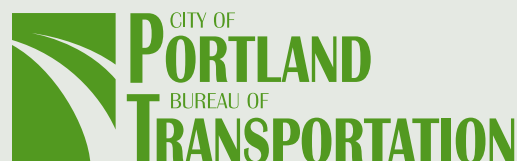




City of Portland Central City Sustainable Freight Strategy

Report and Recommendations

October 2012





OFFICE OF MAYOR SAM ADAMS
CITY OF PORTLAND

We live in a dynamic time.

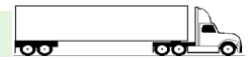
Over the next 20 years, Portland's Central City is expected to become an even more densely populated and economically diverse hub. Among the many ripple effects will be an increase in the demand for products—and the freight traffic to deliver them. In addition to more traffic, there will be increased competition for street space among transit vehicles, trucks, pedestrians, bicyclists, and motor vehicles. We lack the funding or the space to simply increase roadway capacity – and even if we could, experience around the world has shown that to be inefficient to solve traffic problems.

As we grapple with how to meet this challenge, we are turning to the community – especially the freight carriers and logistic companies – for advice and participation. How will you navigate these shifts? What resources will you require to survive and thrive? How will you coordinate with others? I invite you to be part of the *Portland Central City Sustainable Freight Strategy*, which follows. The vision: increase efficient movement of goods while supporting a green economy with family wage jobs and sustaining Portland's status as a healthy, thriving community. Developed by freight experts and sustainability advocates, this plan focuses on the actions we can take immediately to meet the challenges of climate change and take advantage of the business opportunities presented by a denser city. Our goal: find an optimal approach to goods delivery in the Central City and surrounding close-in neighborhoods. As Mayor and Transportation Commissioner, I endorse the *Central City Sustainable Freight Strategy* as a critical first step in this important journey, and I invite you to join us. Help us develop and implement the ideas in this plan. Together, we will ensure we keep freight moving while keeping Portland a great place to live and work!

Sincerely,

Sam Adams

Mayor, City of Portland



Executive Summary

In 2009, the Portland City Council adopted the Climate Action Plan which sets targets for reducing carbon emissions to 40% below 1990 levels by 2030. Recognizing that moving goods and people accounts for nearly half of the greenhouse gas emissions in Multnomah County, the Climate Action Plan highlights the importance of improving the efficiency of freight movement in the Portland region. The goal of the Climate Action Plan to reduce greenhouse gas emissions runs parallel to operating an efficient freight business. Using more fuel increases carbon emissions; using less fuel saves money for the freight company.

In addition, the anticipated increase in urban density supported by current City and regional land use policies will create a much more diverse and mixed use Central City area. One of the challenges of an increasingly dense Central City will be delivering groceries, clothing, office supplies and on-line products to consumers while garbage, packages and locally manufactured products need to be shipped out. Not only will the amount of freight movement increase, Portlanders will prefer that it moves with less noise, parking space and fuel consumption.

In developing potential strategies for implementing the Climate Action Plan and accommodating freight movement within a denser Central City environment, the Portland Bureau of Transportation (PBOT) initiated a planning process in 2010 to identify sustainable freight practices implemented in other urban areas and their applicability in Portland. This process called upon local freight experts and other stakeholders to recommend sustainable strategies tailored for Portland. The following summarizes what was heard from the various stakeholder group discussions:

City of Portland Climate Action Plan

2030 Objective #7: Improve the efficiency of freight movement within and through the Portland metropolitan area.

2030 Objective #9: Reduce the lifecycle green-house gas emissions of transportation fuels by 20 percent.

- Sustainability is directly associated with productivity; fewer trips and delivery miles are achieved with full loads.
- Freight carriers reduce their carbon footprint by improving fleet performance.
- Customers are already adapting their shipping/receiving schedules to avoid peak hours of traffic.
- Existing inadequate supply of on-street loading and unloading spaces erode efficiency.
- It is important to recognize that the changed conditions that result from redevelopment can have significant impacts on the operating needs of close-in industrial manufacturers and shippers - and that, in many cases, those close-in industries enhance Portland's livability.
- Restricting truck size does not necessarily lead to efficiency; one large truck can be more sustainable than multiple smaller trucks with respect to fuel use, emissions produced, and the number of on-street loading areas needed.

Achieving the Climate Action Plan goals and challenges of accommodating freight movement within an increasingly dense Central City environment requires ongoing partnerships among the business community, local governments, community interests and the other stakeholders. The *Central City Sustainable Freight Strategy* is designed to address these issues and enhance our ability to reduce emissions and fuel usage even further. The following actions were recommended by City staff, the Sustainable Freight Working Group and the Portland Freight Committee for implementing the *Central City Sustainable Freight Strategy*:

- Prepare a comprehensive truck loading and parking plan to increase the efficient use of public right-of-way space.
- Develop a best practices street design guide for the safe and efficient movement of delivery vehicles.
- Identify incentives to encourage unattended delivery depots and other "last mile" delivery solutions.
- Apply zoning provisions to allow centralized freight distribution districts to freely operate and to increase industrial-based employment densities.
- Implement an off-hour delivery pilot program for the Central City.
- Explore partnership opportunities to provide financial and other incentives to purchase/lease electric-hybrid delivery vehicles and install charging stations.
- Coordinate with other City bureaus and outside agencies to develop strategies to increase the use of rail, barge and other multi-modal freight options.



Acknowledgements

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1. Key Elements of Sustainability

While there is no official definition of sustainability, there are several key interrelated elements that influence the implementation of sustainable freight strategies and objectives. These key elements involve the economic, environmental and social needs and impacts of urban freight transport. BESTUFS (Best Urban Freight Solutions), a program funded by the European Commission to identify best practices and solutions for urban freight transport, describe these interrelated elements as follows:

BESTUFS approach to sustainable urban freight transport:

The aim of a sustainable transport strategy is, “to answer, as far as possible, how society intends to provide the means of opportunity to meet **economic**, **environmental** and **social** needs efficiently and equitably, while minimizing avoidable or unnecessary adverse impacts and their associated costs, over relevant space and time scales” (UK Round Table on Sustainable Development, 1996).

Existing freight transport systems in urban areas create a variety of negative economic, environmental and social impacts. These include:

- **Economic impacts:** congestion, inefficiency, and resource waste.
- **Environmental impacts:** pollutant emissions including the primary greenhouse gas carbon dioxide, the use of non-renewable fossil-fuel and waste products such as tires, oil and other materials.
- **Social impacts:** the physical consequences of pollutant emissions on public health (death, illness, hazards etc), the injuries and death resulting from traffic accidents, noise, visual intrusion, and other quality of life issues (including the loss of greenfield sites and open spaces in urban areas as a result of transport infrastructure developments).

Sustainability policies can address **economic**, **environmental** and **social** objectives. The most effective sustainability freight transport policy measures are likely to be those that meet **economic**, **environmental** and **social** needs simultaneously; and so minimize trade-offs between objectives to reduce associated losses and costs.

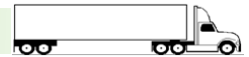
City of Portland Climate Action Plan

2012 Action (i): Protect existing intermodal freight facilities and support centrally located and regionally significant industrial areas that may provide for future intermodal facilities and provide for efficient local deliveries.

2012 Action (ii): Work with the Portland Freight Committee and other regional partners to develop a plan for reducing greenhouse gas emissions related to freight movement within and through the Portland region.

Sustainability: Economy, Environment, and Equity.

Sustainability implies that actions are—at a minimum—economically beneficial, ecologically sound, and socially just, and that they will continue to be so for future generations. This interaction between Economy, Environment, and Equity are thought of as the “triple bottom line.” Consideration of Economy, Environment, and Equity were used to develop the implementing actions in the *Central City Sustainable Freight Strategy*.



2. Freight Logistics 101 – Developing a Better Understanding

Before identifying potential sustainable freight strategies for the Central City, one must first understand the fundamentals of freight logistics and other key issues that need to be considered when developing transportation solutions.

2.1 Shipping Demand by Mode

A number of factors influence freight mode selection by industry and commodity type. Because the freight transportation industry is highly competitive, the private sector usually chooses the most cost-effective mode of transport. Each mode has certain advantages and disadvantages in terms of cost, speed, reliability, visibility, and security.

Figure 1 shows the spectrum of freight transportation service characteristics by mode. For example, package and express shippers favor air and truck because these modes offer the fastest and most reliable door-to-door service for lightweight shipments. The cost is high, but customers are willing to pay for high quality service. In contrast, shippers of bulk commodities like coal, grain, and petroleum prefer to use water or rail. These modes offer less speed and reliability, but provide transportation at a far lower unit cost. Freight rail (intermodal, carload and unit train) occupies a place between and overlapping water transport and trucking. It competes with water transport for heavier, lower-value, less time-sensitive commodities. It competes with trucking for higher-value, often containerized, shipments moving over longer distances. It is the preferred mode for a number of economically significant, but heavy and bulky commodity groups, such as coal, farm products, and minerals.

What is Freight?

“Freight” refers to the commercial transport of goods that includes various types of movement from bulk items such as grain, lumber, and fuel to the delivery of consumer products to local businesses. “Goods” refers to items that are moved commercially and transported by multiple and often interconnected freight modes – waterborne, air, rail, pipeline, and truck – as they move between origin and destination.

Figure 1: Freight Transportation Service Spectrum

Shipping Mode	Air Cargo	Truck	Rail Intermodal	Rail Carload and Rail Unit	Water
Shipping Factors	Higher Shipping Cost Faster/more reliable/more visible		Lower Shipping Cost Slower/less reliable/less visible		
Examples	<ul style="list-style-type: none"> ➤ Air cargo reserved for only the most valuable commodities ➤ Trucks are almost always needed for the last mile 		<ul style="list-style-type: none"> ➤ Range of weights and values ➤ Rail intermodal competitive with truck over longer distances 		<ul style="list-style-type: none"> ➤ Highest weight, lowest value, least time-sensitive cargo
	<ul style="list-style-type: none"> ➤ Perishable food, documents and electronics. 		<ul style="list-style-type: none"> ➤ Vehicles, retail goods and grain. 		<ul style="list-style-type: none"> ➤ Coal, chemicals and grain.

Source: Freight Rail Bottom Line Report - AASHTO



2.2 Growth in Freight Tonnage by Mode

Portland is a regional hub for every freight mode (air, rail, marine, barge, truck, pipeline, even bicycles), giving shippers and customers multiple options for delivering and receiving goods. Increase options give shippers opportunities for increased efficiency, which is usually exemplified by decreased fuel consumption. However, despite these transportation options, most commodities moved in the region can only utilize a portion of these modes due to the specialized service characteristics and customer demand factors, as referenced above. As with most urban areas throughout the U.S., the majority of the freight moved into, out of, within, and through the Portland region is by truck.

According to the Port of Portland's Commodity Flow Forecast illustrated in **Figure 2** below, 67 percent of all freight in the region moves by truck at some point, which is projected to grow to 73 percent by 2030. Water and rail combined account for 26 percent of all freight moved in the region. In general, the nation's rail and water freight transportation networks are much less extensive geographically than the network of highways and roads, making trucks a faster and more convenient delivery mode for most short and many long-distance freight trips.

Figure 2: 2000 – 2030 Growth in Freight Tonnage by Mode in the Portland Region (in millions of tons)

Mode	2000		2030		Growth 2000-2030
	Tons	%	Tons	%	
Truck	197.2	67%	380.0	73%	93%
Rail*	32.9	11%	59.2	11%	80%
Water**	43.5	15%	50.3	10%	16%
Air	0.4	0.01%	1.1	0.02%	175%
Pipeline	22.2	7%	31.2	6%	41%

Source: Commodity Flow Forecast Update and Lower Columbia River Cargo Forecast, Port of Portland, June 2002.

*Includes intermodal. **Combines ocean-going steamships and river barges.

Freight movement is expected to continue to be a central element of the Portland economy and the tonnage volume is expected to increase by 76 percent by 2030. Increasing freight volumes will put pressure on all elements of the freight transportation system – roads, rail, pipelines, and marine and air terminals. Many parts of the freight transportation system are managed by other public agencies and private operators. ODOT is responsible for the Interstate Highways and state roadway network (i.e. I-5, I-205, I-84, I-405, US 30 and US 26), the BNSF and UP Railroads own and operate the class I freight rail system, and the marine and airport terminals are owned by the Port of Portland. Coordination to accommodate the growth in freight movement will need to include individuals and organizations in both the public and private sectors.



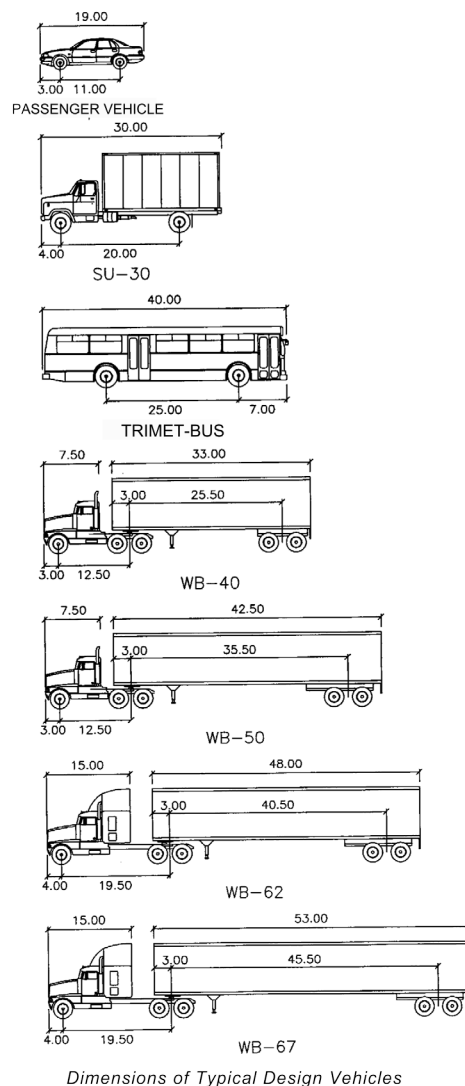
2.3 Truck Size and Classification

The size and type of a truck selected for delivery is typically determined by the goods or materials being hauled and the distance traveled. The American Association of State Highway and Transportation Officials (AASHTO) developed a classification system that identifies trucks by their approximate height, width, length, and wheel base (WB) which is illustrated in **Figure 3**. Goods delivery to a variety of local business such as supermarkets, shopping centers and malls are often made by a WB-67 due to the sheer volume of products being delivered to a single location and the number of multiple deliveries that can be made by single load. Other deliveries are made by medium-sized trucks such as the WB-40 which has a similar size and turning radius as a TriMet bus, and Fed-Ex and UPS delivery vans and single-unit beverage delivery trucks. For the purposes of this document, medium-sized trucks refer to trucks used primarily for making local deliveries in the Central City such as single-unit vehicles.



Franz produces a variety of bakery products in the Central City that are shipped throughout the northwest region.

Figure 3: Truck Types.



Pacific Coast Fruit Company relies on WB-67 trailers for large inbound shipments, which are then consolidated into smaller vehicles for local delivery.





2.4 Selecting the Optimal Freight Mode

Because the freight transportation industry is highly competitive, the private sector chooses the most cost-effective mode for transportation based on production, logistics and other customer requirements. Selecting freight modes with lower emission rates (i.e., truck to rail, air cargo to truck) are often referenced as a sustainable strategy for reducing freight generated carbon emissions. However, a variety of key issues need to be considered:

- Convenience, shipping cost, handling requirements and customer needs are key factors in determining which mode of transportation is appropriate for the distribution of certain commodities.
- The Class I railroad operators (Union Pacific and BNSF) have shifted away from internal regional moves to more long-haul, single-commodity and container traffic between major rail hubs. As a result, local rail movements have been delegated to short-line rail operators which often have inconsistent and incomplete rail networks, requiring access to either other railroads (which can be costly and slow) and/or transfer to truck.
- Most rail systems do not possess the convenience and door-to-door service provided by trucks. Unless shippers or receivers are located directly on a rail line, they typically rely on trucks for the entire delivery or to dray goods to or from a rail, marine, or air facility. Trucks offer flexibility and time savings that make it difficult for other modes to compete and the limited locations of rail infrastructure and remote locations of certain industries make many goods dependent on truck movements.
- Trucks are used to move the goods from a ship docked at a port or to a rail yard to be loaded onto a train. Even if an item is shipped by air to another continent, it had to also travel by truck to get to and from the airport. Pedal-powered delivery companies receive products by truck before they can be loaded and delivered to their final destination.

While shipping more goods by rail or water is generally more sustainable, it will not decrease the number of truck deliveries on city streets.



Bulk items such as lumber and grains that are less time sensitive are usually shipped by rail.



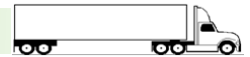
Time sensitive and high value products like fresh produce and computer equipment are typically shipped by air freight.



Trucks are used to deliver the vast majority of freight in the Central City.



Specialty delivery services like B-Line operate in the Central City area.

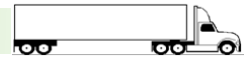


2.5 The Global Supply Chain and the Central City

The interdependency of the Central City with the global supply chain is key to understanding the reliance on the region's transportation network for efficient goods movement delivery. The following diagrams help illustrate the supply chain of the movement of goods to Central City businesses.

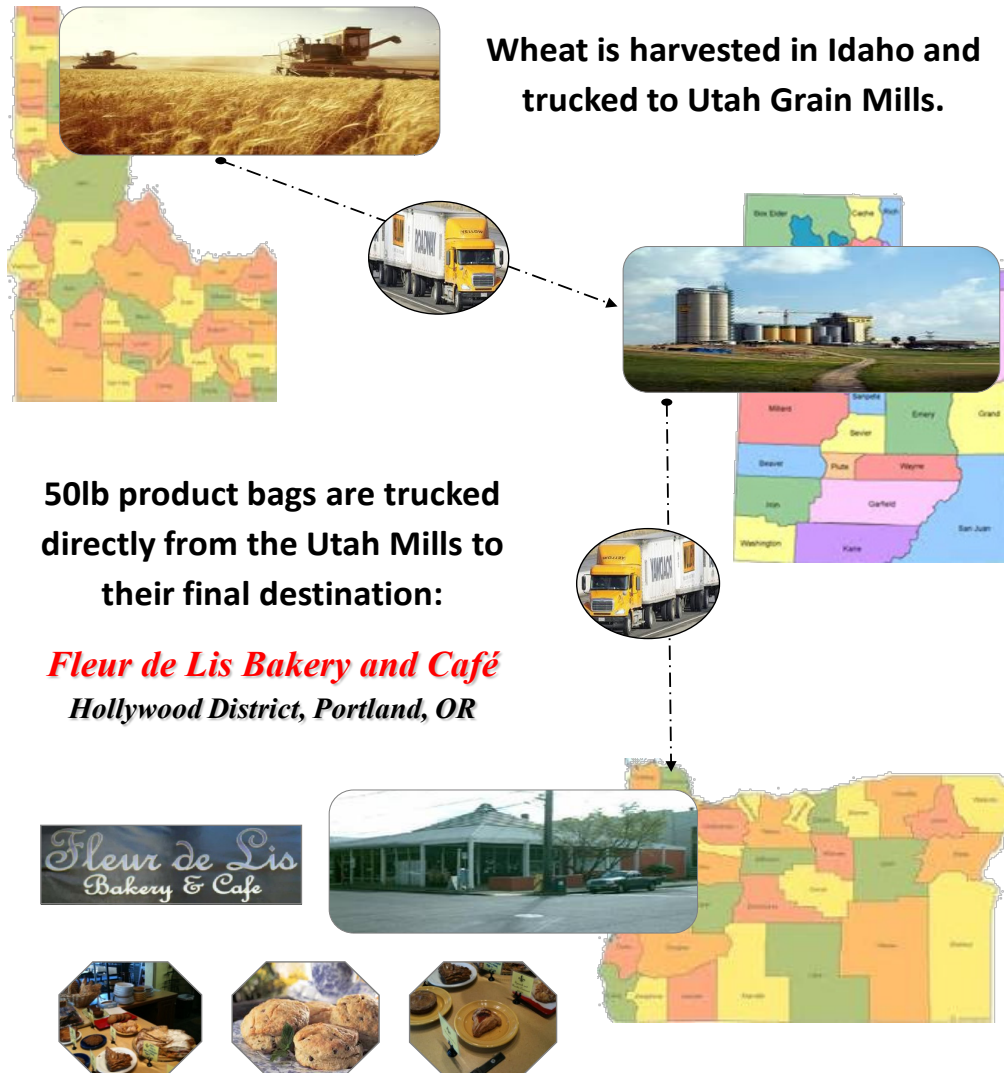


Supply chain for coffee beans distributed by the Portland Roasting Company. As shown, Portland-bound coffee beans are imported throughout the world and travel by ship to the ports of Tacoma (WA), Portland (OR), and Long Beach (CA), where they are then trucked to various nearby warehouses, before shipment by truck directly to various stores that sell Portland Roasting Coffee beans. Rail is used to ship between the Port of Long Beach and the Portland Roasting Company warehouse in Portland, and B-Line Urban Delivery (a tricycle distribution company in southeast Portland), which receives deliveries by Portland Roasting Company truck, is used for deliveries to multiple Central City locations.



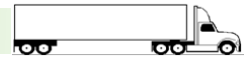
Supply Chain for Scones Baked at Fleur de Lis Bakery and Cafe

Hollywood District, Portland, OR



TYLIN INTERNATIONAL

The Fleur de Lis Café and Bakery in northeast Portland is a celebrated Hollywood District establishment which serves pastries made on site. The wheat they use is supplied by Glory Bee Foods of Eugene, OR, which has hard winter wheat grown in Idaho trucked to a mill in Utah before being trucked directly to Fleur de Lis in 50 lb bags.



3. Research Findings of Sustainable Freight Practices – What We Learned

In 2010, PBOT staff conducted research to identify sustainable freight practices and programs that have been implemented in other urban areas (both national and international) and to examine what can be learned in respect to their applicability in Portland. While not exhaustive, the research did identify five broad common themes of sustainable freight strategies:

1. Clean Vehicle Technology
2. Low Emission Zones
3. Urban Consolidation Centers
4. Last Mile Solutions
5. Off-Hours Deliveries

The following is a summary of these strategies along with the key findings and conclusions drawn from the research and recommendations for potential applicability in Portland. A more detailed research report and list of reference can be found in the *Technical Appendix*.

3.1 Clean Vehicle Technology

Most of the research on *clean vehicle technology* focused on the *Electric Vehicle City Distribution (ELCIDIS)* initiative that was set up by the European Commission to test the viability of using hybrid electric trucks and electric vans for urban goods distribution in central city areas in six European cities.

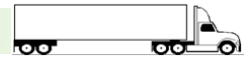
A summary of the key findings include:

1. Reduce environmental impacts: The common goal for using hybrid/electric trucks was to help reduce roadway/sidewalk damage, congestion, emissions and noise impacts from heavy diesel trucks and commercial vehicles on narrow streets in dense urban centers.
2. Ability to compete with gas/diesel vehicles: The price performance ratio, reliability, available maintenance and servicing must be at the same high level as gas/diesel powered equivalents in order to gain acceptance and market share.
3. Combine with urban consolidation centers (UCC): Operating hybrid/electric vehicles for urban distribution is best combined with an *urban consolidation center (UCC)* based approach.
4. Mainly applicable for small package/parcel “last-mile” deliveries: Small and large electric vans are applicable for postal and package deliveries. Larger parcels and/or voluminous goods need large electric vans and hybrid trucks.
5. Provide incentives/advantages (carrots): Provide incentives/advantages to encourage the use of environmental friendly delivery vehicles like extension of delivery hours, preferential parking and possibilities to enter restricted areas, such as public transit lanes and pedestrian areas.
6. Implement/enforce access restrictions/regulations (sticks): Implement/enforce access restrictions/regulations for heavy freight delivery vehicles and/or diesel trucks in central city areas.



FedEx, UPS and other companies are experimenting with medium-duty electric delivery vehicles in various U.S. and European Cities.

- Today, it takes roughly 60 new trucks to equal the NOx and Particulate Matter produced by one truck 30 years ago. (U.S. Environmental Protection Agency)
- Starting January 2012, a new Oregon law prohibits commercial vehicles with a GVW of 10,000 pounds or greater to idle more than five minutes in any continuous 60 minute period. (Oregon HB 2081)



Conclusions and Recommendations:

Although the research conducted for clean vehicle technology is over 10-years old and battery technology has changed, the relatively high capital cost for vehicle purchase compared to a gas/diesel powered equivalent along with the limited payload capacity and delivery range remains a major disincentive for their wide-spread use by the freight industry. While the technology and market share for electric/hybrid delivery vehicles continues to evolve, the City can provide certain incentives to help mitigate some of the economic and logistic barriers for their use. It is recommended the City evaluate the following potential actions:

- Explore opportunities to partner with others organizations (i.e., Metro, PGE, PSU, ODOT) to provide financial incentives for vehicle purchase/lease and/or the installation of charging stations.
- Explore the feasibility of waiving City permitting fees for installing on-site charging stations in the Central City and possibly provide free charging stations as is done for passenger vehicles.
- Tailor incentives to encourage electric/hybrid delivery vehicle use by private urban consolidation center that operate and serve in the Central City area.
- The closer the UCC is to the city center, the more likely it will encourage the use of all-electric delivery vehicles.

3.2 Low Emissions Zones

To address poor urban air quality and improve public health, more than one hundred cities across Europe have established Low Emissions Zones (LEZs) that set stricter standards for vehicle emissions within designated areas, usually city centers. Vehicles that don't meet the higher standards are banned, or their operators are charged fees for driving in the zones. Trucks are targeted under all LEZ schemes, and regulations typically require replacement of older trucks with cleaner vehicles, though most LEZ policies allow operators to retrofit some older vehicles to meet the emissions requirements.

1. Goal: The goal of LEZ programs is to improve public health through reductions in motor vehicle emissions that impact health (primarily CO, PM, NO_x).
2. LEZs improve air quality within the zone: In Europe, LEZs are effective tools for reducing vehicle emissions within the designated zone. Inclusion of more vehicle classes (cars and motorcycles, as well as trucks) results in a larger reduction in emissions.
3. Implementation of a LEZ policy imposes substantial cost on businesses: The implementation of a low-emission zone requires freight businesses to replace trucks or undertake expensive retrofitting. This can be especially challenging for small operations that have few capital resources and cannot shift non-compliant vehicles to other regions. Providing exceptions for economic hardship or grants/loans for vehicle replacement can mitigate the economic impact of an LEZ on small businesses.
4. Could result in export of pollution: The air quality improvements achieved by an LEZ policy are achieved through the use of cleaner vehicles rather than a reduction in motor vehicle traffic. As the vehicle fleet turns over, older vehicles which emit higher levels of pollutants are usually transferred or sold for operation outside of the zone. In effect, an LEZ policy may simply redistribute vehicle emissions from the low emission zone to areas with less stringent regulations.

Conclusions and Recommendations:

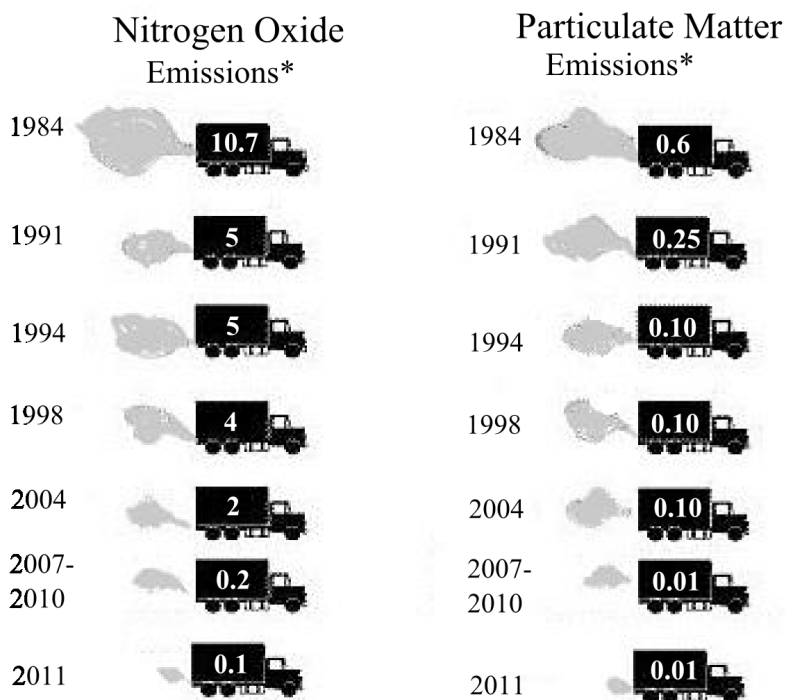
In the U.S., air quality is monitored by the U.S. Environmental Protection Agency (EPA) on a regional basis within an airshed that has similar geographic and meteorological conditions. The regional airshed for the Portland area includes Multnomah, Clackamas, and Washington counties and parts of Clark County and is managed by the Oregon Department of Environmental Quality and the Washington Southwest Clean Air Agency. Implementing a European-based LEZ in such a restricted geographic area as the Central City would appear to have limited measurable benefits in reducing regional emission levels. In fact, implementing a Central City low emission zone may simply export the pollution to other areas within the Portland airshed as found with the European research. Furthermore, various programs currently exist that effectively improve truck emissions over time without the need to implement a European-based low emission zone model.



EPA has required diesel engines manufactured since 2007 to have virtually no particulate emissions and significantly lowered NOX emissions. Oregon's Clean Diesel Initiative speeds up the replacement of older engines—a program that has been used by Tidewater, Bernert and Shaver barge lines, as well as Burlington Northern rail lines. While old engines remain on the road, it's safe to say that the new standards are redefining the way we view diesel vehicles. The image of a big truck belching black smoke filled with particulate matter has been replaced with a truck that can emit less particulate matter than it takes in. In addition, advances in engine technology and fleet performance have greatly improved overall fuel efficiency and vehicle emissions for the nation's truck fleet.

As carriers and shippers continue to replace older trucks with newer more fuel efficient and cleaner operating vehicles, the air quality impacts from freight delivery vehicles will continue to improve. It is therefore recommended that the City continue to rely on existing regional air quality monitoring and management procedures that are currently in place and regulated by the EPA and the DEQ rather than implement a European-based low emission zone model for the Central City.

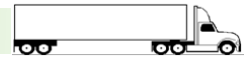
EPA Standards for New Trucks and Buses



* EPA's emission standards for trucks and buses are based on the amount of pollution emitted per unit of energy (expressed in grams per brake horsepower hour).

EPA Fuel Sulfur Content Standards for Heavy-Duty Diesel Engines

- Before 1993, sulfur content for heavy-duty diesel engines was unregulated.
- Beginning in 1993, maximum sulfur content for diesel was regulated to 500 parts per million (ppm).
- In 2006, the sulfur content for heavy-duty trucks was reduced further to 15 ppm, known as Ultra Low Sulfur Diesel.



3.3 Urban Consolidation Centers

The research on urban consolidation centers (UCC) is based on publications prepared by *BESTUFS* (*BEST Urban Freight Solutions*), an initiative funded by the European Commission to identify best practices and solutions for urban freight transport. A *BESTUFS* sponsored workshop entitled “*Approaches to Urban Consolidation: Concepts and Experiences*” captured the collective research and recommended best practices on UCCs. A summary of key findings are as follows:

1. Urban consolidation centers defined: “Urban consolidation centers” involve a physical center that performs break-bulk (inbound), load consolidation (outbound), stocking, customer collection, product handling, pricing/labeling, and waste removal/recycling.
2. Benefits vs. costs: The potential benefits (i.e., reduced heavy commercial trips in city centers, reduced pollution, noise and fuel consumption) must be weighed against costs (capital and operating costs of consolidation center, additional handling stage in the supply chain, security, liability, customer service issues).
3. Previous experience: Previous experiences with publicly operated urban consolidation centers have mostly been negative from the commercial perspective. Many have closed due to low volumes of throughput, on-going requests for public financial support, and poor service levels.
4. Logistic issues: Most urban freight is already consolidated at the intra-company level or by parcels carriers so benefits to carriers could be limited. It may be difficult for a single center to be able to handle the wide range of goods moving in and out of an urban area, due to different handling and storage requirements. Previous studies report an increase in delivery costs due to an additional stage in supply chain which imposes a cost (and often a time) penalty.

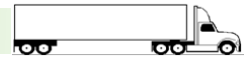


The Central Eastside Industrial District serves as a local distribution center for the Central City.

Conclusions and Recommendations:

The Central Eastside Industrial District - and other close in industrial areas - already serve as a platform for freight consolidation by providing a centralized location for private warehousing and distribution companies to perform many of these functions. For example, the Pacific Coast Fruit Company already provides complete warehousing, distribution and supply-chain management services for their customers and conducts break-bulk activities for larger inbound shipments and consolidates loads into smaller vehicles for local delivery. Other businesses located in the Central City area provide similar warehousing and distribution services and select delivery vehicle size based on economic efficiencies and customer needs. In addition, the research findings also noted that transferring goods from a large well-laden heavy truck to smaller (more environmentally friendly) vehicles can be counter productive if the net results are a greater number of smaller vehicles that use more fuel, drive more miles, generate more greenhouse gas emissions and potentially increase the economic costs for both carriers and receivers. This further illustrates one of the overarching findings that the freight industry naturally moves toward more fuel efficient methods.

Since previous experience with publically operated urban consolidation centers has mostly been negative, it is recommended they are best operated by private business enterprises and decisions for selecting the size and type of delivery vehicle be at the intra-company level based on economic efficiencies and customer needs. The City can support the location of these facilities in the Central City by maintaining existing zoning and land use policies that allow these facilities to operate and by providing the supporting transportation infrastructure needed to accommodate their operations. However, while the Central Eastside Industrial District currently serves as a centralized location for freight consolidation, it is under redevelopment pressure and slowly being converted into non-industrial uses.



3.4 Last Mile Solutions

The “last mile” is the final link in the supply chain that delivers goods to a receiver’s home, business or other delivery point. Covering the last mile is expensive, accounting for 28% of all transportation costs according to the *Council of Supply Chain Management Professionals*. The business-to-consumer delivery market is particularly challenging for freight firms as, in addition to the wide dispersion of receivers, carriers also wrestle with the costs resulting from frequent failed deliveries. Parcel delivery services have developed a range of solutions to cut the delivery failure rate and increase operational efficiency. Many of these strategies also promise to improve the environmental sustainability of parcel delivery through reductions in vehicle miles traveled (VMT).

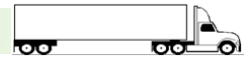
Among these last mile solutions are the use of collection/delivery point networks and locker banks. A collection/delivery point (CDP) network is an attended delivery system that consists of designated locations where packages can be delivered or picked up by a carrier. Locker banks are unattended delivery points, where carriers leave packages. Customers are responsible for retrieving packages from the CDP or locker bank. The key findings for these strategies are described below:

1. Goal: increase parcel delivery efficiency: These delivery strategies achieve economic benefits for carriers through the consolidation of parcel deliveries and the elimination of failed deliveries. They provide convenience to receivers who can easily access a CDP or lockerbank and are infrequently at home during delivery hours.
2. Splitting the last mile – environmental benefits: Locker banks and delivery point networks effectively split the last mile between carriers and receivers. The carriers drop packages at collection points or lockers from which receivers have to retrieve the packages. These strategies can reduce VMT and provide ancillary health and environmental benefits but only if customers retrieve their packages by bike, on foot, or by chaining their package pickup with another auto trip.

Conclusions and Recommendations:

While the provision of collection/delivery point networks and locker banks are typically operated by private sector logistic companies – i.e., FedEx and DHL in Germany - the City can help facilitate these types of operations through the city’s zoning and development code language. It is recommended the City evaluate the following potential actions:

- Identify incentives to allow/encourage unattended delivery boxes in apartment and condo buildings (i.e. adjust allowable FAR credits for installing unattended delivery box to serve building).
- Identify land use/development barriers for allowing local post offices/attended delivery depots in residential neighborhoods and neighborhood commercial districts (aka 20-minute complete neighborhoods)



3.5 Off-Hours Delivery

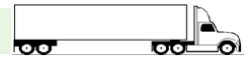
In the face of increasing traffic congestion during daylight hours, dense cities like New York are exploring night delivery strategies to decrease freight conflicts with other road users, improve delivery efficiency and reduce operating costs for carriers, and lighten the environmental impact of freight operations. In 2010, a research team at Rensselaer Polytechnic Institute (RPI) completed an Off-Hour Truck Delivery Pilot program in collaboration with NYCDOT. The pilot study worked with carriers and receivers in the grocery, restaurant and retail clothing sectors during a one-month test of off-hours deliveries in Manhattan. A summary of the pilot's key findings are as follows:

1. Goal: increase freight delivery efficiency: The aim of an off-hours delivery policy is to increase the operational efficiency of delivery vehicles by shifting deliveries to hours with lower levels of traffic congestion.
2. Receivers need incentives: Off-hours deliveries impose additional costs on receivers, requiring them to staff their stores in off-hours or build a secure delivery area that can be accessed by carriers. Receiver participation in an off-hour delivery program requires financial incentives to offset those costs. The RPI researchers estimated that providing incentive payments to receivers would yield substantial net economic benefits in reduced congestion.
3. Carriers have sufficient incentives: Provided enough customers are willing to receive off-hours deliveries, carriers can achieve efficiencies that make off-hours operation attractive. Off-hours deliveries in the New York pilot study resulted in higher average speeds, lower service times and reduced parking fines.
4. Unattended deliveries eliminate need for receiver incentives: The use of delivery lockers or keyed entry allows receivers to accept off-hour deliveries without incurring staffing costs. Eliminating those costs makes acceptance of off-hours deliveries feasible without incentive payments.

Conclusions and Recommendations:

As learned in the NYC pilot program, carrier savings from off-hour deliveries are not large enough to compensate for the additional cost imposed on receivers and that customer needs is the main factor that determines when goods are delivered. While carriers are willing to make off-hour deliveries, they are not willing to refuse a customer's request for daytime deliveries. From an economic equity stand point, financial incentives would need to be provided to the receivers that would incur additional costs for off hour deliveries. While the carrier/customer relationship is a key factor, the City can potentially encourage greater participation in off-hour deliveries by providing educational outreach to carriers and receivers in the Central City on the potential benefits. It is recommended the City evaluate the following potential actions:

- Implement an education program for carriers serving the Central City and their customers to demonstrate how off-peak delivery programs can benefit them.
- Evaluate City code and related policies to identify potential barriers for off-hour/night-time deliveries to occur (i.e., noise ordinances, restrictions on night-time deliveries, etc.).
- Implement an off-hour delivery pilot program for the Central City area.



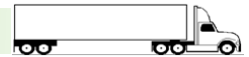
4. Stakeholder Group Discussions - What We Heard

In developing the Central City Sustainable Freight Strategy, a diverse group of local freight and sustainability experts were consulted throughout the process to identify key issues with moving and delivering freight in the Central City and to recommend sustainable freight strategies for implementation. The following is a summary of what we heard from these groups.

4.1 Sustainable Freight Working Group Discussions

The Sustainable Freight Working Group was composed of both freight delivery providers and sustainability interests to review the research findings, draft work products and provide direction on the recommended strategies. The key outcomes from the Working Group include:

1. Shippers and carriers equate sustainability with the efficiency and profitability of their operations. The result is that successful business models - based on making their operations as efficient as possible - have the collateral effect of decreasing the environmental footprint of those operations. Fewer miles traveled to accomplish deliveries means lower fuel, maintenance and labor costs, as well as fewer greenhouse gas emissions. New diesel engines not only burn cleaner, they lower fuel costs.
2. Freight operators seek to fill their trucks with as much freight as possible because it reduces the number of trips to accomplish the same number of deliveries. Carriers are also making deliveries during night time or other off-peak periods which significantly reduces travel time and fuel consumption because there is much less congestion on the roads.
3. There is an inadequate amount of available on-street loading areas for trucks to accomplish their deliveries which results in increased truck vehicle-miles travelled as drivers circulate to find available loading space. Available on-street loading space leads to less time to accomplish a delivery and higher driver productivity.
4. Street geometry design – such as mountable curbs – can be a safe means of accommodating large trucks who are unable to negotiate the shortened turning radii presented in curb extensions; and these and other design innovations need to be explored more vigorously.
5. Finally, we need to identify opportunities to allow greater use of rail, barge and other multi-modal options for moving heavy freight, and encourage the use of local bicycle/tricycle courier services and other last-mile delivery solutions in the Central City area.



4.2 Summary of Stakeholder Interviews

During the summer/fall of 2010, ten individuals who represent companies or industries that produce, receive and move products in the Central City were interviewed to identify what sustainable freight practices they have implemented to increase their operational efficiency. These companies include dry goods, beverage distribution, produce, paper goods, and parcel/package delivery industries. All but three (Fred Meyer, UPS and Organically Grown Company) of the companies interviewed operate outside the Portland region. A more detailed stakeholder interview report can be found in the *Technical Appendix*.

Individuals Interviewed for Sustainable Freight Strategy:

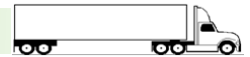
Name	Title	Interview date
Margi Lifsey	Manager, ODOT Sustainability Program	8/13/2010
Lisa Sedlar	President, New Seasons Markets	8/24/2010
Franklin Jones	CEO, B-Line Urban Delivery	8/25/2010
Kurt Malmedal	NW District IE, UPS	8/25/2010
Pete Hansen	President, Portland Paper Supply	8/26/2010
Ann Weaver	President, Elephant's Deli	9/1/2010
Joel Halloran/Melinda Merrill	Transportation Mgr/Public Affairs, Fred Meyer	9/8/2010
Natalie Reitman-White	Sustainability Mgr, Organically Grown Co	9/10/2010
Skip Brown	Architectural Services Dir, BOMA/Melvin Mark	9/10/2010
Ann Widmer	Sustainability Mgr, Craft Brewers Alliance	10/12/2010

Stakeholder Interview Questions:

1. Describe your business and the role of freight in your operations.
2. What are the current challenges to efficient freight operations?
3. What is your company doing to make your shipping more efficient?
4. How will your company react to rising energy costs?
5. How will your company continue to serve our Central City customers as becomes denser?
6. What could your company do to improve the sustainability of goods movement activities?
7. What can the City of Portland do to assist industry to improve the sustainability of their goods movement activities (e.g., preserve and enhance network of freight corridors; preserve and enhance industrial/employment land uses; improve loading/unloading curb space areas, etc.)?
8. Are you aware of sustainable freight practices in use?
9. What should be the elements of a sustainable freight strategy?

Stakeholder Interview Findings:

- Sustainability is directly associated with productivity – fewer trips, fewer miles, less time loading and unloading – improves operational efficiency and produces fewer emissions – and most carriers and shippers measure their performance in becoming more sustainable (e.g., amount of time spent idling, amount of time completing deliveries, number of parking summonses received, etc.). People who move into industrial areas should acknowledge and respect the needs of the industries located there.
- All of the carriers have reduced their carbon footprint through improved performance of their fleets, consolidating loads, filling trucks to capacity, using alternative fuels, purchasing more efficient trucks, and their logistics (e.g., increasing intermodal movements) strategies. Moreover, many shippers and carriers employ a sustainability coordinator/manager to assist the logistics and accounting staff in helping to reduce operating costs.
- Customers are often willing to adapt their shipping/receiving schedules to avoid peak hours.
- There's an inadequate supply of on-street loading and unloading spaces.

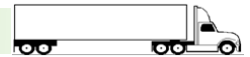


- Central City industrial areas mix commercial, industrial and occasionally residential uses. We are spending a lot of our public resources to improve the livability character of these districts, often by sacrificing the accessibility and mobility needed for industry to properly operate (e.g., curb extensions that prohibit truck maneuvers along IMAX and/or into off-street loading bays, and on-street loading areas replaced with parking spaces).
- In addition, reduced availability of on-street parking.
- Government can reinforce and enhance more sustainable operations by:
 - a. helping to increase the amount of produce grown closer to the region,
 - b. providing educational campaign to promote sustainable freight practices (e.g., to assist carriers in their discussions with customers to conduct off-peak deliveries, and to promote reduced idling by carriers),
 - c. installing fast-charge stations and bio-diesel fuel infrastructure,
 - d. reviewing noise ordinances which prohibit night-time operations,
 - e. involving the freight community in its policy and planning discussions,
 - f. advocating for rail infrastructure to help move refrigerated goods in the I-5 corridor.
- Government agencies need to recognize that there is rarely one single solution to a problem, and that reliance on a limited number of solutions (e.g., restrictions on truck size and delivery periods as is seen in Europe) can lead to unintended consequences (e.g., one large truck is more sustainable than multiple small and medium-sized trucks with respect to fuel consumed, emissions produced, and on-street loading areas needed, etc.).

4.3 Portland Freight Committee Discussions

The Portland Freight Committee also discussed sustainable freight practices for the Central City as part of their regularly scheduled monthly meetings and provided the following insights:

- Need to ensure that there's an understanding of the interdependencies between freight movement in the Central City and the region as a whole. For example, small van and bicycle deliveries can be made in the Central City because trucks or rail deliver products to their distribution centers via the region's freeway and mainline systems.
- In addition, the goods that are moved in the Central City and on local streets represent a relatively small portion of the goods moved within the City and the region. For example, raw materials, construction materials, finished goods, and most agricultural products, travel in the region, but are very rarely found on Central City streets.
- Motor carriers are very much in favor of increasing the number of deliveries to off-peak periods but believe that it would require a "massive public education campaign."
- Be aware that there's often a fuzzy line between what public education intends and how it might morph into regulations. Regulations tend to suppress innovation; education tends to increase innovation.
- It would be helpful to identify those market segments which could feasibly operate during off-peak periods; and then focus public education efforts towards the carriers and shippers making up those market segments.
- There may be special conditions with security into/out of origins and destinations. E.g., customs and inspections personnel may only be available during peak hours. Further, the shippers themselves (e.g., computer parts from Hillsboro) might not be able to adapt to off-peak schedules. Is there something we can do about this?
- The strategy needs to address the need for more freight capacity, and must be based on market-based solutions, not government edicts.
- With respect to increased on-street loading zones, need to demonstrate that it will reduce presence of double-parked trucks, which will improve level of service (LOS).
- Need to develop strategies that demonstrate that Portland is a good place to do business. Another strategy to reinforce this would be to provide incentives to grow the traded sector.
- Need to discuss how a sustainable freight strategy may lead to tradeoffs with improvements to regulations and/or other modes.
- City regulations make it very expensive to develop barge docks – barging more freight can reduce the amount of pavement and truck traffic.



5. Recommended Actions

One of the fundamental lessons learned from this process was the unique and specialized roles that the public and private sectors have in providing and facilitating efficient goods movement and delivery services in the Central City. Because the freight transportation industry is highly competitive, private-sector service providers are best positioned for selecting the most economical and cost-effective methods of delivering goods and meeting their customers needs. The transportation industry is already predispositioned to maximize profits by reducing fuel consumption and delivery costs and inherently already implements sustainable practices as part of their overall business model. The public sector's primary role in facilitating efficient goods movement is by creating the physical and regulatory environment that allows transportation service providers to operate as efficiently as possible.

The City is responsible for providing and maintaining an adequate public street network that allows transportation service providers to operate in a safe and efficient manner. One of the primary tools available is through the City's regulatory authority of allocating the use of public right-of-way space. The efficient allocation of public right-of-way helps facilitate traffic circulation while also improving access and safety for all modes of transportation. Providing adequate space for truck loading activities to occur allows carriers and shippers the ability to serve local business in an efficient and cost-effective manner while also meeting customer needs. Another valuable tool is through the City's land use and zoning regulatory authority that allows close-in industrial and employment centers within the Central City to effectively operate. A recent example of innovative and effective zoning policy that allows both central city employment and freight distribution activities to occur is the Employment Opportunity Subarea (EOS) in the Central Eastside Industrial District. The EOS is designed to encourage the development of an urban employment center that supports a more diverse industrial base and increased employment density while also protecting the existing industrial and freight distribution business located within the District. Allowing centralized locations for private distribution and freight consolidation companies to freely operate reduces the overall volume of heavy truck traffic on Central City streets while also providing a more efficient freight delivery system for Central City businesses.

The following recommended sustainable freight actions are based on what was learned from the case study research and from the input received by the various stakeholder groups on what constitutes sustainable and efficient practices for freight delivery in the Central City.



Recommended Actions	Deliverable	Timeline	Stakeholder Issues
Public Right-of-Way Based Actions			
Action #1: Truck Parking and Loading Zones			
<ul style="list-style-type: none"> Prepare a comprehensive truck loading and parking plan for the Central City to increase the efficiency of the on-street loading system, increase compliance with City loading regulations, and balance commercial loading and parking needs with other uses within the public right-of-way. Seek funding to a complete truck loading and parking plan to align with Central City 2035 Plan. 	Prepare Truck Loading and Parking Plan strategy to City Council for approval as a City Engineer Report.	12 months	The allocation of public right-of-way space for truck loading and parking should be developed in concert with the Central City 2035 Plan.
Action #2: Street Design Best Practices Guidelines			
<ul style="list-style-type: none"> Prepare a supplemental City Engineers Report, as an addendum to the Designing for Truck Movements and Other Large Vehicles in Portland that identifies engineering design options for truck-friendly curb designs and other street design treatment and best practices to facilitate safe and efficient truck movements in the Central City. Seek funding source to prepare Supplemental City Engineer Report. Coordinate with BES to help fund best practice guidelines 	Prepare supplemental City Engineer Report document recommended to City Council for approval.	6 months	<ul style="list-style-type: none"> Design options need to be balanced with other modal interests (bike, pedestrian, auto). Modal benefits and tradeoffs need to be clearly articulated. Need to consider stormwater issues.
Land Use and Policy Based Actions			
Action #3: “Last Mile” Solutions			
<ul style="list-style-type: none"> Identify incentives to allow/encourage unattended delivery boxes in apartment and condo buildings (i.e. adjust allowable floor area ratio(FAR) credits for installing unattended delivery box to serve building). Identify land use/development barriers for allowing local post offices/attended delivery depots in residential neighborhoods and neighborhood commercial districts (aka 20-minute complete neighborhoods) 	<p>Identify regulatory barriers and opportunities for implementing “Last Mile” solutions in the Central City.</p> <p>Recommend actions as part of developing the Central City Plan.</p>	6 months	Private delivery service providers (i.e., FedEx, UPS, etc) will ultimately determine the feasibility of implementing specific “last mile” solutions based on market demand and customer need.



Recommended Actions	Deliverable	Timeline	Stakeholder Issues
Action #4: Centralized Freight Distribution Districts			
<ul style="list-style-type: none"> Apply zoning provisions to IG1-zoned properties east of the Union Pacific railroad alignment in the Lower Albina Industrial District that allow certain compatible office-like uses, similar to the Employment Opportunity Subarea (EOS) regulations in the Central Eastside. Evaluate the feasibility of establishing Employment Opportunity Subarea (EOS) zoning to other close-in industrial and employment centers to increase industrial-based employment density while also creating the regulatory environment for private freight consolidation and distribution businesses to freely operate. 	<p>Zoning code amendment prepared by BPS.</p> <p>Apply EOS zoning to close-in industrial districts and employment centers as recommended by BPS.</p>	<p>By 2014</p> <p>12 months</p>	<p>Applying EOS zoning in Lower Albina is identified as a recommended action in the draft Central City 2035/N/NE Quadrant Plan.</p>
Public/Private Partnership Opportunity-Based Actions			
Action #5: Off-hours Delivery			
<ul style="list-style-type: none"> Implement an education program for carriers serving the Central City and their customers to demonstrate how off-peak delivery programs can benefit them. Evaluate City code and related policies to identify potential barriers for off-hour/night-time deliveries (i.e., noise issues). Implement an off-hour delivery pilot program for the Central City area. 	<p>Implement specific strategies and actions for increasing off-hour and night-time deliveries within the Central City.</p>	<p>Based on technical report findings, implement an off-hour delivery pilot program within 6 months.</p>	<ul style="list-style-type: none"> Additional labor cost for receiving nighttime deliveries. Increased noise from trucks delivering at night in mixed use Central City districts.
Action #6: Electric-Hybrid Delivery Vehicles			
<ul style="list-style-type: none"> Explore opportunities to partner with others organizations (i.e., Metro, PGE, PSU, ODOT, ODOE) to provide financial incentives for vehicle purchase/lease and/or the installation of charging stations. Explore the feasibility of waiving City permitting fees for installing on-site charging stations in the Central City and possibly provide free charging stations as is done for passenger vehicles. Tailor incentives to encourage electric/hybrid delivery vehicle use by private urban consolidation center that operate and serve in the Central City area. 	<p>Develop public/private partnerships for implementing pilot programs for encouraging greater use of electric-hybrid delivery vehicles and supporting infrastructure.</p>	<p>Based on technical report findings, implement an electric-hybrid delivery vehicle pilot program within six months.</p>	<ul style="list-style-type: none"> Large up front capital cost to purchase electric-hybrid delivery vehicle compared to conventional gas/diesel vehicles. New/developing technology still unproven. Limited vehicle delivery range. Limited to small package deliveries.

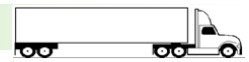


Recommended Actions	Deliverable	Timeline	Stakeholder
Other Potential Sustainable Freight Actions			
Action #7: Multi-Modal Freight Strategies			
Freight Rail: <ul style="list-style-type: none"> Coordinate with Metro and the Port of Portland to develop a regional rail strategy to identify needed infrastructure improvements and potential funding sources to improve both Class I and short-line rail service. Evaluate the feasibility of developing Urban Consolidation Centers to allow small shippers competitive access to class I rail services. Coordinate with BPS, PDC, and the class I railroads to identify land use and zoning issues and potential public-private partnership opportunities. 	<ul style="list-style-type: none"> The Port of Portland is currently preparing a Port Rail Plan update that will identify infrastructure needs and potential funding sources. Prepare a supplemental rail strategy that focuses on short line needs and access to industrial properties. Technical report on potential opportunities, barriers and feasibility of developing Urban Consolidation Centers in Portland. 	<p>Port Rail Plan to be completed in 2012.</p> <p>As funding becomes available.</p> <p>As funding becomes available.</p>	<ul style="list-style-type: none"> Need to address short-line rail infrastructure needs and industrial lands access.
Barge and Ship: <ul style="list-style-type: none"> Evaluate opportunities, constraints, benefits and economic feasibility of increasing the use of barge and river-dependent freight movement in the Central City. Coordinate with BPS and the Port of Portland on the West Hayden Island Plan to evaluate the potential for increasing the share of ship-to-rail freight tonnage and reducing truck traffic on the city roadway network. 	<ul style="list-style-type: none"> Technical report evaluating the role barge and river-dependent freight movement has as a viable sustainable freight strategy for the Central City. Technical report evaluating the impacts and potential benefits a WHI marine terminal could have in increasing ship-to-rail freight movement and reducing truck traffic on the city roadway network. 	<p>Results of the technical report should help inform amendments to the Portland River Plan.</p> <p>West Hayden Island Plan is scheduled to be completed in 2012.</p>	<ul style="list-style-type: none"> LUBA remanded River Plan back to the City. BPS to conduct analyses of potential impact on industrial land supply. LUBA petitioners may appeal decision to the Court of Appeals. Rail infrastructure needs on WHI to be identified in the Port Rail Plan update.



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