This section contains information and statistics relating to the PRC, North America, Europe and Japan, as well as the Chinese automotive engine industry, in which we operate. Certain information and statistics set out in this section have been extracted from various government publications, market data providers and other independent third-party sources. Except for the Frost & Sullivan Report referred to below which was commissioned by the Company, neither our Group, its connected persons, the Joint Global Coordinators, the Sole Sponsor, the Joint Bookrunners, the Joint Lead Managers, the Underwriters, nor any other party involved in the Global Offering has commissioned any such third-party sources. We believe that these sources are appropriate sources for such information and statistics and have taken reasonable care in extracting and reproducing such information and statistics. We have no reason to believe that such information and statistics are false or misleading or that any material fact has been omitted that would render such information and statistics false or misleading. The information in this section has not been independently verified by us, the Joint Global Coordinators, the Sole Sponsor, the Joint Bookrunners, the Joint Lead Managers, the Underwriters or any other party involved in the Global Offering and no representation is given as to its accuracy, completeness or fairness.

Certain information and statistics are extracted from an industry report prepared by Frost & Sullivan, dated February 22, 2013 (the "Frost & Sullivan Report"), which we commissioned. The information and statistics extracted from the Frost & Sullivan Report reflects an estimate of market conditions based on Frost & Sullivan's research and analysis. The information and statistics extracted from the Frost & Sullivan Report should not be viewed as a basis for investments provided by Frost & Sullivan and references to the Frost & Sullivan Report should not be considered as Frost & Sullivan's opinion as to the value of any security or the advisability of investing in our Company. The information and statistics may not be consistent with other information and statistics compiled within or outside China. For a discussion of the sources, methodologies, bases and assumptions used in preparation of the Frost & Sullivan Report, see "—Source of Information". For a discussion of risks relating to our industry, see "Risk Factors — Risks Relating to Our Industry" in this prospectus.

SOURCE OF INFORMATION

In connection with the Global Offering, we have engaged Frost & Sullivan to conduct a detailed analysis and prepare an industry report of the automotive engine market in China. We incurred a total of RMB1.4 million in fees and expenses for the preparation of the Frost & Sullivan Report. The payment of such amount was not contingent upon our successful Listing or on the results of the Frost & Sullivan Report. Except for the Frost & Sullivan Report, we did not commission any other report in connection with the Global Offering.

Frost & Sullivan is an independent global market research and consulting company which was founded in 1961 and is based in the United States. Services provided by Frost & Sullivan include market assessments, competitive benchmarking, and strategic and market planning for a variety of industries. We have included certain information from the Frost & Sullivan Report in this prospectus because we believe such information facilitates an understanding of this market for potential investors.

Frost & Sullivan's independent research was undertaken through both primary and secondary research obtained from various sources within China. Primary research involved interviews with leading industry participants including vehicle manufacturers, engine suppliers and related industry experts. Secondary research involved reviewing company reports, independent research reports and data based on Frost & Sullivan's own research database. Projected total market size information in China was obtained from historical data analysis plotted against macroeconomic data as well as specific related industry drivers such as increasing disposable income, the rise of PV and LCV sales

and increasing product diversification mapped against available projected drivers obtained through interviews with industry experts and participants. Frost & Sullivan research may be affected by the accuracy of these assumptions and the choice of these parameters.

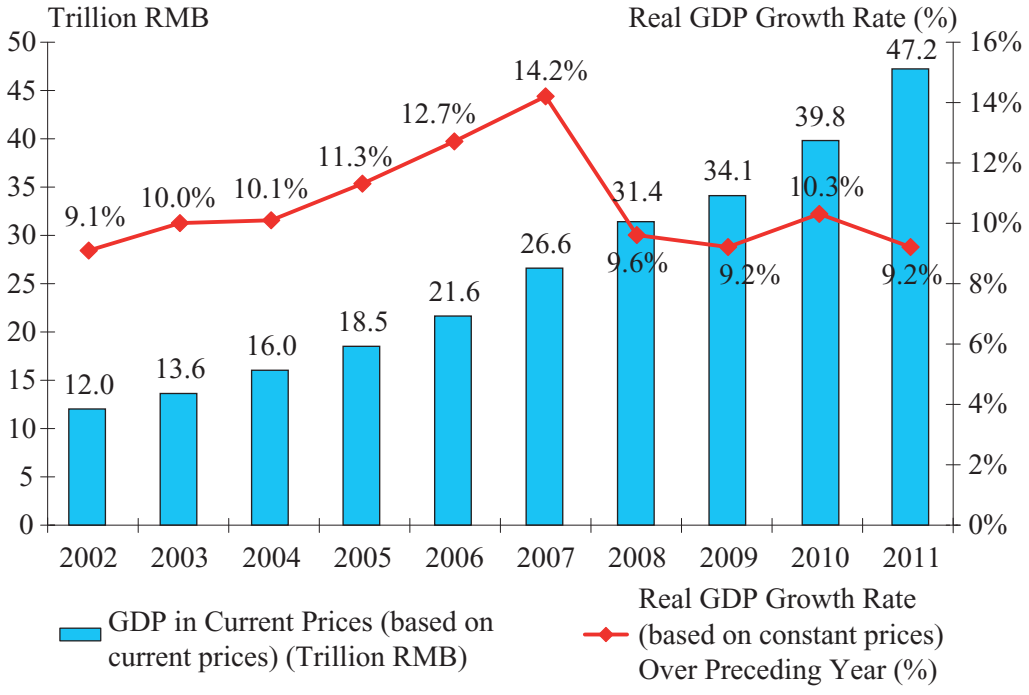
See "Risk Factors — Risks Relating to the Global Offering — There can be no assurance on the accuracy or completeness of certain facts, forecasts and other statistics obtained from various government publications, market data providers and other independent third party sources, including the industry expert report, contained in this prospectus".

OVERVIEW OF THE PRC ECONOMY

PRC economic growth

According to the International Monetary Fund (the "IMF"), China experienced significant economic growth between 2002 and 2011, with real GDP increasing by at least 9% each year, making China one of the fastest growing economies in the world. In 2008, the global financial crisis negatively impacted the PRC's economy. However, the economy began to show signs of recovery and growth in early 2009 in part due to the PRC Government's strong economic stimulus. In 2009, China's real GDP grew 9.2% from 2008, exceeding the PRC Government's 8% target, and it further grew 10.3% in 2010 and 9.2% in 2011. According to the IMF, China's real GDP growth is expected to be 8.2% in 2012 and 8.8% in 2013. Furthermore, according to a speech delivered by China's Premier Wen Jiaobao at the annual meeting of the National People's Congress in Beijing on March 5, 2012, China's GDP growth is targeted at 7.5% for the year 2012. According to the 12th Five-Year Plan for National Economy and Social Development (《國民經濟和社會發展第十二個五年規劃》) (the "12th Five-Year Plan"), the PRC Government expects to achieve an average of 7.0% annual GDP growth during the period from 2011 to 2015. The following chart illustrates China's real GDP growth from 2002 to 2011:

China's real GDP growth from 2002 to 2011

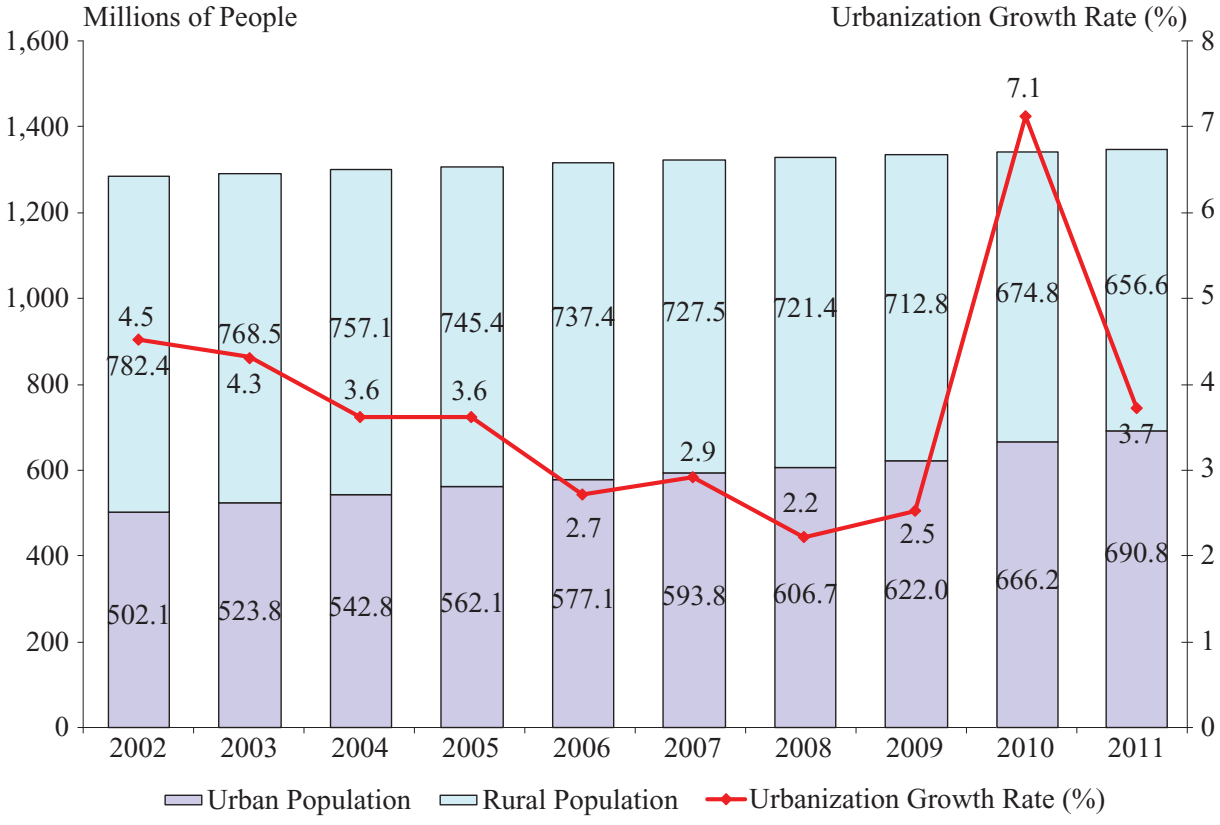


Sources: International Monetary Fund, World Economic Outlook Database, April 2012; National Bureau of Statistics of China

PRC population growth and urbanization

In China, the industrialization process has accelerated urbanization through the migration of rural populations towards urban areas and the transformation of towns into cities or districts. In recent years, China has undergone a significant urbanization process. According to the National Bureau of Statistics of China, the total population in China increased by approximately 62.9 million, or approximately 4.9% from 2002 to 2011, while the urban population in China increased by approximately 188.7 million or approximately 37.6% from 2002 to 2011. In 2011, the total urban population reached 690.8 million, representing approximately 51.3% of the total population of 1,347.4 million in China. The trend of urbanization, along with the large population base, is anticipated to create an attractive consumer group both in terms of size and purchasing power. The following chart illustrates the historical rural and urban population, and the urbanization growth rate in China from 2002 to 2011:

China's rural and urban population from 2002 to 2011



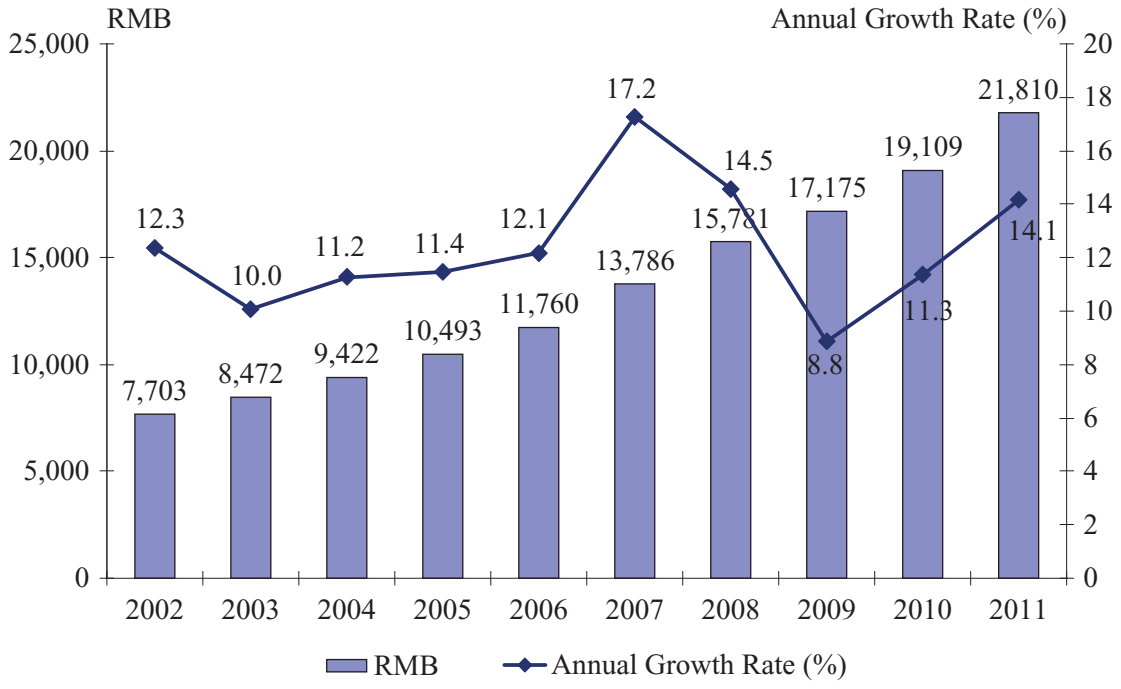
Source: National Bureau of Statistics of China

Disposable income growth of urban and rural households

With the rapid growth of the PRC economy, income levels of urban and rural households have increased and their living standards have improved. According to the National Bureau of Statistics of China, the per capita annual disposable income of urban households in China increased at a CAGR of 12.3% from approximately RMB7,703 in 2002 to RMB21,810 in 2011. In addition, the per capita annual net income of rural households in China also increased at a CAGR of 12.2% from approximately RMB2,476 in 2002 to RMB6,977 in 2011. The following charts set forth the historical

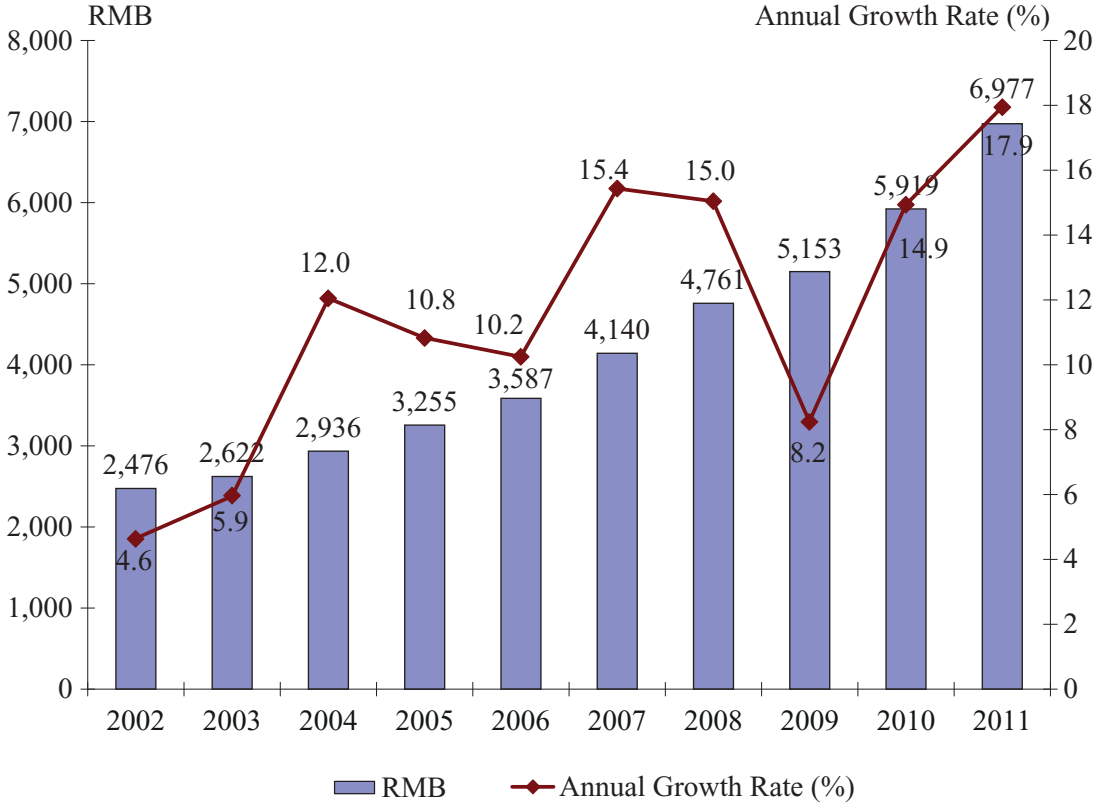
per capita annual disposable income of urban households and per capita annual net income of rural households in China from 2002 to 2011:

China's per capita annual disposable income of urban households from 2002 to 2011



Source: National Bureau of Statistics of China

China's per capita annual net income of rural households from 2002 to 2011

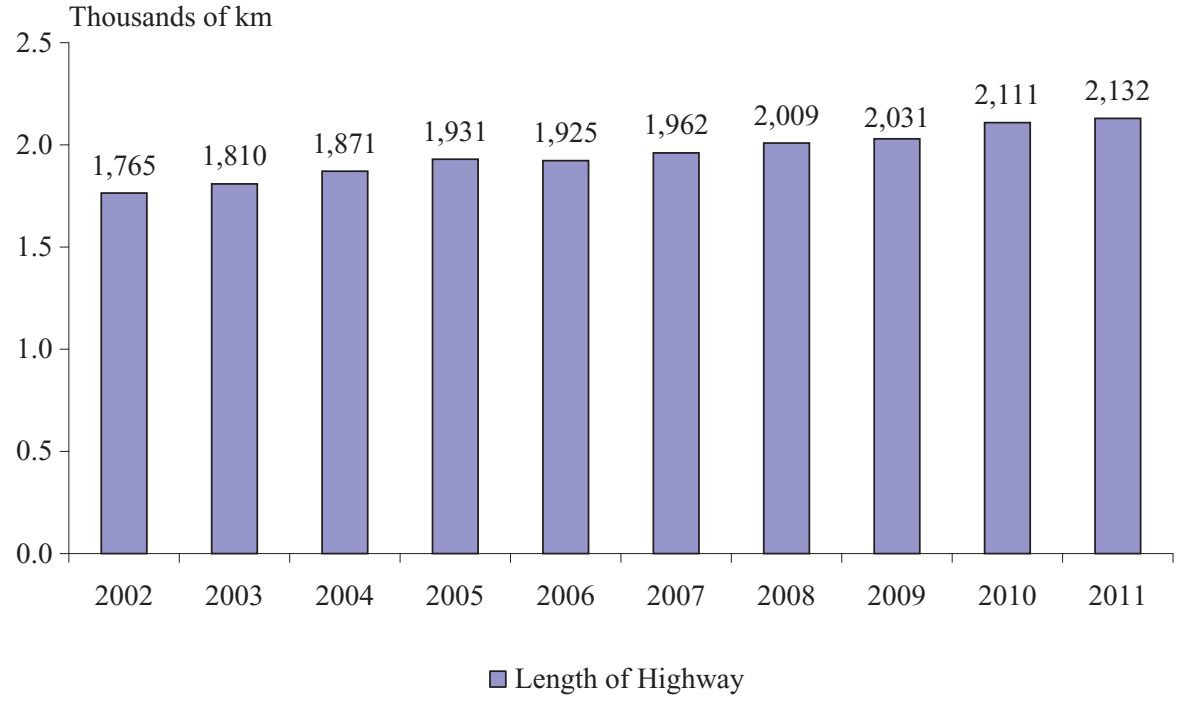


Source: National Bureau of Statistics of China

China's highway and passenger traffic growth

Since China's adoption of economic reforms in 1978, rapid economic growth and significant infrastructure spending have led to the rapid expansion of modern highways and expressways in China. According to the National Bureau of Statistics of China, by the end of 2011, China had approximately 4.1 million kilometers of highways, including paved country roads that met PRC national or provincial standards, and approximately 84,900 kilometers of expressways connecting major cities. In addition to the expansion of highways and expressways, according to the PRC Government's Planning for Technical Development of Highway and Waterway Transportation set forth in the "12th Five-Year Plan", China expects to construct or re-construct roads in rural areas to reach 3.9 million kilometers by the end of 2015. The following chart illustrates the length of China's highways from 2002 to 2011, excluding the length of country roads:

Length of China's highways from 2002 to 2011(1)

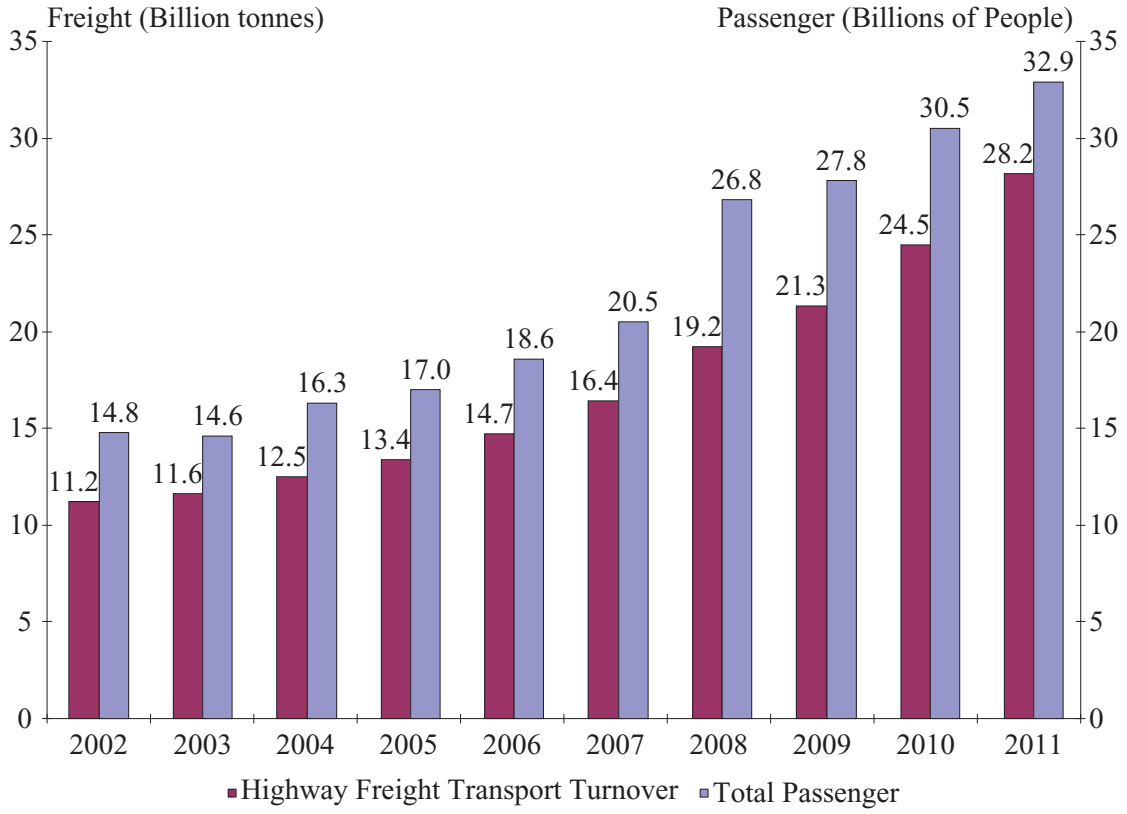


(1) The length of China's highways excluded the length of country roads.

Source: Ministry of Transportation of China

The continuous efforts by the PRC Government to expand its road transportation network, the increasing disposable income of urban and rural households and the increasing domestic commerce have, in turn, contributed to increased highway freight and passenger traffic in China. The following chart illustrates the highway freight transport turnover and number of total passengers in China from 2002 to 2011:

China's highway freight transport turnover and number of total passengers from 2002 to 2011



Source: Ministry of Transportation of China

OVERVIEW OF THE PRC PV AND LCV MARKET

The PRC automotive industry policies and regulations

In 2009, the State Council introduced the Restructuring and Rejuvenation Programme of the Automotive Industry (《汽車產業調整和振興規劃》), which lays out certain important means to encourage the growth and development of the automotive industry in China. The major measures of the plan include: (i) encouraging the expansion of major automotive companies through mergers and acquisitions; (ii) earmarking US$1.5 billion as a special fund to support automotive companies to upgrade their technologies and produce "new energy vehicles" and for related component development; (iii) supporting the development of "self-owned" automotive brands; and (iv) encouraging and driving automotive vehicle market growth and sales. Among others, the following policies and regulations introduced by the PRC Government have been, and some continue to be, particularly favorable to the PV and LCV markets:

- *Fuel tax reform that benefits small and compact vehicles*

  The PRC Government has started a reform to adjust the fuel tax and oil price in China in order to promote energy savings and emission reductions. According to the Notice of the

State Council on Implementing the Oil Price and Tax Reform (《國務院關於實施成品油價格和稅費改革的通知》), which came into effect on January 1, 2009, gasoline tax increased from RMB0.2 per liter to RMB1 per liter, and diesel tax increased from RMB0.1 per liter to RMB0.8 per liter, and at the same time, six categories of tolls for road maintenance and management were removed. As a result, vehicles with high fuel consumption and emission will incur higher taxes than vehicles with low fuel consumption and emission.

- *Purchase tax reform and subsidies for vehicles with low engine displacement*

  The vehicle purchase tax in China was reduced from 7.5% to 5% for consumers who purchased passenger cars with displacements of 1.6L or below from January 20, 2009 to December 31, 2009. Subsequently, the State Council approved an extension of such reduction through December 31, 2010, with the vehicle purchase tax increased to 7.5% in 2010. As a result of the purchase tax relief, the purchase cost for these low engine displacement vehicles decreased, which in turn stimulated the demand for these models. This tax relief program, however, ended in December 2010 and the levy of a 10% vehicle purchase tax resumed at the beginning of 2011.

  Further, pursuant to the Promotion and Implementation Rules on "Energy-saving Products and People-benefiting Projects" regarding Fuel-efficient Vehicles (Passenger Vehicles with Displacement of 1.6 liters or below) (《"節能產品惠民工程"節能汽車(1.6升及以下乘用車)推廣實施細則》) jointly issued by the MOF, NDRC and MIIT on May 26, 2010, gasoline passenger vehicles and diesel passenger vehicles (including hybrid and dual-fuel vehicles) with engine displacements of 1.6L or below and integrated fuel consumption lower than the current standard by approximately 20% are included as recommended products under the "energy-saving products and people-benefiting projects". Customers who purchase these vehicles will receive a one-time subsidy of RMB3,000 per vehicle from the PRC Government through the vehicle manufacturers.

- *Financial subsidies which encourage consumers in rural areas to purchase light vehicles or trade in older cars*

  China adopted the Implementation Rules for Old-for-New Replacement of Automotives (《汽車以舊換新實施辦法》) and the Implementation Scheme for Promoting Purchase of Motor Vehicles and Motorcycles in Rural Areas (《汽車摩托車下鄉實施方案》) to promote the use of minibuses and LCVs. Pursuant to the Operational Rules for the Purchase of Motor Vehicles and Motorcycles in Rural Areas (《汽車摩托車下鄉操作細則》) jointly issued by the MOF with seven other ministries on June 4, 2009, farmers in China who purchased compacts or light trucks or traded in their old vehicles during the period from March 1, 2009 to December 31, 2009 were entitled to subsidies provided by the PRC Government. On December 9, 2009, the State Council decided to extend the period of this subsidy program until the end of 2010. Such measure aimed to stimulate demand and encourage consumption as well as change the consumption structure by promoting vehicle sales in rural areas.

- *Support the development of electric and hybrid vehicles*

  On June 28, 2012, the State Council issued the Plan for the Development of Energy-saving and New Energy Automotive Industry (2012-2020) (《節能與新能源汽車產業發展規劃(2012-2020)》) to encourage the development and manufacture of the energy-saving and new energy automotives. It plans to support the research and development of energy-saving and new energy vehicles such as electric and hybrid cars

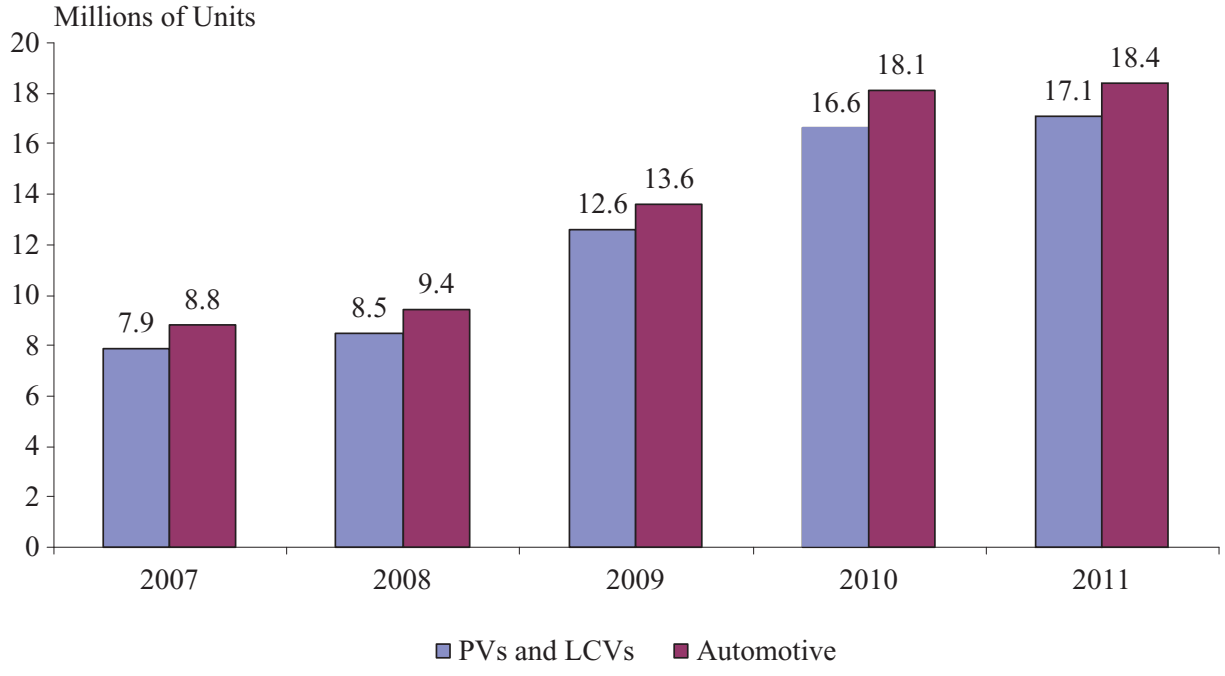
through various government policies and subsidies. It also stresses the need to build an after-sales service network and a charging network for the energy-saving and new energy vehicles. According to this plan, it targets that the cumulative production and sales of pure electric vehicles and plug-in hybrid electric vehicles will reach 500,000 units by 2015 and five million by 2020, and the fuel-consumption level of the energy-saving PVs and LCVs will reach a lower level. It encourages auto manufacturers to master the key technologies of new energy vehicles such as advance internal combustion engine and hybrid system integration, and form a group of competitive local new energy automotive companies.

In addition, according to the Regulation on the Implementation of the Vehicle and Vessel Tax Law of the PRC (《中華人民共和國車船稅法實施條例》) which became effective on January 1, 2012, energy-saving and new energy vehicles and vessels may enjoy reduction or exemption of the vehicle and vessel tax.

For a discussion of certain uncertainties with respect to the PRC automotive industry policies and regulations, see "Risk Factors — Risks Relating to Our Industry — Changes in automotive industry policies and regulations may adversely affect our business, financial condition and results of operations" in this prospectus. For a more comprehensive list of the automotive industry policies and regulations, see "Regulatory Overview" in this prospectus.

In addition to the development of the economy, the growth in urbanization and increased disposable income, the above policies directly encouraged, and some continue to encourage, the purchase and usage of PVs and LCVs in China. According to the China Association of Automobile Manufacturers, from 2007 to 2011, the unit sales of PVs and LCVs in China experienced a significant increase from an aggregate of 7.9 million units in 2007 to 17.1 million units in 2011. The following chart illustrates the unit sales of PVs and LCVs and overall automotive unit sales in China from 2007 to 2011:

Unit sales of PVs and LCVs, and overall automotive unit sales in China from 2007 to 2011

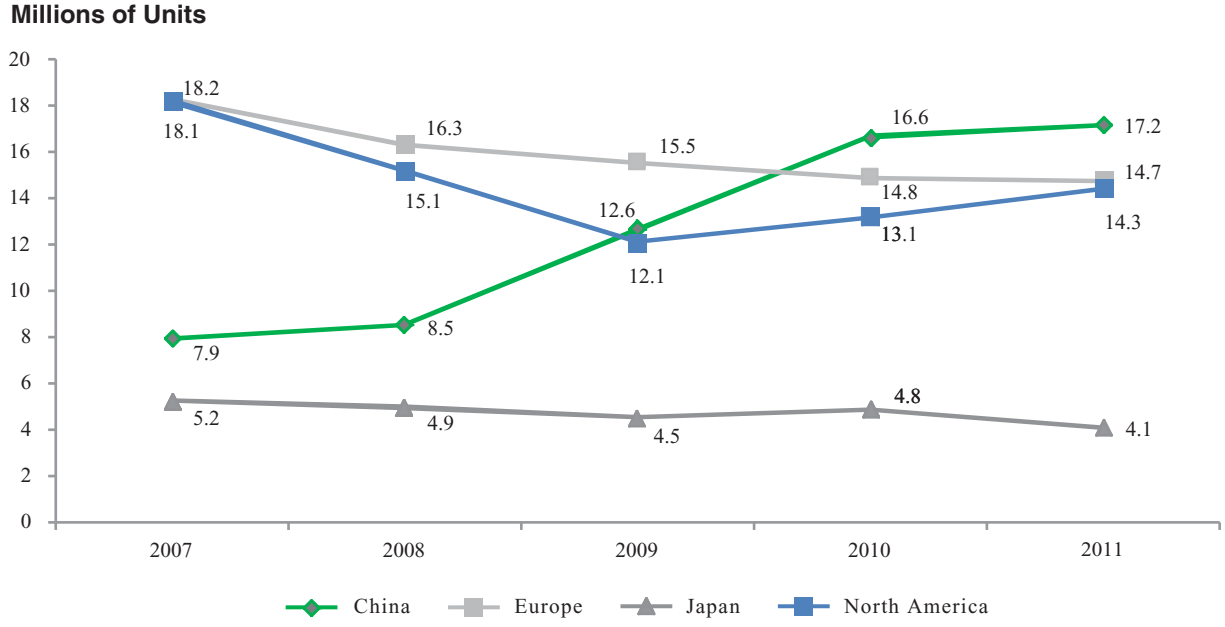


Source: China Association of Automobile Manufacturers; Frost & Sullivan Report

Development and growth of the PV and LCV market in China

According to the Frost & Sullivan Report, the automotive industry in North America, Europe and Japan contracted during 2008 and 2009 and rebounded slightly in 2010. The worldwide economic slump led to a downturn in global automotive production, except in China. China is the only major PV producing country which experienced positive growth in the production volume of PVs in 2009, and continued to grow and outperform North America, Europe and Japan. In 2010, China overtook Europe to become the largest PV and LCV market in the world. The annual unit sales of PVs and LCVs in China increased by approximately 9.3 million units or approximately 117.7% from 2007 to 2011. The following chart illustrates the PV and LCV unit sales in China, Europe, Japan and North America from 2007 to 2011:

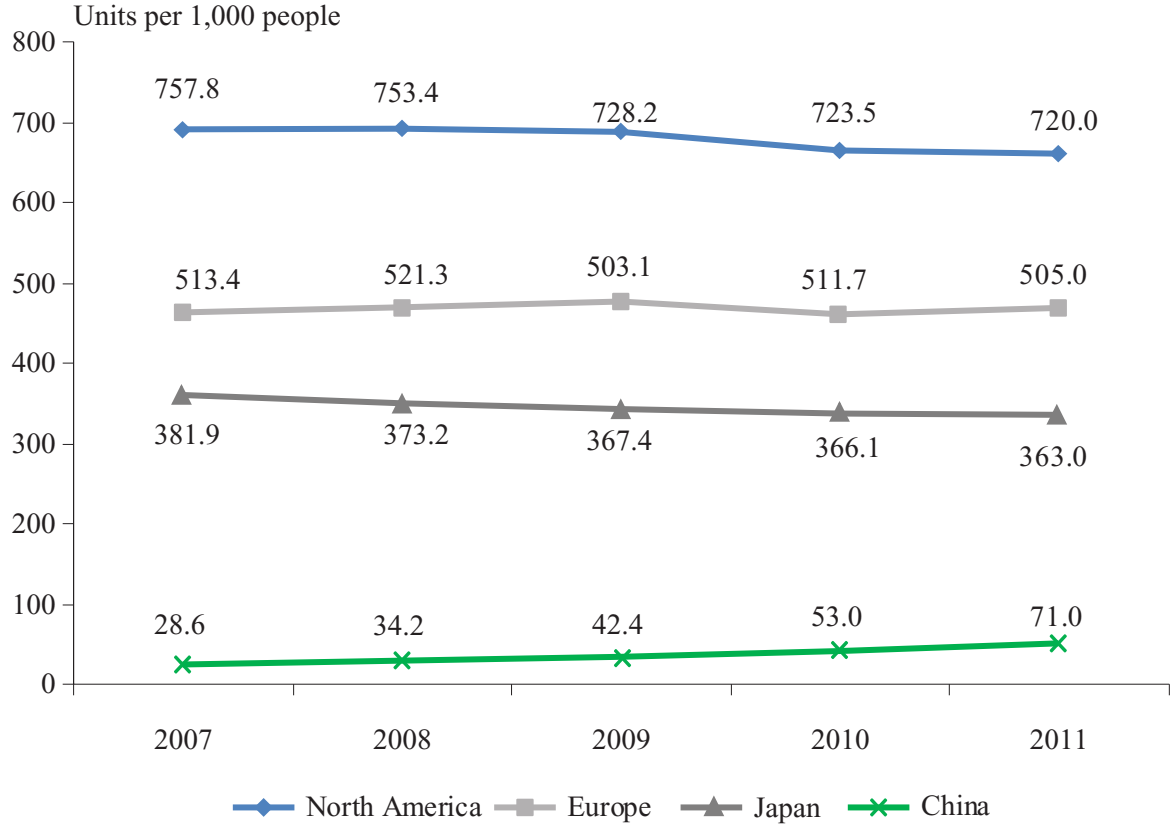
PV and LCV unit sales in China, Europe, Japan and North America from 2007 to 2011



Source: Ministry of Land, Infrastructure, Transport and Tourism of Japan; European Automobile Manufacturers' Association; US Bureau of Transit Statistics; China Association of Automobile Manufacturers; Frost & Sullivan Report

According to the Frost & Sullivan Report, despite the unit sales growth of PVs and LCVs in China since 2008, the PV and LCV unit ownership per capita ratio in China is far behind that of North America, Europe and Japan. In 2011, the PV and LCV unit ownership per capita in China was approximately 10.1 times, 7.1 times and 5.1 times less than that for North America, Europe and Japan, respectively, which indicates the potential for continued growth of China's PV and LCV market. The following chart illustrates the PV and LCV unit ownership per capita in China, Europe, Japan and North America from 2007 to 2011:

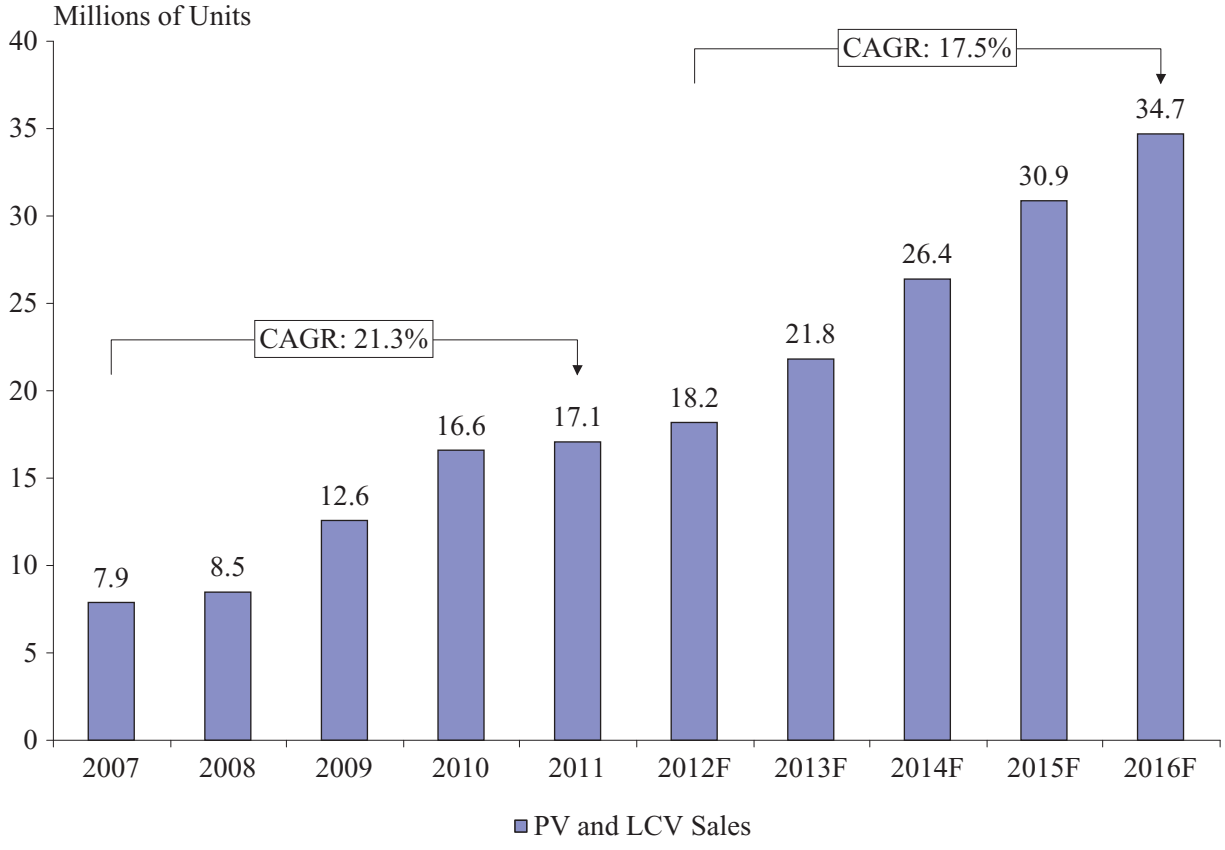
PV and LCV unit ownership per capita in China, Europe, Japan and North America from 2007 to 2011



Source: Ministry of Land, Infrastructure, Transport and Tourism of Japan; European Automobile Manufacturers' Association; US Bureau of Transit Statistics; China Association of Automobile Manufacturers; Frost & Sullivan Report

According to the Frost & Sullivan Report, the PV and LCV sales volume in China experienced rapid growth from 2007 to 2011. In particular, the PV and LCV sales volume increased by 48.2% from 2008 to 2009 and by 31.7% from 2009 to 2010. These growth rates were primarily driven by PRC Government initiatives implemented in 2008, including a RMB4 trillion investment plan to stimulate the slowed economy in China and a package of stimulating policies to encourage the consumption of vehicles. However, these policies also encouraged advanced consumption, which combined with the slowed global economy in 2011, contributed to slower growth in 2011. Beyond 2011, the growth of the Chinese PV and LCV market is expected to continue and annual sales are projected to reach approximately 34.7 million units in 2016. The following chart illustrates the historical sales volume of PVs and LCVs in China from 2007 to 2011 and its forecast from 2012 to 2016:

Historical and forecast PV and LCV sales in China from 2007 to 2016



Source: China Association of Automobile Manufacturers (as to historical figures); Frost & Sullivan Report (as to forecasted figures)

The PRC PV Market Landscape

According to the Frost & Sullivan Report, out of the 17.1 million units of PVs and LCVs sold in China in 2011, 14.5 million units or 84.8%, were PVs. The PRC PV market is relatively consolidated, with the top 20 PV manufacturers accounting for 81.2% of the total PV market in terms of sales volume in 2011. Among the PV manufacturers, the local OEM segment accounted for 30.2% of the total PV market and the foreign-invested OEM segment accounted for 69.8% of the total PV market in terms of sales volume in 2011. In the local OEM segment of the PV market in China, where the OEMs are local automotive manufacturers without foreign shareholders, the top 10 PV manufacturers

accounted for 77.6% of the total local OEM segment of the PV market in terms of sales volume in 2011 in China. Brilliance China Group accounted for 4.5% of the total local OEM segment of the PV market and ranked eighth in terms of sales volume in 2011.

OVERVIEW OF THE PRC PV AND LCV ENGINE MARKET

Independent vs. captive brand engine suppliers

Suppliers of engines to automotive manufacturers can be classified as either independent or captive brands. Independent branded engine suppliers are characterized by their ability to supply unaffiliated automotive manufacturers with engines that retain their own brand independent from the brand of the manufactured vehicle. Furthermore, their engines are designed to adapt to vehicles manufactured by different automotive manufacturers and they generally enjoy more freedom in pricing their engines based on various cost and market factors. Captive brand engine suppliers, on the other hand, generally provide their engines exclusively to affiliated automotive manufacturers, and their engines adopt the same brands as the automotive manufacturers. We are an independent branded engine manufacturer because we are able to supply engines to unaffiliated automotive manufacturers and our engines retain our "XCE 新晨動力" brand rather than the brands of the manufactured vehicles. Our customers include both local OEM and foreign-invested OEMs.

Drivers of the PV and LCV engine markets

According to the Frost & Sullivan Report, there are five major growth drivers of the PV and LCV engine markets in China:

- *The growth in sales of PVs and LCVs is expected to continue to drive the long term demand for engines.*

  As mentioned above, China's PV and LCV sales increased from approximately 7.9 million units in 2007 to 17.1 million units in 2011. The PV and LCV market is expected to maintain stable and strong growth in the coming five years, and annual sales are projected to reach approximately 34.7 million units in 2016. Accordingly, the demand for PV and LCV engines is expected to continue to increase.

- *Rising market share of local manufacturers of PVs encourages the development of local engine manufacturers.*

  The market share of local manufacturers of PVs in China was 28.2% in 2007 and reached 30.2% in 2011. The development of local automotive manufacturers encourages the development of local engine manufacturers, since the local automotive manufacturers generally prefer to source engines from local engine manufacturers compared with global automotive manufacturers who generally prefer to source engines from their captive brand suppliers.

- *Solid and stable raw material supply secures the production of key engine parts.*

  Aluminum and steel are major raw materials essential to the production of key engine parts, such as engine blocks, cylinder heads and pistons. The production of aluminum and steel reached approximately 22 million tonnes and 624 million tonnes, respectively, in China in 2011. In particular, the production of aluminum in China accounted for approximately 44% of global production in 2011. A solid and stable supply of raw material supports the production of key engine parts.

- *The demand from the international market is expected to increase.*

  Compared with engines manufactured in developed markets, such as Japan and the U.S., engines manufactured by Chinese engine manufacturers can be manufactured at a lower cost, which could influence more OEMs to source engines from qualified engine manufacturers in the PRC.

- *The local engine manufacturers are keen to improve their technology.*

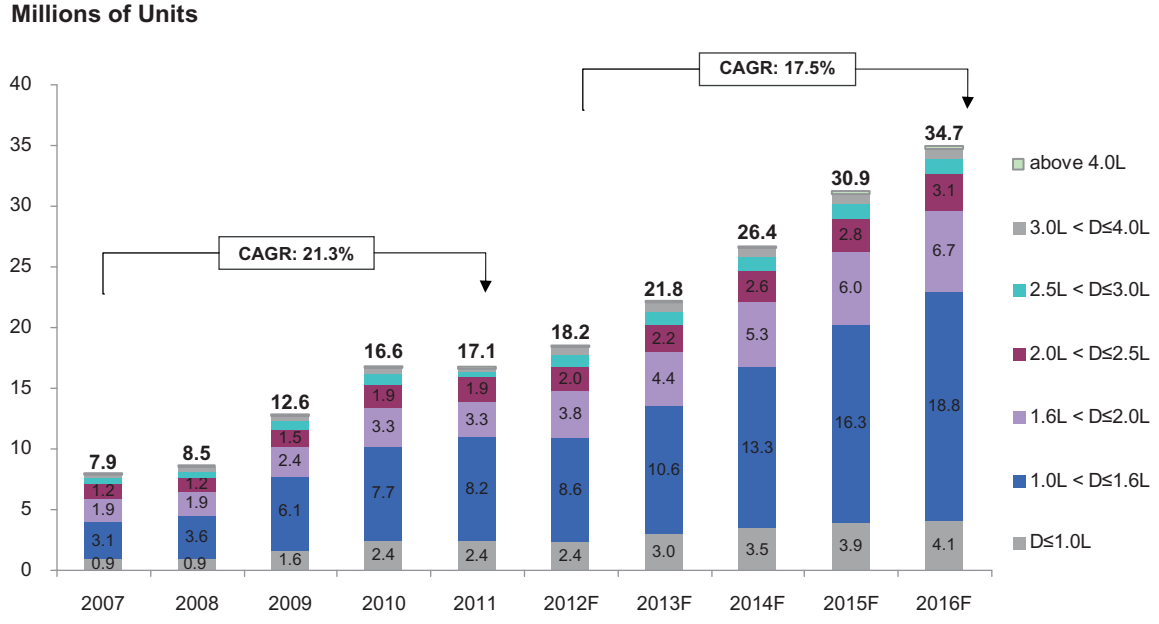
  Driven by higher emission standards issued by the PRC Government and the technical requirements raised by the OEMs, local engine manufacturers need to upgrade their technology through, for example, in-house research and development and external cooperation with overseas automotive manufacturers. Enhanced technologies are expected to better enable them to capture opportunities to enter the supply chains of OEMs in the PRC and overseas markets.

With the above key market drivers, sales of PV and LCV engines in China have increased significantly during recent years. The sales volumes of PV and LCV engines in China were consistent with the sales volumes of PVs and LCVs over the same period, as the replacement volumes and second-hand market sales volumes are negligible, according to the Frost & Sullivan Report.

For a discussion of the risks and uncertainties relating to the PRC automotive and automotive engine industries, see "Risk Factors — Risks Relating to Our Industry".

According to the Frost & Sullivan Report, among the different displacement ranges of PV and LCV engines, engines with a displacement range from 1.0L to 1.6L presented the strongest growth in China during the years 2007 to 2011, followed by engines with a displacement range of less than 1.0L. The following chart illustrates the market trend of the PV and LCV engine market in China by displacement range from 2007 to 2011 and its forecast from 2012 to 2016:

Historical and forecasted market trend of the PV and LCV engine market in China by displacement range from 2007 to 2016



Source: China Association of Automobile Manufacturers (as to historical figures); Frost & Sullivan Report (as to forecasted figures)

Growth trends of gasoline and diesel engines in China

Gasoline and diesel are the most common fuel types for PV and LCV engines. In general, the main differences between gasoline and diesel engine are ignition, compression ratios and fuel delivery.

- A gasoline engine intakes a mixture of gas and air, compresses it and ignites the mixture with a spark, while a diesel engine intakes just air, compresses it and injects fuel into the compressed air. The heat of the compressed air lights the diesel fuel spontaneously.

- A gasoline engine compresses at a ratio of 8:1 to 12:1, while a diesel engine compresses at a ratio of 14:1 to as high as 25:1. The higher compression ratio of the diesel engine results in better fuel efficiency.

- A gasoline engine uses either a carburetor or a fuel injection system to deliver the fuel to the cylinder, while a diesel engine uses direct fuel injection, which means a diesel engine has no spark plug. As such, a diesel engine usually has a simplified fuel injection system structure, which allows it to have a comparatively longer service life than gasoline engine.

Based on existing technologies, the thermal efficiency, measured by how much energy is converted from thermal to kinetic form during the process of fuel burning in engine cylinders, of a diesel engine is better than that of a gasoline engine. However, the main disadvantage of the diesel engine is the higher cost for the treatment of particulate and nitrogen oxide emissions and the PRC market often faces a shortage in the supply of diesel. On the other hand, both the OEMs and engine suppliers have launched mature and low cost technologies for gasoline engine emission treatment and the PRC market has a relatively abundant supply of gasoline.

Several factors expected to influence the growth of gasoline and diesel engine sales in China include:

- the price and the supply of gasoline and diesel fuel;

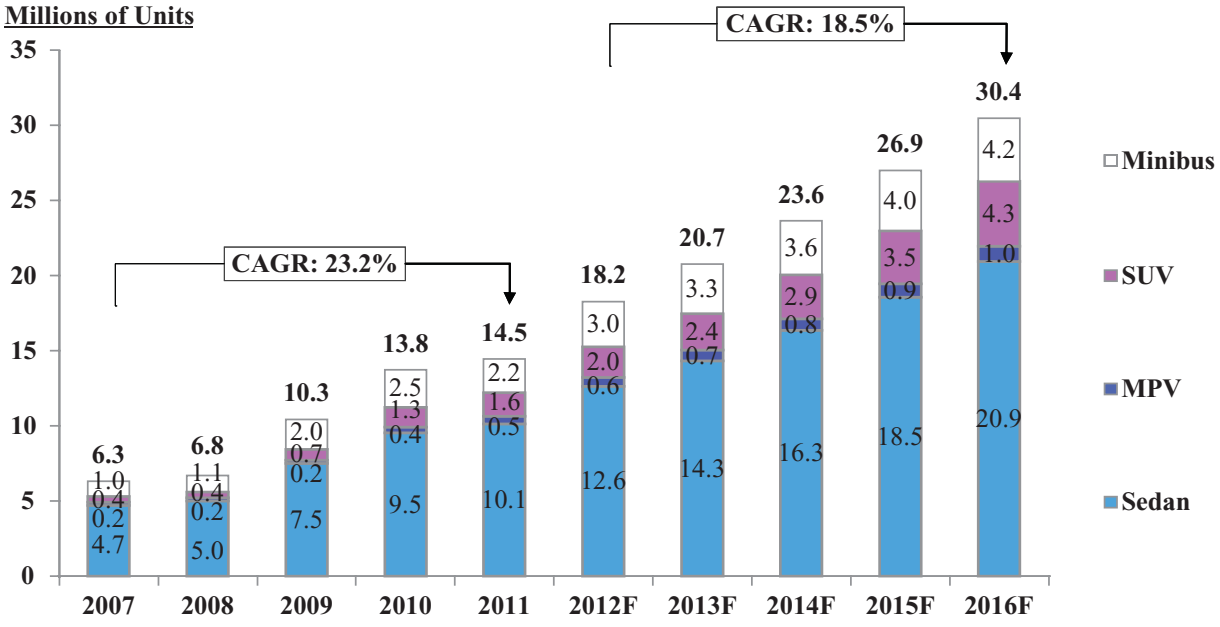
- the innovation and improvement of thermal efficiency for gasoline engines; and

- the cost reduction of the diesel engine emission treatment system.

According to the Frost & Sullivan Report, since 2007, gasoline engines sales in China had a higher growth rate as compared with diesel engines and such trend is expected to continue through 2016. The unit sales of gasoline engines in China increased at a CAGR of 22.0% from 2007 to 2011, while those for diesel engines increased at a CAGR of 15.7% during the same period.

According to the Frost & Sullivan Report, among the different applications of PV engines in China, the engine market for SUVs presented the strongest growth between 2007 to 2011, and its growth is expected to remain the strongest through 2016. The slower growth from 2010 to 2011 is mainly due to the advanced consumption in year 2009 and 2010, which were primarily driven by PRC Government initiatives implemented in 2008, including a RMB4 trillion investment plan to stimulate the slowed economy in China and a package of stimulating policies to encourage the consumption of vehicles. The following chart illustrates the market trend of the PV engine market in China by application from 2007 to 2011, and its forecast from 2012 to 2016:

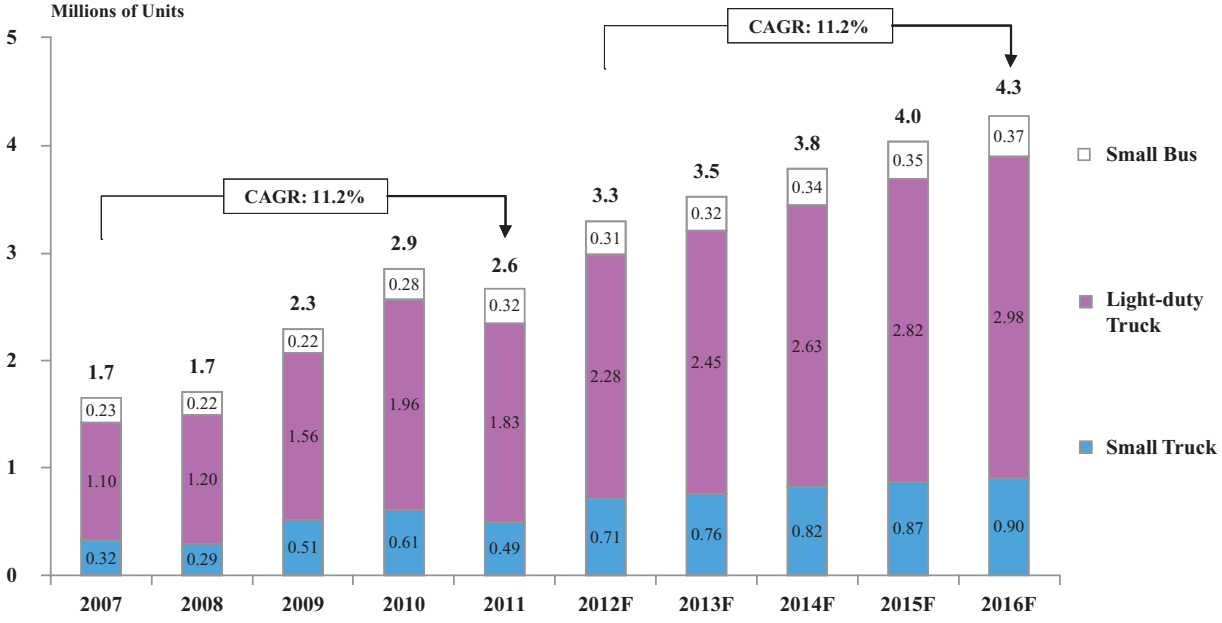
Historical and forecasted market trend of the PV engine market in China by application from 2007 to 2016



Source: China Association of Automobile Manufacturers (as to historical figures); Frost & Sullivan Report (as to forecasted figures)

According to the Frost & Sullivan Report, among the different applications of LCV engines in China, the engine market for light-duty truck presented the strongest growth between 2007 to 2011, and its growth is expected to remain stable through 2016. However, the total sales volume of the LCV engines decreased from 2.9 million units in 2010 to 2.6 million units in 2011. The following chart illustrates the trend of the LCV engine market by application in China from 2007 to 2011, and its forecast from 2012 to 2016:

Historical and forecasted market trend of the LCV engine market in China by application from 2007 to 2016



Source: China Association of Automobile Manufacturers (as to historical figures); Frost & Sullivan Report (as to forecasted figures)

Market trends in the PV and LCV engine markets in China

According to the Frost & Sullivan Report, the market trends in the PV and LCV engine markets in China include:

- *The development of low displacement engines*

  The popularity of small vehicles in China encourages the production of engines with lower displacement volumes. Vehicles with engines with a displacement range from 1.0L to 1.6L presented the strongest growth during 2007 to 2011 in China, followed by vehicles with engines of the next segment from less than 1.0L. These two segments are expected to continue their strong growth and achieve approximately 21.5% and 14.1% CAGR, respectively, from 2012 to 2016.

- *Automotive engine manufacturers face pressure to improve fuel efficiency*

  The automotive industry is engaged in efforts to shift towards developing more environmentally friendly products. The PRC Government has implemented several policies to prompt the development of new energy vehicles so as to lower the country's crude oil consumption. As a result, the traditional internal combustion engine-powered vehicles face pressure to improve fuel efficiency, which contributes to competitive pressure in the automotive engine manufacturing industry.

- *Stricter emission standards affect product development of automotive engines*

  The PRC Government has accelerated steps of introducing the next phase of emission standards for PVs, requiring engine manufacturers to meet much stricter requirements. It is expected that additional policies on emission standards will be introduced into the market in the near future, leading to necessary technology upgrades for automotive engine manufacturers and affecting their product development plans.

- *Engine prices may decrease in the next few years*

  In general, engine prices may decrease in the next few years mainly due to the following reasons: (i) as advanced engine technologies become widely adopted over time, the premium in engine prices caused by the adoption of advanced technologies may gradually disappear; (ii) automotive manufacturers generally demand their engine suppliers to lower the engine prices as part of their own effort of cost control; and (iii) competition between the engine suppliers also causes them to lower the engine prices to stay competitive.

THE COMPETITIVE LANDSCAPE IN THE PRC PV AND LCV ENGINE MARKET

Barriers to entry

According to the Frost & Sullivan Report, the entry barriers for the engine markets in China include:

- *Technology requirements*

  The engine is the key component of an automobile. Engine and component suppliers are expected to have strong research and development capabilities in order to enhance the power output, improve fuel efficiency and ensure that their products comply with the increasingly strict emission standards.

- *Equipment requirements*

  The manufacturers of automotive engines provide both the equipment for production and product testing. During the research and development period, these manufacturers generally need to conduct around ten product tests for each of their engines and components. Accordingly, the adequacy of the manufacturers' equipment is essential to the operation of their businesses.

- *Quality certification requirements*

  Automotive manufacturers usually require engine suppliers to pass certain quality certification standards such as QS9000, VDA6.1 and TS16949, which are awarded by independent third parties. In addition, engine suppliers are normally required to pass quality tests set by the automotive manufacturers. It usually takes around 18 months for an engine supplier to complete the relevant approval process of the automotive manufacturers, after which the supplier would then be listed in the suppliers list of the automotive manufacturers.

- *Customer base*

  Most of the automotive manufacturers can manufacture the engines by themselves, primarily due to the fact that the engine is one of the most important components of a vehicle. Hence, automotive manufacturers generally have limited demand for outsourcing engines from independent branded engine manufacturers. As a result, it is difficult for a new entrant to establish a customer base and business relationship as an independent branded engine manufacturer.

- *Economies of scale*

  Engine manufacturing business is capital intensive. Engine manufacturers need to mass produce to achieve economies of scale in order to lower per unit production costs and to remain competitive. It is hard for a new market entrant, especially independent branded engine manufacturers, to establish scalable production and to achieve economies of scale.

Engine classification

The classification of engines installed on a particular model of vehicle as premium, middle or basic edition can be determined with reference to a combination of various factors including the technology employed, quality of components, raw materials, displacement range and brand awareness. For example, premium edition of an engine, in contrast to basic edition of that engine, is more likely to be made of aluminum rather than iron, uses imported components rather than domestic produced components, employ advance technologies rather than traditional technologies and has a better brand name recognition.

Most of the engine manufacturers have the capability to manufacture a range of engines for a particular vehicle model, from basic to premium editions. However, some of them strategize to focus on manufacturing only premium or basic edition engines, based on their competitive advantages. For example, manufacturers of luxury cars like Mercedes-Benz are more likely to focus on premium engines only, while local independent engine manufacturers tend to focus on middle and basic edition engines.

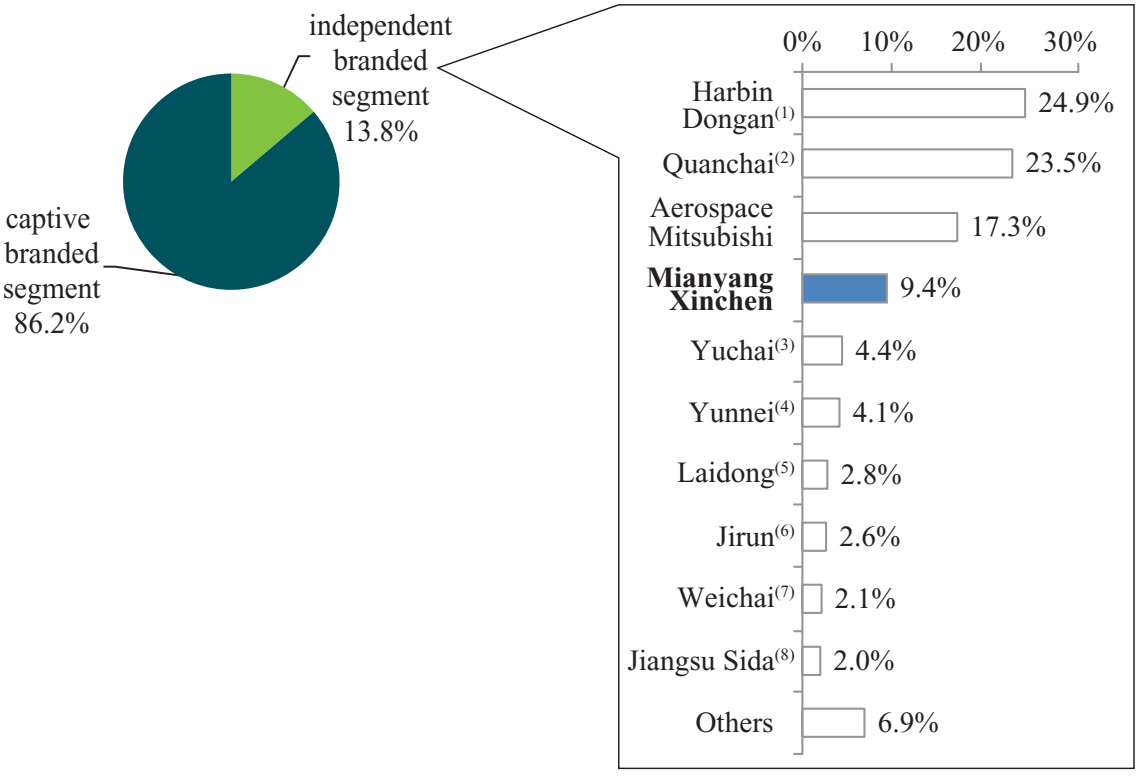
Engine supplier selection process and criteria

According to the Frost & Sullivan Report, typically, during the product development process, the research and development department of an automotive manufacturer will design a vehicle model based on its market positioning strategy and evaluation of the cost structure and functions of the new model. Afterwards, the production planning department will then evaluate the proposals for cost structure made by the research and development department, and together with the procurement department, identify potential suppliers from different pools of suitable system and parts suppliers based on certain criteria, including manufacturing cost, market positioning and final product pricing. As a result, an automotive manufacturer may have different engine supplier pools for the basic edition and premium edition of one automotive series and it will not invite bidding from engine suppliers from different pools at the same time. As such, even within the same displacement range and supplying to the same automotive manufacturers, two engine suppliers may not form direct competition against each other due to the fact that they belong to different pools of suitable engine suppliers.

Competitive landscape

According to the Frost & Sullivan Report, captive brands accounted for approximately 86.2% of the PV and LCV engine market in China in 2011 in terms of sales volume, while independent brands accounted for the remaining approximately 13.8% of this market. The following chart illustrates the estimated share in terms of sales volume in 2011 of the PV and LCV engine market in China by engine manufacturers:

Market shares of independent branded manufacturers in the overall PV and LCV engine market in China in 2011



Source: Frost & Sullivan Report

(1) Harbin Dongan Auto Engine Co. Ltd.* (哈爾濱東安汽車發動機製造有限公司)
(2) Anhui Quanchai Engine Co., Ltd.* (安徽全柴動力股份有限公司)
(3) Yuchai Machinery Co., Ltd.* (廣西玉柴機器股份有限公司)
(4) Kunming Yunnei Power Co., Ltd.* (昆明雲內動力股份有限公司)
(5) Shandong Huayuan Laidong Engine Co. Ltd.* (山東華源萊動內燃機有限公司)
(6) Zhejiang Jirun Automobile Company Limited* (浙江吉潤汽車有限公司)
(7) Weichai Power Co., Ltd* (潍柴動力股份有限公司)
(8) Jiangsu Sida Power Mechanical Group Co., Ltd.* (江蘇四達動力機械集團公司)

The following table illustrates the market positions in terms of sales volume of the top five independent branded manufacturers in the overall PV and LCV engine market in China by displacement in 2011:

Market positions of top five independent branded manufacturers in the overall PV and LCV engine market in China by displacement range in 2011

Rank	D ≤ 1.0L	1.0L < D ≤ 1.6L	1.6L < D ≤ 2.0L	2.0L < D ≤ 2.5L	2.5L < D ≤ 3.0L	3.0L < D ≤ 4.0L	Above 4.0L
1	Harbin Dongan	Harbin Dongan	Aerospace Mitsubishi	Quanchai	Quanchai	Quanchai	Yuchai
2	**Mianyang Xinchen**	Aerospace Mitsubishi	Quanchai	Aerospace Mitsubishi	Yunnei	Yunnei	Quanchai
3	Jilin Liuji[(1)]	**Mianyang Xinchen**	**Mianyang Xinchen**	**Mianyang Xinchen**	Chengdu Chengfa[(3)]	Weichai	Weichai
4	Shanxi Chenggong[(2)]	Laidong	Harbin Dongan	Yuchai	Yuchai	Deutz[(5)]	Deutz
5	Chongqing Zongshen	Quanchai	Laidong	Jiangsu Sida	Changchai[(4)]	Jiangsu Sida	/

Source: Frost & Sullivan Report

(1) Jilin Chaofeng Liuji Engines Co., Ltd.* (吉林綽豐柳機內燃機有限公司)
(2) Shanxi Chenggong Huaihai Engine Co., Ltd.* (山西成功淮海發動機有限公司)
(3) Avic Chengdu Engine (Group) Co., LTD* (中航工業成都發動機(集團)有限公司)
(4) Changchai Co., Ltd.* (常柴股份有限公司)
(5) DEUTZ AG (道依茨公司*)

In 2011, Harbin Dongan led the independent branded engine market in the less than 1.6L displacement segment. Aerospace Mitsubishi led the market in the between 1.6L and 2.0L displacement segment, Quanchai led the market in the between 2.0L and 4.0L displacement segment, while Yuchai led the market in the above 4.0L displacement segment. According to the Frost & Sullivan Report, both Harbin Dongan and Aerospace Mitsubishi adopt imported technologies from other parties, hence Mianyang Xinchen was the largest independent branded engine manufacturer with in-house technology in the 1.0L-1.6L market segment in the PRC. In addition, because Quanchai, Yuchai, Laidong and Jiangsu Sida only offer diesel engines, Mianyang Xinchen was the largest engine manufacturer with both gasoline and diesel engine capabilities in the 2.0L-2.5L LCV market segment in the PRC.

In relation to the performance of independent branded engine manufacturers by application, Mianyang Xinchen, Jilin Liuji and Quanchai ranked as the largest independent branded engine manufacturers in the small bus, small truck and light-duty truck segments in China in 2011, respectively. Further, Harbin Dongan ranked as the largest independent branded manufacturer in the sedan segment, while Aerospace Mitsubishi ranked as the largest independent branded manufacturer in the SUV, MPV and minibus segments in China in 2011. In particular, according to the Frost & Sullivan Report, Mianyang Xinchen is the largest engine manufacturer with independent in-house technology in the Sedan, SUV and MPV segments. The following table illustrates the market positions of the top independent branded manufacturers in the overall PV and LCV engine market by application in China in 2011:

Market positions of top five independent branded engine manufacturers in the overall PV and LCV engine market by application in China in 2011

Rank	Small Bus	Small Truck	Light-Duty Truck	Sedan	SUV	MPV	Minibus
1	**Mianyang Xinchen**	Jilin Liuji	Quanchai	Harbin Dongan	Aerospace Mitsubishi	Aerospace Mitsubishi	Aerospace Mitsubishi
2	Yuchai	Harbin Dongan	Yunnei	Aerospace Mitsubishi	Harbin Dongan	Harbin Dongan	Harbin Dongan
3	Aerospace Mitsubishi	Shenyang Xinguang Brilliance	Yuchai	Shenyang Xinguang Brilliance	**Mianyang Xinchen**	Shenyang Xinguang Brilliance	**Mianyang Xinchen**
4	Harbin Dongan	Laidong	Laidong	**Mianyang Xinchen**	Shenyang Xinguang Brilliance	**Mianyang Xinchen**	Shenyang Xinguang Brilliance
5	Shenyang Xinguang Brilliance	Shanxi Chenggong	Jiangsu Sida	Tritec Engine(1)	Yunnei	Yunnei	Shanxi Huaihai(2)

Source: Frost & Sullivan Report

(1) Tritec Motors Ltd
(2) Shanxi Chenggong Huaihai Machinery & Electric Co., Ltd.* (山西淮海機電有限責任公司)