

China

Country spotlight

Population (million) (World Bank, 2016a):	1 371
Urban population (% of total) (World Bank, 2016b):	56%
GDP per capita (2014 USD/year) (World Bank, 2016c):	8 000
Average price gasoline and diesel (USD cent per L, 2014) (GIZ, 2015):	117; 109
Fuel tax class (2014) (GIZ, 2015):	taxed petroleum fuels

Page | 1

In 2015, more than 22 million LDVs were sold in China (IHS Markit, 2016), consolidating its status as the world's largest car market. China's on-road LDV stock reached about 142 million cars in the same year, and China's LDV ownership averaged 0.10 LDVs per capita (IEA, 2016a). Fuel economy regulations for passenger cars were first introduced in 2005. During Phases I and II individual models were required to meet specific thresholds, which were differentiated on the basis of vehicle weight. Corporate average fuel consumption (CAFC) targets were established with the introduction of Phase III (2012-15). Phase IV, which took effect on 1 January 2016, targets a new sales fleet average specific fuel consumption of 5 Lge/100 km (based on the NEDC; this would correspond to 5.6 Lge/100 km using the WLTC) by 2020 if all manufacturers are able to meet their specific CAFC targets (TransportPolicy, 2016). Flexibility schemes allow for highly efficient cars (battery electric vehicle [BEV]/plug-in hybrid electric vehicle [PHEV]) to be counted multiple times per vehicle when calculating the CAFC values. LCVs are subject to standards that differ both by target value and compliance structure; individual LCV models are still subject to fuel consumption targets (TransportPolicy, 2016). Labels showing fuel economy, fuel type, rated power and empty weight, among other information, were made mandatory for passenger cars in 2009 (ICCT, 2014c).

Market profile and vehicle characteristics

China is the largest LDV market in the world. In 2015, LDV sales grew by almost 8% on a yearly basis to 22 million vehicles. In the same year, China produced 22.9 million LDVs, which also makes it the world's largest LDV producer (OICA, 2016). More than half of the LDVs sold come from joint ventures with foreign car manufacturers, such as FAW-Volkswagen, Hyundai-Beijing, Shanghai-General Motors, etc.

The average specific CO₂ emissions of Chinese new vehicle sales have been decreasing steadily since 2010. Between 2010 and 2015, sales shares of newly registered LDVs that emit more than 210 g CO₂/km shrank and vehicles with slightly better emissions per km, in the 150-180 g CO₂/km range, saw rapidly growing market shares. The average fuel economy of new Chinese LDVs gradually improved from 8.5 Lge/100 km in 2013 to 8.1 Lge/100 km in 2015, which is 10% higher than the worldwide average.

In 2015, gasoline engines dominated the Chinese market, representing almost 95% of new LDV registrations. Record sales of electric vehicles resulted in a 1% market share in 2015.

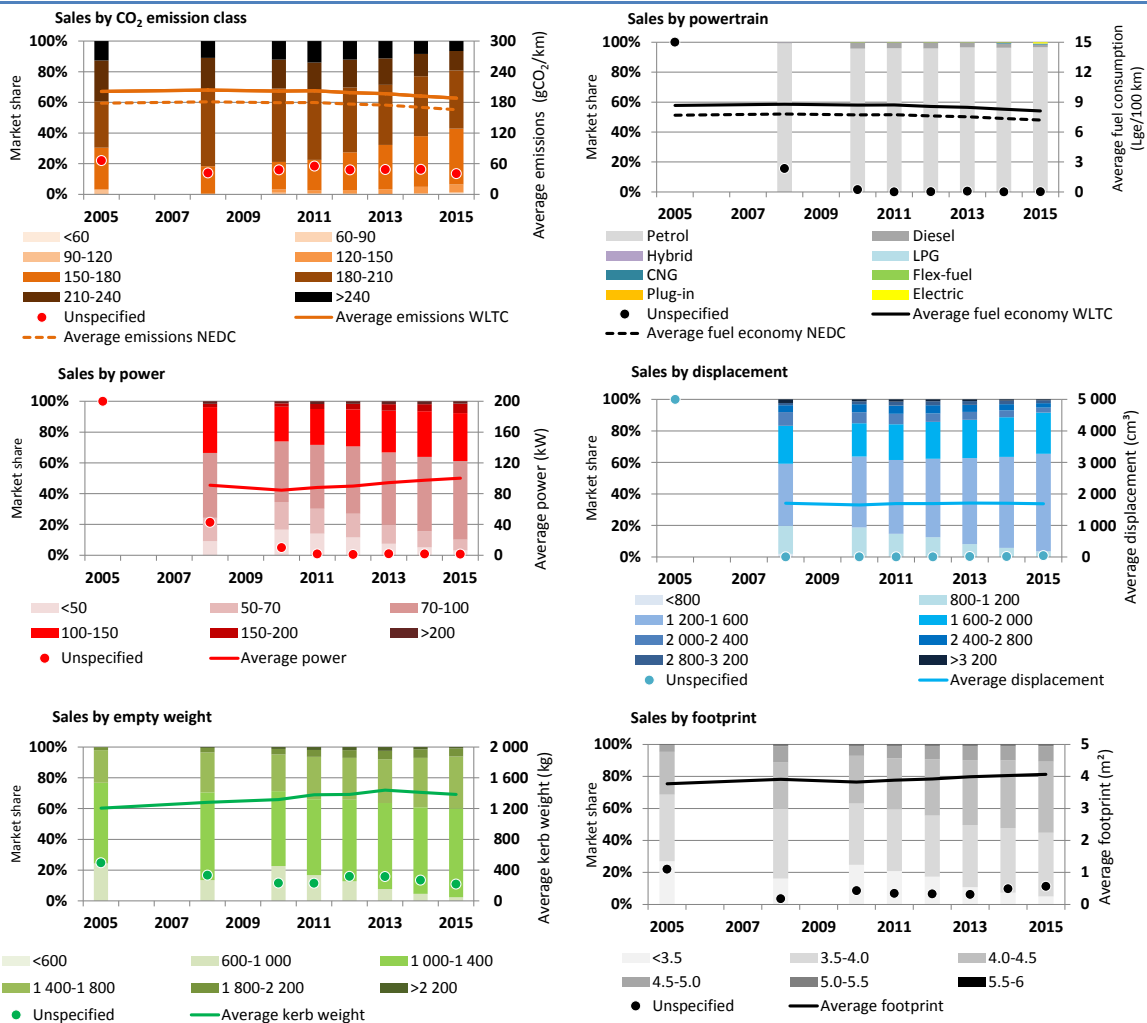
Engine power has grown steadily since 2010, but a slowdown was noticed between 2013 and 2015. Nevertheless, the average engine power of newly registered vehicles has surpassed 100 kW in 2015, similar to Germany. Vehicles with a power rating in the 100-150 kW range experienced the largest growth in market share. Between 2013 and 2015, engine displacement was almost static. The Chinese LDV market shares of vehicles with the smallest and largest engines have been decreasing until 2015, leading to reduced variability in engine size.

During the period 2013-15, the average weight of newly registered vehicles decreased by almost 4%. This trend is the reverse of that observed for 2005-13. The evolution of the average footprint of newly registered LDVs went in the opposite direction: it grew by 6% between 2010 and 2015. New

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

registrations of LDVs of less than 3.5 m² dropped by 80%, showing clear signals that Chinese car buyers prefer larger vehicles as higher incomes allow.

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

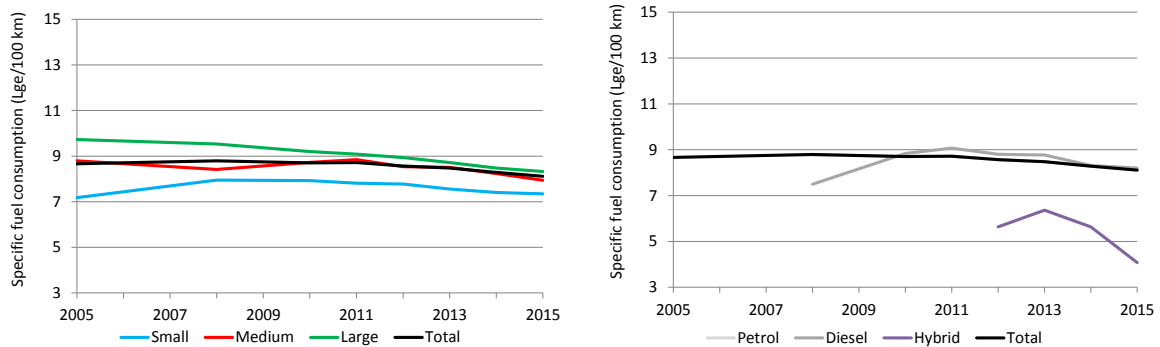


Source: IEA elaboration and enhancement for broader coverage of IHS Markit database.

Analysis of fuel economy trends

Specific fuel consumption first grew from 2005-2008, then declined thereafter to 2015 (Figure 2). The gap between the fuel economy of medium and large LDVs narrowed between 2010 and 2015 compared with earlier years. Between 2013 and 2015, the average fuel economy of small LDVs improved at a slower rate than in previous years. The average fuel economy of conventionally-powered LDVs was very similar across the different powertrains. The years after 2013 show a steep improving trend in hybrid fuel economy.

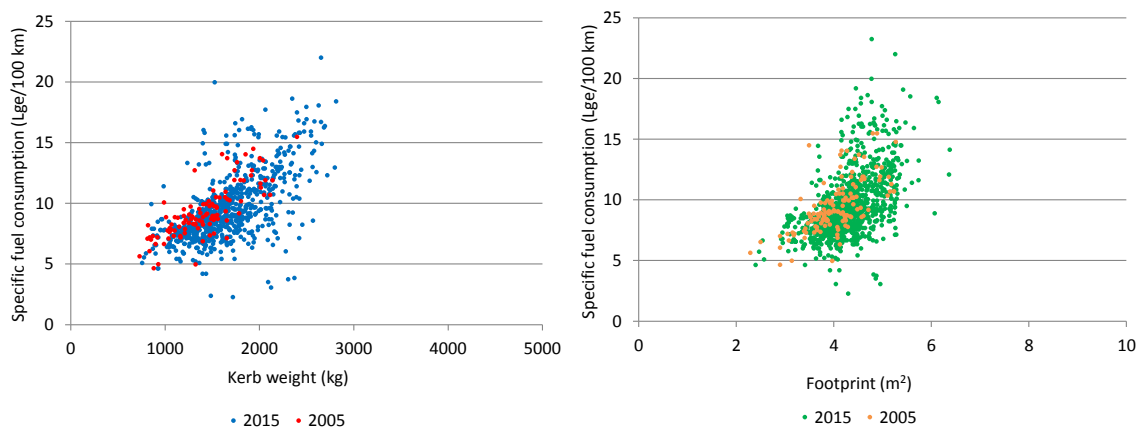
Figure 2 • Average new LDV fuel consumption per km by vehicle segment and powertrain, China, 2005-15



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

The availability of models increased in 2015 compared to 2005 and 2013 (IEA, 2016a), spreading out across the weight and footprint spectrum, with a much wider range of models offered in 2014 and 2015 having better fuel economy than in 2013.

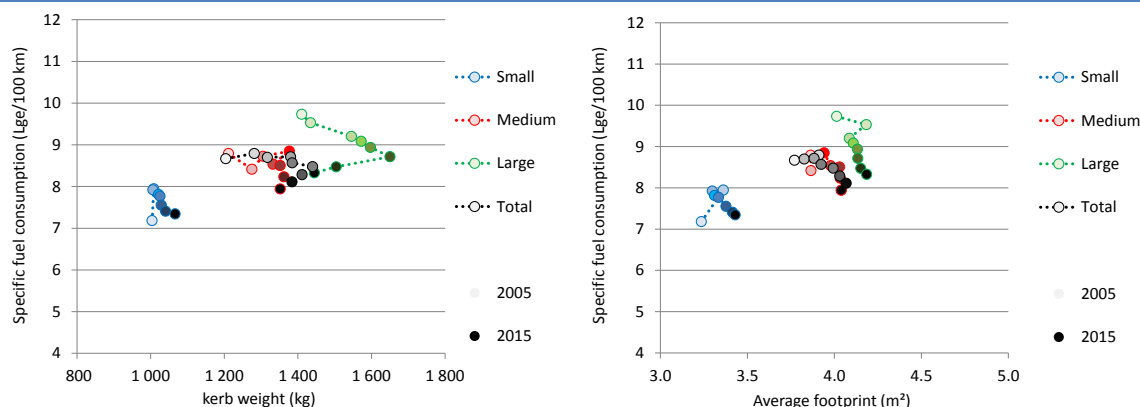
Figure 3 • Fuel consumption per km of new LDVs plotted against vehicle weight and footprint, China, 2005 and 2015



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

Comparing average weight with average fuel economy, the large segment showed the most erratic trends from year to year (Figure 4). After steady weight growth between 2008 and 2012, the average weight of new large LDVs fell by almost 15% in just two years. This is consistent with the tightening of compliance of fuel economy standards that occurred in 2015. The average weight of small and medium LDVs has increased from 2005-2015, but the weight increase of medium vehicles stopped in the last years, and their fuel economy has begun to improve. Footprint showed similar developments to weight, but with less volatility.

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



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

References

- GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit) (2015), *International Fuel Prices 2014 – Data Preview*, www.giz.de/expertise/downloads/giz-2015-en-ifp2014.pdf.
- ICCT (2014c), *A review and evaluation of vehicle fuel efficiency labeling and consumer information programs*, www.theicct.org/sites/default/files/publications/VFEL%20paper%20ICCT_%20for%20APEC%20-%202012%20Nov%202015%20FINAL.pdf.
- IEA (International Energy Agency) (2016a), “Technology and policy drivers of the fuel economy of new light-duty vehicles: comparative analysis across selected automotive markets”, GFEI Working paper 12, OECD/IEA, Paris, www.globalfueleconomy.org/data-and-research/publications/gfei-working-paper-12.
- IHS Markit (2016), *Vehicle Registrations and Other Characteristics at Model Level* (database), IHS Markit.
- OICA (International Organization of Motor Vehicle Manufacturers) (2016), *World Motor Vehicle Production*, www.oica.net/category/production-statistics.
- TransportPolicy (2016), *Fuel Efficiency and GHG*, http://transportpolicy.net/index.php?title=Category:Fuel_Efficiency_and_GHG.
- World Bank (2016a), *World Bank Open Data, World Development Indicators: Population Dynamics*, <http://databank.worldbank.org/data/reports.aspx?source=health-nutrition-and-population-statistics>.
- World Bank (2016b), *World Bank Open Data, Urban population (% of total)*, <http://databank.worldbank.org/data/reports.aspx?source=health-nutrition-and-population-statistics>.
- World Bank (2016c), *World Bank Open Data, GDP per capita (current USD)*, http://databank.worldbank.org/data/reports.aspx?Code=NY.GDP.PCAP.CD&id=af3ce82b&report_name=Popular_indicators&populartype=series.

