

## **International comparisons of energy efficiency indicators**

### **Introduction**

International comparisons of energy efficiency are a helpful way to measure performance of the UK relative to other countries and understand the key energy demands of the UK economy. This article presents indicators for each of the main energy consuming sectors based on data published by the ODYSSEE European energy efficiency indicators project. These indicators are designed to make meaningful comparisons but care must be taken when making comparisons regarding efficiency due to significant differences in the types of energy used in different countries due to differences in heating demand, building type and structure of industry which cannot be fully controlled for.

Data are taken from the ODYSSEE database unless otherwise noted. The ODYSSEE project is a European Commission supported project made up of partners from EU Member States together with Norway to produce detailed energy efficiency indicators for European countries. The majority of European Union (EU) countries have data covering at least 2001 to 2011. However, in some cases a country will not have 2011 data available yet so in this case 2010 data has been used. For Estonia, Hungary and Malta, all data are for 2010. If a country is not displayed on a cross-European chart, it is because that country does not have data for that indicator.

This article provides a brief overview of energy efficiency in the domestic sector, the manufacturing sector, the service sector and the transport sector.

### **Domestic**

The indicator in chart 1 shows average energy consumption per dwelling adjusted for climatic differences across the EU. In 2011, UK average consumption per dwelling when scaled to the EU climate<sup>1</sup> was 16,100 kWh per dwelling<sup>2</sup>, 2 per cent lower than the European Union (EU)<sup>3</sup> average of 16,500 kWh per dwelling but consumed 2 per cent more energy per dwelling than Germany but 30 per cent less per dwelling than France.

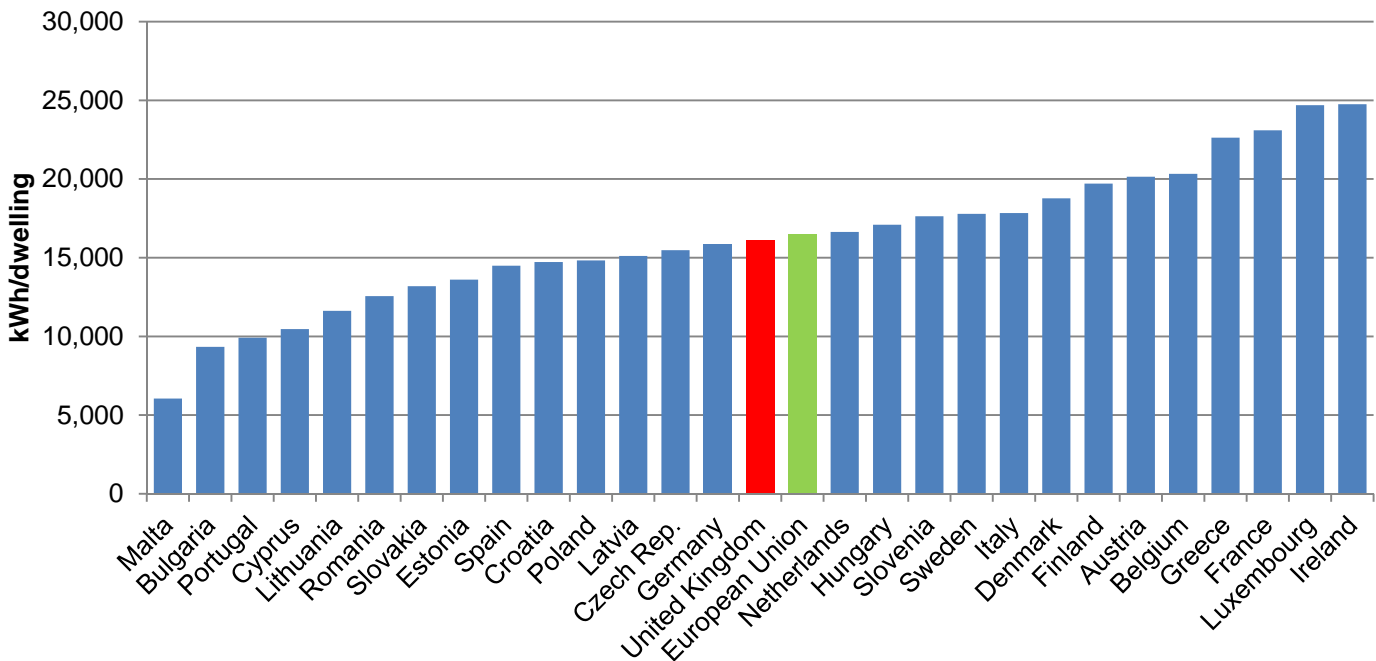
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<sup>1</sup> Temperature correction of a country's energy consumption data adjusted for difference in temperature compared to the average EU climate.

<sup>2</sup> The UK data for charts 1 and 2 is different to the raw ODYSSEE data. The reason for this is that for the UK data we have applied our own national temperature correction methodology prior to the scaling to the EU climate. We will continue to discuss methodology issues with the ODYSSEE network regarding the methodology going forward.

<sup>3</sup> The 'European Union' (EU) statistics refer to a weighted average of 27 of the 28 member states. For certain indicators, not all EU member states will have data points and therefore would not be included in the average. Croatia is shown throughout this chapter but is not included in the calculation of the 'EU' statistics.

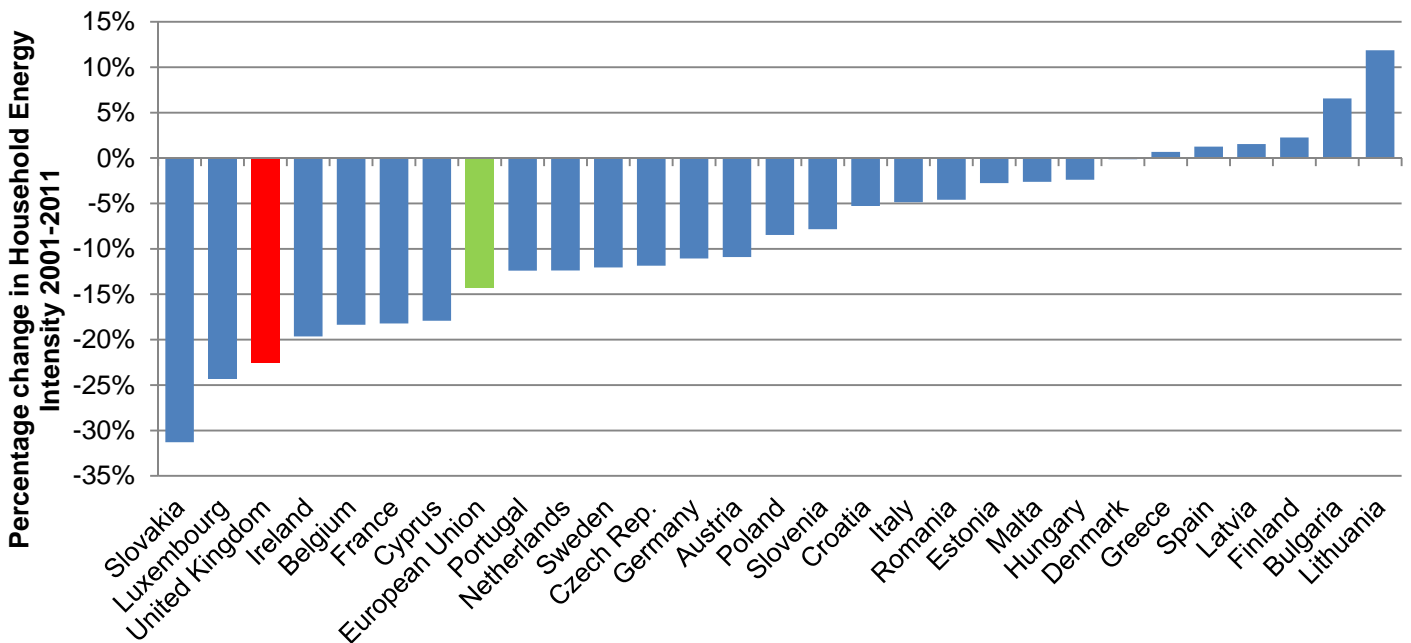
**Chart 1 Household energy consumption per domestic dwelling adjusted to the EU climate, 2011. (provisional statistics)**



Source: ODYSSEE

Overall, UK energy consumption per dwelling fell by 23 per cent between 2001 and 2011, the third largest percentage decrease in Europe after Slovakia and Luxembourg. By comparison, the EU27 average fell by 14 per cent over the same period, with energy consumption per dwelling falling in the majority of EU countries over this period.

**Chart 2, Change in household energy consumption per dwelling adjusted to the EU climate between 2000-2011. (provisional statistics)**

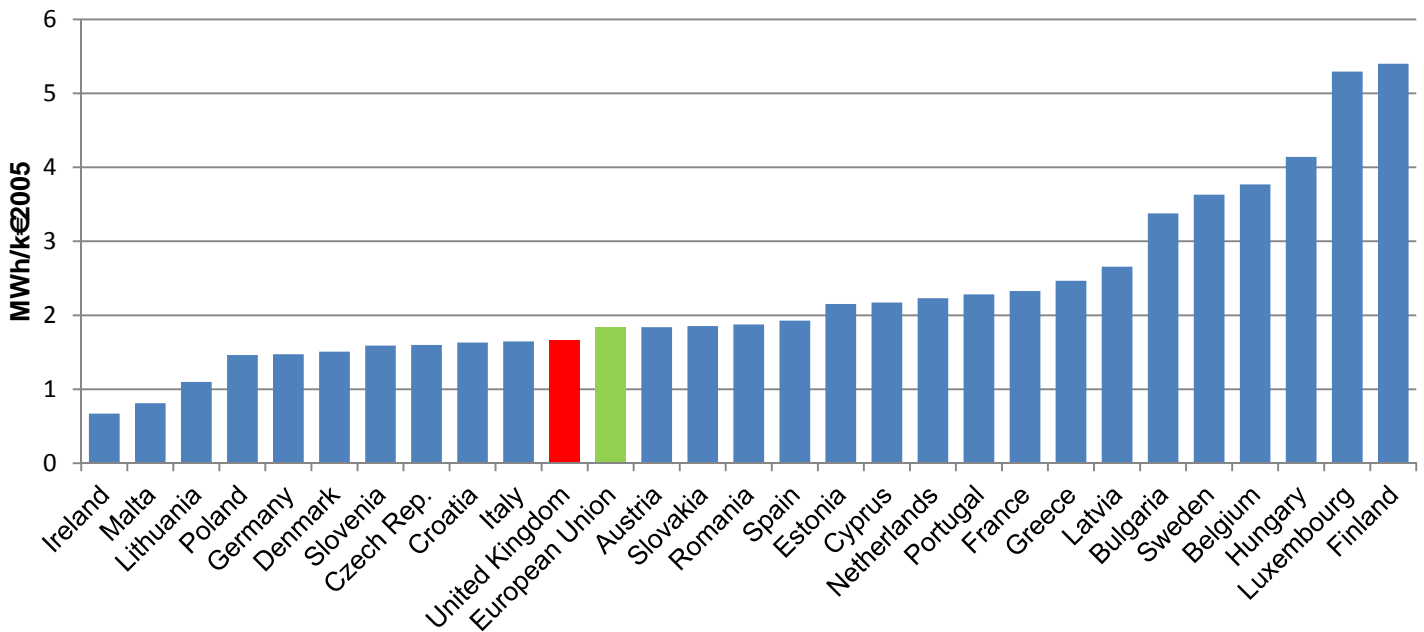


Source: ODYSSEE

## Manufacturing

The UK has one of the lower manufacturing energy intensities in Europe, 10 per cent below the EU27 average relative to gross value added (GVA).<sup>4</sup> The type of manufacturing activity varies between countries and this will therefore have an effect on energy intensity.

**Chart 3 Manufacturing energy consumption per unit of GVA: 2011 (PPP adjusted)**



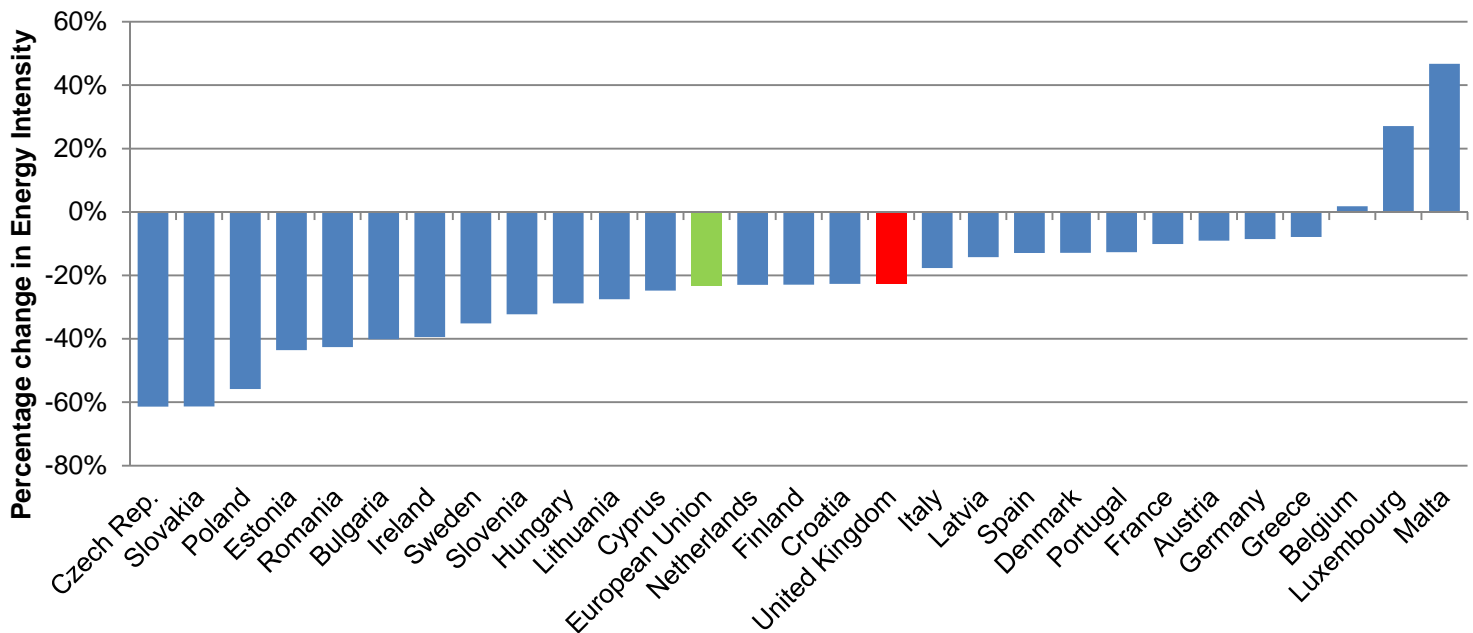
Source: ODYSSEE

Since 2001, UK energy intensity has fallen by 22 per cent as shown in chart 4. Although the UK's reduction is less than the EU average, the UK has made a larger reduction than most of the larger EU economies (France, Germany, Italy and Spain). Over this time period, the EU as a whole decreased its manufacturing energy intensity by 23 per cent. Between 2001 and 2011, the GVA of the UK's manufacturing industry<sup>5</sup> fell by 8 per cent and in 2011 manufacturing only accounted for 10 per cent of the UK's GVA.

<sup>4</sup> Adjusted for purchasing power parity (PPP).

<sup>5</sup> ONS Blue Book, Chained Volume indices

**Chart 4 Change in manufacturing energy consumption per unit of GVA, 2001-2011 (PPP adjusted)**

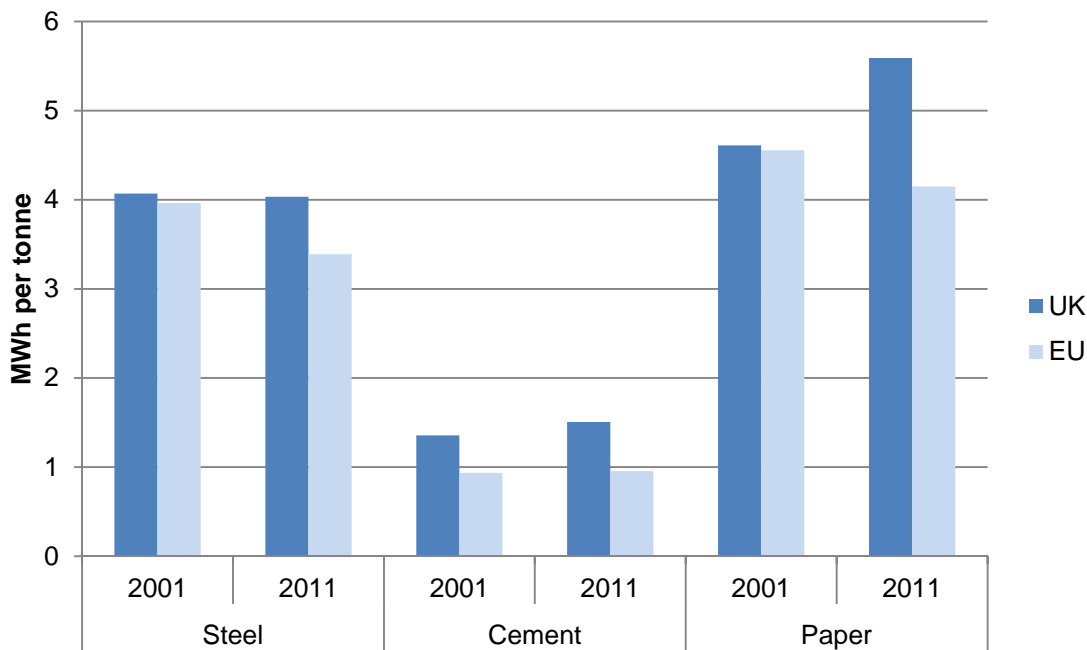


Source: ODYSSEE

Manufacturing energy intensity as a broad indicator can be difficult to assess due to the varying structures of the manufacturing industries in different EU countries. While the indicator does show that the UK manufacturing industry has lower energy intensity relative to the EU, it is important to look at the sub-sectors within manufacturing to compare the relative efficiencies of countries. Care should be taken whilst making international comparisons of manufacturing as the type and quality of products produced varies between countries. For example in the steel industry, energy intensity will vary depending on the share of coke that is manufactured on-site relative to what is imported.

Energy intensity with the cement, steel and paper sectors are primarily measured by energy by tonne of output (as opposed to GVA) as shown in chart 5. Using this measure for these energy intensive sectors the UK is shown to be more energy intensive than the EU as a whole. In 2011, the UK was more energy intensive than the EU in cement by 58 per cent, paper by 35 per cent and steel by 19 per cent. Furthermore, the UK's energy intensity in cement increased by 11 per cent and paper by 21 per cent between 2001 and 2011, this may be partly due to a decline in output from the sectors which is likely to reduce the overall efficiency of production. UK output of the cement sector fell 25 per cent between 2001 and 2011, whilst the paper sector fell 30 per cent and the steel sector 41 per cent over the same time period.

**Chart 5 Energy intensity by manufacturing sector: UK & EU 2001 & 2011.**



Source: ODYSSEE

### Non-domestic: Commercial and Public Sector Services

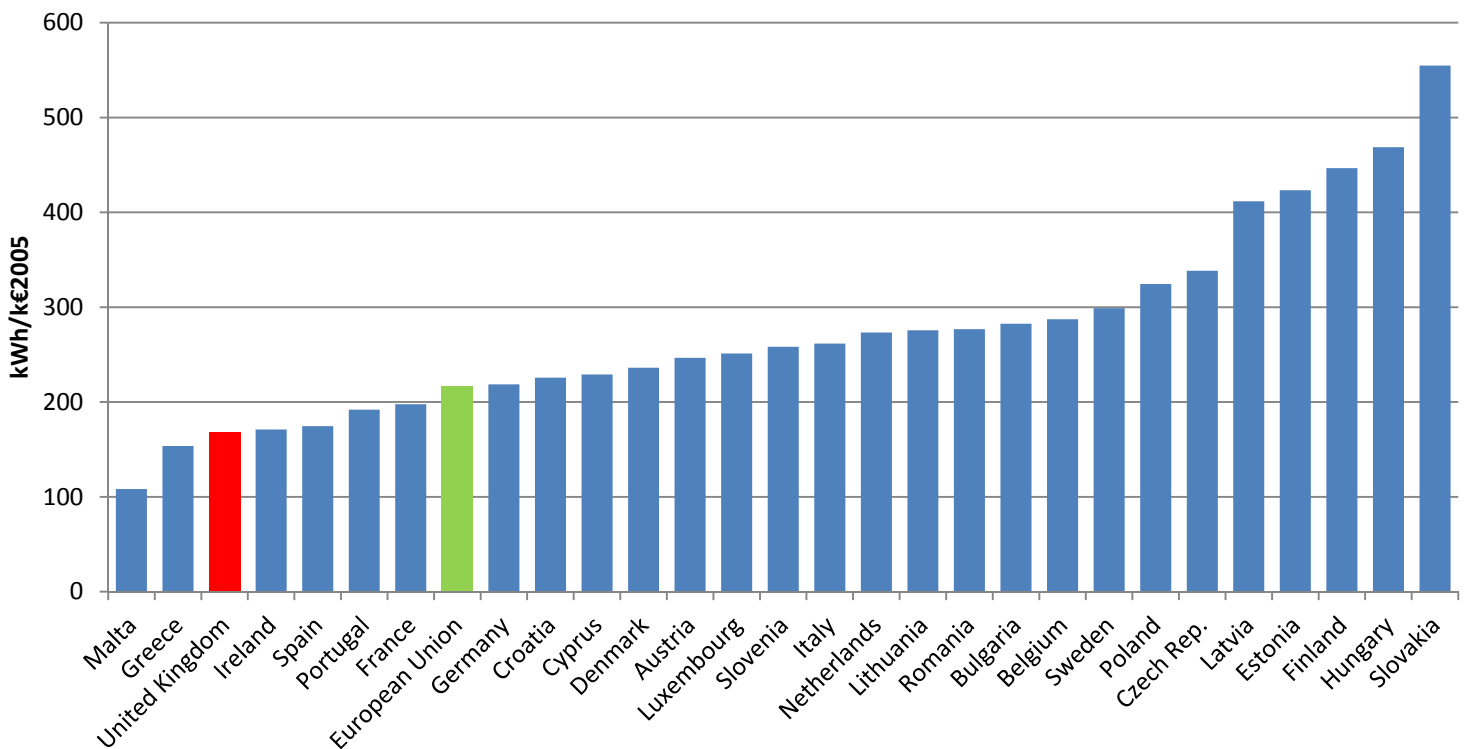
The UK has one of the least energy intensive service sectors in the EU as measured by energy consumption per unit of GVA, as shown by chart 6. The UK performs particularly well on this indicator due to the high value professional services that generate high GVA for relatively low energy use. UK service sector energy consumption per unit of GVA was 22 per cent lower than the EU average. The UK service sector is the dominant sector of the UK economy, contributing 78 per cent of GDP output in Q3 2013.<sup>6</sup>

Between 2001 and 2011, the UK's service sector energy intensity fell by 33 per cent, compared to a fall of 11 per cent in the EU as a whole. Over the same time period, the GVA of the service sector in the UK increased 24 per cent.<sup>7</sup>

<sup>6</sup> ONS Index of Services – August 2013 - [www.ons.gov.uk/ons/rel/ios/index-of-services/august-2013/index.html](http://www.ons.gov.uk/ons/rel/ios/index-of-services/august-2013/index.html)

<sup>7</sup> ONS Blue Book, Chained Volume indices

**Chart 6 Service Sector energy consumption per unit of GVA: 2011 (PPP adjusted).**



Source: ODYSSEE

## Transport

Chart 7 shows the average energy consumption (litres) per 100 km travelled for cars in EU countries, where figures are available. For the vehicle fleet as a whole, the UK has the lowest consumption per distance travelled of 5.8 litres/100km (equivalent to 49 miles per gallon). This is 16 per cent below the EU average.

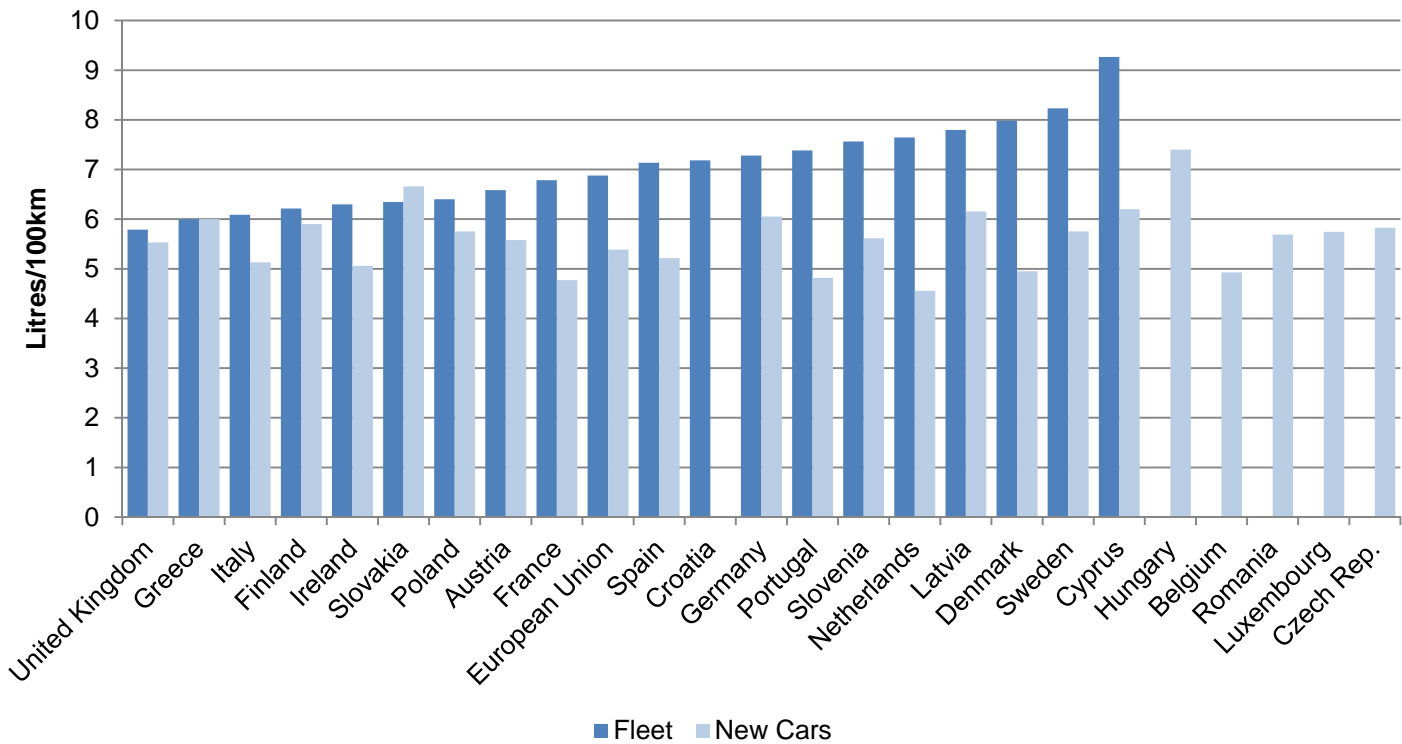
The UK new car consumption per distance travelled is 5.5 litres/100km (equivalent to 51 miles per gallon). This is higher than the EU average of 5.4 litres/100km. This is likely to reflect demand for larger; higher energy consuming vehicles in the UK relative to the rest of Europe.

For the UK, energy consumption for both new cars and the car fleet as a whole decreased 24 per cent between 2001 and 2011. This is compared to an EU average of 22 per cent for new cars and 12 per cent for all cars. In the UK, for 2012, the average number of years since 1<sup>st</sup> registration for cars was 7.7 years,<sup>8</sup> compared to 8.2 years for the European Economic Area in 2009 (the last data available).<sup>9</sup> Higher replacement of the car stock will lead to more energy efficient cars and this is one of the reasons that the UK average energy consumption for the entire car fleet is the lowest in the EU.

<sup>8</sup> DfT Road Traffic Survey - [www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/184161/veh0211.xls](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/184161/veh0211.xls)

<sup>9</sup> [www.eea.europa.eu/data-and-maps/indicators/average-age-of-the-vehicle-fleet/average-age-of-the-vehicle-3](http://www.eea.europa.eu/data-and-maps/indicators/average-age-of-the-vehicle-fleet/average-age-of-the-vehicle-3)

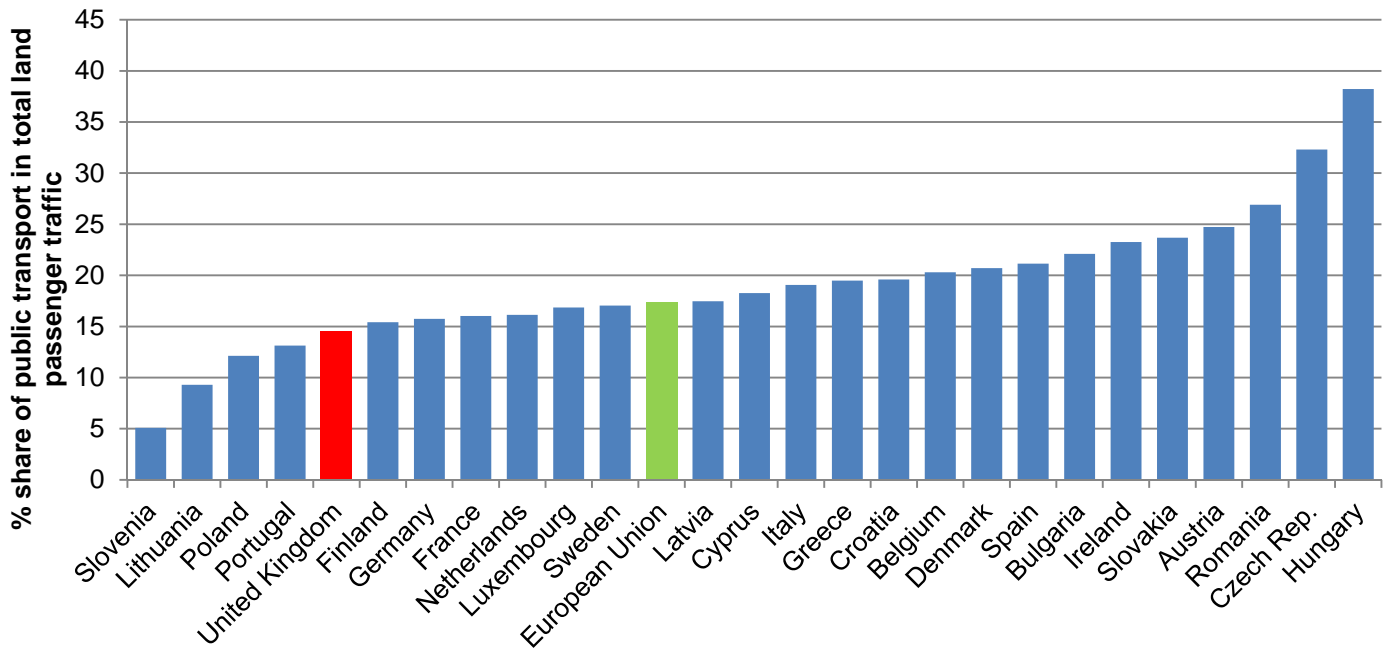
**Chart 7 Specific consumption per 100 km of new cars and total fleet, 2011.**



Source: ODYSSEE

The UK has the fifth lowest percentage share of public transport in total land passenger transport, accounting for just 15 per cent of all traffic. This has increased 2 percentage points from 13 per cent in 2001. The EU average has decreased from 18 per cent of public transport in total land passenger transport to 17 per cent from 2000 to 2011.

**Chart 8 Percentage share of public transport in total land passenger transport: 2011.**



Source: ODYSSEE

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