

Brazil

Country spotlight

Population (million) (World Bank, 2016a):	207.8
Urban population (% of total) (World Bank, 2016b):	86%
GDP per capita (2014 USD/year) (World Bank, 2016c):	8 500
Average price gasoline and diesel (USD cent per L, 2014) (GIZ, 2015):	127; 102
Fuel tax class (2014) (GIZ, 2015):	taxed petroleum fuels

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In 2015, approximately 2.5 million LDVs were sold in Brazil (IHS Markit, 2016). This represents a decline against the previous two years, but was sufficient to maintain Brazil as the largest market in South America. The LDV stock totalled 38.6 million registered vehicles (IEA, 2016b). LDV ownership was 0.18 vehicles per capita, similar to other countries in the region.

In 2012, the Brazilian government introduced the "Inovar-Auto" programme to foster the adoption of more efficient vehicles through fiscal incentives. Manufacturers and importers meeting a fuel economy target benefit from a tax reduction on industrial products of up to 30%. This effectively offsets the 30% tax rate that was established before the introduction of the fuel economy regulation (TransportPolicy, 2016).

A voluntary label informing consumers about the fuel economy performance of vehicle models was introduced in 2007 (ICCT, 2014c). The "Inova Energia" programme also provided grants and loans to stimulate innovation in energy efficiency, including in transport (IEA, 2016c).

Biofuels have been promoted by the Brazilian government since 1975. In 2014, biofuels accounted for 19% of total road transport fuel use in (IEA, 2016a).

Market profile and vehicle characteristics

In 2015, 2.5 million new vehicles were registered in Brazil, which was a drop of more than 25% compared with 2014 (IHS Markit, 2016). Nevertheless, Brazil is still the largest LDV market in Latin America and is the seventh largest LDV market worldwide. In the same year, Brazil produced more than 2.3 million LDVs, making it the world's ninth-largest producer (OICA, 2016). Most vehicles sold are produced by foreign OEMs; Fiat, Chevrolet and Volkswagen represented almost 50% of the Brazilian LDV market in 2015.

Between 2014 and 2015, a steep decline was observed in CO₂ emissions per km, from around 190 g CO₂/km to 130 g CO₂/km, while CO₂ emissions were stable between 2005 and 2013. The downward trend is coherent with growth in the market share of vehicles having specific emissions of 120-150 g CO₂/km and a 75% decrease in the market share of vehicles with specific emissions of 210-240 g CO₂/km over the last five years.

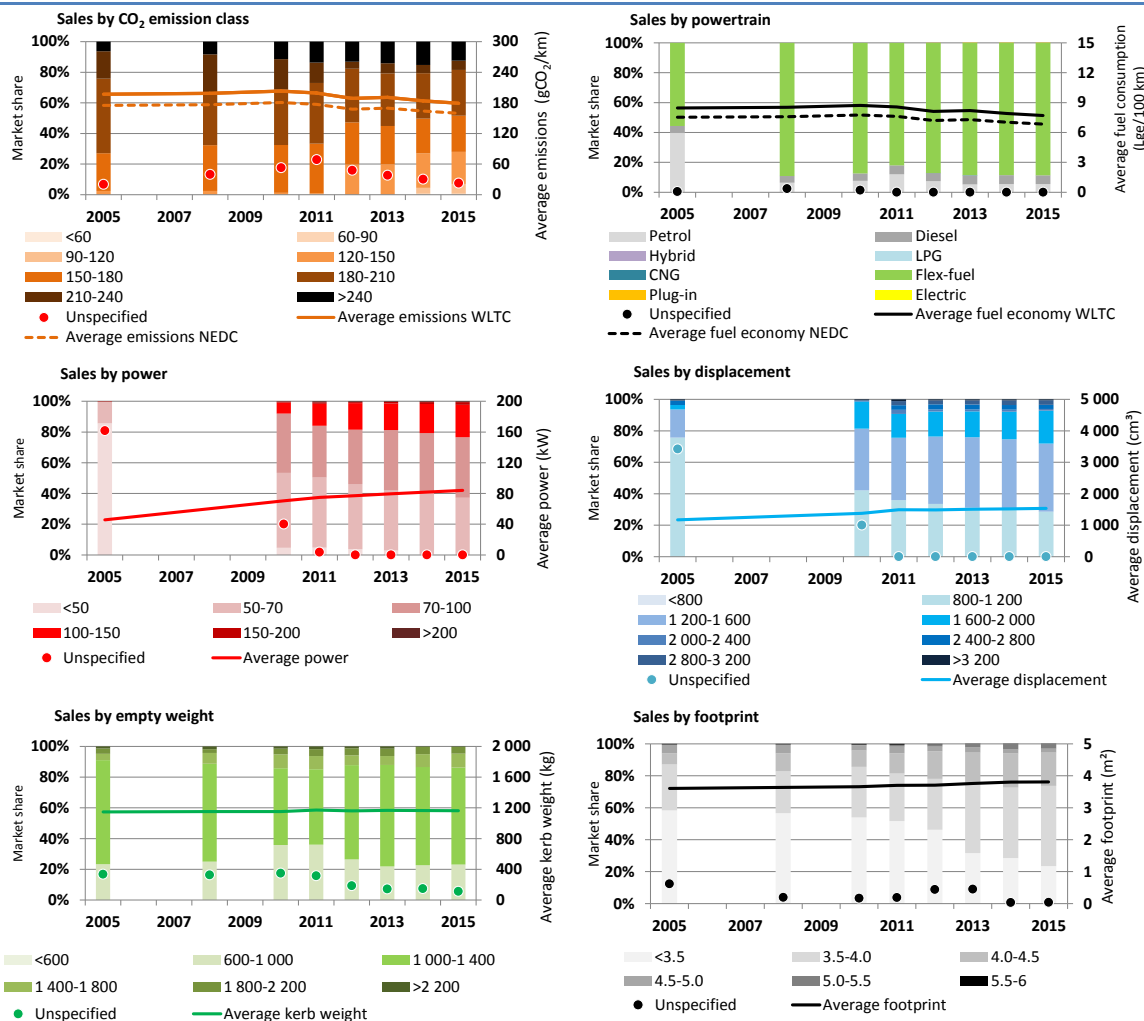
Average fuel economy improved to 7.7 Lge/100 km in 2015, down one percentage point from 2014. Brazil's average fuel economy was still slightly higher than the global average fuel economy of 7.6 Lge/100 km.

Due to the National Alcohol Programme (Proálcool, created in 1975 and enabling the production of ethanol for use as transport fuel from sugarcane), gasoline blended with anhydrous ethanol (with shares between 18% and 27%) is widely available in Brazil. Many vehicles have been produced to allow for blending of hydrous ethanol (also available as transport fuel) in any ratio. Flex-fuel vehicles (i.e. vehicles which are able to use variable shares of gasoline and ethanol) already reached a market share of more than 50% in 2005 (Figure 1, top right). By 2013, their share increased to almost 90%, thanks to almost universal availability across vehicle models. This share remained steady in the subsequent two years.

Between 2013 and 2015, average engine power steadily increased from 80 kW to 84 kW. This was mainly the result of increased sales in the 100-150 kW segment. Overall, the engine power of vehicles sold in Brazil was similar to that of Argentina, but more than 10% lower than for Chile and Mexico.

Engine displacement went down by 3% between 2013 and 2015. This indicates that more power is being generated per litre. The average weight of LDVs declined over these three years and the majority of LDVs weighed between 1 000 kg and 1 400 kg. The average footprint remained relatively unchanged, but between 2013 and 2015 the share of newly registered vehicles with a footprint of less than 3.5 m² fell, which led to a small increase towards 4 m².

Figure 1 • LDV market by g CO₂/km, powertrain, power, displacement, weight and footprint, Brazil, 2005-15

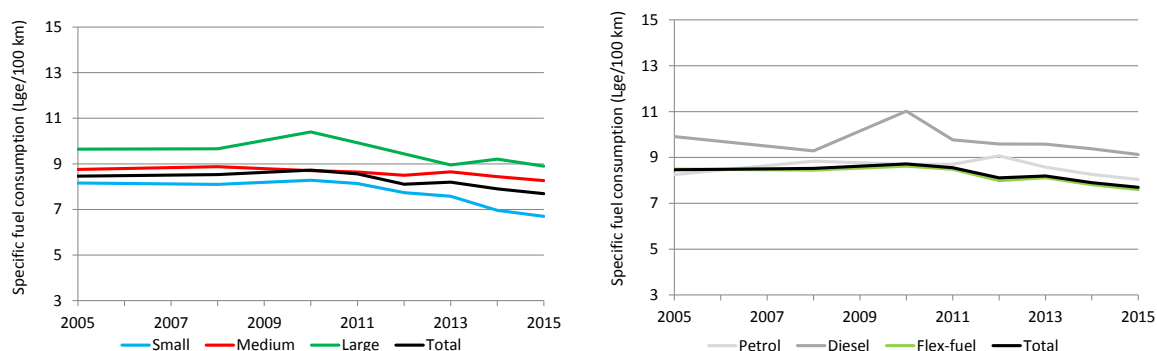


Source: IEA elaboration and enhancement for broader coverage of IHS Markit database.

Analysis of fuel economy trends

Between 2010 and 2015, Brazil’s sales-weighted average fuel economy improved slightly, reaching 7.7 Lge/100 km in 2015 (Figure 2). The fuel economy trend within the large vehicle segment fluctuated significantly over the same period, while newly registered small LDVs experienced a stable decline in specific fuel consumption to less than 7.0 Lge/100 km. Diesel LDVs experienced a steep improvement in average fuel economy between 2012 and 2014, reaching similar fuel economy levels in 2015 as those observed in 2008. Diesel LDVs had higher specific fuel consumption compared with gasoline LDVs, due to the fact that diesels are almost exclusively sold in the large segment, a pattern also observed in other emerging economies.

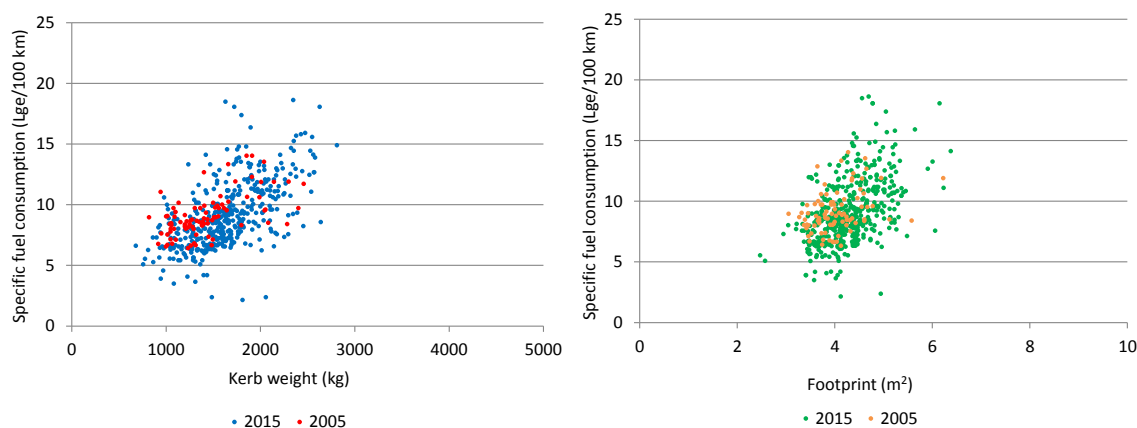
This summary is taken from GFEI Working Paper 15. For more complete information and references, see <https://www.globalfuelconomy.org/data-and-research/publications/gfei-working-paper-15>

Figure 2 • Average new LDV fuel consumption per km by vehicle segment and powertrain, 2005-15

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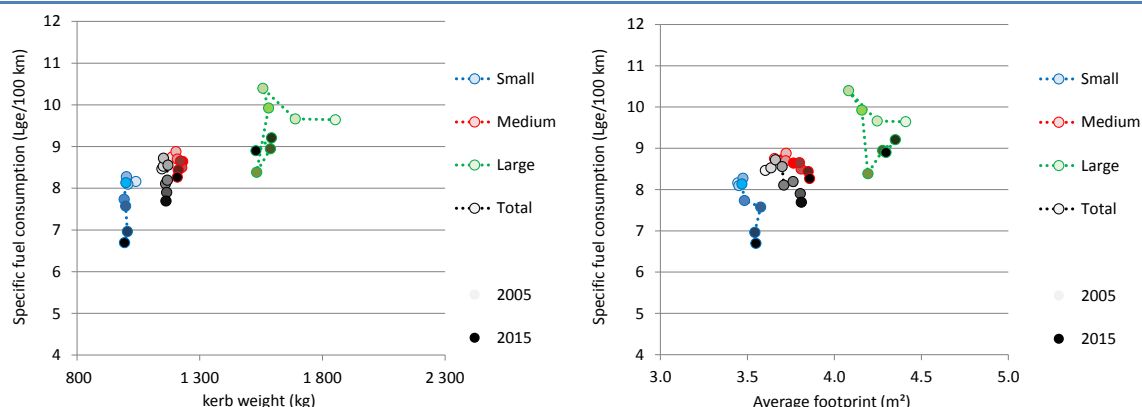
Source: IEA elaboration and enhancement for broader coverage of IHS Markit database.

On the metrics of vehicle weight and average fuel economy, the range of variability in new models increased in 2015 as compared with 2005 (Figure 3, left). Overall, a small shift to the right implies that new LDVs increased in weight, but overall were slightly more fuel efficient. The right-hand side of Figure 3 similarly shows more variability in the footprint of models sold in 2015 compared with 2005; however, the average fuel economy remained relatively stable.

Figure 3 • Fuel consumption per km of new LDVs plotted against vehicle weight and footprint, Brazil, 2005 and 2015

Source: IEA elaboration and enhancement for broader coverage of IHS Markit database.

Large cars became lighter and more efficient between 2005 and 2012 (Figure 4), followed by fluctuations in fuel economy despite a steady average weight. Newly registered vehicles in other size classes had stable average weight and improving fuel economy in recent years. Total average fuel economy was mostly driven by trends in small and medium LDVs. A similar trend holds for vehicle footprints (Figure 4). The fuel economy improvement in the small and medium vehicle segment in the past few years suggests that the LDV regulations adopted in 2012 have primarily affected small and medium LDVs.

Figure 4 • Average new LDV fuel consumption per km by segment plotted against vehicle weight and footprint, Brazil, 2005-15

Source: IEA elaboration and enhancement for broader coverage of IHS Markit database.

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