UK Transport Energy Demand – 2005 - 2030

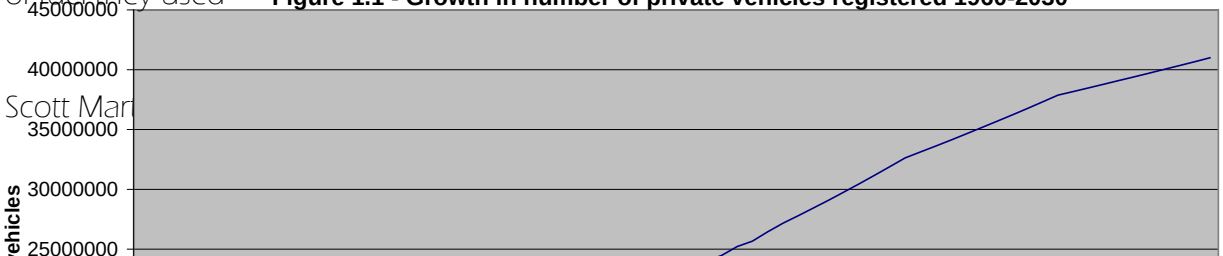
The style in which residents of modern UK society have chosen to live has placed a huge burden upon the energy industry, as levels of consumption and therefore energy demand have increased substantially over the last half century. One major area of growth over this time has been in the transport industry, which in 2003 accounted for 33% of the total energy demand for the UK, the highest of all sectors (DUKES, 2004). A large proportion of this growth can be attributed to the increase that has occurred in private motoring. As technological advances and manufacturing processes have been able to increase vehicle output, at the same time lowering costs, consumers have realised that private motoring is an affordable method of travel and as such private vehicle ownership has increased by ten times since 1950 (statistics.gov.uk) and could be why it now accounts for four fifths of the total distance travelled per person (dft.gov.uk). The source of growth in the number of private vehicles has not been limited to those who did not previously have a car. Only three out of ten households in had a car in 1961, but by 1998 seven out of ten households had at least one. Over the same period the proportion of households with two or more cars has grown from 2% to 28% (statistics.gov.uk).

There are several reasons as to why this trend has occurred. In real terms, the retail cost of vehicles has fallen, and is still falling, relative to the change that people have experienced in salaries. Cars are also seen by many as a status symbol, with many people wanting the latest model, or the more expensive luxury options so that it portrays a certain image about them. It is seen as abnormal for any adult of this country not to drive, but who would be capable, so there is somewhat of a pressure on people to own a car and be able to drive. Increased disposable incomes and years of road building schemes also mean that people are able to make more use of vehicles, commuting to and from work, going out for trips at the weekend without needing to consider cheaper alternatives. Therefore, the distance that people are travelling has also increased. All of these factors have led to an increase in the energy demand from light vehicles and therefore the transport sector as a whole.

Since 1960, the number of vehicles on the roads has risen by an average of 2.3% each year, but there must be a limit for how long this growth can continue. My projections for the growth in light vehicles over the next 5 years is based on this 2.31%, but from 2010, I would expect this growth to have dropped somewhat, and envisage a figure of around 1.5% annually for the period up to 2020. From 2020 onwards, the market for vehicles will be somewhat saturated, and can see growth being no greater than 1% per annum, but have based predictions on a figure of 0.8%. Figure 1.1 illustrates the past growth in light vehicles and shows my predictions for future growth based on these past trends.

Advances are being made in private motoring, with the introduction of smaller cars such as the Smart Car, which has a very small engine and low fuel consumption, and offers a very economical way of travelling compared to other private vehicles. The cars are also physically smaller, meaning that congestion may seem less of a problem. As stated previously, car travel increased but the increased fuel efficiency of cars in this country meant that the total amount of fuel they used

Figure 1.1 - Growth in number of private vehicles registered 1960-2030



increased by only 1% between 1990 and 2000 (DTI, . However, larger vehicles have also become increasingly popular in this country. The term 'Soccer mom' used in America to describe those mothers who take and pick up their children from school, soccer practice and the like, in large SUVs (sports utility vehicles) seems to be catching on in the UK, with more vehicles of this nature being produced and marketed by manufacturers.

Whilst vehicle fuel efficiency has increased over the last 20 years, the US has seen a downturn in the average number of miles per gallon achieved on its roads, a trend attributed to the large SUVs (news.bbc.co.uk). However, I do not believe that the UK will follow this trend, so overall, the amount of energy used to travel each km will reduce. From previous efficiency improvements, which have been at an average of 1.3% each year, I would say that further advances can be made, and my projections for this use the average of 1.3% up to 2008, reducing to 0.8% from 2009 to 2015 and 0.5% from 2016 to 2030. This is because there must be some limits to how efficient traditional vehicles a can become, so improvement could not continue at a rate of 1.3% indefinitely. Figure 1.2 gives a graphical representation of how efficiency has changed in the past and how I expect it to change in the future.

Road transport is not the only area to have undergone growth over the last few years. The cost of air travel, one of the most inefficient methods of travel in terms of its energy use, has significantly decreased over the last decade and the advent of low cost, no frills airlines such as Easy Jet and Ryan Air. With short journeys within and between European countries costing as little as 99p, and journey times on average for most journeys much quicker than other methods, this has caused a massive surge in the energy demand for the aviation sector, and between 1993 and 2003, it underwent the largest increase in energy consumption of any of the modes of transport categorised. In 1993, 362.02 PJ were used, but by 2003 this had increased to 549.24 PJ. To compare, the figure for road transport went from 1817.00 to 1923.72 PJ over the same period (DUKES, 2004). Figure 1.3 shows how the number of passengers carried in the UK has risen over the last 50 years.

Figure 1.2 - Average energy consumption per km travelled for light vehicles 1964-2030

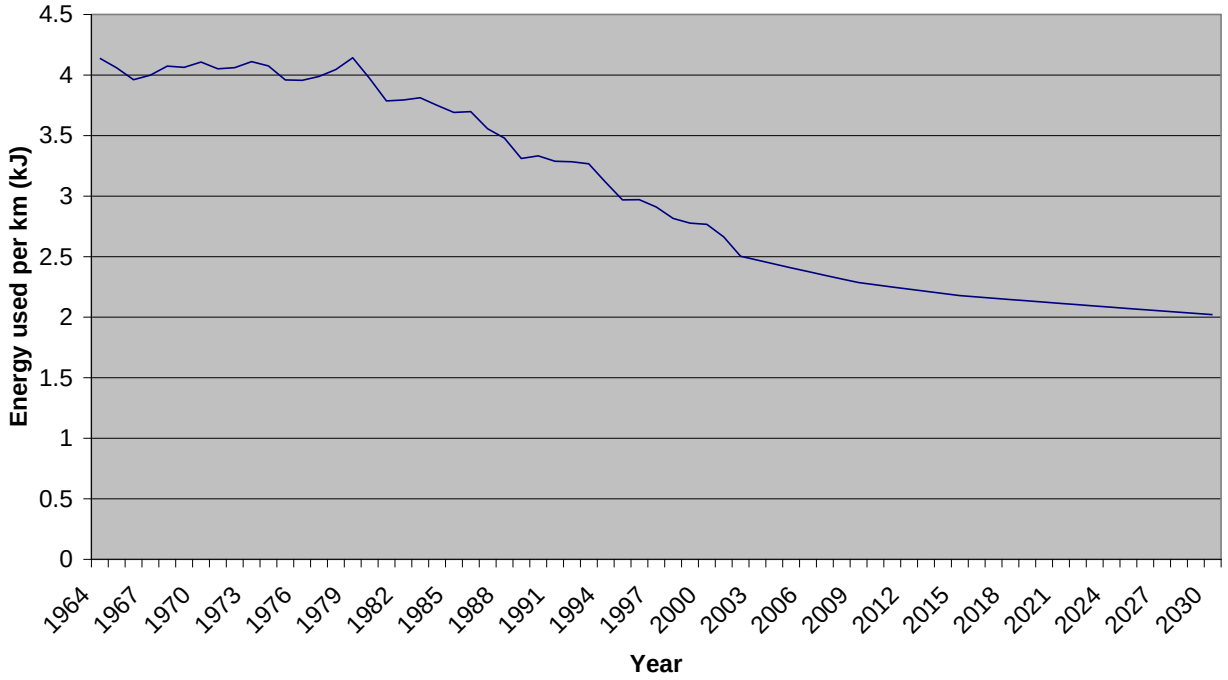
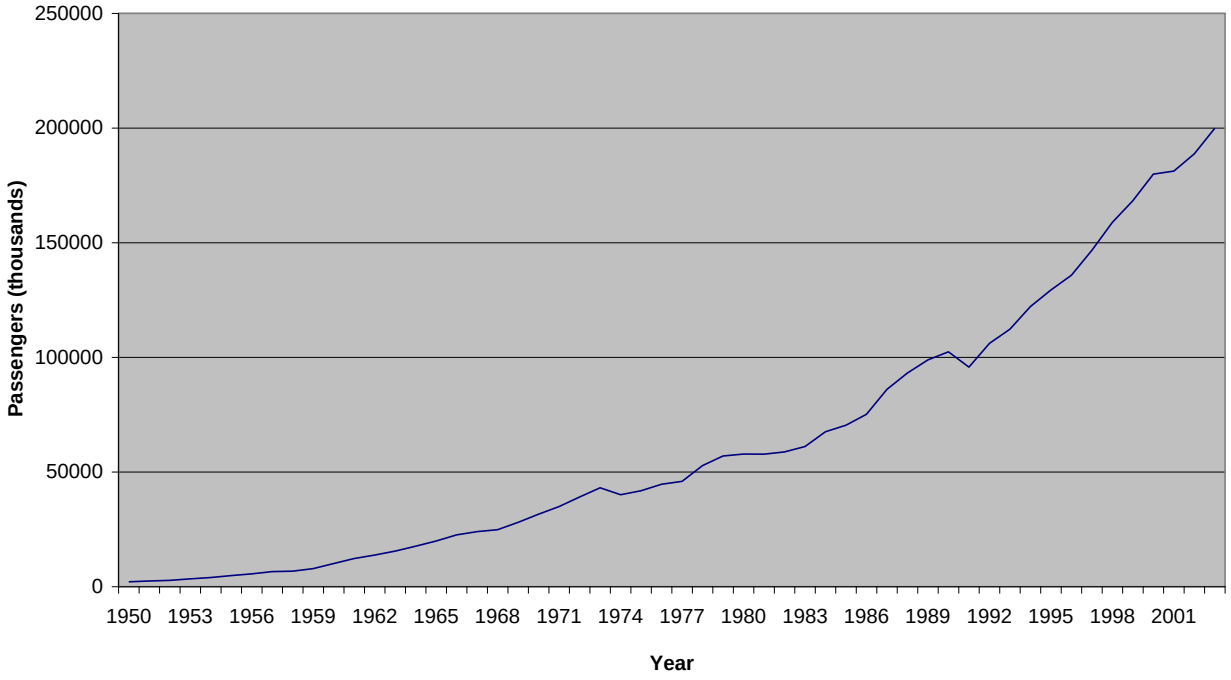


Figure 1.3 - Growth in airline passengers 1950-2003



If airlines were included in carbon emissions trading as other businesses have to, costs would inevitably be passed on to consumers, meaning if people want to continue to travel in such an unsustainable way, then it should and must be them who bear the cost and not the

remainder of society. It therefore may not be necessary to impose absolute or strict limits on growth in this industry, as the costs may be collected through carbon trading, which may be enough to regulate this themselves. In fact the aviation industry currently receives more subsidies than any other transport method, in the form of tax concessions, which amount to £9 billion a year, through no tax on aviation fuel and no VAT on aviation transactions. If the VAT exemptions were removed and fuel was taxed at the same rate as petrol for cars, work published by the Aviation Environment Federation shows that, although there would be stable passenger growth, there would be no demand for any new runways or airports. However, it would prove difficult to tax aviation fuel without international agreement, so a Europe-wide emissions charge could be an effective substitute to try and limit the growth that will inevitably occur in this consumer attractive sector.

The growth in other areas of the transport industry, such as railways and shipping has been very minimal, with railways actually undergoing a decrease in their energy demand over the last 10 years (dti.gov.uk), even though passenger numbers, track length and distance travelled have all increased. The energy demanded by water transport has remained fairly constant over the last 10 years, but did undergo a sharp decline in 2001 and 2002. On the whole, I do not envisage any growth of any great scale in either of these sectors over the next 25 years, and if anything I believe that the energy demanded from shipping will decline and demand from railways will depend on the level of investment that is put into the network and into the trains themselves. If congestion in our towns and cities does become more of a problem than it already is, and local authorities adopt schemes similar to the congestion charge seen in London, then there is every possibility that rail use will grow. Although growth has already happened in this sector, and the energy use declined, so for these reasons I expect very little if any at all, growth in the energy demand from rail transport.

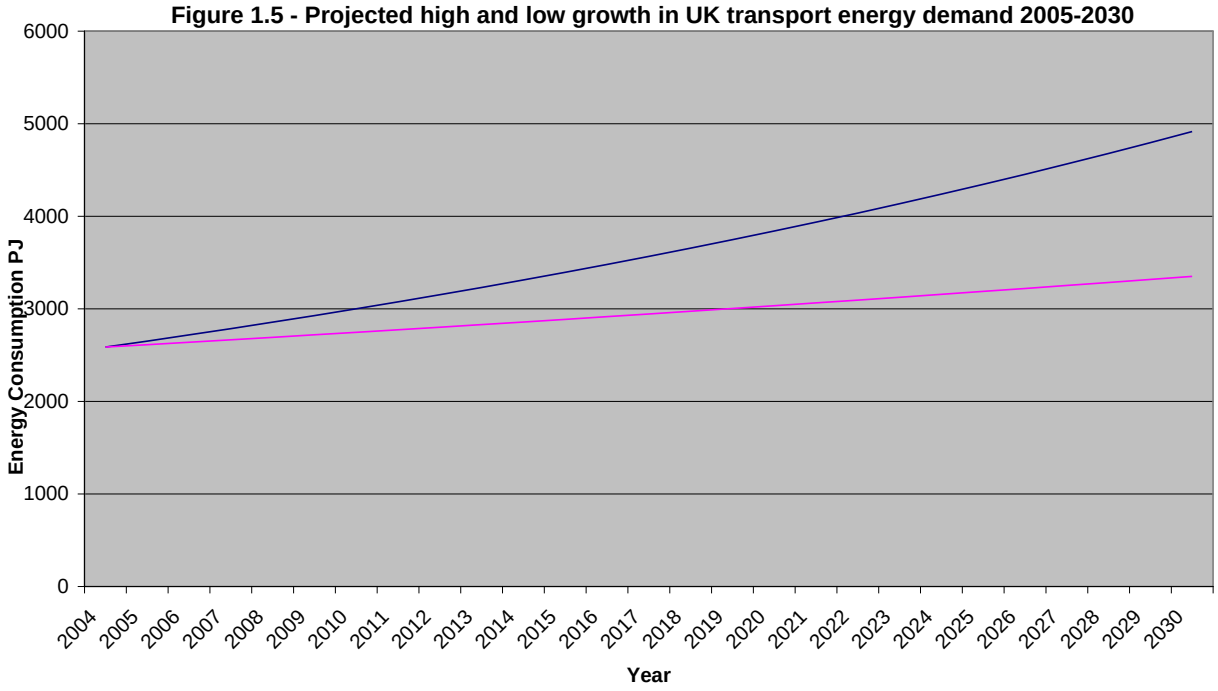
As for the source of the fuel for the transport sector, I believe that most of it will continue to come from oil based products. Until suitable alternatives are found to be economically viable and available on a wide scale, which may not come about until there is a major oil crisis and technology is forced to develop, it seems that oil is the only real major source of fuel. Electricity does and will supply some transportation methods, so I estimate that it will provide 1% of the demand over the next 25 years, with the other 99% coming from oil. It is too early to say which of the developing technologies for transport, if any, will be successful, so therefore the demand for these alternatives cannot be accurately predicted at this time.

Overall, I have no doubt that growth in the transport sector will continue over the next 25 years. It may not be at rates we have previously seen, as demand will eventually start to level off and limits to how far we can and want to will be reached. However, the increase in energy demand as a whole between 1990 and 2000 was 8%, which is much less than the 26% growth in Gross Domestic Product (GDP) between 1990 and 2000 (DTI). Thus the level of energy consumption per unit of output - which is often called the energy ratio of the economy - fell by 13 per cent between 1990 and 2000. As long as the economy continues to grow at this rate, I believe that energy demand, especially from transport, will continue to grow.
Depending on the economic and political policies that are put into place over the next 25 years, I expect that transport energy demand growth will be somewhere between 1% and

2.5% overall. Therefore, my calculations for the future demand take these two figures as the high and the low predictions, and the differences are visible in figures 1.4 and 1.5 below.

Figure 1.4 – Projected UK Transport Energy Demand Figures 2005-2030

Year	Total Transport Energy (PJ) LOW 1% Growth	Total Transport Energy (PJ) HIGH 2.5% Growth
2005	**2613**	**2651**
2010	**2746**	**3000**
2015	**2886**	**3394**
2020	**3033**	**3840**
2025	**3188**	**4345**
2030	**3350**	**4915**



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www.statistics.gov.uk – many useful pages accessed regarding the transport statistics for the UK

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http://news.bbc.co.uk – various articles regarding SUVs and fuel consumption