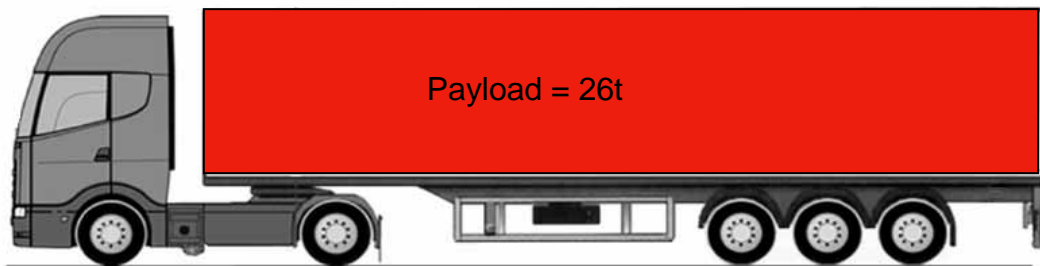


# Heavy Commercial Vehicle Fuel Efficiency

Heavy commercial vehicles predominantly use Diesel fuel as the energy source for the movement of freight by road.

The maximum permitted mass for a heavy commercial according to pan-European rules (Directive 96/53/EC) is 40t supported by a minimum of 5 axles.

Such an articulated vehicle for non specific freight transport would have an unladen mass of about 11t therefore having a freight load capacity of about 26t.

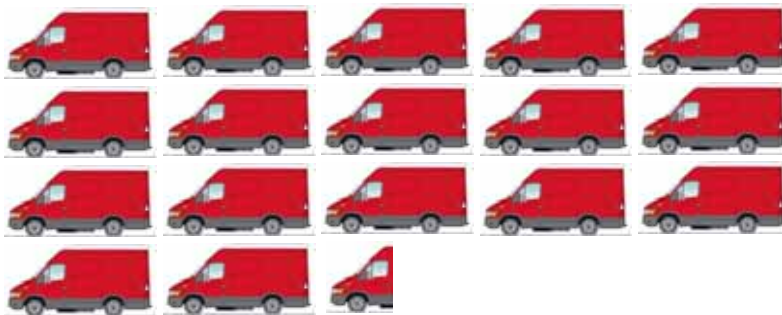


Gross mass = 40t

Typically, under normal heavy truck operation, such a vehicle would achieve a fuel consumption of 30 L/100km. In order to relate this consumption more appropriately to the movement of the freight carried, an alternative metric may be used.

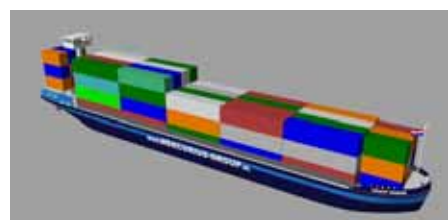
The specific fuel consumption is 1.15 L/100t.km (i.e.  $30/26$ ), this being the fuel consumption required to move 1t of freight over a distance of 100 km.

Similarly, a 3.5t van having a freight load capacity of about 1.5t and having a fuel consumption of typically 16 L/100km would have a specific fuel consumption of 10.7 L/100t.km.



It is clear that it would require 17.3 such 3.5t vans to move the 29t of freight carried by the articulated vehicle; the resulting specific consumption being more than 10 times greater. This illustrates the importance of the correct vehicle choice for a specific transport mission.

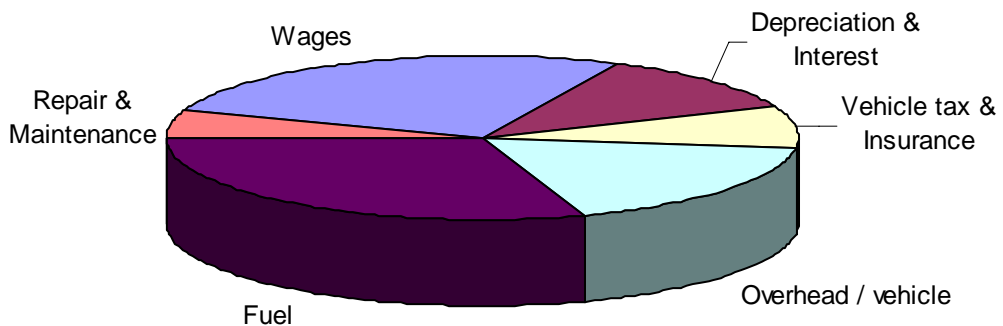
This unsurprising result demonstrates that for all transport modes, the heavier the vehicle (whether road, rail or water craft), the greater will be the fuel and hence energy efficiency in moving freight.



Specific fuel consumption is a highly useful metric since it relates to the purpose of the transport operation, that is to move freight. It also focuses the mind on the need to operate vehicles that are appropriate to the nature of the goods carried.

In reality, the optimum fuel consumption (L/100t.km) is achieved under fully laden conditions and will deteriorate when the vehicle is partially laden or unladen. Clearly for optimum transport efficiency, unladen or partially laden vehicle operation is to be avoided at all costs.

Even though the heaviest commercial vehicles have a very low specific fuel consumption, fuel cost is a significant fraction (c30%) of the total operating cost of the vehicle and the fact that the freight transport industry is highly competitive means that containment of vehicle operating costs and consequently fuel saving is highly important.



This graphic represents operating costs typical of a 40t articulated tractor in the UK. With fuel costs representing 30% of the overall operating costs, the largest single cost category, successful road freight transport operators will take steps to ensure vehicle fuel efficiency in the way they operate their vehicles.

Manufacturers recognise the competitive need to produce fuel efficient vehicles. Their annual research and development budget always has a significant resource to ensure vehicles meet operators' expectations in this regard.

Freight transport by waterway and rail can be very efficient with extremely low specific fuel consumption due to the very high operating masses and the absence of significant gradients.



The transport of freight by a combination of road, rail and waterway is referred to as multi-modal and its exploitation contributes to improving the specific fuel, and hence energy, consumption of freight movements.