and has demonstrated large scale zero-emission vehicle deployments in the United States and abroad (vans and bikes). They have a portion of their current fleet that is now electric vans, including some in the Portland market (an exact number was not given).

Companies 1 and 4 have both used e-cargo bikes for deliveries, operated by third-party carriers. Only Company 1 has implemented any e-cargo bike deliveries in the Portland area with Company 4 primarily operating bike deliveries in New York City. Company 4's key factors for e-cargo bike deployment considerations included: safe bike infrastructure, availability of bike loading and parking areas, delivery demand density (packages per sq./mile), weather, and topography. Company 1 expressed concern about cargo bike carriers' ability to scale quickly to meet demands if the ZEDZ project pushed additional customers to that carrier.

2.4 Policy Recommendations

Reaction to ZEV policy strategies. UFL presented each organization with a list of potential strategies to influence the adoption of ZEVs and asked for their top choices and reactions. The strategies are listed below in **BOLD and underlined** in rough order of collective preference with specific comments listed below each strategy.

What would influence the adoption of ZEVs into your companies' fleet?

- **Provide EV-only loading/unloading spaces in areas with scarce parking and/or curb access.**
 - One company reported that they would support zero-emissions loading zones as long as there is real-time camera/technology enforcement. They reported that delivery workers often find loading zones occupied by passenger vehicles parked there or TNC vehicles waiting for a ride and emphasized that enforcement is an integral piece for zero-emission loading zones.
- **Increase government purchasing incentives (e.g., grants, loans, or tax credits).**
 - Consensus that incentives for both vehicles and overnight charging infrastructure installation would be helpful for all businesses trying to electrify their fleets.

- Consensus that all relevant tax incentives for vehicles, EV parking, and/or infrastructure will improve the cost equation for the EV fleet total cost of ownership (TCO).
- **Allow EVs to view curb space availability ahead of arrival.**
 - One company reported that routing software is highly dynamic day-to-day, designed to minimize VMT and time on the road, so drivers will arrive when and where routing software sends them. Entering loading zone data in routing software would help drivers target loading zone parking where available.
- **Strategically place and make publicly available EV charging stations.**
 - One company mentioned that overnight charging might be more useful since respondents stated it would be unlikely for a vehicle to stop during a route to charge.
 - One company reported currently using overnight depot charging where electric vans are deployed but is open to exploring the use of public charging infrastructure.
- **Reduce parking rates, permit fees, or tolls for EVs.**
 - Consensus that lower rates might create additional incentives for EV adoption.
- **Charge lower electricity rates for EVs than typical commercial rates.**
 - One company indicated that lower electricity rates might incentivize EV adoption.
- **Allow EVs to view and reserve curb space ahead of arrival.**
 - Consensus that reservations might be hard to implement given the difficulty predicting exact arrival times and dynamic nature of driver behaviors to current conditions.
 - One company indicated that routes for last mile package delivery are dynamic, traffic impacts delivery times, and stop times are very brief, so it would likely be challenging to align delivery times with pre-reserved curb space delivery time slots. However long term, they were open to investigating the possibilities, knowing this tech development would be complex, and take time.
- **Congestion pricing.**
 - Consensus that this policy could be potentially disruptive and burdensome to delivery companies.
- **Stricter enforcement of anti-idling restrictions.**
 - Some organizations reported that they already do not allow trucks to idle during deliveries. Consensus that this strategy was unlikely to incent EV adoption.

Reactions to the proposed Portland ZEDZ. Below is a list of additional feedback on the proposed pilot and ZEDZ concept and its perceived impacts on these organizations.

- Designating zero-emission loading zones could serve as a driver toward electric vehicle adoption especially if these zones increase efficiency and reduce challenges in finding parking and loading areas.
- The size and scale of the ZEDZ may impact the business decision to make changes. For example- a bigger area or more than one area with these zones might have more influence than a smaller area.
- The City should consider the timeline for implementation- especially if contracts or terms between businesses are less flexible to change (e.g. pricing, vehicle availability, etc). Longer timelines give businesses more time to anticipate and make changes to their fleet and operations.
- Larger companies with more access to capital will likely have an easier time adapting than smaller companies with less capital and flexibility in their operational model.

3. Key lessons learned

- The transition to zero-emission delivery is complicated and must consider the various players and companies involved in these transactions. While many of the interviewees themselves expressed support or interest in this initiative on a personal level, they made clear that there were several factors that would determine fleet conversions and changes to the current state of operations.
 - There is an interplay between these players, which is sometimes overlapping. Retailers and suppliers (those who market and sell goods), carriers or delivery fleets (those who transport and deliver the goods), and receivers (customers or businesses that order or receive the goods).
 - These interviews validated information received through other channels that there appears to be a shifting landscape around fleet ownership and delivery. Some of the companies interviewed mentioned that they have historically owned and operated their own delivery fleet and performed “in-house” deliveries. They mentioned that they have increasing plans to shift towards either third-party carriers (third parties that would complete deliveries on their behalf similar to a contractor model) and/or for “in-house deliveries” shifting the fleet assets towards a rental or leasing model to minimize capital costs for fleet maintenance and ownership.
 - Cost has traditionally been the biggest determining factor for companies performing deliveries with third-party contracts often awarded to the lowest cost vendor. Factors that impact cost, such as higher vehicle rental or ownership costs, will impact the financial equation for businesses.
 - As a result, it is not yet understood how these changes may impact the speed and timing of ICE to ZEV fleet conversion and/or how these industry shifts might impact the ability for companies to react to new policies such as the



Portland ZEDZ. How does the cost of fleet electrification factor into purchasing and bidding within private carrier and third-party carrier decisions? Can fleet providers procure electric vans or trucks quickly enough for carriers to rent/lease/purchase? Can existing zero or low-emission carriers, such as cargo bike logistics operators quickly absorb additional customers?

- Carriers and delivery companies react to market demands from their customers: the receivers and/or the retailers. The interviews highlighted that as of September 2024, they are not hearing from these customers about preferences or requirements for ZEV deliveries. Those interviews indicated that this would impact their decisions around ZEV deployments.
- In addition to curb space changes, companies identified other infrastructure and zoning requirements such as requiring loading docks for new developments and/or providing off-street loading areas for deliveries to buildings.

4. Appendix

4.1. Questionnaire

Interviews were structured into four main topics, each containing multiple questions.

- Topic 1: general information about the organization being interviewed
- Topic 2: routing, parking, and current operations
- Topic 3: future scenarios and incentivization

The following table contains a list of questions categorized into the three topics listed above. However, the interviews were relatively informal, and the questionnaire was taken into consideration more as a starting point.

Portland will be the first U.S. city to pilot a regulated Zero-Emission Delivery Zone (ZEDZ). The regulated ZEDZ will be active during a demonstration period of approximately six months beginning in late summer/early fall of 2024. During this temporary demonstration period, the parking rules for all truck loading zones within the project area will be changed to prioritize access for zero-emission vehicles only. Loading zones within the ZEDZ will be monitored by parking sensors, both before and after the approximately six-month long demonstration period, so that project staff can better understand the impact of this regulation.

Before the interview begins, state that we are performing interviews with a variety of companies and that these will not be recorded and any answer will remain anonymous. We understand that you may have competitors in this space and we will never share any information or your responses with any other company.

#	Variable	Question/ Description
<i>0. Interviewee</i>		
0.1	Contacts	Name and contact of the interviewee(s)

0.2	Role	Role in the organization, department, responsibilities, ...
<i>1. Organization</i>		
	Main business activity	Describe the main business activities of your organization, including types of goods moved or services performed, who (and where) are their customers, and where are they located
	Fleet composition	How many vehicles comprise your fleet and what types? Do you own all the vehicles in your fleet, lease, or rent?
	Sustainability	<ul style="list-style-type: none"> • Does your company have stated sustainability goals/Climate Action Plan • How does your company currently monitor its progress towards meeting those goals? • What other goals does your company have that might be related to sustainability, e.g., efficiency gains, route optimization, etc.?
<i>2. Routing, parking, and current operations</i>		
	Distribution center/fleet depot	Where is your Portland-area based distribution center, vehicle depot or dispatch center located? (Inside city limits or outside?) Address or neighborhood
	No. routes	How many routes do you have during a typical day? Do any vehicles, on average, perform multiple tours? Do these include pick-ups at customer locations?
	Location of stops	Where do you usually perform deliveries/pick-up/services?
	Route time and mileage	When do you usually perform the routes? Day of week, time of day (early morning, morning, ...) How many miles?
	No. stops per route/deliveries per route	How many customers do you serve per route? How many deliveries do you make per route? Roughly how many stops?

	Parking choice	<p>Where do drivers usually park?</p> <ul style="list-style-type: none"> Do drivers use truck loading zones, off-street parking, loading/unloading bays, alleys, and/or curb parking?
	Dwell time	<p>What's the typical dwell time for a parking stop? Do your deliveries require special equipment (e.g., pallet jack, forklift, etc.)?</p>
	Challenges	<ul style="list-style-type: none"> What are the main challenges your drivers experience in driving and parking in the City of Portland? <ul style="list-style-type: none"> Ask about parking violations and the cost of those violations, as well as permitted parking. Which specific areas/neighborhoods are the most challenging and why?
<p><i>3. Future scenarios and incentivization</i></p>		
3.1	<i>Fleet composition answer dependent</i>	<i>If the company has previously owned or currently uses zero-emission vehicles (EVs, e-cargo bikes, etc.) ...</i>
	Previous Usage	<ul style="list-style-type: none"> How was your previous experience using zero-emission vehicles <ul style="list-style-type: none"> I.e., why and how did they adopt it before Why did your company discontinue the usage of zero-emission vehicles?
	Current Usage	<ul style="list-style-type: none"> How does your usage of zero-emission vehicles (location/route, goods type, delivery time) differ from traditional vehicles?
3.2	<i>Fleet composition answer dependent</i>	<i>If the company hasn't previously owned or doesn't currently use zero-emission vehicles...</i>
	EV (BEV or other zero-emission vehicle) adoption & incentives	<ul style="list-style-type: none"> Has your company considered or explored EV or other sustainable fuel fleets? Do you have a timeline for adoption? How would a ZEDZ influence that timeline?

	E-cargo bikes adoption & incentives	<ul style="list-style-type: none"> • Has your company explored adopting e-cargo bikes into its fleet? Does the type of good you delivery facilitate cargo bike usage? • How might a ZEDZ influence the adoption and/or usage of e-cargo bikes?
3.3	Policies for ZEV adoptions	Review the PBOT ZEDZ pilot and locations
	Policies for ZEV adoption	<p>What would influence the adoption of ZEVs into your companies' fleet? Examples:</p> <ul style="list-style-type: none"> • Strategically placed and publicly available EV charging stations • Allowing EVs to view curb space availability ahead of arrival • Allowing EVs to view and reserve curb space ahead of arrival • Provide EV-only loading/unloading spaces in areas with scarce parking and/or curb access • Increased government purchasing incentives (e.g., grants, loans, or tax credits) • Reduced parking rates, permit fees, or tolls for EVs • Congestion pricing • Stricter enforcement of anti-idling restrictions • Charge lower electricity rates for EVs than typical commercial rates
	Reaction to ZEDZ	<p>How likely is a ZEDZ with ZEV-only loading/unloading/parking spaces to impact your companies decision or timeline to use zero-emission vehicles? More likely, less likely, or no impact? Considerations?</p>
	Recommendations	Other recommendations for the City to consider to support your company/fleet in this transition?



	Other thoughts	Is there anything else related to this topic that you think we or PBOT should know either about your operations specifically or about the industry in general?
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