



Life without Lorries:

The Impact of a Temporary Disruption of Road Freight Transport in the UK

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1 Introduction

This report considers what would happen if no lorries operated on Britain's roads for a week. Its purpose is to demonstrate how dependent our economy and quality of life are upon road freight transport. The intention is not to alarm people about the vulnerability of the distribution system. The scenario described here is hypothetical and very unlikely to occur so abruptly and completely.

Over the past twenty-five years, there have been only two occasions when the road freight system has been seriously disrupted: during the 1979 lorry drivers' strike and the September 2000 fuel crisis. In both cases, it took several days for the actions to take effect and even at their maximum extent a substantial amount of freight continued to be moved by road. The fuel protests in 2000, example, only seriously affected supply chains over a period of three days (12 – 14 September) ¹. Many companies were able to run their lorries on fuel that they had bunkered and thereby maintain a near-normal service. In the hypothetical scenario considered in this report, no lorries would operate for a period of a week. The fuel crisis of 2000, nevertheless, provides some indication of what would happen if all lorries were 'parked up' for seven days.

2 Terms of reference

In analysing the impact of a complete shut-down of the road freight system, we have made several assumptions:

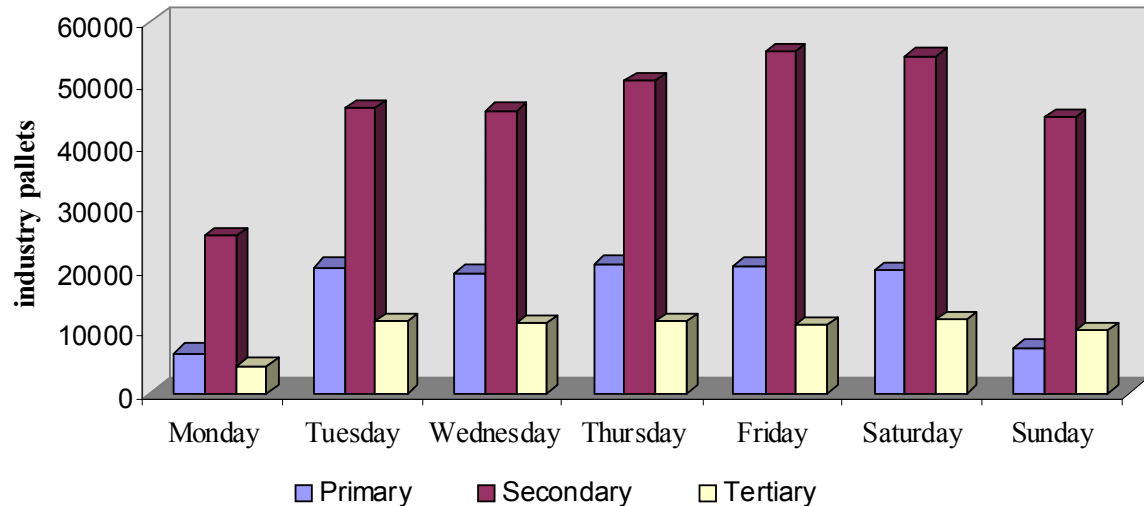
1. No advanced warning will have been given to companies or consumers. They will not, therefore, have been given the opportunity to stockpile or make other contingency plans.
2. When the disruption occurs, it is announced that it will only be temporary and that there is no need to 'panic-buy'. We assume, therefore, that products will continue to be consumed at an average rate. If panic buying did occur, this rate of depletion could increase exponentially with the result that inventories of critical products such as fuel and groceries held at point of sale would be exhausted within a day or two.
3. Only lorries with a gross weight of 3.5 tonnes or more will be affected. Small vans, with a gross weight below 3.5 tonnes, cars and buses will continue to run. There may therefore be some displacement of freight from trucks to vans, while travel to and from the shops will still be possible (until affected by fuel shortages).
4. All road deliveries will cease at 12 am on the first day (Day 1).

3 Timing of the disruption

The impact of the lorry stoppage will depend on its timing relative to daily, weekly and seasonal cycles. The volume of freight moving through the supply chain widely fluctuates over these different time scales. There are also critical cut-off times in delivery schedules. If the disruption occurred before one of these cut-off times, the logistical consequences would be much greater. Terminating all deliveries at 12am, for example, stops overnight deliveries of parcels, pallet-loads and newspapers and the replenishment of supermarkets with perishable products. Figure 1 shows how the volume of groceries distributed varies across the week at primary (factory to distribution centre), secondary (distribution centre to supermarket) and tertiary (local

wholesale depot to small shop / catering outlet) levels. If the stoppage began on Sunday at 12am its impact on shelf-availability would be less immediate than if it started on Thursday or Friday night. On a seasonal basis, the worst case scenario would be for the stoppage to occur a week or two before Christmas when the flow of 'fast moving consumer goods' reaches its peak.

Figure 1: Pallet-loads of grocery products delivered on different days of the week.



Source: 2002 Food Transport KPI Survey ²

4 Importance of road freight transport

Lorries deliver 4.5 million tonnes of freight each day, approximately 80 kgs per person – more than the average body weight³. They move 82% of freight tonnage in the UK⁴. Although very high, this percentage under-estimates their contribution to economic well-being in several respects:

1. The average value of freight moved by road is significantly higher than that moved by other modes. Assuming an average 'value density' of £1,600 per tonne for road freight, the goods delivered each day by lorry would be worth around £7 billion.
2. Freight moved by road has a much lower density than that moved by rail or water. If measured in terms of cubic volume, therefore, road's share of the freight market would be much higher than 82%.
3. The division of freight between transport modes is not uniform across the supply chain. Rail and water-based services are used mainly to transport basic commodities at the upper levels of the supply chain. Road transport has a near monopoly in the distribution of finished products at the lower levels of the supply chain, particularly in the distribution of retail supplies. It is distribution at this level which will be most severely disrupted by the absence of lorries and which will have the greatest impact on consumers.
4. It is possible to substitute lorries for other modes of transport on almost every type domestic freight movement. On only a small minority of the deliveries made by road, however, would it be possible to substitute an alternative mode.

5 Integration of road transport into production and distribution

The speed and flexibility of road transport has enabled companies to synchronise freight deliveries with their production and distribution operations. These deliveries are increasingly seen as an extension of the production line, with supplies being replenished on a just-in-time basis. The aim is to keep products flowing through the supply chain and minimise the time they spend in storage. British business has been very successful in reducing the amount of inventory in the supply chain relative to total sales. In 1986, the manufacturing, wholesale and retail sectors were, collectively, rotating their inventory 7.2 times per annum. By 2001, this figure had increased to 10.5⁵. Had the speed with which inventory moved through the supply chain remained at its 1986 level, there would have been an extra £50 billion of inventory in the economy in 2001, absorbing huge amounts of working capital and storage space and impairing industrial competitiveness. By driving down inventory levels, however, companies have made their operations much more dependent on rapid and reliable delivery by road. Right across the supply chain, buffer stocks have been sharply reduced and order lead times compressed, making the availability of products highly sensitive to even quite short delays in the transport system.

A temporary shut-down of the road freight system would sever the links between the various points in the supply chain at which inventory is held. The quality of life for the average citizen would be affected mainly by the amount of inventory held in the shops. This retail inventory has been sharply reduced over the past twenty years as companies have:

- Cut inventory costs
- Reduced back-storeroom areas to release space for sales display and merchandising
- Used shelf-space more intensively
- Accelerated stock rotation to improve freshness, update styles and speed new product introductions

In the 'fast-moving consumer goods' sectors, stocks held at the point of sale would run out fairly rapidly. In the absence of trucks they could not be replenished from inventory held further back along the supply chain. The amounts of inventory held upstream would therefore have little impact on the availability of products to the average consumer. It is very unlikely that retailers or their suppliers would give consumers access to their distribution centres or factories as they are not geared up for the collection of individual items by the public.

6 Impacts of the supply chain disruption

The following tables summarise the main impacts on different 'stakeholder' groups:

Citizens:

Consumption	<ul style="list-style-type: none"> • shortages of products, particularly perishable items, in shops - introduction of rationing • home deliveries disrupted
Travel	<ul style="list-style-type: none"> • lack of fuel and spare parts, prevents personal travel, especially by car
Work	<ul style="list-style-type: none"> • production operations suspended due to lack of inbound supplies
Utilities	<ul style="list-style-type: none"> • localised disruption of gas, electricity and water supplies

Communication	<ul style="list-style-type: none"> • mail and newspaper deliveries interrupted
Healthcare	<ul style="list-style-type: none"> • confined to emergency services
Recreation	<ul style="list-style-type: none"> • travel to sporting events difficult • distribution of beer and spirits paralysed
Waste disposal	<ul style="list-style-type: none"> • waste collections interrupted – accumulation of waste at home

Agriculture:

No milk collections	<ul style="list-style-type: none"> • need to dispose of milk on farms
Lack of feed for animals (dependent on season)	<ul style="list-style-type: none"> • slaughter and disposal of animals on farms
No outbound distribution of harvested product	<ul style="list-style-type: none"> • delay harvesting • quality of produce deteriorates • lack of storage space • cash flow problems
Inability to transport animals to markets and abattoirs	<ul style="list-style-type: none"> • cash flow problems
Waste disposal	<ul style="list-style-type: none"> • waste collections interrupted – accumulation of waste at farms

Industry:

Lack of raw materials, fuel, parts and packaging	<ul style="list-style-type: none"> • production operations suspended
Non-delivery of spare parts to maintain factory and office equipment	<ul style="list-style-type: none"> • production operations suspended
Lack of storage space for finished products	<ul style="list-style-type: none"> • production operations suspended
Waste disposal	<ul style="list-style-type: none"> • waste collections interrupted • lack of storage space for accumulated waste

Retailing:

Lack of inbound supplies at both primary (factory to distribution centre) and secondary (distribution centre) to shop	<ul style="list-style-type: none"> • loss of sales due to product stock-outs at shop level • wastage of perishable produce at distribution centre
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Utilities

Lack of raw materials fuel and parts	<ul style="list-style-type: none"> • lack of fuel for pumping operations for water and gas – supply disrupted • constraints on the repair of water and gas networks causing localised service disruption • water purification / sewage plants affected
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Transport operators:

Road feeder services to rail, water and air freight terminals disrupted	<ul style="list-style-type: none"> • inter-modal freight movements curtailed
Lack of fuel	<ul style="list-style-type: none"> • partial disruption of bus, train and air services
Lack of storage for inbound containers at ports and airfreight at airports	<ul style="list-style-type: none"> • ships unable to off-load cargoes • external trade links disrupted

The problem would not simply be one of unsatisfied demand, with shortages arising at the bottom end of the supply chain. Further back along the chain, some manufacturing and processing operations would have to be suspended partly because of a lack of inbound supplies but also because of a lack of on-site storage space for finished products.

7 Opportunities for substitution

The net effect of the withdrawal of trucks would partly depend on the extent to which consumers and companies could make four forms of substitution:

Product substitution: e.g. replacing perishable foods with long-life / frozen products. Over the proposed time interval, this could be achieved by most consumers drawing on their domestic supplies of long-life products and switching their supermarket purchases to canned and dry packaged foods. Consumers would consider it a nuisance, but it would have little effect on their nourishment or health. Indeed many people would benefit from a temporary reduction in their calorie intake!

In the absence of newspapers, people would rely more heavily for news on television, radio and the internet. Postal services would be replaced by telephone calls, faxes and emails. During the fuel crisis of 2000, BT reported a 33% increase in telephone calls ⁶.

As most spare parts are equipment-specific, opportunities for substitution are limited.

The substitutability of drugs is also limited, particularly life-critical varieties. As discussed below, however, hospitals and pharmacies keep an adequate supply of these drugs and could top up with emergency van deliveries if required.

Some of the milk that would normally be delivered fresh to the retail market could be converted into cheese to increase its shelf-life.

Modal substitution: transferring freight traffic from road to other modes

There would be very little scope for modal switching within the proposed time-scale. Relatively few factories and warehouses and no shops have a direct rail link. Even if the premises were rail-connected, it would take weeks rather than days to instigate an alternative railfreight service, given constraints on infrastructure, rolling stock and operating procedures. Although there are around 1000 active freight terminals connected to the national rail network, the majority of them require the collection and/or delivery of freight by road. Domestic inter-modal services, which account for roughly 20% of railfreight tonne-kms⁷, would have to be suspended.

The issue is not whether it would be possible to substitute an alternative mode for rail on one link in the supply chain. If road were required for any of the links in the supply chain, the flow of product would be disrupted.

Vehicle substitution: displacing freight from lorries to vans

The opportunities for transferring freight to vans would also be very limited. A recent government survey of the use of small vans in the UK did not enquire about the carrying capacity or loading of these vehicles. It did, however, determine that in 2003 vans made approximately 173 million trips involving the collection and / or delivery of goods⁸. The most recent estimate of the average loading of vans (for 1993) was 152 kgs⁹. If one assumes a similar loading figure for 2003, vans would have carried only around 5% of the tonnes-lifted by lorries in that year, despite the fact that vans are 5.6 times more numerous than lorries¹⁰. It would take roughly 18 vans to carry the average load lorry load (in terms of weight). Most of the nation's van fleet is already

occupied for much of the day moving freight, people and equipment. It would have limited capacity to carry an additional burden of freight displaced from lorries.

Locational substitution: replacing distant suppliers with local suppliers

If the supply chain disruption caused by the absence of trucks were to last for weeks or months, one would anticipate some return to more localised sourcing. This would reverse the lengthening of supply chains that has been occurring for many decades. For example, in 1953 each tonne of freight moved by road in the UK travelled a distance of 35 kms. Today it moves 92 kms by road¹¹. It is partly because of this lengthening of freight hauls, that we are now so dependent on the truck.

If retailers were to rely more heavily on local sources of supply, from which deliveries could be made by van, their product range would be drastically reduced. In the early 1950s, for example, when food production and distribution was much more localised, the average grocery store stocked 250 items. Today consumers are accustomed to an average supermarket range of 22,000 lines.

Over a period of a week, there would be limited potential for switching to local supply. The large supermarket chains and food wholesaling groups have highly centralised systems of buying and distribution systems which are not suited to localised sourcing of supplies at an individual shop level¹². Depending on the season of the year at which the disruption occurred, a new market opportunity would be created for farmer's markets. Overall, however, locational substitution would have only a marginal impact on product availability across the supply chain.

8 Sectors likely to be most affected

Attention will focus on nine sectors with the following characteristics:

- distribution is exclusively or predominantly by road
- delivery by road is highly time-sensitive
- limited inventory is held in the supply chain
- short order lead times
- strong influence on the quality of life / economic well-being

These sectors are as follows:

1. Grocery retailing
2. Catering
3. Fuel supply
4. Healthcare
5. Banking
6. Postal services
7. Parcels
8. Beer
9. Waste disposal

More general consideration will be given to the impact on agriculture, manufacturing industry, the construction industry, the service sector, non-food retailing, Britain's external trading links and employment.

8.1 Grocery retailing

The major grocery retailers are responsible for roughly 4.5% of all lorry traffic, approximately 9% of articulated vehicle traffic¹³. Their deliveries are highly time-sensitive and keep the shops replenished with minimal inventory. In the absence of trucks, stocks of produce, chilled products and fresh meat in supermarkets would be very rapidly depleted. These products are cross-docked at the distribution centre and despatched to the supermarkets within a few hours. No inventory of fresh produce is held (Table 1). Shops get delivery of these products from suppliers or their distribution centres within 24 hours (Table 2) and on average receive around 1.5 deliveries per day containing these items (Table 3). Fast moving ambient-temperature products generate a similar frequency of delivery, though typically have slightly shorter order lead times both at the primary and secondary levels. Within one day of the lorries being withdrawn, the availability of fresh products in supermarkets would be sharply reduced. Distribution centres hold inventory of less perishable products (Table 1), but these could not be transported to the shops.

Table 1: Average inventory at distribution centre: number of days

Fast Moving Ambient	10
Slow Moving Ambient	11.2
Produce	0
Chilled	0
Fresh Meat	0
Frozen	8.9
Beers, Wines and Spirits	19.2
Non-food	19.6

Source: Institute of Grocery Distribution 2003¹⁴

Table 2: Order lead times for supermarket products:

(Weighted average for ASDA, Co-op, Marks and Spencer, Sainsbury, Somerfield, Tesco and Waitrose)

	Supplier to DC	DC to Shop
Fast Moving Ambient	2.2	1.4
Slow Moving Ambient	2.8	2.0
Produce	2.2	0.9
Chilled	1.9	0.9
Fresh Meat	1.9	0.9
Frozen	1.6	1.8
Beers, Wines and Spirits	18.1	1.6
Non-food	23.3	2.3

Source: Institute of Grocery Distribution, 2003

Table 3: Average frequency of delivery to stores: deliveries per week

Fast Moving Ambient	11.6
Slow Moving Ambient	5.6
Produce	11.2
Chilled	11.1
Fresh Meat	11.1
Frozen	5.7
Beers, Wines and Spirits	5.4
Non-food	4.4

Source: Institute of Grocery Distribution, 2003

One grocery product which would quickly run out of stock is bread. A large proportion of the bread consumed in the UK is baked in factories and distributed via distribution depots to shops. One of the largest bakery companies, for example, has twelve bakeries around the UK. Almost all their output is distributed through nineteen regional depots. These depots act as cross-docking points and do not hold stock. To maintain freshness the bread supply chain has very little inventory. Bread is normally ordered on day 1, baked on day 2 for delivery early in the morning of day 3. Shops sell most of that day's supply of bread within 24 hours. The in-store bakeries also receive their supply of ingredients from the major bakery groups on a short order lead time and hold only 1-2 days stock of these inputs. The major supermarkets would therefore run out of bread within a day or two.

The disruption of the grocery supply chain would have a variable impact on the population. For example, households in higher socio-economic brackets tend to shop for groceries less frequently, buy in greater bulk and hold larger stocks of these products at home. People in rural areas, regardless of their social class, also tend to hold larger stocks of grocery products. These groups would be better placed to cope with the emptying of supermarket shelves than poorer families and elderly citizens, particularly in urban areas, who tend to shop more regularly for smaller amounts.

Most grocery stores would be likely to introduce a system of rationing within the first few days of the stoppage.

8.2 Catering

Around a third of food expenditure goes on meals purchased outside the home¹⁵. The fast food outlets, restaurants and hotels where people 'eat out' rely on frequent deliveries of perishable produce. The average fast-food restaurant receives three deliveries per week and holds a maximum of two days stock of perishable products and four days of other items. As almost all these deliveries are made by lorries with gross weights of over 3.5 tonnes, they would be interrupted within two days, drastically reducing the range of meals on offer and probably resulting in their closure.

Catering in work-places, schools and hospitals would also be seriously affected.

8.3 Fuel supply

In 2003 38% of our electricity was generated by gas-powered stations, 22% by nuclear power and 35% by coal-fired stations¹⁶. 4% was produced using oil or other fuels and 1% by hydro-electric stations. The movement of fuel to power stations involves little use of road transport. It is moved mainly pipeline, rail and sea. Hence the absence of lorries would not seriously affect the supply of power to the National Grid. Some companies have their own power generators that rely on road deliveries of coal or oil. These would be disrupted, though the companies in question could switch to the Grid supply.

The main impact of fuel shortages would be felt by motorists and operators of vans and other utility vehicles. The average petrol station sells around 4 and 5 million litres of fuel per annum – say 80-100,000 litre per week. The tanks beneath the forecourt hold 50-55000 litres but operators usually do not usually fill them to economise on stock holding costs. The average filling station gets 3-4 deliveries per week in compartmentalised tankers containing a range of fuel types and with total

carrying capacity of 28,000 litres. If deliveries were interrupted, stocks of most types of fuel would be exhausted with 2-3 days (at normal rates of consumption).

There are approximately 25 million private cars in the UK ¹⁷. On average their fuel tanks hold around 55 litres. They travel an average of 15700 kms per annum at an average fuel efficiency of 10.6 kms per litre. The average car therefore consumes 4.1 litres of fuel per day. If we assume that the average fuel tank is half full at any given time, it would need to be refilled roughly once a week. This would mean that 3.6 million cars per day have to be refuelled. At normal levels of motoring, and given the inventories of fuel in filling stations, there would be a steep decline in car usage after the third day (Figure 2). It is unlikely, however, that the level of motoring would remain normal. As happened in the 2000 fuel crisis, households would cut back on non-essential travel to conserve fuel and car occupancy rates would increase as people shared lifts ¹⁸ People would also make more journeys on foot and by bicycle.

On the basis of a similar analysis (Table 4) it can be estimated that roughly half a million vans require refuelling each day. Assuming a linear decline in van usage the proportion of vans in operation would follow the same downward trend as cars (Figure 2).

Table 4: Cars and vans: numbers, usage and fuel consumption

	Cars	Vans
Vehicle numbers (millions)	25.0	2.7
Average distance travelled per day (kms)	43	59
Average fuel efficiency (kms per litre)	10.6	8.8
Average daily fuel consumption (litres)	4.1	6.8
Average fuel tank capacity (litres)	55	70
Number of vehicles requiring re-fuelling each day (million)	3.6	0.5

Figure 2: Decline in % of cars and vans in use due to the interruption in fuel supply

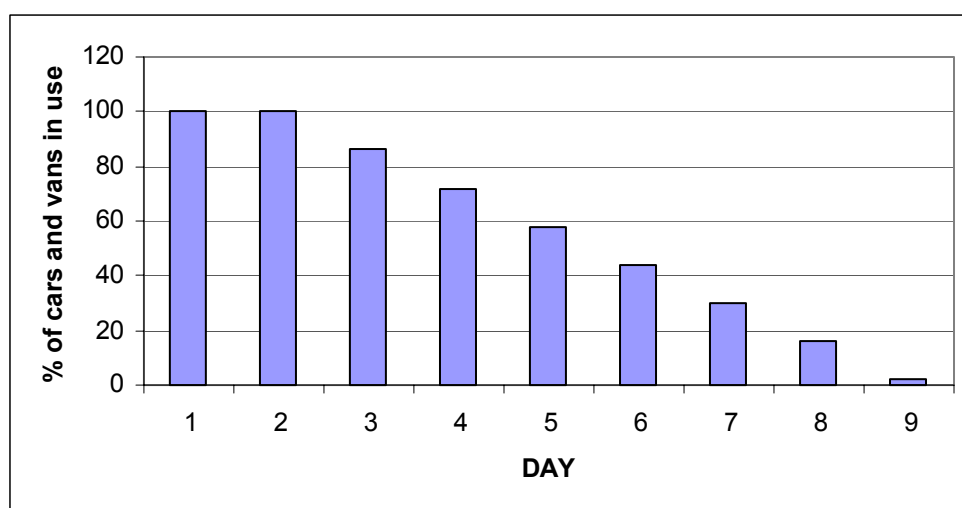


Figure 3 shows the sectors generating the largest volumes of van traffic. They would be the most adversely affected by the gradual decline in van activity.

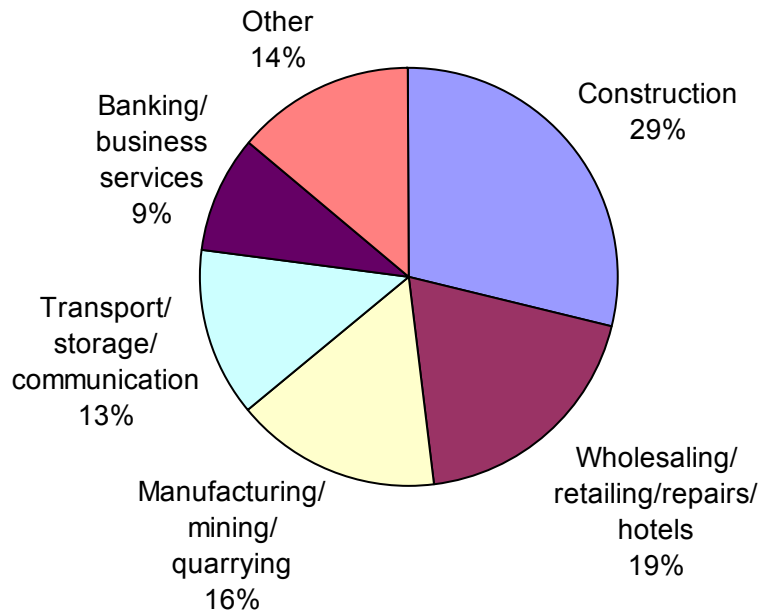


Figure 3: Van traffic generated by different economic sectors.

Source: Department for Transport 2004 ¹⁹

During the fuel crisis of 2000, rail passenger services were largely unaffected, partly because many of these services are electrified but also because the stocks of diesel fuel at rail depots were sufficient to maintain services for the duration of the fuel blockades. Indeed patronage of rail services actually increased by around 20% during the week of the fuel crisis²⁰. According to Network Rail, '40% of the national rail network is equipped with power supplies for electric trains'²¹. A large proportion of surface rail services in London and Glasgow, the London Underground and tram services in Manchester and Sheffield use electric traction. Most of these would be likely to continue for the week of the lorry stoppage. It is estimated that railway companies have around three days' supply of fuel for diesel-powered trains. After 2-3 days, the timetable for diesel train services would sharply reduced. At present a very small proportion of fuel is delivered to train depots by rail. In theory this could be increased though it would probably be difficult to organise this modal switch over the period of a week.

Bus services were also largely unaffected by the September 2000 fuel crisis. Stocks of diesel fuel at bus depots would allow many of these services to continue operating for longer than a week. One large urban bus company estimates that it would have enough fuel to support a full timetable for around ten days. As a precautionary measure, however, it might reduce off-peak services to ensure that peak services were maintained. This operation is considered fairly typical of large urban bus networks. In smaller towns and rural areas, fuel storage capacity in bus depots is more limited and services would probably be cut-back sooner.

Within a day or two, the government would introduce a system of fuel rationing to ensure that essential users were given priority access to fuel reserves.

8.4 Healthcare

Hospitals would be severely affected by the lack of trucks within a very short period. In the immediate aftermath of the haulage shut-down, the three most critical flows to be affected would be of laundry, food and waste disposal:

Laundry: To minimise the risk of infection, laundry must be regularly cleaned and this is usually done off-site by outside contractors. A hospital in York, for example, has its laundry washed by a company in Sheffield with trucks regularly shuttling between the two locations and little inventory of clean laundry in the system. A lack of clean bed-linen would probably force managers to suspend elective surgery within a day and allow only emergency operations.

Food: A typical district hospital of around 800 beds requires roughly 3-4000 meals per day for patients and staff. Most hospital catering is now outsourced to catering firms which prepare the meals in separate plants. These plants can be a long way from the hospital and require long trunk movements by road. For example, a large hospital in Scotland currently sources its meals from a caterer in Wales. Meals are ordered on day 1 for delivery on day 2. This hospital catering network would break-down within a day.

Waste: there are different collection cycles for hospital waste. At a typical district hospital, domestic waste (of waste food, packaging etc) is collected daily, chemical waste every second day and medical waste around once a week. There is limited storage space at hospitals to accumulate this waste and there would be serious concern about the effect on hygiene.

Deliveries of consumable products are made roughly three times a week to the average hospital. Although around a week's supply of these products is held, some items will run out within several days. The supply of pharmaceutical products would be less of a problem, partly because of the inventories held in the typical hospital, but also because of the ease with which drugs could be distributed on an emergency basis by vans or cars.

As a lack of fuel reduced the level of personal mobility, after 2-3 days, medical staff would have difficulty travelling to work. Contingency plans are, nevertheless, in place to give medical staff priority access to available stocks of fuel should the supply be disrupted. If emergency rationing of fuel operated as planned, the staffing of the hospital could probably be maintained at a much reduced level of activity for a week.

8.5 Banking

Over £500 billion worth of notes and coins is moved each year by lorry across the 'cash-in-transit' network²². This includes new coins and notes supplied by the Mint and the transfer of cash within the financial sector. Huge numbers of cheques are also physically transported, most of them through a centralised cheque-clearing centre in Milton Keynes. The public withdraws around £6 billion in cash each week. Many banks and ATMs are restocked with cash on a daily basis, mainly through a network of cash and coin centres around the country. Bank branches also receive a steady inflow of cash from the public and small traders, though during the crisis week without lorries concern about the future availability of cash would probably discourage citizens and traders from depositing money.

The lorries moving cash are specially-designed, armoured vehicles. For example, Securicor Cash Services, one of the four large 'cash logistics' companies in the UK, operates 1850 vehicles, each running an average of 140 miles each working day²³. This includes its fleet of 120 trunk vehicles that each run 200 miles a day. Transferring cash to vans which were not designed for this purpose would pose a major security risk. Nor would there be sufficient vans available to handle this traffic.

An increasing proportion of financial transactions would be made by cards or electronic media. The shortage of cash would, nevertheless, depress the level of economic activity and cause major problems for poorer households that do not have bank accounts or credit cards.

8.6 Postal Services

Approximately 82 million items of mail are moved each night. Virtually all of them are moved in a lorry for at least part of their journey. 70% of mail is networked between the 75 mail centres around the country, the vast majority of it in 3000 lorry trunk movements. These are supplemented with feeder movements by rigid vehicles. No mail is currently moved by rail. Some of the longer haul traffic is moved by air, though deliveries to and from the airports are by lorries of over 3.5 tonnes which be affected by the stoppage. Opportunities for replacing lorries with vans would be very limited as all mail is now containerised. The rigid and articulated vehicles are designed to handle these containers, but they could not be accommodated on vans. If vans were used, the mail would have to be de-containerised and man-handled. This would greatly increase labour requirements and slow down the handling operation. Also, given the available population of vans, any transfer of mail to these vehicles would be very limited. Most postal services would therefore cease on Day 1.

8.7 Parcels

It has been estimated that in 2002 approximately 930 million packages were delivered in the UK, 60% of them to the home. The average household received 22 packages, roughly one every 17 days²⁴. Over a seven day period, just over 40% of households would be likely to receive a parcel. This indicates the extent to which home delivery of parcels would be disrupted. If the lorry stoppage occurred in the weeks leading up to Christmas the impact would obviously be much greater. In the absence of lorries, only the localised delivery of packages by van would be possible and this represents a tiny proportion of the total parcel business. Businesses would be more seriously affected by the disruption of parcel deliveries. In a typical week they receive around 8 million parcels.

8.8 Beer

Beer is distributed both to 'on-trade' outlets (i.e. pubs and clubs) and 'off-trade' outlets (supermarkets and off-licences):

On-trade:

Busy city centre pubs typically receive two or three beer deliveries per week. Most have relatively small cellars and can only accommodate between 3 and 7 days of stock of the main brands of beer. They would start to run dry after 3-4 days.

Smaller urban pubs get an average of one delivery per week and hold around 1½ weeks stock. Small pubs in rural areas receive less frequent delivery (some getting a delivery once every two weeks) and so have correspondingly higher levels of inventory relative to sales.

In the absence of beer deliveries, stocks would be exhausted first in the city centre establishments, then suburban pubs and finally rural pubs. One might envisage demand migrating outwards, assuming that consumers were still able to travel out to more distant pubs for a drink.

Off-trade

It is estimated that there is around 2 days of inventory of the best-selling beers in the typical supermarket and another 2-3 days in the distribution centre. Both shops and distribution centres get daily deliveries of beer. Within 2-3 days, stocks of the main brands would be exhausted in many supermarkets, particularly if consumers switched some of their demand from on-trade to off-trade outlets.

Upstream production and distribution

Further upstream the brewers' distribution centres hold around two weeks of inventory, though without lorries it would not be possible to access any of this product.

The brewing operation would be severely affected by the loss of road transport in a very short time. Less than one day of inventory of some raw materials, particularly malt and packaging, is held at the brewery. When supplies of the first essential ingredient was disrupted, production would stop, probably within a day. If road freight services were restored within a week, there would be sufficient stocks of beer at the distribution centres to meet demand while the brewing operation was restarted.

8.9 Waste Disposal

Britain produces around 1.3 million tonnes of waste per day, the vast majority of which travels by road on at least part of its journey to a landfill site, recycling point or incinerator²⁵. Without lorries to move this product, the limited storage facilities for waste at factories, farms, construction sites, quarries, sewage works, hospitals, offices, shops and homes would quickly fill up. Table 5 shows the average weight of different types of waste moved each working day.

Table 5: Daily tonnages of several types of waste transported by road

Type of Waste	Tonnes-lifted
Household waste	109,200
Iron & steel waste & blast furnace dust	12,900
Non ferrous ores & waste	69,200
Paper pulp & waste paper	39,300

Source: Department for Transport, 2004 (unpublished data)

9 Other Impacts

9.1 Agriculture

The impact of the lorry stoppage on the agricultural sector would be variable and partly dependent on the time of year at which it occurred. If it happened in the summer months when animals were grazing, the impact would be much less than in the winter when farms require a regular supply of processed feed. Even in the winter, however, many livestock farms would have large enough stocks to feed the animals for at least a week. Farms rearing poultry, on the other hand, generally have very limited stocks and would run out after a few days. Moreover, the 'supply' of live animals cannot be 'turned off' in the way that, for example, a chemical plant could suspend production. Animals entering the food chain can only be slaughtered at licensed abattoirs or processing plants. Farmers might be able to transport small numbers of animals by tractor to nearby abattoirs. The centralisation of abattoir

capacity over the past twenty years has substantially increased the average distance from farms, in most cases necessitating the movement of animals by lorry. The geography of life-stock markets has been subject to a similar trend.

Once slaughtered animals must be rapidly distributed or refrigerated. If their meat could not be moved to packing or refrigeration plants, there would be a high level of wastage. The centralisation of food production in the UK has resulted in meat travelling long distances in large quantities from abattoirs to packing, refrigeration and processing plants and from there to regional distribution and shops. Severing all the links in this chain simultaneously would not only deprive consumers of food supplies, but also leave large amounts of product to rot. In-transit inventories of perishable products on the trucks would also be wasted as on-board refrigeration equipment ran out of fuel. It is estimated that approximately 12-15% of articulated lorries carry refrigerated loads.

The milk supply chain would be particularly vulnerable. Britain's 20,000 dairy farms produce an average of 1900 litres of milk per day. Just under half of these farms receive a daily collection, the remainder a collection every second day. As cows need to be milked twice a day and the storage capacity on farms is very limited, within 2-3 days farmers would have to start disposing of milk. Further down the supply chain, milk is continuously processed in dairies with little or no inventory held. Much milk production and distribution is now centralised making it heavily dependent on road haulage.

If the withdrawal of lorries occurred during the harvesting period for much arable production, the potential waste of perishable fruit and vegetable products would be huge. Harvesting could be delayed until road transport operations resumed, though this would have cost implications and adversely affect product quality. The market could be over-supplied with these products once the stoppage was over, depressing prices and increasing the level of wastage.

On the positive side, farmers' markets would flourish. Using a combination of tractors and vans, farmers would be able to distribute some of their produce locally. They would also use 'pick-your-own' promotions to get consumers to come to their farms to collect produce, while there was still sufficient fuel available to permit trips into the country.

9. 2 Manufacturing industry

Manufacturing industry would grind to a halt within a few days. The combination of low inventory, centralisation and extended supply lines makes industry heavily reliant on the continuous flow of road freight. Assembly plants requiring the regular input of a broad range of parts from numerous suppliers within narrow time windows would be particularly exposed. Most car plants now have only a few hours supply of many components. Production line stoppages would therefore occur almost immediately. Other manufacturing operations would be less time-sensitive, but still find it difficult to maintain production for more than a few days. Companies producing simpler products with few components and with larger inventories would be able to switch production to items for which a full range of parts was available. This would offer only temporary relief.

One of the most critical inbound supplies for many manufacturing sectors would be packaging. Factories typically lack storage space for a bulky, low value product like packaging and therefore rely on regular lorry shuttle services from manufacturers of packaging materials. Many would run out of packaging before raw material and component stocks were exhausted – often within a day.

9.3 Construction industry

Building materials account for roughly 10% of the freight tonnage moved by road²⁶. Research by the University of Cardiff has found that the stock-yards on building sites often hold large amounts of inventory of some products as a result of poor replenishment practices and unreliable delivery²⁷. The fabrication process, nevertheless, relies on regular deliveries of some materials during the working day. Ready-mixed concrete, for example, must be delivered on a just-in-time basis within narrow time-windows to ensure that it does not solidify in the vehicle. Disruption of the supply chain for a few critical materials would stop building work on many construction sites within a day of the lorry stoppage.

9.4 Service sector

So long as electrical power and utilities were maintained, many office-based activities could continue. Much of the service sector would be more seriously affected by the inability of staff to travel to work. Once the fuel shortages began to bite, many companies would resort to tele-working, using tele-communications to keep their staff employed while at home. During the 2000 fuel crisis, there was a temporary surge in tele-working²⁸.

The service sectors likely to be hardest hit by the lack of trucks would be:

Catering: denied supplies of perishable food stuffs from day 1

Repair and maintenance: constrained by a lack of spare parts

Retailing: particularly non-food retailers, shops stocking only perishable food products and newsagents

9.5 Non-food retailing

Stocks of non-food products would also run down during the week. These generally have a much slower rate of stock rotation than groceries and consumers would find it easier to postpone purchases of these items. During the 2000 fuel crisis, non-food retailers suffered a significant loss of sales, particularly those in out-of-town locations. (Ironically, grocery retailers saw their sales temporarily increase as a result of panic buying.) The British Retail Consortium estimated that, overall, £200 million of retail sales were lost during the fuel crisis, mostly by non-food retailers²⁹. The losses from a complete, week-long lorry stoppage would be very much greater.

In terms of personal well-being, medicines would be the most critical range of non-food products. A van-based network of emergency deliveries could be organised to keep local pharmacies adequately stocked.

9.6 External trading links

Approximately 84% of British exports (by value) are of material goods requiring transport to ports, airports or the Channel Tunnel³⁰. Between 85 and 90% of these exports are moved by road on at least part of the journey to the point of exit from the UK. If there were no lorries, exports worth around £450 million per day would be held up.

On average 5000-6000 lorries enter or leave the UK each day³¹. This international traffic would stop and large numbers of vehicles rapidly accumulate at the ports. Much perishable product *en route* to the UK would either be wasted or diverted to other continental markets. For example, on the average day around 150 lorry loads of fresh produce arrive in the UK from the south of Spain.

An average of 6300 containers arrive at British ports each day, 54% of them at Felixstowe and Southampton, ports which are already congested³². If there were no lorries to distribute these containers away from the ports, lack of storage space would make it necessary to suspend the off-loading of vessels within a few days, disrupting inbound trade flows.

9.7 Employment

As the week without lorries progressed, an increasing proportion of the labour force would be laid off. The first employees to be affected would be those in industries relying on the just-in-time delivery of materials and components by road. Car assembly plants and the construction industry would be particularly vulnerable. Within a day, however, large parts of British industry would have an inadequate range of supplies to maintain full production and would have started to scale down operations. Even companies with enough inventory on-site to maintain production might be constrained by a lack of storage space for finished product or, in the case of perishable products, the inability to distribute within shelf-life restrictions.

Across manufacturing industry staff lay-offs would be caused mainly by a lack of material supplies. Companies reliant on road deliveries of fuel would also be badly affected.

As discussed earlier, much of the employment in the service sector would be maintained until fuel shortages prevented staff from commuting to work, particularly by car. By switching to public transport or cycling some could continue to work as normal, while for some others would be able to tele-work from home.

10 Getting back to normal

The level of economic activity would drop sharply in the days following the withdrawal of road transport. After a week, the country would be plunged into a deep economic and social crisis. Once the lorries starting running again, it would take several weeks for most production and distribution systems to recover.

Many businesses would not survive a week-long suspension of their operations. At any given time there are many companies whose trading and cash flow positions are fragile. They would be unable to withstand even a temporary loss of business.

With stocks of groceries in shops and home larders seriously depleted, it could take several weeks to rebuild inventories to their previous levels. Capacity constraints in factories, warehouses and in the transport system would limit the extent to which production and deliveries could be 'ramped up' to refill the empty shelves. There would also be a 'spike' in demand as consumers replaced much of their household stock of longer-life product, building in an extra margin to cover them against future crises.

Restarting some production processes would be time-consuming and costly. In the case of processes involving heat treatment, such as smelting, baking, brewing and cement making, it could take a day or more to get the equipment back up to the

required temperature. At the opposite end of the temperature range, refrigeration equipment in vehicles, cold storage and freezer compartments would have to be reactivated and temperatures lowered to requisite levels.

For many companies, the main problem would be re-establishing procurement, production and distribution schedules. As explained in section 5, activities are now closely integrated across the supply chain. Before production operations could restart companies would have to have the right combination of materials and components in the right quantities in the right locations. Delays in starting-up manufacturing or repositioning inventory at one level in the chain would prevent downstream manufacturers and distributors from restarting their operations. In the immediate aftermath of the lorry stoppage, the true inter-dependence of supply chains would become all too apparent³³.

It would take hospitals many weeks to carry out the elective surgery postponed during the stoppage. The accumulated waste at various points in the supply chain could take weeks to clear. More waste would temporarily be diverted to land-fill sites as recycling facilities would have difficulty coping with the backlog. Shortages of critical materials could delay the resumption of building work for a week or more.

Some of the freight that would have been carried during the week without lorries will not now materialise. There will be no need, for example, for the newspapers that would have been published that week. Much of the perishable produce that would have been consumed that week will not now be distributed to shops, though some of it will be transported as waste. Total demand for a broad range of products will have dropped partly because people were unable to shop for them but also because many consumers would have experienced a loss of income during the week of the lorry stoppage.

It is likely, however, that the vast majority of the freight that would have been moved during the week of the stoppage will still have to be moved once the lorries start running again. With more intensive use of vehicle capacity, including greater multi-shifting of vehicles, it might be possible to clear this backlog within a week or two. Foreign hauliers would be likely to expand their cabotage operations in the UK to capture some of the excess traffic.

External trading links would also take significant time to recover, particularly given capacity constraints in the shipping and air cargo sectors. A proportion of the £3 billion of export sales that would have been partly or wholly road-freighted to ports and airports during the week of the stoppage would have been rejected by their foreign customers, adversely affecting the balance of payments. The longer term competitive position of British exporters in foreign markets would also have weakened.

11 Conclusion

For the economy as a whole the loss of road transport for a week would be devastating. The Institute of Directors estimated that the level of economic activity in the UK was reduced by 5% during the week of the September 2000 fuel crisis³⁴. The disruption of most supply chains at this time, however, was fairly patchy and ended just before the critical three day watershed when inventories of many grocery products and fuel would run out. As Marsden and Beecroft note 'Supply chain problems would have been much worse had the crisis continued one or two days more'³⁵. If the country were deprived of road haulage for a week, the economic losses would be an order of magnitude greater and could easily amount to half a week's output.

Road freight is the life-blood of the national economy. Without lorries to carry this freight, current standards of living could be maintained for only a few days. Table 6 charts the progressive decline in these standards that could be expected over the first five days without lorries. This decline would be even more dramatic if you allowed for the effects of panic buying.

Lorries may be essential, but they are generally disliked by the public. People often fail to see the connection between the amount of lorry traffic on the road and the availability of all the goods and services they take for granted. One way of demonstrating this connection is by showing how quickly our economic system would collapse if all lorry movements were to cease. This is what we have attempted to do in this report.

Table 6: Probable effects of the lorry stoppage over the first five days.

Day 1	Day 2	Day 3	Day 4	Day 5
<p>All movements of lorries over 3.5 tonnes cease at 12am</p> <p>Most mail services and parcel deliveries stop</p> <p>No newspapers</p> <p>Manufacturers operating on a just-in-time basis suspend operations</p> <p>No supplies of fresh produce in grocery outlets</p>	<p>Supermarket stocks of many perishable / short shelf-life product run out, including bread, milk and eggs</p> <p>Milk disposal on farms</p> <p>More manufacturing in low-inventory sectors closes down</p> <p>Shortage of cash in banks and ATMs</p> <p>Construction work ceases on most building sites</p> <p>Growth of farmers' markets</p>	<p>Most petrol stations run out of fuel</p> <p>Around 15% of the car fleet without fuel</p> <p>Supermarket stocks of fast-moving grocery lines exhausted</p> <p>Introduction of rationing for fuel and some food products</p> <p>Fast food outlets close</p> <p>Widespread lay-offs from manufacturing sector</p> <p>Busier pubs run out of beer</p> <p>Slaughter of poultry on farms</p>	<p>Petrol stations run dry</p> <p>Most of the manufacturing sector shut-down</p> <p>Most non-electrified rail services suspended</p> <p>Serious cash shortages</p> <p>Bus companies reduce off-peak frequencies, esp. in rural areas</p> <p>Gas and water utilities disrupted by lack of fuel and spare parts</p> <p>Congestion at ports stops off-loading of vessels</p>	<p>Half of the car fleet without fuel</p> <p>Large proportion of the labour force laid-off or unable to travel to work</p> <p>Retail stocks of most grocery products exhausted</p> <p>Almost all manufacturing closed down</p> <p>Severe disruption of the health service</p> <p>Serious problems from the accumulation of waste</p> <p>Range of non-food products in shops substantially depleted</p>

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