Developing a Sustainable Urban Freight Plan – a guide

Considerations based on worldwide good practice, with specific reference to freight planning in Beijing
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About Smart Freight Centre
Smart Freight Centre (SFC) is a global non-profit organization leading the way to a more efficient and environmentally sustainable global freight sector. SFC works with partners and existing initiatives to help businesses gain competitive advance from smarter freight and catalyze sector-wide action.

SFC focuses on three approaches:
- Define and drive business leadership and collaboration between the private sector, government and civil society (Smart Freight Leadership)
- Create and implement a universal and transparent way of calculating logistics emissions across the global supply chain through the Global Logistics Emissions Council (GLEC)
- Catalyze the sector-wide adoption of proven and cost-effective technologies and solutions starting with road freight through SFC’s Smart Trucks Platform.

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# Developing a Sustainable Urban Freight Plan – a guide

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Executive Summary

Urban land use and transport planning often overlooks freight activity which, if considered at all, is treated as a private sector issue that will be solved by market forces. But within logistics supply chains urban freight comprises one of the costliest and most emission-intensive segments of the whole supply chain, and the need for cities to have less congestion, clean air and good road safety is growing.

Smart Freight Centre (SFC) and the Beijing Transport Institute (BTI, formerly the Beijing Transport, Environment and Energy Center) are collaborating on increasing the sustainability of freight, specifically in Beijing and the broader Beijing, Tianjin and Hebei province area. As part of this collaboration, SFC undertook a review of urban freight plan good practice from cities and regions around the world, based on urban freight plans of 9 cities and regions.

This guidance document on developing an urban freight plan is based on that review good practice. While this guidance is designed to provide a reference point for Beijing, it will hopefully be useful to other large Metropolitan cities who are considering developing or updating their urban freight plans.

This guidance document identifies four broad areas of focus, framed around four basic questions; ‘where are we now?’, ‘where are we going?’, ‘how do we get there?’, and ‘what do we need to do?’. It provides information to answer each of these questions and specific examples, taken from the good practice urban freight plans. The document is not designed to be prescriptive, but is instead intended to provide a spur to action.

All of the good practice cities stress that tackling urban freight issues is complex. But they also demonstrate that, by taking some action however small-scale, they have begun to address the challenges they face in collaboration with businesses and logistics carriers, and are delivering more sustainable urban freight.
1. Introduction

Urban freight refers to the movement of freight vehicles whose primary purpose is to carry goods into, out of and within urban areas. Urban freight is crucial to the economic development of cities, but has negative environmental and social impacts. Reducing these impacts and improving the efficiency of urban freight is crucial for the sustainability and livability of cities in both developed and developing countries.

It is also important for the logistics sector and for the economic development of any city and this makes it an ideal area for cities to consider and address. While there may be little opportunity for costly public intervention, setting a clear ‘direction of travel’ and raising the issues with stakeholders can produce clear ‘win-wins’; meaning that improvements begins to occur, if only at a relatively small scale.

1.1 Urban freight growth

Urban growth
Today, approximately 3.9 billion people live in urban areas: 54 percent of the world's population. Around the globe, there are 500 cities with a population over 1 million and 1,700 cities with population greater than 300,000. The latest projections show that growing urbanization combined with population growth, could add another 2.5 billion to urban populations by 2050; with 90 percent of this growth taking place in developing countries in Asia and Africa.

To facilitate this movement of goods and people, the global road network length increased by approximately 12 million lane km between 2000 and 2012. China and India accounted for more than 50 percent of the paved lane/km additions during that period. China’s road network has quadrupled in the last twenty years and could reach 5.8 million kilometers by 2030.

Growing demand for goods
Income levels are increasing, and this is increasing the demand for goods and services. Consumers are also demanding more choice, often of products sourced from around the globe. The freight and logistics industry is responding to this demand which, with the growth of e-commerce, is also increasing the trend to shorter lead times.

According to the International Transport Forum (ITF), international and domestic freight was approximately 112,000 billion tonne-km in 2015 and could triple by 2050, although this depends on many factors. Developing economies will fuel this growth, with non-OECD countries accounting for over 60% of global road and rail freight transport in 2050.

Fragmented freight industry
Transport companies providing urban freight services tend to be very small. In Europe, 80 to 90 percent of carriers have five or fewer vehicles. In Italy, the “padroncini” (small individual entrepreneurs, usually owning one truck) carry 80 percent of all consignments delivered in urban areas. China’s trucking sector is also highly fragmented; of approximately 6.79 million trucking companies, 91 percent are self-employed (owner-drivers), with less than 2 percent (12,000 companies) having more than 100 trucks.

References
7 China Road Transport Association (CRTA, 2014). China Green Freight Initiative Annual Report
Different supply chains exist for different commodities. When building a new hospital, steel and cement need to be delivered. But when the hospital is in operation, fresh food needs to be delivered to feed the patients and pharmaceuticals and blood need to be delivered to keep them healthy. Specialized freight operators exist in all these and many more sectors.

**Inefficient logistics**

This complexity of freight operators guarantees a very competitive market and a low price for transport services. However, it makes it difficult to deploy technological innovations and the associated fleet management skills that could improve the social and environmental conditions that result.

Logistics costs can also be very high in developing countries and cities. Logistic costs account for less than 10 percent of GDP in the US and EU, but range from 15 to 25 percent of GDP in Asia and Latin America, due to poor fuel efficiency and the low load factor of trucks. Internationally it is estimated that this costs around US$8 billion annually, and in Beijing it has already been estimated that trucks are running 40 to 50 percent of the time empty.

**High impacts**

Freight transport is usually characterized as being the life-blood of a country and vital for its economic development. However, there needs to be recognition of the associated externalities brought about by freight traffic. These include road safety and labor issues, but more importantly, the extremely high impact on the environment, public health, and development of a sustainable city.

The freight sector constitutes a comparatively small portion of traffic or energy consumption within the urban transport sector, but generates a disproportionately large emission and pollution impact. Overall logistics activity accounts for approximately 7 percent of total global GHG emissions, and within the logistics sector, freight transport accounts for around 90 percent of total GHG emissions and 35 to 60 percent of logistics costs.

Last mile emissions are estimated to account for up to 25 percent of logistics supply chain emissions and 28 percent of total transport costs. Commercial vehicles are responsible for about 30 to 50 percent of traffic-based particulate matter (PM) and nitrogen oxides (NOx) in cities in developed economies, and more than 50 percent in cities in developing countries.

### 1.2 Urban Freight Plans

Urban mobility planning is a challenging and complex task. Planners need to manage many, sometimes conflicting, demands and requirements at the local, and often regional level. Understanding how to increase the sustainability of urban freight systems is a challenge for policy makers and urban planners in developing broader sustainable and livable cities.

To meet this demand, the European Union (EU) has developed the Sustainable Urban Mobility Plan (SUMP) approach, providing guidance in how to prepare an urban mobility strategy that builds a clear vision for the sustainable development of an urban area. Sustainable Urban Logistics Plans (SULP) are also being developed.

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8 Green Freight Asia (2013), Green Freight in Asia – Towards a Green Economy: Macroeconomic indicators and their relevance for sustainable Road Freight in Asia and a comparison with markets in Europe and the Americas.
9 BTI (formerly BTEC) (2015), Beijing’s Green Freight Development Status and Challenges, BTI presentation
10 Metabolic (2016), Beijing’s Freight System
11 World Economic Forum / Accenture (2009), Supply Chain Decarbonisation. Geneva
13 Alan McKinnon (2012), Mapping a Decarbonization Path for Logistics, Dialogue on future trends
14 Parcel2Go 2013, The 'last mile' problem, Supply Chain Digital
15 Bernhard O. Herzog, Sudhir Gota & Rajnish Ahuja (2013), Sustainable urban freight in Asian cities. GIZ
Much of this activity is still in the early days of development and the successes and failures are yet to be fully understood. And, in practice, several EU and the US cities have already developed urban or city freight plans as shown in Table 1.

### Table 1. Selection of existing urban freight plans

<table>
<thead>
<tr>
<th>City or Region</th>
<th>Freight Plan</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>London</td>
<td>London Freight Plan</td>
<td>2007</td>
</tr>
<tr>
<td>Seattle</td>
<td>City of Seattle Freight Master Plan</td>
<td>2016</td>
</tr>
<tr>
<td>Paris</td>
<td>Paris Sustainable City Logistic Charter</td>
<td>2013</td>
</tr>
<tr>
<td>Washington State</td>
<td>Washington State Freight Mobility Plan</td>
<td>2014</td>
</tr>
<tr>
<td>Belo Horizonte</td>
<td>PlanMob-BH</td>
<td>2010</td>
</tr>
<tr>
<td>California</td>
<td>California Freight Mobility Plan</td>
<td>2016</td>
</tr>
<tr>
<td>Brussels</td>
<td>Brussels Strategic Plan for Urban Freight</td>
<td>2013-2016</td>
</tr>
<tr>
<td>Stockholm</td>
<td>The Stockholm Freight Plan</td>
<td>2014-2017</td>
</tr>
</tbody>
</table>

These are all individual documents, with a range of strategy and policy options to address local freight challenges and issues. However, there is a basic level of similarity and consistency in the approaches that, in an area of public policy still in early development, demonstrates that these urban freight plans are good, if not necessarily best, practice.

An “urban freight plan” has explicit long-term freight goals and a clear set of measures to address urban freight. As such, any plan is not just focused on one issue, but instead focuses on developing a safe, efficient and environmentally sustainable urban freight system. The development of a plan also enables an alignment of stakeholder views and actions towards a common goal.

To stimulate the shift towards cleaner and more sustainable transport in urban areas, this approach has effectively been endorsed through the European Commission adopting the Urban Mobility Package in December 2013. The Package is complemented by a document that sets out the concept for Sustainable Urban Mobility Plans (SUMP) that has emerged from a wide exchange between stakeholders and planning experts across the EU. The White Paper on the future of transport in the EU published in March 2011 by the European Commission, sets the general framework for future activities in the transport sector.\(^\text{16}\)

### 1.3 Lessons learned

Talking to anyone already involved in addressing urban freight issues can prove interesting and will give the listener details about an extremely wide range of issues, approaches and local initiatives. It will also tend to focus on specific and successful approaches and can prove overwhelming.

Smart Freight Centre (SFC) has addressed this issue by reviewing global approaches to sustainable urban freight. This review has focused on the freight plans of larger cities as this is considered more relevant for the work SFC is undertaking with Beijing Transport Institute (BTI, formerly known as Beijing Transport Energy and Environment Center) to identify and draw lessons and practices from cities with similar challenges and size.

In the SFC report ‘Developing Sustainable Urban Freight - a review of good practices’, there are details of 5 approaches to urban freight.\(^\text{17}\) The report considers what’s know about freight including; the issues in each area, the available data, the range of stakeholders and some of the local initiatives to address freight sustainability.

There is also a summary of the review of urban freight plans from around the globe, not just the five urban case study areas. While this is designed to be generic, it provides the reader with an overview, and avoids

\(^{16}\) GIZ (2014). Urban Mobility Plans: National Approaches and Local Practice

\(^{17}\) http://www.smartfreightcentre.org/main/info/publications
drowning in detail. It also provides a clear set of lessons that need to be considered when developing an approach to sustainable urban freight in a specific local context. In summary, the lessons are:

1. There is clear need for a freight vision, accompanied by appropriate land use and transport strategy and clear targets, to drive and focus activity
2. The coordination of approaches especially regulation and institutional coordination – is critical to success
3. Working with stakeholders is not optional – the freight area is complex and stakeholders have competing needs. Success depends on these being clearly understood and incorporated into any approach to urban freight
4. There is a need to improve data, tools and modelling, but not at the expense of doing nothing. No city will ever have a perfect set of freight data so there is a need to start with what is available
5. There are some issues to be aware of that will not have an easy resolution. These include the options around tradeoffs, the need for experimentation and consideration of the uptake of technology.

1.4 Content of an Urban Freight Plan

The information in is vital in highlighting what many cities have done and are planning to do to manage urban freight activity. It also demonstrates that, while sustainable urban freight plans vary in the precise content, their structure is generally similar.

SFC has used these similarities to produce a simple framework approach to developing an urban freight plan, of “Where are we now?”, “Where are we going?”, “How do we get there?”, and “What do we need to develop the freight plan?”. The next 3 sections of this report provide the overview of considerations for any city wanting to develop a freight plan, supplemented with examples where appropriate. It also focuses in on the experience of Beijing, as this was the original purpose of SFC’s work.

![Diagram of possible structure and contents of a city freight plan for sustainable urban freight](image-url)
2. Where are we now

The first thought in addressing urban freight issues is ‘it’s too big and complex’. While freight is complex, the evidence suggests that the approach need not be, if it is approached in a logical manner.

The good practice suggests that the first consideration of a sustainable freight plan needs to be understanding the current situation within the urban area. The plan must recognize the current level of freight activity the known or quantifiable impacts, existing and potential challenges, and the existing efforts to address these issues. This is described under the next three sections.

2.1 Freight activity and impacts

A freight plan should begin with an overview of the transport and freight challenges the city is facing. This could include the development history of the city as it affects freight, and the impacts brought about by the social economic and environment development of the city.

Some of this will be obvious to those in the city administration – ports in port cities, key railway terminals, road infrastructure, and existing logistics sites are all key drivers of freight activity. What will be less obvious is the ‘last mile’ activity – where are the goods being delivered to, what postcodes, what streets? The range of delivery premises include shops, offices and restaurants, but also residential premises, hospitals and construction sites.

The cities in the good practice plans detail the volumes of freight, based on national freight tonnage and vehicle registration information, or on local traffic count information where it is available. Urban freight is often composed of a variety of vehicles: articulated and rigid trucks and a range of less regulated and more informal types of vehicles including small vans, scooters and bicycles. Using passenger vehicles for moving goods is also common, making it challenging to collect basic data that reflects the volume and the flows of freight traffic in developing countries. As a result, it is often the case that the data sets are incomplete.

There will certainly be information on some of the local impacts of urban freight. This maybe particular congestion hotspots or could be in the form of actual or estimated data on the social, economic and environmental impacts. Analysis of the good practice freight plans suggests the following key impacts:

<table>
<thead>
<tr>
<th>Freight Impacts</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Congestion</td>
<td>‘Hotspots’ caused by the volume of freight vehicles or key delivery locations</td>
</tr>
<tr>
<td>Pollution</td>
<td>Usually air quality issues or greenhouse gas emissions, often estimated based on the volume of freight traffic</td>
</tr>
<tr>
<td>Road safety</td>
<td>Accident statistics</td>
</tr>
<tr>
<td>Transport efficiency</td>
<td>Loading factors, energy usage, or based on journey times and the reliability of journey timings</td>
</tr>
<tr>
<td>Noise</td>
<td>Usually at delivery points or near to major highways</td>
</tr>
<tr>
<td>Health impacts</td>
<td>A combination of air quality, safety and noise issues</td>
</tr>
</tbody>
</table>

**Activity and impacts - Examples**

The Paris Climate Action Plan (2007) estimated that trucks constitute about 14 percent of the total vehicle kilometers traveled, but emit 26 percent of CO2 emissions, 43 percent of SOx emissions, 38 percent of NOx and 59 percent of PM emissions from the transport sector within the Paris Metropolitan area.

The Tokyo freight survey reports that the highest proportion of on-street parked vehicles are delivery trucks, occupying 60 percent of the total space. It is also estimated in Tokyo that the average load factor of trucks is 50 percent, with smaller capacity trucks having load factors as low as 20 to 30 percent.
2.2 Challenges

The challenges facing most urban areas are rooted in the growing urban population, increasing economic development and consumers’ fast changing behaviors. All of these factors increase the volume of goods transported to the cities, which brings the need for urban freight planning into sharp focus.

An added complication is that there is also an increasing competition for road space. In developing countries this is the result of increasing motorization, while in many cities in developed countries it is driven by the reallocation of road space to pedestrians or cyclists with wider sidewalks and dedicated cycle lanes. For freight traffic the cumulative impact is that roads are increasingly congested, and there is increasing competition for loading and unloading space at the curbside.

Achieving change is made increasingly difficult but multiple stakeholder interests. Understanding stakeholder interests and issues is a common theme of the good practice freight plans, and needs to take place early in the process.

<table>
<thead>
<tr>
<th>Challenges - Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>During the development of the California Freight Mobility Plan (2016) an electronic stakeholder survey was sent to more than 180 stakeholders. The information received from 72 completed surveys was combined with 27 participant telephone interviews to identify the top five stakeholder challenges:</td>
</tr>
<tr>
<td>1. Freight rail and freight intermodal terminal access</td>
</tr>
<tr>
<td>2. Community and environmental impacts</td>
</tr>
<tr>
<td>3. Seaport access</td>
</tr>
<tr>
<td>4. General state of highways</td>
</tr>
<tr>
<td>5. Need for highway-rail grade separations</td>
</tr>
</tbody>
</table>

One of the earlier city freight plans, the Berlin Strategy for an Integrated Urban Freight Transport System (2006) identifies commercial transport as having “far-reaching consequences for air quality, climate, noise levels, as well as traffic safety”. It also identifies major challenges with the polycentric nature of the city and existing regulations on ambient noise levels and the Environmental Zone (Umweltzone), that effectively restrict the flexibility of logistics activity.

The Washington State Freight Mobility Plan (2014) looks at much more strategic issues and attempts to understand the key challenges for the logistics industry which are described as:

1. Preservation of freight infrastructure
2. Congestion impacting freight-dependent businesses in real, measurable ways
3. Trucking companies facing numerous challenges to provide safe, reliable and cost-competitive services
4. Will the state’s freight systems be able to meet national defense priorities?

2.3 Existing efforts

It is necessary to understand previous efforts and projects and those that are currently, or are planned, to take place the city. These projects and efforts maybe the outputs of direct national, regional or local policy, and are usually a combination of “carrots and sticks” i.e. regulations, street layout (whether by design or chance) and incentives.

There will certainly be government policy impacting on freight activity, maybe determining the types of freight vehicles used by the logistics operators, and sometimes they are the spontaneous response of a city in addressing current freight and transport challenges. In Stockholm, there is a low emission zone and in London a congestion charging zone; neither of these were specifically designed to impact freight activity, but both affect the nature of local carrier behavior.

There are also examples where the increase of pollution from heavy duty vehicles has resulted in policies to ban such vehicles from downtown areas (for example in Madrid). However, it is crucial for urban transport planners to recognize the combined impacts of all existing programs when considering the future challenges the city will face.
Drawing on the local lessons learned, both the successes and failures from existing efforts, will provide invaluable knowledge and guidance for the development of future policy and activity.

### Existing efforts – Examples

In the development of the **New York City Freight Transportation Plan** it was key to recognize recent freight-planning activity throughout the state. The State Department of Transportation, several Metropolitan Planning Organizations and transportation authorities, including the Port Authority of New York and New Jersey, had developed freight related plans, programs, studies, and an annual report.

The New York Freight Plan examined these activities to identify the current impacts and potential progress they could make in enhancing the existing conditions. The Plan included recommendations based on this analysis, and identified opportunities to bundle existing and new projects together for greater benefit.

The **Seattle Freight Master Plan** was formally adopted in October 2016. Data relating to past freight action plans, the city’s land use pattern, topography, traffic volumes, and several other factors were reviewed in the development of the plan.

In addition, a major input into the master plan was the output from the Seattle Freight Access Project (2015). This project was initiated prior to the master plan to identify the truck-freight transportation infrastructure investments planned by other stakeholders, and to determine what was still needed over the next 20 years to keep Seattle industry productive and to keep the city moving. This Freight Access Project was designed specifically to act as a building block for the key policy, program, and technical issues that would be fully examined in the Seattle Freight Master Plan.

### 2.4 Beijing

**Beijing - Freight activity and impacts**

The rapid growth in the population, vehicle numbers and freight volumes in Beijing are having an enormous impact on energy consumption, pollution levels, congestion, CO₂ emissions, and noise. In addition, the increases in material consumption and demand for high quality freight services is intensifying the problems; a situation which will be exacerbated by increasing disposable income.\(^1\)

All of this has a negative impact on climate change, the environment and public health. It is estimated that the social costs induced by motorized transportation are equivalent to between 7.5 and 15 percent of Beijing’s GDP.\(^2\) It is clear that the growth of freight activity needs to be accommodated, to not undermine any urban planning attempt to mitigate the impacts of continued city development.

**Key facts about the city of Beijing are:**

- Population 21.71 million people (2015), predicted to reach 23 million by 2020
- Total vehicles 5.58 million (2015) an increase of 3.3 million compared with 2004
- 260 vehicles per thousand people
- Road transport volume reached 254 million tons (2014), with an annual growth of 6 percent between 2008 and 2014
- Significant progress in socio-economic development; living standards increasing continuously in the last two decades, Beijing average income increase from 15,637 RMB in 2004 to 52,530 RMB in 2016
- Per capita GDP reached 107,000 RMB in 2014, growing 450 percent since 2000
- Beijing is a mega inland city; road transport takes the primary role in the transport system accounting for 90 percent of the total transport volume

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\(^{18}\) Page 32, Metabolic “Beijing’s Freight system, Analysis and Strategy Recommendations from a System Thinking Perspective”.

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Figure 2. Beijing Social Economic and Freight Data 2014

Figure 3. Examples of Beijing Congestion in May 2016 within 6th Ring Road

Key freight facts are:
- Among 51,000 carriers, 19,000 are logistics businesses and the rest are individual owner-drivers
- Road transport industry hired 324,600 professionals
- Fewer than 7,000 business carriers own more than 4 trucks, and only 2 percent of the logistics businesses own more than 50 trucks
- Commercial freight vehicles include 137,000 vans and light trucks, and 48,000 heavy duty vehicles
- In the last five years, the number of vehicles has increased 6 percent/annum, but cleaner vehicle uptake has been slow
- The expansion of the city has led to the average freight haul distance increasing from 45km in 2008 to 65km in 2014
- Freight congestion hotspots include main trunk roads at night (as a result of the day time ban), and near logistic centers and freight vehicle parking areas
- Freight vehicles make up only 3 percent of the total vehicle population but are involved in 25.6 percent of traffic deaths in Beijing (18,621 in 2012)
- An average of 2 traffic incidents/month are caused by explosion, fire or leaking of dangerous materials from freight vehicle
- Approximately 107,500 trucks, cars and vans from neighboring regions travel into Beijing every day.20

Key impacts are:
- High energy consumption: In 2014, the freight sector consumed 954,000 tons standard coal, or 30 percent of the total energy consumption of the transport sector. This is the highest percentage for total energy consumption among the industries measured by Beijing Municipal Commission of Transport

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20 BTI (formerly BTEC) (2015), Beijing’s Green Freight Development Status and Challenges, BTI presentation
• Pollution: the freight sector accounts for 47.6 percent of total particulate matter (PM) emissions and 95 percent of PM 2.5 emissions from traffic in the city, ranking it number one. Freight also accounts for high levels of CO and NOx, at 56 percent and 26 percent respectively.

**Beijing - Challenges**

A key challenge is that the carrier fleet is dominated by a **large number of small vehicle fleets** and high numbers of owner-drivers. The small and dispersed nature of the carrier fleet means that it may be challenging to identify the full extent of the industry (especially individual drivers) and influencing change will be difficult.  

21 Also, as the freight industry is so **highly fragmented**, it suggests low levels of vehicle efficiency, with high levels of empty running and little consolidation of cargo, and low levels of uptake of industry best practice. This is also suggested by the apparently low levels of safety consciousness and environmental awareness. Traffic incidents cause congestion and economic costs can be attributed to the benefits of reducing the number of incidents.

At the end 2014, there were approximately 300,000 freight vehicles, including 203,000 commercial vehicles (trucks and vans) and 100,000 non-commercial vehicles (passenger vans, scooters, tricycles and other informal transport). The number of vehicles is increasing 10 percent year on year, and there is a need to understand which vehicles are being bought, as the current profile suggests that transport capacity is underdeveloped.

The commercial vehicle fleet is dominated by small trucks (62 percent). However, the number of larger trucks (HDV) is growing fast, with a 16 percent increase since 2011. The current fleet is dominated by two body types: drop sides (45 percent) and box-van trucks (26 percent). In 2012, most of the vehicles sold were general trucks, accounting for over 90 percent of the whole truck population sold.  

23 **Third, Beijing’s freight is mainly short distance urban delivery.** A recent survey identified that 84.6 percent of Beijing’s road freight volume was being delivered within the city, implying many short distance urban trips. Only 15.4 percent was outbound for delivery, mostly serving the neighboring Hebei and Tianjin areas, with small percentages to Inner Mongolia and Shan‘Xi province.  

24 Like many large cities, there are many stakeholders involved in the Beijing freight sector. A range of government agencies and institutions have potentiality competing responsibility for managing vehicles, businesses and logistics centers, and a different mix of agencies influence policy. This makes the alignment of policy, regulations and enforcement very challenging.

• Organizations involved in vehicle management include: involved in managing freight sector involves Ministry of Transport, Beijing Municipal Transport Committee, Ministry of Industry and Information Technology, Department of Business Administration, Transport Management Bureau, Integrated Checking Station, Environment Protection Bureau, Development and Research Bureau, etc.

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21 Refers to carriers operate in the market that include business carriers who registered as a carrier company, individual driver owners who operate as a “carrier” without business license.
24 Page 37, a special survey conducted by BTI (formerly BTEC) “Green Freight” and Benchmarking System Study, BTI, 2014

### Table 2. Institution set-up and roles of main stakeholders of Beijing freight administration

<table>
<thead>
<tr>
<th>Department</th>
<th>Office</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commission of Commerce</td>
<td>Logistics Development</td>
<td>Logistics and distribution facilities focused on the preparation of the city spatial planning, organization and implementation of policies and measures; responsible for international freight forwarding business qualification record; coordinated planning and construction of logistics parks, and promote third-party logistics, professional logistics and distribution chain development.</td>
</tr>
<tr>
<td>Beijing Municipal Transport</td>
<td>Freight Transportation</td>
<td>Road transport industry management; operating license, none operation of hazardous chemicals transportation licenses; participate in the development of goods transport business code of conduct and service quality standards; and oversee the implementation of the specific standards.</td>
</tr>
<tr>
<td>Transport Commission</td>
<td>Department</td>
<td></td>
</tr>
<tr>
<td>Development Reform Commission</td>
<td>Infrastructure Branch</td>
<td>Hub, freight station, and other infrastructure developments</td>
</tr>
<tr>
<td></td>
<td>Industry Development</td>
<td>Organize and coordinate the implementation of the strategic planning and major policies of the industrial structure adjustment strategy and high-end industrial functional areas, industrial agglomeration areas and major industrial bases.</td>
</tr>
<tr>
<td>Planning Commission</td>
<td></td>
<td>Urban functional land planning, the city’s logistics land planning and approval</td>
</tr>
<tr>
<td>Environmental Protection Bureau</td>
<td>Motor Vehicle Emission</td>
<td>To organize the formulation of the control plan for motor vehicle emission control, and put forward the target and measures for the control of vehicle emission pollution</td>
</tr>
<tr>
<td></td>
<td>Management Office</td>
<td></td>
</tr>
<tr>
<td>Public Security Bureau</td>
<td>Procedure Control Department</td>
<td>Responsible for the development of freight vehicles, traffic management policy; responsible for issuance of policies on freight vehicle permits licenses examination and issuance of the urban freight passes and permits to Beijing.</td>
</tr>
<tr>
<td>Beijing Administration for Industry and Commerce</td>
<td>Supervision and Management Enterprise</td>
<td>Responsible for the registration of enterprises; to formulate and organize the implementation of the plan to investigate unlicensed enterprises.</td>
</tr>
</tbody>
</table>

### Beijing - Existing efforts

Within Beijing, the transport authorities and local industry have begun to respond to the growing need to manage freight activity, but there is not an agreed plan in place and current efforts are not being effectively coordinated. However, there is a variety of activity occurring which clearly demonstrates the commitment and desire for change. This includes:

Improvements to fleet profiles through the introduction of vehicle replacement and upgrade policies

In 2008, Beijing Transport Commission, Beijing Environment Protection Bureau and Beijing Finance Bureau jointly produced an administrative paper designed to encourage “green fleet” operations for the delivery of the Olympic Games in the city. While work was focused on the bus fleet, especially for moving the athletes around the city, the approach developed into a policy in 2009 that included financial support for “green fleets”. In 2010, a target of 50,000 green trucks\(^{26}\) was included in a Green Freight Initiative designed to guarantee an improvement in urban freight and included 1200 carriers\(^{27}\).

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\(^{25}\) BTI (formerly BTEC) presentation at June 29 Beijing Green Freight System Thinking Workshop

\(^{26}\) Green trucks refer to vehicles that meet Beijing emission standards, recommended by the Ministry of Transport that fit for road transport, achieved green label, installed GPS and met specific safety requirement. Refer to “Notice of 2011- 2015 Beijing City Freight “Green Trucks” Vehicle Subsidy Management Rules”.

\(^{27}\) The “Green Fleet and Vehicle Selection Criteria” issued by the Beijing Bureau of Finance, lists specific selection criteria for green trucks that meet Ministry of Transport recommended standards.
Policy guidelines were subsequently developed later in 2010 for phasing out “Yellow label” 28 vehicles, effectively old and out-of-date (pre-1995) trucks, to improve emission standards and introduce more energy-efficient vehicles.

Promotion of green freight policies
Based on the requirements of the Beijing Clean Air Action Plan for 2012 to 2017, a green freight indicator system was developed to lead government policies. It included the following elements:
- Swift payment of subsidies on vehicle replacement to reward champions
- Establishment of a business pollution evaluation system to provide monitoring and benchmarking
- Integration of energy saving and emission reduction measures and policies to reinforce the policy impact

Introduction of cooperative transport solutions
Two cooperative logistics operations have been piloted:
- Logistics operators in Beijing have actively participated in national ‘drop and hook’ (dropped trailer) pilot projects and achieved tangible results
- A local operator, Kuai Xing Xian Logistics, were involved in a pilot project for a shared delivery platform, where Optimal was introduced to improve loading capacity. Using the consolidated delivery scheme, greater efficiency was achieved on 98 percent of routes, generating a 23 percent emission saving

Encouraging Industry-wide adoption of green technologies and measures
In 2015 BTI (formerly BTEC) and SFC developed a green technology pilot project with 4 logistics operators (Xiang Long Logistics, Qingniao Logistics, Hezhong Logistics and Chun Yitong Logistics). This included the evaluation of ‘real-world’ experience, and a monitoring and data collection system for vehicle safety, fuel efficiency, cost effectiveness and the reliability of improved performance. The pilot project provided valuable insights as to the applicability of new technology for carriers, and the likely barriers to wider adoption.

BTI and SFC are now working together to develop scalable solutions and roll-out the approach to a wider audience. This includes the provision of strategies for conducting transport manager training on fuel saving solutions, the introduction of a smart trucks platform to accelerate the adoption of proven fuel-saving technologies, and the incorporation of relevant measures and best practice into Beijing’s sustainable freight strategy.

Building industry awareness and understanding on energy saving and emissions reduction
Beijing is establishing green management systems for businesses by the introduction of; emission standards, a green tire verification and monitoring system, and an adoption evaluation system for upgrading to green technology.

As an active member of the China Green Freight Initiative, Beijing is the lead city in the establishment of a Green Freight City Network. Beijing, Shanghai, Shenzhen, and Guangzhou, currently participate in this network, where best practice and common initiatives can be discussed, and potentially adopted, by fellow cities.

28 It refers to trucks that registered before 1995 that are below national III emission level.
3. Where are we going

The urban freight system is complex, and a sustainable freight plan needs to provide a common purpose and harness a wide level of support. While local government may have a vision for the future as a ‘sustainable city’, what is the freight element of this and do stakeholders understand and agree?

We must also set some goals, turning this vision into specifics, so that we can develop a strategy of how we plan to achieve this vision. And finally, we must have some targets – otherwise we do not know if we are making progress and, if so, by how much.

![Figure 5. From vision to goals to KPIs and targets](image)

### 3.1 Vision

A vision statement will define the optimal desired future end state. It is therefore long-term in nature, and may seem almost impossible to achieve. However, by being deliberately ambitious and requiring commitment, it acts as a focus to address the cities’ challenges and helps to provide guidance and inspiration to key stakeholders.

A Vision Statement:
- Defines the optimal desired future end-state; the mental picture
- Provides guidance and inspiration as to what we are focused on achieving in five, ten, or more years of city freight
- Functions as the "direction of travel" - it is what key stakeholders understand their work every day ultimately contributes towards achieving over the long term
- Is written succinctly and in an inspirational manner, so that it easy for decision makers and stakeholders to repeat at any given time.29

Developing a shared common vision is not easy and not a task that can be done by one individual organization or one authority. As a “common ideal state”, the vision must be agreed and valued by all freight-related stakeholders. For this reason, consultations should be conducted with a diverse set of stakeholder groups who may have conflicting visions, objectives and expectations.

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Developing a vision may be a slow and challenging process, but it will clarify the range of stakeholder needs and perceptions of exactly what ‘sustainable urban freight’ mean to them. The vision may appear at odds to individual sector and business interests and objectives, and a number of consultations and discussions, and eventual compromise will be required in the process of developing a common vision. Visions vary between countries and cities, but common characteristics include improving economic vitality and the social quality of life, while limiting the negative impacts on the environment.

### 3.2 Goals

The theory for setting goals is that they are “an ambitious commitment to address a single challenge, with specific, measurable and time bound outcomes that directly contribute to achievement”. Examination of the good practice freight plans suggests that the three main topics covered are safety, air quality and congestion/journey speeds. However, the good practice also implies that it is almost impossible to set precise time-bound outcomes for freight.

#### Goals - Examples

The California Freight Mobility Plan (2015) states six goals covering the following areas:

1. **Economic Competitiveness** - Improve the contribution of the California freight transportation system to economic efficiency, productivity, and competitiveness
2. **Safety and Security** - Improve the safety, security, and resilience of the freight transportation system
3. **Freight System Infrastructure Preservation** - Improve the state of good repair of the freight transportation system
4. **Environmental Stewardship** - Avoid and reduce adverse environmental and community impacts of the freight transportation system
5. **Congestion Relief** - Reduce costs to users by minimizing congestion on the freight transportation system
6. **Innovative Technology and Practices** - Use innovative technology and practices to operate, maintain, and optimize the efficiency of the freight transportation system while reducing its impacts

Similarly, Seattle’s vision statement (above) is supported by six very similar goals that address: economy, safety, state of good repair, equity (balancing business and resident needs) and environment.

The Stockholm Freight Plan (2014) includes four main goals:

1. To enable more reliable delivery times
2. To facilitate commercial freight vehicles by improving access to efficient loading zones
3. To promote the use of clean vehicles
4. To advance the freight delivery partnership between the City and other stakeholders

Instead, urban freight plans usually have an overall time frame that they are working towards, this is often part of a broader city-wide approach to planning timeframes. For example, in London the 2007 Freight Plan had 2016 as its timeframe, and current strategy work in London is looking towards 2030 – in line with land use planning time horizons. In Tokyo, much of the current activity is focused on 2020 and the forthcoming Olympic and Paralympic Games. The principle of working to support forthcoming changes to the road network (the
Olympics, or in Sydney Australia the arrival of a new rapid transit system) provides business stakeholders with a clear reason to work with city authorities.

### 3.3 KPIs and Targets

The setting of clear targets, or more detailed key performance indicators (KPIs), can important as they provide the ability to measure and evaluate the effectiveness and progress of policy and investment performance. Urban freight systems are complex, and targets and KPIs can be used to give a clear indicator as to impact of any implementation.

The details around data collection are discussed in 4.4 below. However, it is useful to consider setting targets early in the planning process and involving multiple stakeholders. The process of setting targets can assist in defining how any actions are implemented, and ensure that all factors have been taken into account. It can also help to avoid any misunderstandings between stakeholders, and minimizes data collection costs.

A sustainable freight plan could set quantitative targets for goals relating to operational efficiency, modal split, environmental savings, road safety or other relevant indicators. It has been suggested that for many countries and cities, the immediate objective in understanding the nature and scale of the freight sector is to answer four public policy questions:30 How much freight is being moved? Where is the freight going? What is the relative use of different transport modes? How efficient is the freight being transported?

SFC has made an inventory of 130 indicators that are used by other cities. From these we have derived 16 indicators that are the most commonly used in the measurement of city-level freight performance:

<table>
<thead>
<tr>
<th>Category</th>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic</td>
<td>▪ GDP/Capita (PPP)³¹</td>
</tr>
<tr>
<td>Urban form</td>
<td>▪ City size (km²)</td>
</tr>
<tr>
<td></td>
<td>▪ population density (People/km²)</td>
</tr>
<tr>
<td></td>
<td>▪ retail establishment density (Number of establishments/km²)</td>
</tr>
<tr>
<td></td>
<td>▪ delivery density (average number of deliveries per establishment, or per square meter etc.)</td>
</tr>
<tr>
<td>Operational</td>
<td>▪ Average loading factor (percent)</td>
</tr>
<tr>
<td></td>
<td>▪ average trip length within the urban area(km)</td>
</tr>
<tr>
<td></td>
<td>▪ empty running (percent)</td>
</tr>
<tr>
<td></td>
<td>▪ freight lifted (Tons/Capita)</td>
</tr>
<tr>
<td></td>
<td>▪ freight motorization index (vehicles/1000 population)</td>
</tr>
<tr>
<td></td>
<td>▪ urban freight share of VKT ³²(percentage)</td>
</tr>
<tr>
<td>Social</td>
<td>▪ Fatal accidents involving freight vehicles</td>
</tr>
<tr>
<td></td>
<td>▪ freight employment</td>
</tr>
<tr>
<td>Environmental</td>
<td>▪ Freight emission intensity (g/tonne-km),</td>
</tr>
<tr>
<td></td>
<td>▪ urban freight emission share (percent PM, NOx, CO₂)</td>
</tr>
</tbody>
</table>

The good practice cities have developed a range of targets for a variety of freight impacts, including some very detailed measures. However, it appears that the robustness of the data, and the effort required to gather it, may not always be cost effective and the usefulness of some of these measures in measuring the direct impact of city policy measures may be questionable.

It is also noted that in many cities, the amount of freight data available is insufficient to support evidence-based decision-making. What is clear is that a small amount of data can be enough to develop a small-scale pilot or trial, enabling effective data to be secured.

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³¹ Adjusted for purchasing power parity
³² Vehicle kilometer of travel
Developing a Sustainable Urban Freight Plan – a guide

Beijing - Vision
Beijing’s 13th Five-Year transport plan\textsuperscript{33} could provide a possible overall vision as “A safe, reliable, convenient, efficient, financially sound and sustainable transport system.”

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{beijing.png}
\caption{Figure 6. Consideration of Beijing in developing the 13th five-year transport plan\textsuperscript{34}}
\end{figure}

The next steps are to develop a freight specific element to this vision, one that City administrators and logistics stakeholders alike can support.

\begin{itemize}
\item Number of deliveries and pick-ups per week per employee in an activity;
\item Number of deliveries and pick-ups per km\textsuperscript{2} in a zone;
\item Number of car trips for purchase per km\textsuperscript{2} in a zone;
\item Number of deliveries and pick-ups per activity in a zone;
\item Number of hours of on-street double parking for delivery or pick-up in a zone, per vehicle, per activity;
\item Number of kilometers for one delivery or pickup in a zone, per vehicle, per activity;
\item Average distance travelled per collection/delivery; total vehicle km per week in French urban areas; average time taken per delivery; average driving time and stationary time; average speed/mode;
\item Grams pollutant per km (g CO\textsubscript{2} per km) liter of Fuel per km according to the zone, the vehicle, the activity;
\item € per collection or delivery, total vehicle km per week in French urban areas, road occupancy by vehicles transporting goods, weight average transported kg per km / vehicle, € per trip for purchase, € per home delivery, freight Intensity i.e. tonne-km/GDP, lorry traffic intensity i.e. VKM/GDP, goods lifted in Tons, average length of haul, empty running (percent), energy intensity – Fuel consumed per tonne-kilometer.
\end{itemize}

In the Paris Climate Action Plan (2007) the city is targeting to decrease its overall emissions by 75 percent by 2050, compared with 2004. For 2020, the target is to reduce greenhouse gas emissions and energy consumption by 25 percent and ensure that more than 25 percent of total energy consumption is from renewable or recovered energy\textsuperscript{1}.

34 http://www.bjjtw.gov.cn/xxgk/dtxx/201606/t20160622_131114.html
**Beijing - Goals**

Beijing city planners and decision makers have begun to consider the future development of freight across the city region. There are three key questions that will need to be considered when defining goals:

1. **What new demands will be imposed on the regional freight landscape and transportation organizations as a result of the strategy for integrated development across Beijing, Tianjin and Hebei?**
   - With integrated development among Beijing, Tianjin and Hebei, the non-core functions of the capital will be moved outwards. In the future, large warehousing and distribution facilities such as freight stations will be relocated in the cities and province.
   - Greater Beijing Outer Ring Road will reshape the new freight channels in surrounding areas, which may impose a new demand on the transportation organization and fleet composition of enterprises.
   - Given the increasingly demanding environment protection, freight policies may well tend to become more stringent.

2. **How can freight transformation be guided and sustained given the constraints from energy conservation and emission reduction?**
   
   As freight sector energy consumption takes large share of Beijing's transport energy and air pollution, freight is likely to be a sector where transportation is most closely connected to environment protection.
   - How can freight enterprises survive?
   - How can basic city transportation demand be guaranteed?
   - How can government agencies turn pressure into opportunities to facilitate industry transformation?

3. **How can freight industry management be improved collaboratively?**
   
   It will take partnership to collectively improve freight industry activity; from the government side, decision tools, monitoring and KPIs, and planning and policy research should be integrated; from an industry perspective, developing sustainable business model, improve management skills, adopt green technologies and measures need to be considered; and at the society level, how to build and enhance a market mechanism that leads to sustainable development and a green freight industry is the challenge.

**Beijing – KPIs and targets**

The Beijing 13th Five-Year Transport Plan set three major KPIs to measure Beijing Transport:

- Non-Motorized Transport and public transport to reach 75 percent of all transport
- Congestion index controlled below 6.0
- Safety: reduce death rate per 10,000 vehicles to below 1.60

Beijing has also set KPIs for some of the existing freight projects, such as measuring the performance of a logistic park. Beijing has developed a four-layer indicator system, and developed core indicators including:

- Fuel efficiency per unit
- Ratio of clean energy use
- Capacity of clean and new energy provided on vehicles
- Low carbon building
- Adoption of green technologies
- Efficiency of equipment and facilities
- others

Future KPIs could be based on these existing indicators and data collected for more of the freight sector.

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35 Which refers to walking, cycling, and public transportation.
36 Beijing defined traffic into five categories, with score 8-10 being heavily congested.
4. How do we get there

4.1 Institutional and policy framework

Supportive institutional arrangements and a coordinated policy framework are critical for the successful implementation of an urban freight plan. While it is important to design urban freight policies so they are in context with the national policy-making framework, it is also critical that the plan is an integral part of the land use and transport planning processes in the urban area. This will ensure the plan is consistent with national goals and with other urban and regional policy initiatives. It will also maximize the use and effectiveness of the full range of local transport policy interventions.

In many cities, the long-term land use and development plan is supported by, and sometimes integrated with, an urban transport plan. The transport plan will contain policies and proposals for all traffic, especially public transport, across roads, rail and all other modes. The plans will also consider road user safety, air quality, congestion and connectivity; what is often missing is any consideration of freight movements.

The purpose of the urban freight plan is to correct this deficiency. It must take into consideration any existing land use and transport plans and, as developing these plans is usually an iterative process, be able to inform the next round of the planning process.

National and regional governments may also have corresponding objectives for reducing greenhouse gas emissions, air pollution, and energy dependency, and to improve road safety and sustainable development. These national policies can also help guide cities in prioritizing strategic options and guide their investment decisions.

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**Policy Framework - Example**

The **Stockholm freight plan** (2014) has clear linkages with the higher-level land use and transport planning. Stockholm first developed a city vision, then a city land use plan and subsequently an urban mobility plan.

**Vision 2030 and the Stockholm City Plan**

Vision 2030 describes the Stockholm of the future – what it will be like to visit, inhabit and work in the city. The Stockholm City Plan supports this vision, and describes how the city will grow and develop.

**The Urban Mobility Strategy**

The City of Stockholm’s transport plan, the Urban Mobility Strategy, governs the planning of the city’s streets and highways. The strategy contains the policies and proposals to ensure the transport system adapts to meet the vision.

The Plan describes streets from an urban mobility perspective and highlights the importance of streets as attractive places to be. This includes walking, cycling and public transportation, as well as the need to accommodate commercial freight traffic.
4.2 Partnerships and stakeholder engagement

Transport projects are often politically controversial, especially at a local level. An integrated approach to planning helps generate a broad base of support for intervention and the good practice cities demonstrate that this is achieved through effective stakeholder engagement.

The business-to-business nature of freight activity presents unique challenges for city planning authorities and a key element of the development of successful freight plans has been to put a special emphasis into engagement with key stakeholders. This increases the understanding of the multiple interests of freight stakeholders and helps to balance any perception that regulation of freight activity is the only solution.

Stakeholders should be involved from across the supply chain, including; shippers, carriers, logistics providers, and customers and businesses, as well as key affiliates such as trade associations, and resident and special interest groups, to foster a mutual trust between partners, government and civil society. Some cities have also engaged with vehicle manufacturers and academics, especially when developing innovative solutions.
Developing a Sustainable Urban Freight Plan – a guide

Avoiding any negative impact on economic development, or any sense of injustice or even political turmoil, requires compromise and a thorough analysis of the plan’s likely impacts on different interest groups. Strong stakeholder commitment and participation in the development and design of the freight plan reduces these misgivings, and helps to build effective partnerships for delivery.

4.3 Freight data system

In developing an urban freight plan, individual cities need to prioritize the challenges they face so that they can set clear targets and objectives. Good data is the key to any successful prioritization of urban freight, as well as efficient urban freight policy implementation. And, as we discussed in Chapter 2 and Section 3.3, cities need urban freight data to understand local issues and challenges, develop targets, evaluate multiple solutions and anticipate future planning requirements.

However, the availability of urban freight data in cities is extremely poor. Cities may have freight data about their own fleet composition and demand, and can model freight emissions as a result, but most lack industry-wide data, especially from an under developed and high competitive private sector. There is little consistency or standardization in terms of the data collected about urban goods and vehicle flows, often even within the same country. And these issues are made more complicated by difficulties in defining vehicle boundaries, as many freight vehicles may pass through an urban area, rather than stop.
Some cities in developed countries like France and Japan have carried out extensive surveys to develop a common data collection methodology and roll out urban freight indicators. These approaches are reviewed in SFC “Developing Sustainable Urban Freight, a review of worldwide policy good practice, with 5 supporting case studies”, but both approaches have proved costly.

Options to improve the quality and quantity of urban freight data in cities appear expensive and are unlikely to occur quickly. However, while this may reduce the ability to effectively target planning and implementation of sustainable freight measures, it should not stop all efforts to address sustainable urban freight. Some cities have used estimations based on national data or have extrapolated information from other cities to provide an initial area to target intervention. Others have begun a dialogue with local stakeholders to increase their awareness and involvement and data has been forthcoming as a result.

**Freight data system - Example**

The **Stockholm Freight Plan** was published in 2014 and was designed to begin the process of changing city freight activity by 2017. It was therefore critical to develop a range of indicators that would measure the amount of progress achieved in reaching the city’s five goals in only 3 years. The indicators are:

<table>
<thead>
<tr>
<th>Goals</th>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 To enable more reliable delivery times</td>
<td>▪ Percentage of distributors and end customers that are satisfied with traffic flow in the city should increase. ▪ Percentage of vehicular journeys with good journey time reliability in high traffic should not decrease.</td>
</tr>
<tr>
<td>2 To facilitate for commercial freight vehicles</td>
<td>▪ Increase in the number of loading zones for heavy freight vehicles ▪ More monitoring of unauthorized parking in loading zones for heavy freight vehicles</td>
</tr>
<tr>
<td>3 To promote the use of clean vehicles</td>
<td>▪ Increase in the number of clean vehicles included in or resulting from projects in which the City is involved ▪ Reduction in CO2 emissions resulting from Freight Plan projects</td>
</tr>
<tr>
<td>4 To advance the freight delivery partnership between the City and other stakeholders</td>
<td>▪ At least one tangible project should be initiated every year with stakeholders in the external freight network. ▪ Two meetings with both the internal and external freight networks should be conducted every year</td>
</tr>
</tbody>
</table>

While focused on smaller cities, the European **Freight TAILS** project has been designed to develop freight management policies that pro-actively support the functioning of growing cities, whilst reducing the carbon emissions associated with urban freight transport. None of the cities has access to good quality freight data but Gdynia and Umeå are using the project to kick-start local data gathering.¹

Gdynia (Poland) has a big issue with Heavy Duty Vehicles from the seaport entering the city. When installing the new traffic management system, the city also installed a ‘weigh-in-motion’ sensor, that could detect overweight vehicles leaving the port. This has enabled the city to enforce against these vehicles, but also to engage with the freight carriers in the development of the city’s sustainable freight plan.

Umeå (Sweden) simply asked their local group of stakeholders what were their three biggest issues in accessing the city centre. This provided details of key hotspots and accessibility issues that the city could begin to address, and is now leading to the development of a common vision for city freight traffic, which the private sector will fully support.

**Actions**

Actions are defined activities and interventions with a specific objective, budget, timeframe and output. Collectively actions (‘initiatives’, ‘projects’, etc.) are designed to support the achievement of the plan goals. Examination of the detailed actions in the good practice cities, shows that most actions are closely linked with specific goals, although some, such as stakeholder participation, address the whole plan.
All sustainable urban freight plans will contain a list of actions. And, based on the good practice cities, a full categorization of the range of actions and policies that could be used to implement sustainable urban freight plans is provided in appendix A.

However, the complexity of managing freight activity means there are hundreds of different policies, interventions and actions a city could take. The first step is to decide what issues or goals should be prioritized and then to identify which actions are appropriate at both the local and wider urban scale.

Setting the priority may be obvious, it could be the one stand-out issue facing the city or a specific local hotspot. But where it was not obvious, many of the good practice cities initially focused on small-scale ‘win-win’ issues (sometimes described as ‘low-hanging fruit’). This approach encourages stakeholders to see city authorities as helpful problem solvers, and not just as regulators. For example, in London this included solving traffic enforcement issues at an individual intersection and providing information to ensure curb side deliveries could be made legally.

It may be helpful to take one example: If we assume our priority is to improve fuel efficiency and reduce emissions we can identify over 20 different actions we could take that are listed in Appendix A. If we categorize these into ‘vehicles and fuels’, ‘freight movement’, and ‘transport system’ as shown in the figure below, we begin to identify clusters of activity: we could target the vehicles (replacement, maintenance and fueling), the logistics management (routing and scheduling systems, and driver behavior) or the physical infrastructure.

There may be political preferences that dictate the direction the urban authorities should take or cost may be the over-riding factor. In which case, while the first two areas require close working with the logistics carriers, there is obviously less cost involved than in building new, or re-engineering existing infrastructure.

What all of the cities did was ensure that some actions were deliverable in the short-term. Whether these were small-scale pilot projects, formalized discussions with stakeholders or providing online information on city regulations, what appears to be key is to do something. All of the cities report that, being seen to address urban freight issues and work with the industry, has enabled them to make more progress than had previously been possible.
### Actions - Example

The **Seattle Freight Master Plan** (2016) contains actions focused at specific goals. Below is an example of the actions to meet the goal to improve safety. While each action is listed under a specific goal, it may actually help advance multiple goals in the plan.39

<table>
<thead>
<tr>
<th>Strategies</th>
<th>Actions</th>
</tr>
</thead>
</table>
| Develop a comprehensive freight education program | - Work with partners to develop and disseminate educational materials on freight mobility and safety issues  
- Develop freight safety training for members of SDOT’s modal advisory boards (e.g. take a ride in a truck, experience the roadway from a disabled pedestrian perspective)  
- Work with partners to host truck rodeos to educate residents on freight design challenges, safety, truck blind spots, and the role of freight in an urban setting  
- Utilize growth in home deliveries to heighten community awareness of freight performance requirements |
| Improve safety at railroad crossings | - Document at –grade rail crossings and conditions through the Move Seattle Levy  
- Work with partners to evaluate and make improvements at –grade rail crossings |
| Support commercial vehicle enforcement efforts | - Explore long-term funding opportunities for increased commercial vehicle enforcement efforts  
- Continue to have SDOT Commercial Vehicle Enforcement Officers provide training to Seattle Police Department(SPD)  
- Participate in Washington State Patrol (WSP) emphasis efforts |
| Employ Traffic Incident Management System practices | - Follow established Traffic Incident Management System (TIMS) practices in collaboration with SPD and WSP to quickly address traffic incidents on the freight network, including incident clearing and alternate route identification |
| Maintain landscaping … to reduce truck sightline issues | - Identity additional funding for SDOT landscape maintenance crews  
- Integrate the freight network into landscape maintenance management plans |

### 4.5 Beijing

**Beijing - Institutional and policy framework**

The development of a sustainable urban freight plan for Beijing will need to take into consideration the existing policy framework. Beijing will have to align its freight efforts around a range of policy documents which integrate the regional transport plan with the city’s own transport, economic development and clean air action plans.

The following documents will all need to be considered:
- Beijing Clean Air Action Plan 2013 -2017 (September 11, 2013)
- Beijing/Tianjin /Hebei Coordinated Development Planning Outline (March 23, 2015)
- Beijing/Tianjin/Hebei Integrated Transport Development Plan (December 8, 2015)
- Beijing 13th Five Year Transport Plan guidelines for the Development of a Low Carbon Transport System (July 4, 2016)
- National Guidelines for Accelerating and Promoting Green Circular Transport Development (May 22, 2013)
- Action Plan for Air Pollution Control in Beijing, Tianjin and Surrounding Areas (Ministry of Environment Protection [2013] No. 104)

**Beijing - Partnerships and stakeholder engagement**

SFC and BTI have reviewed the roles and responsibilities of the major stakeholders and partners involved in the Beijing freight sector. Based on the urgent priority being to address the congestion and air pollution challenges, an initial list of stakeholders could include:

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**Table 4. Beijing freight stakeholders**

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Roles and responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ministry of Transport - Cargo Transport Division, Road Transport Department</td>
<td>Responsible for developing relevant transport policies and standards for operating vehicles; over-sight of logistics market and driver training in accordance with relevant laws and regulations</td>
</tr>
<tr>
<td>Beijing Municipal Transport Commission Cargo Division, Transport Management Bureau</td>
<td>Responsible for control of cargo transport in Beijing; developing relevant policies and standards on modern logistics development; issuing road transport licenses and licenses for the non-commercial transport of hazardous chemicals; developing codes of conduct and service standards on cargo transport, and supervising of their implementation</td>
</tr>
<tr>
<td>Beijing Municipal Environment Protection Bureau, Motor Vehicle Emission Management Division</td>
<td>Overall responsibility for management of motor vehicle pollution in accordance with the Clean Air Action Plan; developing Beijing pollution control standards for motor vehicles, and supervising their implementation; carrying out comprehensive analysis of Beijing motor vehicle pollution; developing a pollution prevention plan on the control vehicle emissions, proposing goals and measures on vehicle emission pollution control</td>
</tr>
<tr>
<td>Beijing Traffic Management Bureau, Traffic Order Division</td>
<td>Responsible for developing transport management policies (freight vehicle included); developing policies on issuing permits for freight vehicles; reviewing and issuing Downtown Entry Permits and passes and Beijing Entry Permits</td>
</tr>
<tr>
<td>Beijing Municipal Commission of Commerce</td>
<td>Responsible for planning logistics and distribution key facilities with other departments, developing relevant policies and ensuring implementation; coordinating planning and construction of logistics zones, collecting and analyzing logistics-related information of Beijing city, promoting the development of third party logistics and a more professional logistics distribution industry</td>
</tr>
<tr>
<td>Beijing Development and Reform Commission</td>
<td>Responsible for the comprehensive analysis of infrastructure development and coordination of major issues; promoting reform of infrastructure investment and financing system; coordinating investment on infrastructure projects such as civil aviation and railway projects</td>
</tr>
<tr>
<td>China Road Transport Association</td>
<td>Association of national road transport businesses, working with the Ministry of Transport to implement the China Green Freight Initiative</td>
</tr>
<tr>
<td>China Federation of Logistics and Purchasing</td>
<td>Responsible for developing and amending freight science and technology, statistics and standards, releasing annual development report on logistics and practitioners (such as drivers, etc.,), an industry association that links carriers, technology providers and government agencies</td>
</tr>
<tr>
<td>Beijing Road Transport Association</td>
<td>Responsible for standardizing and guiding members’ conduct, contacting Beijing freight companies and coordinating implementation of relevant policies</td>
</tr>
<tr>
<td>Large international and domestic shippers</td>
<td>Beijing municipality is already in discussion with large shippers, including Jing Dong, Alibaba, Tencent, IKEA, Lenovo, and P&amp;G Shippers that operate across the region (Beijing, Tianjin and Hebei provinces) should also be a priority</td>
</tr>
<tr>
<td>Beijing registered carriers</td>
<td>Carriers such as Xianglong Logistics, Qingniao, Hezhong, Chuny Yi Tong that are already worked with Beijing government and development agencies, are effectively ‘early adopters’ Beijing can identify local shippers using data from the Traffic Management Business Management Bureaus</td>
</tr>
<tr>
<td>Universities, academia and research institute</td>
<td>Tsinghua University, Renmin University, and Beijing University of Technology can provide technical support on policy, standards, verification etc.</td>
</tr>
<tr>
<td>Development agencies and NGOs</td>
<td>Asia Development Bank (ADB), Clean Air Asia (CAA), German Corporation for International Cooperation (GIZ), Rock Mountain Institute (RMI), Smart Freight Centre (SFC), World Resources Institute (WRI), World Bank</td>
</tr>
</tbody>
</table>
Beijing - Freight data system

Beijing is examining the freight survey methodologies used in Tokyo to understand any lessons and develop a local approach.

The nature of private sector led freight development naturally puts limits on any data collection system and the efficient use of tools. It is urgent to improve the methods and quality of data collection, and ensure the connection between freight development and urban expansion are sufficiently analyzed.

Beijing - Freight actions

Beijing is a world class city, but as a mega-city it has its own set of challenges. However, the range of actions identified in Appendix A shows the good practice from other metropolitan cities (London, New York, Tokyo, Paris etc.), many of which are relevant for Beijing.

The priority issues for the freight plan to address in Beijing are to reduce congestion and improve air quality.

SFC and BTI have reviewed the existing strategies being taken in Beijing and, using the example above (section 4.4), have identified appropriate actions for each of the intervention areas. As a next step, specific strategies to meet the city’s goals could be linked to the intervention areas (e.g. air pollution, congestion, land use).

Table 5. Categorizing Beijing existing freight actions

<table>
<thead>
<tr>
<th>Intervention area</th>
<th>Projects</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicles and fuels</td>
<td>- Smart Transport Manager training&lt;br&gt;- Smart Trucks Platform</td>
<td>These projects are designed for Beijing carriers to encourage adoption of fuel saving technologies and measures that are within the carrier's reach. They will also create fuel saving champions within the company</td>
</tr>
<tr>
<td></td>
<td>- Subsidies for GPS and telematics</td>
<td>Government efforts in promoting telematics, which has already applied to some of Beijing carriers, in 2015 and 2016, Beijing Transport and Environment Centre has subsidized 200 -300 GPS devices to be installed and test among selected Beijing carriers</td>
</tr>
<tr>
<td></td>
<td>- Green Fleet and Green Trucks</td>
<td>Aimed at improving Beijing freight vehicle fleets and emission standards</td>
</tr>
<tr>
<td></td>
<td>- Yellow Label Vehicle Scrappage Programme</td>
<td>Link local initiative with national policy and Ministry of Transport</td>
</tr>
<tr>
<td></td>
<td>- Introducing electric freight vehicles</td>
<td>Beijing initiated electric freight vehicle pilot in 2011 providing subsides to carriers who purchase electric trucks[^1]</td>
</tr>
<tr>
<td>Freight Movement</td>
<td>- Modal shift: ‘drop and hook’ pilot</td>
<td>To improve freight movements, Beijing already participated in four national ‘drop and hook’ pilot projects by offering subsides to pilot carriers</td>
</tr>
<tr>
<td></td>
<td>- Setting up joint distribution center, optimize vehicle and route</td>
<td>Efforts to address the challenges of the whole transport system</td>
</tr>
<tr>
<td></td>
<td>- Beijing Night Delivery</td>
<td>Beijing has banned heavy duty trucks (+8t) within the fifth ring road from 6 am to 10 pm.</td>
</tr>
<tr>
<td>Transport System</td>
<td>- Establishing new transport infrastructure, e.g. subway, highway,</td>
<td>Beijing in seeking to develop public transport system by constructing more metro lines, highways, etc</td>
</tr>
<tr>
<td></td>
<td>communication hubs etc.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Beijing/Tianjin/Hebei joint transport initiative</td>
<td>Beijing Tianjin and Hebei are coordinate efforts in building an integrated transport system</td>
</tr>
<tr>
<td></td>
<td>- Urban Distribution Centers, reallocation and consolidation</td>
<td>Freight distribution centers and logistic parks are one important areas of development according to Beijing 13th Transport Plan.</td>
</tr>
<tr>
<td></td>
<td>- Beijing urban planning to build new freight corridor</td>
<td>According to the Integrate Transport Planning Guidelines for Beijing Tianjin and Hebei, Beijing will work with the Tianjin to construct new freight corridors to enable inter-city fast delivery.</td>
</tr>
</tbody>
</table>

5. What do we need to implement the plan

Having plans and strategies is great, but we need to turn these into actions to reach the desired goals and objectives. The good practice examples all point to the need for clear leadership; coordinating, organizing and managing tasks, timelines, and stakeholder involvement; and communicating the necessary behavior change.

Example
The Office of Freight Mobility, in the New York City Department of Transportation, provided the necessary focus to develop a range of urban freight initiatives. With this as their initial freight plan, the New York team engaged with, and regularly communicated with their stakeholders. Recent successes, especially with pilot off-hours (retimed) deliveries, has led to approval being given to increase the budget and number of staff, and widen the freight program scope to include planning, operations, efficient deliveries and commercial vehicle compliance.

5.1 Staffing

All organizations have staff, but having the right staff is critical to implementing an Urban Freight Plan. They supply the talent, skills, knowledge and experience to achieve the goals and objectives. And, to a large extent, the performance and actual impact of the plan will depend on the quality of the people who implement it.

In the simplest terms, staffing is “putting people in to jobs”. However, to implement a freight plan, staff need to be able to empathize with both the public and private sector stakeholders and understand their specific issues. A city transport authority can often mobilize existing staff, but external expertise, academic input and personnel from key stakeholders are also indispensable in building-up expertise, and technical and management skills to be able to put the plan into action.

To develop and maintain a stable and well managed cross-functional team means recruiting, deploying, and training a workforce of sufficient quality and quantity. It also involves providing on-going development and training opportunities and appropriate remuneration, so that the right type of people are available at the right time.

The team also need to be given sufficient support and leadership to be able to drive through change and successfully implement the plan.

5.2 Funding

A city freight plan must be appropriately funded by internal or external sources, or a combination of both. Having a highly ambitious plan without the necessary staffing of financial support means it is doomed to failure. Many cities have provided an initial allocation of funds from a single department budget, and this provides sufficient resource to focus activity. However, more complex multi-stakeholder projects have been developed to deliver key infrastructure projects (for example Three Mills Lock in London and the Logistics Hotel in Paris).

A city freight plan may have limited funding in its first year or two, and it is very important to plan the allocation of these limited funds carefully to maximize benefit. When US SmartWay allocated their initial budget, it was divided into: recruitment and partner management; marketing and communication; technology verification and testing; special programs/expansion; and general operation costs. In some circumstances, the start of the planning process does not require significant funding other than staff time. However, securing funds is always

41 http://ispatguru.com/staffing-a-function-of-management/
beneficial, as it enables demonstration projects to be trialed and provides flexibility for any new project or initiatives.

It is highly recommended that all reasonable sources of funding are investigated, in both the public and private sector, to secure further funding. This includes relevant public sector agencies such as transportation, environment, public health, climate change, economic development, labor, and public infrastructure spending. Explaining the potential benefits in clear monetary terms is crucial in attracting the participation of private companies, and enables funders to understand the likely returns on their investment.

It may also be possible to establish annual membership fees for partner participation, logo usage and access to any tools or information produced, to secure further funding.

### 5.3 Communication plan

To implement a sustainable freight plan and meet the core objectives, a communication plan is needed. This will ensure engagement with stakeholders is controlled and coordinated, and activity is communicated effectively to both public and private sector stakeholders.

It is useful to say up-front why you want to communicate and what you hope to achieve. This provides clarity to the organizational and communications objectives. It enables a better understanding and prioritization of interest groups and key priorities, and will often shape the timetable of program deliverables.

Also, as stakeholders can range from large companies to individual residents, it assists in identifying who the key stakeholders are and in getting a detailed description of the target audience.43

Once the relevant freight plan audience is identified, the next task is to breakdown key objectives into distinct messages for each audience. Government agencies, industry associations, shippers/carriers, NGOs and development agencies all have different interests, and need to hear tailored messages to act in a coordinated manner.

There are a range of communications channels that have been proven to work in promoting sustainable urban freight plans including: conferences, workshops, leaflets, press releases, case-studies, videos, e-bulletins, e-learning etc. These approaches have been tried across the good practice cities, and on their websites the cities will often provide links to particular communications activity (New York, Stockholm, Barcelona, London etc.).

But, as each target audience has different ways of receiving messages, the most appropriate channels need to be identified to reach them. For example, transport managers have access to emails and PC based e-learning modules, but drivers have easier access to radio advertising or instant messages delivered direct to their phone (e.g. WeChat or WhatsApp) rather than surfing the internet.

A communications work program and evaluation methodology need to be designed as part of the initial plan. This will enable an on-going assessment of the progress of the plan and the amount of stakeholder involvement, both critical to the overall success of the plan.

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43 https://knowhownonprofit.org/campaigns/communications/communications-strategy
## Annex: Examples of Urban Freight actions and policies

<table>
<thead>
<tr>
<th>Fuels &amp; Vehicles</th>
<th>Freight Movement</th>
<th>Transport System</th>
<th>General</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Real-Time Information Systems</td>
<td>• Developing network of ecommerce pickup points</td>
<td>• Cargo Tram</td>
<td>• Create a Freight Advisory Committee</td>
</tr>
<tr>
<td>• Retrofitting aerodynamic technologies to improve fuel efficiency</td>
<td>• Energy Efficient warehouses</td>
<td>• Exclusive truck lanes</td>
<td>• Create a Freight Quality Partnership or Forum</td>
</tr>
<tr>
<td>• Retrofitting rolling resistance technologies to improve fuel efficiency</td>
<td>• Extend opening hours of premises for collections and deliveries</td>
<td>• Mode Shift Program</td>
<td>• Designate a freight person at key agencies</td>
</tr>
<tr>
<td>• Telematics</td>
<td>• Freight clusters (freight villages)</td>
<td>• Non-motorized transport freight distribution</td>
<td>• Foster Industry-Led Best Practice Dissemination Program</td>
</tr>
<tr>
<td>• Use small delivery vehicles</td>
<td>• Freight Exchange</td>
<td>• Relocation of large traffic generators</td>
<td>• Freight Operators Recognition Scheme</td>
</tr>
<tr>
<td>• Eco driving training for drivers</td>
<td>• Freight Parking and loading zones</td>
<td>• Using Capacity of Public Transport</td>
<td>• Freight Company Collaboration</td>
</tr>
</tbody>
</table>

### Actions
- Appointments and pricing strategies at ports
- Loading and Parking restrictions
- Time access restrictions
- Train drivers in the techniques of fuel efficient driving (eco-driving)
- Enhanced Building Codes
- Environmental justice schemes
- Integrating freight into land use planning
- Low emission zones
- Mandatory GHG reporting
- Noise programs/ regulations
- Road pricing/ incentives
- Urban freight policy

### Policy
- Implement Truck Scrappage Scheme
- Introduce Fuel tax
- Restriction on truck idling
- Subsidies for low emission deliver vehicles
- Subsidizing use of low sulphur fuel
- Vehicle size and weight restrictions
- Create a Freight Advisory Committee
- Create a Freight Quality Partnership or Forum
- Designate a freight person at key agencies
- Foster Industry-Led Best Practice Dissemination Program
- Freight Operators Recognition Scheme
- Freight Company Collaboration
- Ring roads for through traffic
- Labelling and Certification