

# WHAT IS FREIGHT TONNE EFFICIENCY?



The Starship was designed and built with the aim of demonstrating what is possible in reducing energy demand in freight transportation. It uses currently available technologies to minimise the amount of energy it takes to transport a load of cargo from one point to another.

Freight tonne efficiency is the favoured statistic for judging the energy intensity associated with moving cargo from point A to point B since it combines the weight of cargo being moved with the amount of fuel consumed.

One truck carrying 1 tonne of cargo = **10 MPG**



Equivalent to:  
**10 tonnes/miles per gallon**  
 4.25 kilometres per litre  
 3.54 imperial miles per gallon

One truck carrying 20 tonnes of cargo = **7 MPG**



Equivalent to:  
**140 tonnes/miles per gallon**  
 2.98 kilometres per litre  
 2.48 imperial miles per gallon

## HOW IS FREIGHT TONNE EFFICIENCY CALCULATED?

$$\left( \frac{\text{DISTANCE TRAVELED (KILOMETRES)}}{\text{FUEL CONSUMED (LITRES)}} \right) \times \text{WEIGHT OF CARGO (TONNES)}$$

## THE STARSHIP INITIATIVE DEMONSTRATION RUN WAS FROM SAN DIEGO TO JACKSONVILLE



TOTAL DISTANCE  
**3,700 kms**  
 (2,315 miles)

The measurement of the overall efficiency of the Starship Truck was verified by an independent third party, the North American Council for Freight Efficiency, using an on-board telematics system. The following parameters were monitored, using at least two independent methods:



**Primary**  
**Secondary**

Vehicle odometer  
 GPS data



**Primary**  
**Secondary**

Engine Control Module (ECM)  
 Beginning and ending fuel level and fuel added



**Primary**  
**Secondary**

Readings from a certified scale  
 Calculated value from engine data