Chapter 2: Freight in Context

2.1 Introduction

Freight transport is a derived demand and thus reflects both the overall demand for goods and also, more importantly, the demand for goods to be moved. As such, freight transport makes an important contribution to the economy. This is manifest in two main ways.

Firstly, efficient logistics extends market reach, by giving manufacturers access to a wider range of raw materials and supplies, and consumers’ access to a wider range of manufactured goods or services, both from domestic and international suppliers. This is of great importance to Wales, and more widely across the UK, as around 20% of national income (GDP) derives from international trade in goods. However, logistics in its widest sense also includes the distribution of information and services. Adding these increases the value of trade to the economy to around 30%.

Secondly, efficient logistics also reduces waste, both in using materials and other resources and in the deployment of capital, and is an important sector of the economy in its own right. It is estimated that logistics (insofar as it can be distinguished from general commercial and industrial activities) account for nearly 4% of the economy of the UK (GDP), valued at around £75bn in 2006. There are 1.7 million jobs in logistics sector workplaces, and a further 0.5 million in logistics roles in other sectors, accounting for around 6% of total employment. In Wales, this is some 7% of employment, with around 61,000 people employed in logistics companies, and a further 30,000 in logistics roles for other organisations. There are some 7,400 logistics workplaces and 2,400 logistics companies. Logistics contributes approximately £2.5 billion per annum to the Welsh economy.

The freight transport element of logistics typically accounts for between 5% and 10% of business costs, although this proportion can be considerably higher in some heavy industrial sectors.

However, it must also be considered that freight operations give rise to other impacts, for example on the environment. These impacts vary according to the mode of transport used, and are considered in more detail in later sections.

A key issue in relation to freight operations is the policy and legislative framework governing the industry. This is formulated at a number of levels, ranging from European Union (EU) to local authority. The key roles of each level are set out in Figure 2.1.

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2 Based on Standard Industrial Classification (SIC) including Wholesale (on a fee or contract basis and of waste and scraps), Freight Transport by Road, Scheduled Air Transport, Non-Scheduled Air Transport, Cargo-Handling, Storage & warehousing, Other Supporting Air Transport Activity, Activities of other Transport Agencies, National Post Activities and Courier

3 Sources: ‘Skills for Logistics’ – UK and Welsh Logistics Sector profiles (2007), LSA Research Report (2005) and direct submission to WFS
**European Union**
- Definition and promotion of Trans-European Networks for transport (TEN-T)
- Environmental and air quality standards
- Vehicle standards, construction and use; including limits for vehicle weights and dimensions (interoperability) and emissions standards for engines
- Limits on working hours, policy for driver training and licensing, policy for tachographs
- Conditions for cabotage (operation of vehicles in states other than the state of registration)
- Interoperability of systems – in particular rail and distance-based charging for freight transport
- Grants and subsidies (international)

**UK Government**
- Inclusion of EU directives in relevant UK legislation
- Grants and subsidies (mostly in England)
- Taxation regime
- Driver, vehicle and operator licensing (including limits for working hours)
- Domestic vehicle standards, construction and use; including limits for vehicle weights and dimensions
- Provision, operation and development of strategic road network in England (Highways Agency)
- Setting national speed limits, signing regulations and traffic regulations
- Enforcement policy for vehicle size, weight and speed limits, vehicle safety standards and drivers’ hours in England
- Developing and support for the rail network in England and overseeing the whole network
- Locations of major freight transhipment centres, ports and airports
- Formulation and development of policy on road user charging
- In England: Planning Policy and Guidance. Regional Assemblies develop Regional Spatial Strategies and Regional Transport Strategies to frame Local Development Frameworks and Local Transport Plans

**National: Welsh Assembly Government**
- Provision, operation and development of strategic road network, including signage on strategic network by the Welsh Assembly Government
- Enforcement policy for vehicle size, weight and speed limits, vehicle safety standards and drivers’ hours
- Planning Policy and associated guidance for Wales
- Recommendations on development and some support for rail network in Wales
- Grants and subsidies (some)

*Note that powers in Wales are different from those in Scotland and Northern Ireland (the other national assemblies/parliaments of the UK). For instance, powers over rail are greater in Scotland, where arrangements cover responsibility for the provision and development of the rail network in Scotland by the Scottish Executive. Similarly, in Northern Ireland, rail is the responsibility of the Northern Ireland Department for Regional Development (NI DRD)*

**Regional Consortia/Local Authorities**
- Regional consortia or partnerships of local authorities will produce transport strategies and plans in Wales (Local Transport Plans in England)
- Responsible for local roads (maintenance, development and signing)
- Provision of loading bays, overnight lorry parking and driver rest facilities
- Planning permission for freight generators and attractors, distribution centres, freight operating bases and lorry parks (excluding major sites)
- De-criminalised parking enforcement and potential introduction of urban congestion charging
- Weight and size restrictions on local roads and restrictions on access, loading and unloading, traffic management orders (including prohibition of heavy goods vehicles) and lorry (no car) lanes
- Powers under consumer legislation such as enforcement of vehicle weight limits by trading standards

Figure 2.1: Levels of Government and Roles and Responsibilities in relation to Freight
Government can play a crucial role in the provision of major infrastructure, which in turn influences the configuration of supply chains. For example, the locations of distribution centres are influenced by road (and rail) links, which can in turn influence the number of locations which can be offered specifically-timed deliveries, and for some industries such services can be an important determinant in meeting just-in-time supply chain requirements.

However, it is important to note that the freight transport industry itself is almost entirely commercial, and the role of governmental authorities is limited. Matters such as legislation on vehicle weights and drivers’ hours, designation of appropriate freight routes and provision of grants for specific initiatives are under direct governmental control, but many other trends in freight movement are driven by commercial factors that lie outside direct public sector control. There have been moves in recent years towards closer working between the public and private sector to address freight-related transport issues, such as through Freight Quality Partnerships. The Wales Freight Group is another very good example of this.

2.2 Trends in Freight Transport

Around 100 million tonnes of domestic freight (‘goods lifted’) are transported in Wales per annum, estimated from Department for Transport (DfT) and Department for Trade and Industry (DTI) figures. In total, the amount of freight transport that takes place (‘goods moved’) is around 13 billion tonne kilometres. This represents around 5% of all freight transport in UK (some 2 billion tonnes of goods lifted giving around 250 billion tonne kilometres of goods moved in the UK as a whole). Mode split for Wales is estimated to be similar to the UK as a whole. Trends in the demand for freight transport in UK over the last 50 years, which are reflected in Wales, are illustrated below:

**Trends in UK Domestic Freight (1953-2006)**

<table>
<thead>
<tr>
<th>Goods lifted (million tonnes)</th>
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</thead>
<tbody>
<tr>
<td>1953</td>
</tr>
<tr>
<td>Road</td>
</tr>
<tr>
<td>Rail</td>
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<tr>
<td>Water</td>
</tr>
<tr>
<td>Pipeline</td>
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</table>

**Goods moved (million tonne-km)**

<table>
<thead>
<tr>
<th>1953</th>
<th>2006</th>
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</thead>
<tbody>
<tr>
<td>Road</td>
<td></td>
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<tr>
<td>Rail</td>
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<tr>
<td>Water</td>
<td></td>
</tr>
<tr>
<td>Pipeline</td>
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</tbody>
</table>

*Source: DfT/DTI, 2006/2007*

It is interesting to note that whereas the weight of freight carried (tonnes of ‘goods lifted’ onto transport) in the UK has stayed remarkably consistent over the last 30 years, freight actually moving around (in terms of tonne-kilometres travelled by transport) has more than doubled. This is accounted for largely by significant increases in the use of road freight, and in particular in making use of road freight’s inherent flexibility to adapt to changes in business practice and help to shape the production and distribution process. Note that North Sea oil and gas coming on stream in the 1970s resulted in significant increases in water transport and pipeline use.

Road transport dominates the movement of freight in UK, accounting for 83% of goods
lifted and upwards of 64% of goods moved. The apparent disparity of these figures is accounted for by the average haul length of goods by road being (generally) shorter than other modes, and a tendency for heavier goods (such as aggregates) to travel longer distances by water or rail.

The proportion of freight in the UK using rail has declined significantly, from accounting for almost a quarter of goods lifted (and over 40% of goods moved) in the early 1950s, to around 4.7% of goods lifted in 2006 (and 8.5% of goods moved). However, this has to be considered against the backdrop of a significantly increasing market for freight movement and decreasing mileage of the rail network. Hence, while the market share of rail freight has declined significantly, the actual amount of goods moved is still over 50% of 1950s levels and pro rata use of the rail network for freight has increased. In recent years, the amount of goods moved by rail has increased significantly; it is currently around 19 billion tonne kilometres (for the UK as a whole), an increase of 50% in the last 10 years. This represents a general upturn in attempts to generate rail-based freight flows since privatisation of the industry, but also reflects changes in wider industry requirements, such as an increase in demand for imported coal, which typically needs to travel further than domestically-mined coal due to the locations of many power stations in former coalfield areas rather than near ports.

2.3 The Role of Freight

The role of freight as a ‘means to an end’ in the Welsh economy has also substantially changed, as it has across the western world. This is primarily from being simply the means by which materials are provided to manufacturers and finished goods shipped to end users, to an intrinsic part of the production process. Note that this applies equally to the ‘production process’ that delivers food to supermarket shelves as to the production of a consumer product such as a washing machine. This is significant in that food distribution, in particular, has manifestly changed with the rise in prominence of supermarket retailers.

Indeed, the effect of efficient management of the supply chain and distribution and use of (particularly road) freight transport as part of the overall process means that manufacturers and retailers no longer hold large stocks of materials and finished items. This has financial and economic benefits in that capital is not tied up in stored stock, but means that large sectors of industry and commerce are reliant on the efficient transport of freight on a day-to-day (or even hour-by-hour) basis, something that can frame views on the effects of delays to (particularly road) freight movements. A consequence of this, and to a certain extent also a cause, has been a gradual reduction in the cost of transport as a proportion of overall production costs.

The increasing ease with which goods are transported around the world, particularly through substantial growth in liner shipping of containers, means that sources of raw materials and part and fully finished goods can be located more or less anywhere in relation to the eventual destination. This globalisation of trade has changed origins of the movements of some freight in Wales, albeit not necessarily substantially changed the amounts. Similarly, although small in terms of the weight of goods carried, the increasing availability of air freight capacity has also allowed international sourcing to utilise marginally priced capacity, making air freight viable even when avoiding the time penalties inevitably associated with surface modes are not paramount.

Notwithstanding the above, the de facto role of freight within the economy as a whole has apparently lessened, if the amount of freight transported is compared to overall GDP.
Indeed, in the context of the UK as a whole, the amount of freight transported (tonne-km) has grown at a lower rate than GDP since the 1950s.

In the context of the wider European economy, it is noticeable that the amount of freight moved in Wales (and the UK in general) is actually significantly less than that of apparently similar European Union (EU) countries. For instance, almost twice the amount of goods is moved (tonne-km) in France than the UK. However, this reflects the size of the country, the more disparate nature of its markets and significant transit movements. Modal share in Wales is more biased towards road freight than the EU average, though these figures reflect the significant availability of inland water transport in key freight movement areas in the heart of western Europe, such as in Germany. Table 2.1 illustrates the amount of freight transported in selected countries of the EU.

### 2.4 Influencing the Demand for Freight

In recent years it has often been questioned whether the sheer volume of road freight movement is really required, or whether more efficient operations could be implemented, thus reducing mileage, congestion and environmental impacts.

For example, the rate of empty running of lorries remains significant, at around 27% in 2005, and has been broadly static for the last 10 years. The incidence of light running, where vehicles are not loaded to their full capacity, is greater still. The FTA believes that a reduction in light or empty running is likely to occur, as return loading should increase with the expansion of load-matching services and a growth in the reverse flow of packaging material and handling equipment. It is obviously not practicable to eliminate all empty or light running. There are a number of activities (for example, certain foodstuffs, chemicals and oils/petroleum) where it is not feasible to secure return loads. However, there still appear to be many opportunities for reducing empty or light running, whether through better information systems, promoting collaboration between operators or introducing improved vehicle or packaging technologies.

There is also a potential link between ‘clustering’ and the freight industry. The more clustered the demand for freight, the more it becomes possible to service demand

<table>
<thead>
<tr>
<th>Country</th>
<th>Road</th>
<th>Rail</th>
<th>Inland Water</th>
<th>Pipeline</th>
<th>Total</th>
<th>Ratio*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wales</td>
<td>8</td>
<td>1</td>
<td>0.5</td>
<td>9.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UK</td>
<td>149</td>
<td>20</td>
<td>12</td>
<td>181</td>
<td>105</td>
<td></td>
</tr>
<tr>
<td>Belgium</td>
<td>40</td>
<td>7</td>
<td>8</td>
<td>57</td>
<td>95</td>
<td></td>
</tr>
<tr>
<td>France</td>
<td>274</td>
<td>50</td>
<td>7</td>
<td>352</td>
<td>94</td>
<td></td>
</tr>
<tr>
<td>Germany</td>
<td>353</td>
<td>75</td>
<td>65</td>
<td>509</td>
<td>105</td>
<td></td>
</tr>
<tr>
<td>Portugal</td>
<td>15</td>
<td>2</td>
<td>12</td>
<td>17</td>
<td>118</td>
<td></td>
</tr>
<tr>
<td>EU</td>
<td>1,392</td>
<td>242</td>
<td>125</td>
<td>1,846</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

* Ratio of tonne-km to GDP, indexed to 1995 (=100)
Source: Estimated from WAG, DfT & EU statistics, 2004 [2003, million tonne kilometres]

Table 2.1: Freight moved in selected EU countries (figures in billion tonne-km)
more efficiently, and tap into a potential to develop multi-directional flows. Similarly, initiatives to deal with waste, such as the EU Waste Electrical and Electronic Equipment (WEEE) Directive, which introduces a producer responsibility to deal with products from production to destruction (encouraging re-use and re-cycling along the way), have the potential to introduce an additional link into the supply chain.

A related issue is the way in which distribution systems have developed over recent years, in particular that the main system of food supply in the UK has evolved to make use of goods vehicles travelling comparatively long distances between suppliers and shops via centralised distribution centres.

These distribution systems are efficiently run, and constantly monitored and adjusted, with consequent reductions in the impact per tonne moved. However, this masks the situation that sources of goods have become more disparate as economies across the world have become closely linked – facilitated to a large part by the freight transport system. This is particularly noticeable for consumers in the sourcing of food, where international air and sea transport can be used to ensure that many previously ‘seasonal’ fruit and vegetables are available all year round. Similarly, the production of consumer goods increasingly takes place in the Far East.

Policies are developing to encourage the local sourcing of food, both to assist Welsh farmers and other producers, and reduce the distance that produce travels (so-called ‘food miles’). The environmental impacts of greater numbers of distribution centres, with associated land-take and energy use, and potential use of smaller vehicles which can lead to extra vehicles and lower load factors, also need to be considered in assessing the most environmentally sustainable approach overall.

To leverage efficiency improvements into the supply chain and to sustain these, UK operators are making increasing use of Intelligent Transport Systems (ITS), including for example vehicle telematics. Uptake of this technology in the UK is twice the level across the whole of the EU. The use of ITS and telematics to improve vehicle utilisation is reinforced by the application of technology that allows the sharing of information between transport suppliers and customers. For example, information about the location of a given consignment in the supply chain can be provided using combinations of GPS (Global Positioning System), RFID (radio frequency identification) and the internet.

At a more local and individual level, spatial planning policies can influence overall demand for some forms of freight, such as:

- Reducing the need for re-delivery of home delivery items such as parcels and packages through the use of neighbourhood secure post-boxes or collecting points;
- Rural consolidation centres could be considered to reduce direct delivery of commercial goods in sensitive areas; and
- Identifying and increasing the social role that specific forms of freight can provide, such as rural postal services, in consolidating domestic deliveries.

2.5 Freight and the Environment – Greenhouse Gases

Transport is a major emitter of greenhouse gases into the atmosphere in developed economies, in particular direct or indirect emissions of the key greenhouse gas, carbon dioxide (CO₂). The specific impacts of freight transport vary significantly according to the mode of transport being used, and accurate and comparable figures can be obscured by other operational elements of freight transport.
transport, such as payload size and whether there is combined transport of passengers and freight. Consequently, a range of estimates of emissions are available for the individual freight transport modes.

Table 2.2 illustrates a selection of these estimates. While these statistics clearly vary significantly, they indicate that sea transport generally emits the least CO₂. Rail and inland waterways are similar (depending on load factors) and emit broadly twice as much CO₂ per tonne-km as sea transport. Road emissions are around 6-times those of rail, with air freight emissions being between 5 and 10-times as much as road (and potentially as much as 100 times greater than that of sea transport).

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</thead>
<tbody>
<tr>
<td>Rail (electric / diesel)</td>
<td>20 / 40</td>
<td>39-48</td>
<td>23</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>Road</td>
<td>100</td>
<td>207-280</td>
<td>123</td>
<td>193</td>
<td></td>
</tr>
<tr>
<td>Inland Waterway</td>
<td>-</td>
<td>40-66</td>
<td>31</td>
<td>44</td>
<td></td>
</tr>
<tr>
<td>Sea</td>
<td>10-20</td>
<td>-</td>
<td>14</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Air</td>
<td>650</td>
<td>1,160-2,150</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

**Sources**
1. Aviation Environment Federation (House of Lords Select Committee on European Union Minutes of Evidence)
2. Inland Waterways Association (www.waterways.org.uk)
3. Biomass Energy Centre (www.biomassenergycentre.org.uk)
4. Sustainable Transport Resources and Waste (www.straw.org.uk)

**Table 2.2:** Carbon Dioxide (CO₂) emissions for freight transport (g/Tonne-km)