



## BYD (Build Your Dreams):

### Journey to Green Dreams

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It was November 6, 2011, at 4 am, Shenzhen, one of the most economically developed cities in China bordering Hong Kong, receded into quietness. However, Wang Chuanfu, founder, chairman and CEO of BYD Company Ltd. (1211: HKG) (see Exhibit 1 for a personal profile) was pacing back and forth in his hotel room in a sour mood. He was en route to Hong Kong to meet with BYD's stockholders and warn the Hong Kong market that net profits for the last quarter of 2011 could be down by 85% to 95%. Wang looked at the stock market reports on BYD. Net profits had fallen 89% in the first half of 2011 compared with the same period last year. He glanced over the reports from mainstream media forwarded by Stella Li from BYD America: "BYD: A Reversal of Fortune", "BYD Comes to Earth", "BYD, A Victim of Its Own Grand Predictions."

It was not the first time that BYD had been pilloried in the media. Wang remembered how back in 2003, when he first decided to enter the auto industry, critics had mocked his vision of entering the conventional car industry with the aim of becoming a world leader in electric car production. Industry experts and analysts questioned whether BYD, or any car manufacturer in China, could bypass the internal combustion engine and lead the world in new energy vehicles.<sup>1</sup>

Yet BYD had stunned the industry by doubling its car sales in China to 448,000 in 2009 from 170,900 in 2008, making it one of China's biggest privately-owned auto makers.<sup>2</sup> It had also caused a buzz by launching its self-developed electric car in December 2008. The F3-DM could travel 100km on a single nine-hour charge from a household socket, and was ahead of its potential rival, the hybrid Chevy Volt, by a year (launched in 2010).<sup>3</sup>

Wang Chuanfu stared at the internal report on his desk, according to which more than 100 BYD dealers were withdrawing from the sales network. Sales for 2010 were 519,800 vehicles, a mere 65% of the forecast of 800,000 vehicles. Net profits were down to 5%, the second lowest ever in the company's 15-year history and half the 10% level achieved the previous year (see Exhibit 2). The third quarter of 2010 had been particularly devastating with profits of only 11.34 million RMB compared to 1.16 billion RMB during the same period in 2009. What was worse was that in contrast to BYD's poor performance, domestic auto production and sales had exceeded 18 million vehicles, an increase of 32.44% and 32.37% respectively, making China the number one consumer of cars in the world, surpassing the US.

BYD's rising status was closely connected to Wang's well-publicized goals: "To be the number 1 car manufacturer in China by 2015 and number 1 in the world by 2025." That ambition had motivated BYD management to focus on the auto industry as its profit margins and market potential surpassed the increasingly saturated battery industry in which it was a leader. As a result, the car business in 2010 accounted for 46% of BYD's total revenue, up from 29% in 2006 (Exhibit 3). The remaining 54% of revenue came from BYD cell phone parts and accessories (44%) and the battery business (10%), departed from its earlier strategy

- 1 Waldmeir, Patti (2011), "BYD, a victim of its own grand predictions." Oct 26 2011, Financial Times, <http://www.ft.com/cms/s/0/cddc1694-ee34-11e0-a491-00144feab49a.html#axzz2hd1XQLQj>.
- 2 Shirouzu, Norihiko (2011), "After stumble, BYD retools strategy," Jan 12, Wall Street Journal. <http://online.wsj.com/news/articles/SB20001424052748703791904576075631107791832>
- 3 McCabe, Aileen (2009), "China plugs into electric car market," April 23, Canwest News. <http://www2.canada.com/ch/chcanews/personalities/story.html?id=1526308>

when the three businesses each had similar weight in BYD's portfolio: 37% battery, 34% cell phone parts and accessories, and 29% cars.

Wang looked at his watch. It was 7 am. He was still trying to figure out what to tell the investors in Hong Kong. What should he say about the long-term strategies of BYD? How would BYD synergize the resources and knowledge in its three business segments: automobiles, cell phone parts/accessories, and batteries and more broadly green energy? Should BYD focus on brand building in the conventional car market, building a solid brand among Chinese consumers and at the same time lobbying the government to invest in the eco system of electric vehicles such as building public battery charging stations? Or should BYD just focus on further development and testing of electric vehicles so that its plan to launch them in overseas markets could be implemented? Or, should BYD pay more attention to the rising demand for solar power, an area where it had developed some expertise and had become one of the few players to be able to produce NES (Narrow bus bar, Electroplate, Selective-emitter) solar panels, and invest further in technological breakthroughs in the large-scale battery storage systems built not only for buildings but an entire city, with the aim of being a global leader in the new energy industry? Wang shook his head at these perplexing questions.

## BYD History

BYD Company Limited (1211: HKG) was founded by Wang Chuanfu and his cousin Lv Xiangyang in February 1995, with a registered capital of 2.5 million RMB. Wang Chuanfu, trained as a metallurgist, and entered the Beijing Research Centre for Nonferrous Metals in 1987, where he worked as a researcher focusing on rechargeable batteries. In 1993, Wang was appointed general manager of Bige Battery Company Limited, established in Shenzhen by the research centre, where he focused on core battery technologies, although most competitors in Shenzhen at that time focused on assembling mobile phone batteries.

In 1993, when Japanese companies stopped producing nickel-cadmium (NiCad) batteries, Wang saw this as an opportunity to enter the industry. In 1995, he left Bige to found BYD as a maker NiCad rechargeable batteries used in toys, hand tools and consumer electronics. BYD had since evolved into a company specializing in three business segments, IT (rechargeable battery and mobile handset components), automobile (fuel-based, hybrid, and electric vehicles), and new energy (solar farm, battery energy storage station, and LED lighting).<sup>4</sup>

BYD had grown from 20 employees to a corporation with more than 150,000 employees and 10 industrial parks across China, including sites in Guangdong, Beijing, Shaanxi, Shanghai and Changsha, totalling nearly 15,000,000 sq. m. It had offices around the world, including in the United States, Europe, Japan, South Korea, India, Taiwan and Hong Kong. (Exhibit 2 provides BYD's financials from 2005-10).

## A Cost Leader and Game Changer in the Battery Industry

The rechargeable battery market was dominated by Japanese manufacturers such as Sanyo, Sony, Toshiba and Panasonic, which had almost 90% of global market share. Chinese-made

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4 <http://www.byd.com/>

cheaper batteries were already available in 1995, but they were of poor quality. BYD's goal was to satisfy the market niche for high-quality, low-cost batteries. Wang Chuanfu and his team analysed the chemical formula and the structure and manufacturing process of Ni-Cad batteries and modified the manufacturing process by blending self-made half-automated equipment that took advantage of the low labour costs in China (Exhibit 4). This modification lowered BYD's product costs by 40% compared to Japanese manufacturers, enabling BYD to grab a share of the rising demand of European and American markets for Ni-Cad batteries used in wireless electric drills, saws, emergency lamps and other products.

While making NiCad batteries, Wang Chuanfu looked into lithium-ion (Li-ion) batteries, widely used in mobile handsets. It was a newer technology, superior to Ni-Cad because of its faster charging times and its stronger capacity to hold the charge. As Japanese manufacturers led in the Li-ion battery market, Wang Chuanfu visited Japan, but discovered that Japanese equipment suppliers charged US\$5 million for a single manufacturing line. The price was driven by the need for a clean room in which to house the manufacturing line, since Li-Ion batteries were prone to explode if even the slightest contaminant, such as dust or humidity, got into a battery during production. Given BYD's registered capital of only 2.5 million RMB, which was barely enough to pay the 20 employees, purchasing a Li-ion battery manufacturing line was out of the question.

This temporary setback forced BYD to look for ways to innovate. The key was the dust and humidity-free production room, since this accounted for the majority of the cost of the manufacturing line. BYD's innovation was to create a "clean box" (see Exhibit 5), with glove access that enabled the employee to stand outside while putting their hand into the box through the attached gloves to undertake the production task. The innovation had a dramatic impact. Not only did a clean box cost much less, but it was modular and scalable. This enabled BYD to increase the number of boxes as demand rose and configure them depending on the demand for different sizes and shapes of batteries from customers.

Perhaps most importantly, the clean box dramatically increased labour productivity. Before entering a clean room, workers needed to clean themselves thoroughly. Because the room was airtight and dry, workers needed to wear a special suit, akin to a space-suit. Given the environment inside the clean room, workers could not work more than two hours at a stretch. But the clean box provided a dust- and moisture-free production environment while the worker worked in a normal environment, they could work a normal 8-hour shift, with no prep time either.

By disassembling the traditional automatic manufacturing process of Japanese companies, BYD was thus not only able to cut production cost by enhancing productivity, but create a process that was responsive to clients' changing needs. Whereas Japanese battery manufacturers had to spend up to several million dollars on a new production line to produce new products, BYD could redesign the workflow, adjust or replace critical components of an existing production line, and train workers in new tasks to achieve the same outcome.

Aside from the clean box innovation, BYD developed almost 60% of all the required machinery for a battery production line, further reducing its costs. In 2000, it cost Sony Corporation, inventor of Li-ion batteries, more than US\$5 million to build one production

line. BYD's product line cost around US\$300,000-500,000<sup>5</sup> – an incredible 90% cost advantage over its competitors. The cost advantage, along with quality control systems such as QS9000 implemented in the battery production lines, gradually lured away the orders of Nokia and Motorola from its competitors. BYD's innovations also set new standards for the mobile phone battery industry. Even the Japanese battery manufacturers were willing to pay for BYD's production line and machinery designs.

BYD's battery business experienced rapid growth, from 48 million RMB in 1999, to 219 million RMB in 2000, 560 million in 2001, and 1.6 billion RMB in 2002. By 2002, it had become one of the top manufacturers alongside the world-leading Japanese companies like Sanyo and Sony. In 2002, BYD's battery business was ranked fourth for Li-ion batteries, second for NiCad batteries,<sup>6</sup> and third in NiMH batteries. Its annual production of 350 million NiCad batteries was 20% behind the biggest player in the world, Sanyo Corporation. In 2003, BYD became the second largest cell phone battery manufacturer, following Sanyo, with a world market share of 23%.

Due to its rapid growth, BYD was able to list on the Hong Kong Stock Exchange in July 2002, raising approximately HK\$ 1.6 billion. The company intended to use these funds to expand development and production of its current battery products, explore new applications of battery products (e.g., electric vehicles), and research new power sources.<sup>7</sup>

By 2005, as the only enterprise in China whose daily production exceeded a million batteries, BYD had built up a solid relationship with giant consumers such as Nokia, Motorola and Bosch. However, aspiring competitors from China and technological changes in the battery industry were a clear cause for concern. For example, Shenzhen B&K Rechargeable Batteries Inc. had a monthly production of 4.5 million batteries, and was expected to reach 30 million after the completion of its industrial park in Shenzhen.<sup>8</sup> Another competitor, Oceanwide, also from Shenzhen and focusing on the Li-ion batteries, produced some 900,000 batteries a month. The resulting price competition led to price drops and the erosion of profit margins.

Battery technology was also changing, with Li-ion batteries being replaced by fuel-cell batteries. BYD had only just begun developing fuel-cell batteries in 2005, which meant that key competitors were ahead. Toshiba had already introduced a new fuel-cell battery for cell phones that could be charged without having to switch off the phone. And Casio had successfully developed a fuel-cell battery for laptops whose capacity was three times larger than that of similar sized Li-ion batteries.

At this crossroads, BYD chose to invest in lithium iron phosphate (LiFePO<sub>4</sub>) batteries ('Fe batteries'), which cost less than half of typical lithium ion batteries and were safer and longer lasting. Fe batteries were more suited for large energy storage stations and electric vehicles. BYD began producing the Fe battery in 2009 at its production base in Huizhou Industrial

5 Wenjing Chai (2008), BYD, Cost Killer and Technology Leader, 21st Century Business Review, of Cost-Driven Innovation, 21 Century Business Review  
<http://www.21cbr.com/html/magzine/200812052/21cbrcase/200812/132475.html>

6 Huckman and maccormack, byd company, ltd. Harvard case, 2009

7 *Ibid.*

8 <http://www.bkbattery.com/main.aspx>

Park, where it had two automatic production lines, working 24 hours a day, producing 1,200 Fe batteries of 200AH, with a total investment of nearly 5 billion RMB.

### **A Controversial Move to Enter the Auto Industry**

As BYD looked for potential new opportunities for expansion and growth, the auto industry caught its attention. The auto market in China had witnessed a surge in demand in 2002, rising to 3.24 million units, an increase of 36.65% from the previous year. Production had kept pace with demand, growing to 3.25 million units in 2002, an increase of 38.9%.<sup>9</sup> The booming auto market in China attracted capital investment in the auto industry from a number of players who had no prior experience in the auto industry such as Mide, AUX Group and Gelinkeer in appliances and home electronics, BIRD and AMOI in handsets, and Hongtashan in the tobacco industry. Undoubtedly, the auto industry was a game for businesses with money to invest. Enterprises seeking to enter needed to have cash to invest up front.

With technological developments, stricter regulatory policies, and increasingly fierce competition, the auto industry had evolved from a business with vertical integration marked by Ford and GE, to a modularized structure, with businesses specializing in branding, core components and technologies. In this highly complex structure, newcomers inevitably faced the challenge of not holding any core technologies or capabilities to manufacture core auto components, or having a cost advantage over specialized manufacturers of non-core auto parts. Not surprisingly, after the recession in China in 2004, there was a shakeout. Impulsive new entrants were forced out of the business one after another. For instance, in August 2004, Bird withdrew, and early 2005 saw the withdrawal of AMOI and AUX.

So when BYD decided to enter auto industry by investing 270 million RMB to acquire a 77% stake in Xi'an Qinchuan Company Limited (Qinchuan for short) in January 2003, fund managers and investors in Hong Kong were stunned. The stock price fell 21% within one day and 2.7 billion HK\$ of BYD's market capitalization vaporized.

However, BYD marched on. Wang Chuanfu chose Qinchuan for multiple reasons. First, Qinchuan was the only authorized car producing enterprise in the north-west region and the Chinese government rarely released car manufacturing licenses to private companies. When BYD bought the 77% stake in Qinchuan, it became the second private car manufacturing enterprise after Geely. Second, Qinchuan had a car production line with a 50,000 unit manufacturing capacity. Third, Qinchuan had acquired core technologies and equipment from leading manufactures such as crucial press equipment from Fagor (Spain), welding equipment from Ogihaha Manufacturing (Japan), and painting equipment from Dürr (Germany). Finally, Qinchuan had 200 engineers who had designed and developed the Flyer sedan. The Flyer met Euro II emission standards, was equipped with luxury accessories, and most importantly, demonstrated Qinchuan's ability to independently develop patents and core technologies as a sedan manufacturer.

However, as a state-owned military enterprise, Qinchuan suffered from a lack of capital and managerial capability. In 2002, it only managed to sell 17,000 vehicles and turn a net profit of 780,000 RMB. BYD managed to turn it around, increasing profits to 38 million RMB between 2002 and 2004, while reducing production and sales (See Exhibit 6). It did so by

9 Source: Chinese Auto Industry Association.

eschewing external suppliers and bringing in-house elements such as fabricating its own dies for the car bodies and manufacturing needed parts, as it had done with its battery business, to improve efficiency and enhance production volume.

## Rising Status as an Automaker (2003-2009)

### *Vertical Integration Strategy*

Having acquired Qinchuan, BYD reached out to develop a strong supplier network, but could not get their attention and negotiate competitive prices because of its low volume of production. Key suppliers of auto parts were either long-term partners of the dominant auto makers or their subsidiaries, and their main mission was to supply these players. They rarely dealt with newcomers, particularly those whose production volumes were low and whose ordering schedules were limited and uncertain. For example, when BYD approached Mitsubishi to order 50,000 engines for its F3 model, Mitsubishi sent representatives to BYD factories to count the number of cars BYD could produce daily and only then agreed to supply the engines.<sup>10</sup> Wang Chuanfu saw the dependence on suppliers as one of the biggest hurdles for BYD to succeed in the auto industry:

*Dominant auto brands have set up the rules of the game. If we follow their rules, we will be pushed to the corner (where the cost of auto parts is too high). The goal of BYD is to reset the price for the industry. In order to do that, we have to provide products with identical quality but half the price. The only way to achieve that is to focus on the bottom of the iceberg, the part below the water. That is, we have to establish a strong backend support system--a strong supplier network and auto parts manufacturing, to cut cost – to match our front-end product – good quality with low price.<sup>11</sup>*

Just as it had done when setting up the battery business a decade earlier, BYD once again innovated and restructured the auto production process by experimenting with ways to combine labour and capital and redesign machines to cut the cost of key manufacturing processes. For example, it would have cost several hundred million renminbi to buy new painting line machines from Dürr, but BYD was able to design and produce its own machines at a cost of 30-50 million RMB. These were customized for BYD's manufacturing processes, and were easy to adjust for different product configurations. BYD replicated its "hands on" manufacturing approach in the battery business to operations in the automotive business. Whenever possible, manpower was used to replace automated machinery to save costs. In the usually high-tech areas such as painting, most jobs were done manually (Exhibit 7 show the manufacturing line). For example, BYD's F6 assembly line in Shenzhen employed 220 people. BYD's approach cut the cost of manufacturing a new car by one third compared to its competitors.<sup>12</sup>

BYD further reduced its costs by vertically integrating its supply chain. For example, auto moulds accounted for up to 80% of the cost of the development of a new car model.

10 Cheng, Jie (2010), Wang Chuanfu Made BYD Legendary, Overseas Chinese Press: Beijing.

11 *Ibid.*

12 <http://www.chinacartimes.com/2010/02/11/the-%E2%80%98truth-about-byd-replication-cost-cutting-and-car-production/>

Qinchuan, when developing its Flyer sedan, had spent 150 million RMB to develop the mould and it took two years for a Japanese car mould supplier to complete the prototype. High costs and dependence on suppliers were an anathema to BYD. So in May 2004, it purchased for a low price the Beijing Jichi Automotive Mould Co. Ltd., a unit of the Beijing Automobile Works, and established the BYD Mould Company Limited. Its independent R&D in moulds allowed BYD to reduce the car mould prototype cost to 30-40 million RMB. As a result, BYD could limit the cost of the prototype of a brand new model to 50-60 million RMB, while at the same time producing it within eight months. In 2008, BYD's mould business not only supplied BYD's needs but also acted as an ODM to major auto makers such as Nissan, Land Rover, GM and Chrysler.

Unlike its major competitors, BYD was a wholly integrated car company, manufacturing nearly every part of BYD cars, a process known as "Made in BYD". It produced all of its automotive spare parts except glass, tyres and steel boards, which were bought from suppliers. On August 9, 2007, BYD completed its integrated business platform: Beijing as its mould manufacturing base; Shanghai as its research and development base for electric cars; Xi'an as the F3 production base; Pingshan, Shenzhen as a production base with an annual capacity of 200,000 vehicles,<sup>13</sup> and Tianjin as a production base. This integrated platform allowed BYD to quickly and inexpensively release 10 conventional car models, the F3, F3r, F6, F0, S6, S8, G3, G3r, M6, and I3, and 3 electric vehicles, the F3DM, E6, and K9, between 2005 and 2010, figures that far exceeded its competitors. (See Exhibits 8 and 9).

Another aspect of BYD's strategy was to aggressively establish its dealership network. It built up a network of 1,000 dealers covering 100% of the second-tier cities and 20% of the third-tier cities. The dealership network consisted of three categories of distributors. The A1 distributor network sold the F3 and F6. The A2 network distributed F3r and F0. The A3 network mainly sold the G3 (mid-luxury sedan). There were several advantages to this distribution structure. First, there could be multiple BYD dealerships in a given area without fear of cannibalization. This helped BYD expand its network rapidly, which in turn created visibility for the brand. Second, it ensured an adequate income for each dealership, although A1 dealerships which sold the most popular F3 model earned more than the others (estimates suggested that A1 dealers sold twice as many vehicles). BYD dealers received higher-than-average margins, and given that BYD made all its own parts, the quality was adequate and low cost, further enhancing dealer income. Fourth, given their narrower focus, BYD dealers could better serve their customers, which helped increase sales, while at the same time minimizing spare parts inventory and the training needs of their workforce, again reducing costs. BYD continued growing its distribution network between 2008 and 2010, reaching 1200.

### **Product Strategy: Imitation and Expansion**

To establish the BYD auto brand within the shortest period of time, BYD was strategic in its choice of car models. Instead of identifying market niches, BYD paid attention to the popular car models on the market such as the Toyota Corolla, which had sold more than 118,000 units in 2008. Using the Corolla as the template for the look of its new model, BYD only needed to work on enhancing the user experience and improving functions to provide Corolla fans with

13 <http://www.people.com.cn/GB/54918/55139/4225918.html>



a spacious, perfectly equipped alternative, at less than half the price – the F3 was exactly that. (see Exhibit 10).

In September, 2005, BYD's F3 entered the market at a price of 70,000 RMB, attracting consumers whom the Corolla had pursued but were more price conscious. The F3 met with instant market success, receiving orders for 9,000 during the first month. On June 18, 2007, the 100,000th BYD F3 was successfully produced off the product line.<sup>14</sup> By May 2008, BYD ranked in the Top 10 for selling more than 10,000 vehicles a month, and in September 2008 the F3 sold 23,500 units. BYD's annual sales of F3 totalled 118,000, outperforming its domestic rival the Chery QQ. The F3 remained the most important contender from BYD. Its sales doubled the following year, accounting for more than 60% of the 450,000 cars BYD sold in 2009. It was the bestselling model in 2010 (see Exhibit 11), with sales reaching 263,947. In 2011, it was still one of the top 20 bestselling car models in China, selling more than 100,000 units. Over 5,000 units F3 cars were exported overseas to 16 countries and regions<sup>15</sup>.

The BYD F3 was labelled a revolutionary copyist of Toyota by industry experts.<sup>16</sup> In the F3's introductory period, BYD's marketing department touted similarities with the Corolla as a selling point. Departing from the easy strategy of licensing technology from multinationals, BYD chose to develop proprietary technologies through reverse engineering. This strategy was supported by its ability to train and retain talented local engineers. BYD engineers, according to Wang, came from China's best schools:

*They are the top of the top...They are very hard-working and can compete with anyone... BYD can afford to hire lots of them because their salaries are only about \$600 to \$700 a month; they also get subsidized housing in company-owned apartment complexes and low-cost meals in BYD canteens.*<sup>17</sup>

"They're basically breathing, eating, thinking, and working at the company 24/7," said a U.S. executive who had studied BYD. In BYD's R&D centres, engineers dis-assembled a targeted car model, modified it and replace patented components with customized ones to form a new design. This radical learning methodology enabled BYD to generate proprietary technologies rapidly, with an accumulation of more than 2,000 patents in 2007 after only four years in the industry. BYD Auto's chief designer, Yubo Lian, acknowledged:

*We dismantled many cars every year. We tried to avoid patented technologies and adopted those that are not patented. We are prepared for lawsuits and expect to win these cases 100% of the time.*<sup>18</sup>

Wang Chuanfu dismissed critics of BYD's imitation strategy:

*We stood upon the shoulders of giants when entering the auto industry. We adopted a lot of non-patented technology. Integrating them into our own*

14 <http://www.invest-lg.com/en-web/ArticlePrint.aspx?artId=22900>

15 *Ibid.*

16 <http://www.chinacartimes.com/2010/02/11/the-%E2%80%98truth-about-byd-replication-cost-cutting-and-car-production/>

17 Gunther, Marc (2009), "The Great Electric Car Race," *Fortune*, 159 (8), 44-50.

18 Tu, Hu (2009), Made by BYD, Profiles from the South. <http://www.infm.com/content/34952>

*production and product design is our innovation. For the development of any new product, 60% of it was based on findings from the literature; 30% from existing products, 5% from raw materials and ingredients, and only 5% was from our own research and development.*

## Changes in the Auto Industry

From 2008, the world auto manufacturing had gone through a period of slow growth. The fallout from the subprime crisis and the subsequent meltdown at Detroit's Big Three – General Motors (GM), Ford, and Chrysler – had dented America's status as the world's largest automobile maker.<sup>19</sup> Accompanying this decline in production was a fall in auto sales in markets such as Europe and North America. For example, Toyota, the world's largest auto manufacturer, experienced a drop of 26.4% sales in 2010. In the developed markets, rising oil prices, economic recession, as well as awareness of carbon pollution had made consumers more fuel-conscious. For example, Toyota's latest business strategy called for a cutback in North American truck output to reflect the shift in demand for fuel-efficient cars. It planned to launch 18 models of mini cars in Europe to meet the demands of fuel-conscious consumers.

As demand for cars declined in the West, auto makers refocused on the emerging markets in the Asia-Pacific region such as China, India, and Thailand, which saw growth in output of more than 72%, from 16.83 million cars in 2000 to 28.95 million in 2008.<sup>20</sup> In these countries, small, affordable fuel-efficient cars were more suited to less affluent consumers and congested roads. J.D Powers reported that sub-compact vehicles were the second fastest growing segment in Asia in 2008, and that total demand for such vehicles could exceed 5.5 million by 2015. To meet the demands of the emerging markets, automakers tended to join hands with indigenous car makers to develop low cost sub-compact cars with fuel efficiency. For example, PSA (Peugeot Citroen) and Renault were among the first automakers to produce low-cost cars in the region. In China, Japanese cars had the highest market share, followed by indigenous Chinese brands which were either JVs with foreign automakers such as SAIC, FAW, or indigenous brands such as Geely, Greatwall and BYD (see Exhibit 12).

## BYD' Ambition in Electric Vehicles (EV)

Wang Chuanfu envisioned BYD's leading role in EVs very early on. According to him, "The real purpose behind BYD's entry in to the fuel car market is to make electric cars." In a departure from other domestic car brands in China, BYD not only independently developed its auto brand but also entered the EV category by investing in researching and developing suitable battery technologies, which were the core of electric vehicles. Battery size and capacity determined the feasibility of building an EV. In January 2004, with a technological breakthrough in mass storage batteries, BYD began to produce electric vehicles.

19 Xie, Ximi (2008), "When US experiences set-backs in saving auto industry, what are the implications for Chinese auto companies?" Dec14, Page 004.

20 The international Organization of Motor Vehicle Manufactures estimates that total vehicle output in the region's top six producing countries-China, India, Japan, Malaysia, South Korea and Thailand- grew by more than 72% from 2000 to 28.95 million in 2008, accounting for 41% of global auto output. "International Organization of Automobile Manufacturer report," <http://webreports.mergent.com>

In the first half of 2004, about 200 BYD F3DM (Dual Mode) hybrid cars went into trial operation as taxis in Xi'an. Fully charged, the F3DM could run for 350 km. In June 2004, at the Beijing International Automobile Exhibition, BYD surprised the industry with its electric cars, hybrid cars and concept electric cars. In 2006, it established a project group for developing the E6, a pure EV. It transferred top talent from its battery and electronics departments with the aim of combining the core technologies of the two industry groups. BYD invested 1 billion RMB and 500 researchers in the development of its EV between 2003 and 2008.

On December 15, 2008, the F3DM, "the world's first dual mode electric vehicle", made BYD a leading force in EV technology (see Exhibit 13 for a picture). By 2010, BYD had sold 100 F3DM vehicles, mainly to governments, banks and other organizations. The purchase of F3DMs was supported by the Shenzhen Municipal Government with a subsidy of 80,000 RMB for each vehicle. It was not until March 2010 that the low-carbon version of the F3DM dual mode plug-in EV began to be targeted at individual consumers and 20 dealerships started to accept private orders.

BYD focused on cost, convenience and practicality when developing the low carbon version of the F3DM, a rechargeable vehicle that could run 200km on a single 9 hour charge from a household socket. The low carbon F3DM had the same look as the F3DM except that it had a solar battery panel installed on the rooftop, and the collected energy was stored in an on-board Fe battery pack. The Low Carbon F3DM essentially provided an alternative energy option for consumers. Both the dual model plug-in EV F3DM and the low carbon F3DM were sold through the same dealerships.<sup>21</sup>

On average, a private car in China does 15,000km a year, with daily usage ranging from 30km to 60km. Thus the F3DM was able to cover three to seven days of the distance a person needed to travel on a full charge. Compared to the Toyota Prius, the F3DM ran a much longer distance (100km) with pure electric energy, but cost only half the price of the 280,000 RMB Prius. It was also cheaper than the Chevy Volt released in late 2010.

To the surprise of many industry observers, BYD also began selling a plug-in electric car with a backup gasoline engine, a move putting it ahead of GM, Nissan and Toyota. BYD's plug-in F3DM went further on a single charge (62 miles) than other electric vehicles and sold for less (US\$ 22,000) than foreign plug-ins (see Exhibit 14 for a comparison). In 2009, BYD introduced the E6, a pure electric vehicle, aimed towards the taxi market. Once fully recharged, the E6 could run 400km. Without the automatic gearbox in ordinary cars, BYD's EV has a simplified structure, increasing its reliability in performance.

In January 2010, BYD's K9, a pure electric bus (see Exhibit 15) successfully passed testing at its Pingshan base, Shenzhen. By September, the first K9 buses went into production to meet an order of 1,000 vehicles from Changsha Municipal Government. On January 23, 2011, K9 carried passengers and ran a bus line in Changsha as a trial operation.

On November 5, 2010 at the 25<sup>th</sup> World Electric Vehicle Conference and Exhibition in Detroit, as a leading Chinese force in the new energy auto industry and the world's only hi-

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21 <http://auto.sina.com.cn/car/2012-11-23/15441068216.shtml>

tech enterprise that produced pure electric buses, pure electric cars, hybrid cars and batteries, BYD became the hottest topic of discussion.

## Challenges of Leading in the EV Industry

BYD aimed to be a leading force with its technological advantage in EV development, leapfrogging traditional automakers with faster speed at developing EVs, and its patents and technologies in battery business. However, its EVs, yet to be commercialized, contributed little to its growth. By the end of 2009, the 450,000 vehicles sold were almost all fuel vehicles. And in 2011, F3DM still had not realized mass production. A BYD spokesman, Wang Jianjun, commented,

*BYD is not willing to harm the individual consumption market when the market environment and supporting facilities are still immature, BYD would like to work with other auto enterprises and make it a better market with the support of favourable policies.<sup>22</sup>*

The commercialization of EV lay in providing powerful, compact and reasonably light batteries on the one hand, and on the other charging stations beyond household electrical sockets. The development of this infrastructure was highly dependent on government support as well as electricity service-providers in the country. In order to deal with the underdeveloped charging infrastructure, BYD decided to explore electric vehicle batteries that could be charged by solar energy. Batteries charged by solar energy would facilitate wider adoption of electric vehicles as they would be less dependent on public charging stations.

While BYD struggled to get the infrastructure ready by lobbying government, constant delays in commercially releasing the E6 to the mass market in both China and overseas lead to suspicion about its capabilities in core battery technologies (such as the Ferrous batteries used for the EVs), and BYD's ability to meet North American safety standards. In the meantime, the developed world fuel car brands were aggressively working with electronics companies and battery companies to develop and release electric vehicles. Since 2009, when BYD was the first to announce its concept EV, the BYD E6, the market had been invaded by Ford Transit connect electric, Nissan LEAF, Smart Fortwo electric drive, Smith Newton (truck), Mitsubishi I MiEV, Tesla Roadster, TH!NK City, and more Hybrid EVs (similar to dual modes) and battery EVs were coming to the world EV market (see Exhibit 16).

### Falling Expectation (2009 to the present)

#### Financial Pressure

BYD's soaring sales as an up-and-coming auto maker, its background in battery technologies, and its ambition and entry into electric vehicles had attracted Warren Buffet and his partners Charlie Munger and David Sokol, who thought that BYD had a shot at becoming the world's largest automaker, primarily by selling electric cars and as a leader in the fast-growing solar power industry. Buffet had bought 28% of BYD's Hong Kong stock through a Berkshire

22 BYD's spokesman, Wang Jianjun. Information source: BYD's Secret Battle Line, Economic Observer, <http://www.eeo.com.cn/eo/jjgcb/2010/07/26/176428.shtml>

Hathaway subsidiary, Mid American Energy, at HK\$9 per share in 2008, an investment of US\$230 million, giving him a 10% stake in BYD. Following Sinopec, BYD became the second Chinese enterprise to have Buffet as shareholder. Its Hong Kong share price soon climbed to more than HK\$80. This well-publicized event and Buffet's endorsement of BYD put the previously unknown Chinese company at the centre of the world media stage.

However, with the recent sales decline of BYD autos, its stock price tumbled. The first half of 2011 witnessed an 89% drop in BYD's revenue and it was the worst-performing stock in 2010 on Hong Kong's 40 Strong China Enterprise Index (see Exhibit 17). The market started losing confidence. In March 2009, BYD's big shareholder, president of Hong Kong Value Partners, Xie Qinghai, reduced his share in BYD for the fourth time on a probable overestimation of EV's development potential. Consequently, Morgan Stanley lowered its sales expectation and investment grading for BYD. This in turn led to the Asian region president of UBS, Cai Hongping, who was responsible for BYD's planned A-share listing, to announce his resignation, leading to a postponement of the issue for a year, to September 2011. David Sokol, chairman of Mid American Energy Company, the Buffet-controlled company which had purchased 10% of BYD shares, resigned in 2011 after its investment in BYD declined by some 82% from its peak value.

BYD was bombarded with negative media coverage triggered by the plunge in its auto sales. The market responded by doubting that BYD could deliver its green promises in electric vehicles or other green technologies, as its R&D in EVs was financed by the revenue from its battery, IT and increasingly heavy percentage of fuel car sales.<sup>23</sup>

### *Mismanaged Dealer Network*

In April, 2010, more than 100 dealers from Chengdu, Beijing, Shandong, Hangzhou, Henan, Dongguan, Shenzhen, withdrew from the sales network due to overstock. They cut their orders and turned to Geely, Chery and Great Wall. Given the slowing auto sales, reduced profits and a shortage of funding, BYD's carefully designed "thousand-store project" failed, damaging its distribution channel. It was a hard hit for BYD. Affected by the dealers' withdrawal, sales fell from 68,129 vehicles in March to 31,069 vehicles in August, forcing BYD to adjust its goal at a review meeting from 800 to 600,000 vehicles, an increase of only 33% from a year earlier. In August 2011, BYD's head of sales, Xia Zhibing, who was among the earlier employees of BYD, resigned, hurting the already slumping sales. Many in the industry took the resignation as an indication of a dispute between BYD and its dealers.

Part of the earlier success of BYD auto sales was its aggressive recruitment of franchisers and BYD dealers. Jia Xinguang, an independent auto analyst based in Beijing, said that dealers should decide the size of their sales departments, not BYD: "BYD's dealers recruited an excessive number of sales representatives last year as a result of the company's ambitious sales target of 800,000 units for 2010." Some dealers did not have the financial resources to run the dealership to meet BYD's sales targets but were recruited anyway.

In addition, grandiose sales targets from BYD put a strain on dealers. In 2007, BYD started a 1000 Store campaigns aiming to establish 1,000 dealers covering 100% of the metropolitan cities, more than 80% of the prefecture-level cities, and more than 70% county-level cities in

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23 Cheng, Jie (2010), Wang Chuanfu Made BYD Legendary, Overseas Chinese Press: Beijing.

China. By 2010, BYD had more than 1,200 dealers and eight customer service centres, with delivery service and technological support for its dealers. It set monthly and quarterly sales targets for dealers according to BYD's annual sales goal: if they did not meet the sales goal, they did not receive any bonus or rebates from BYD, which substantially hurt their profits. As an example, BYD promised a margin of 4000 RMB per F3, a monthly and quarterly rebate of 1000 RMB per vehicle, a commercial subsidy of 1000 RMB per vehicle, and a year-end rebate, which yielded a gross margin of 7000-8000 RMB per F3 sold. However, if monthly or quarterly sales targets were not met, the dealers' profit could be halved. BYD responded to the dealership withdrawal by adjusting its sales goals from 800,000 to 600,000 units for 2010. It also started cutting the employees of the sales unit in BYD from 2,700 to 800 in 2011.

### *Slow Internationalization*

In 2008, Wang Chuanfu had had the nerve to announce BYD's goal to be "the biggest auto maker in the world by 2025" shortly after its success with F3 sales. Until 2010, 5% of BYD's total sales come from six oversea market regions: Latin America, Europe, Africa, former Soviet Union, Asia-Pacific and the Middle East. BYD's plan to release EVs in the US market had been postponed a few times. On December 13, 2009, BYD co-founded a CKD factory with Amal Auto Manufacturer of Egypt, assembling F3 vehicles, which marked the beginning of BYD's local production and marketing in Egypt. On April 30, 2010, taking advantage of the abundant solar resources in California and its favourable policies on EVs, BYD established its North American headquarters in Los Angeles, focusing on its new energy and auto business. The headquarters were responsible for the design, marketing, technological support, after-sales service and training. In January, 2011, BYD's F3DM was put into use at the Housing Authority of the City of Los Angeles (2600, Wilshire Boulevard, LA), marking baby steps towards US market expansion.

## **Conclusion**

After its success in the battery industry, BYD entered the auto industry, hoping to leverage its core competence in battery technologies, cost innovation and operational efficiency to eventually become the leader in the electric vehicle industry. Yet winning the traditional car competition was less easy than BYD had planned, and revenues from the traditional car business fell short of expectations. However, with its foray into EVs and more generally green energy, BYD's need for R&D funding was significant. Wang Chuanfu needed to make some hard decisions regarding what should be the next steps for BYD to get out of the downward spiral. Should BYD shift its focus to its strengths, i.e., battery technologies, and perhaps start serving as a battery provider for exiting auto brands? Or should it soldier on in the traditional auto industry, focusing on building a B-to-C brand in the auto sector which could facilitate its establishment in the EV market when ready?

**Exhibit 1**  
*Wang Chuanfu's Profile*



**Personal**

- Born in 1966 in Wuwei, Anhui Province, receiver of the special subsidy from the National Council
- Chairman and president of board of directors of BYD Co. Ltd., president of BYD Electronic Co. Ltd.

**Educational Background**

- 1987 Bachelor's degree. Central South University of Technology. Metallurgic Physics and Chemistry.
- 1990 Master's degree. Beijing Research Center for Nonferrous Metals. Metallurgic Physics and Chemistry
- 1990-1995 Vice director, Beijing Research Center for Nonferrous Metals.

**Achievements**

- 2002. 11 *Redbud Outstanding Entrepreneur*, HK
- 2002 *Excellent Chinese Entrepreneur of Private Industry*
- 2002 Enters for the first time the Forbes "2002 China's richest"
- 2003. 9 Top10 *Distinguished Young People of Shenzhen*
- 2003. 6 One of the 25 "Asian Stars" selected by BusinessWeek.
- 2009, Ranked as the richest person in China by Forbes Magazine with a total asset of 39.6 billion RMB.

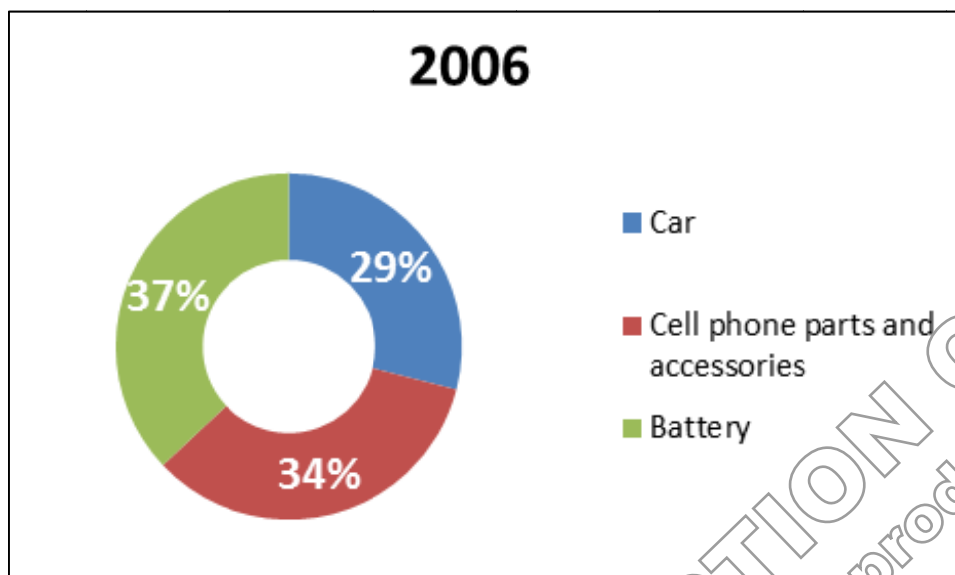
Source: BYD

**Exhibit 2**  
*BYD Financials 2005-2010*

	2010	2009	2008	2007	2006	2005
<b>Sales (1000RMB)</b>	46,685,349	39,469,454	26,788,253	21,211,213	12,938,917	6,498,330
<b>Gross profit (1000RMB)</b>	8,264,374	8,564,731	5,218,836	4,247,687	2,738,183	1,454,545
<b>Gross profit rate (%)</b>	18	22	19	20	21	22
<b>Net profit (1000RMB)</b>	2,523,414	3,793,576	1,021,249	1,611,711	1,117,334	503,013
<b>Net profit rate (%)</b>	5	10	4	8	9	8
<b>Profit per share (1000RMB)</b>	1.11	1.67	0.45	0.71	0.49	0.22
<b>Profit rate of net assets (%)</b>	14	23	9	15	21	12
<b>Total Assets (1000RMB)</b>	53,874,663	40,735,597	32,891,145	29,288,491	16,386,781	11,213,354
<b>Value of net assets (deducted from a few shareholders profit) (1000RMB)</b>	18,460,319	16,682,357	11,285,568	10,708,118	5,292,464	4,175,309
<b>Net assets per share (100RMB)</b>	8.11	7.33	4.96	4.71	2.33	1.84

Source: BYD annual reports of 2005-2010

**Exhibit 3**  
*Sources of Business Volumes of BYD*



Source : BYD 2010 annual report



**Exhibit 4**  
*BYD's Half-Automated Battery Production Line*



Source: <http://media.sohu.com/06/76/news208757606.shtml>

**Exhibit 5**  
*Clean Box*



Source: [http://www.360doc.com/content/11/0815/19/7306746\\_140606188.shtml](http://www.360doc.com/content/11/0815/19/7306746_140606188.shtml)

**Exhibit 6**

*Flyer's Sales and Profits by Year: Before and After Takeover by BYD*

<b>Year</b>	<b>Unit Sales</b>	<b>Revenues (Mil. RMB)</b>	<b>Profits (Mil. RMB)</b>
<b>2002</b>	17,000	700	0.78
<b>2003 (BYD Acquisition)</b>	15,000	500	10.0
<b>2004</b>	14,800	400	38.0

Source: <http://www.100ksw.com/xl/mba/fxzd/182464.shtml>

**Exhibit 7**  
*BYD Auto Manufacturing Line*



Source: [http://www.wheelon.net/news/newslast\\_8168.html](http://www.wheelon.net/news/newslast_8168.html)

**Exhibit 8**  
*Launch Dates of BYD, Geely and Chery Cars*

<b>Year</b>	<b>BYD</b>	<b>Geely</b>	<b>Chery</b>
2003	Flyer	Geely, Meirenbao, Maple M203	QQ, Eastar, Cowin
2004		Maple M303	Eastar 2.0 MT
2005	F3	Ziyoujian, Hoqing	Ruihu
2006		Jingang, Baofeng, Youliou	Neu Cowin, A5. V5
2007	F3R	Vision	QQ6, A1
2008	F6, F0, F3DM	Panda, Jinying	
2009	S8, G3	Zhongguolong	
2010	L3, K9, M6, S6		
2011	G6		

Source: Cheng Jie (2010), The Legend of Wang Chuanfu: The Myth of BYD, Oversea Chinese

Publication House: Beijing, <http://auto.qq.com/a/20110926/000278.htm>,

<http://auto.163.com/08/0901/21/4KPLM9RL0008161P.html>,

<http://yueye.xout.cn/qchq/68096.html>

**Exhibit 9**  
*BYD's Competitors*

<b>Domestic Independent Brands</b>			
Zhejiang Geely Holding Co. Ltd.		Chery Automobile Co. Ltd.	
<b>Major Joint Venture Brands</b>			
Shanghai Automotive Industry Corporation	First Automobile Works	Dongfeng Motor Corporation	Changan Automobile Corporation
◇ SAIC passenger car	◇ FAW Audi	◇ Dongfeng Nissan	◇ Changan passenger car
◇ Shanghai VW	◇ FAW VW	◇ Dongfeng Peugeot	◇ Changan Ford
◇ Shanghai GM	◇ FAW Toyota	◇ Dongfeng Citroen	◇ Changan Mazda
◇ SAIC GM Wuling	◇ FAW Mazda	◇ Dongfeng Honda	◇ Changan Suzuki
◇ Shanghai bus	◇ FAW bus	◇ Dongfeng KIA	◇ Changan Volvo
◇ Shanghai Huizhong	◇ FAW Hainan Mazda	◇ Dongfeng EV	◇ Changan Peugeot Citroen
◇ Shanghai Iveco Hongyan	◇ FAW Xiali		◇ Changan commercial vehicle
◇ New Nanjing Auto	◇ FAW GM Hongta Yunnan		
	◇ FAW cars (Hongqi, Benteng)		
<b>Minor Joint Venture Brands</b>		<b>Others</b>	
Beijing Auto. Grp. Co. Ltd.	Guangzhou Auto. Grp. Co. Ltd.	◇ Changfeng Mitsubishi	
◇ Beijing cars	◇ Guangzhou cars	◇ Huachen BMW	
◇ Beijing Mercedes Benz	◇ Guangzhou Honda	◇ Zhengzhou Nissan	
◇ Beijing Chrysler	◇ Guangzhou Toyota	◇ Huatai Hyundai	
◇ Beijing Hyundai	◇ Guangzhou FIAT	◇ Dongnan Mitsubishi	
◇ Beijing Mitsubishi			
◇ Beijing Jeep			

**Exhibit 10**  
*BYD's F3 Model & Toyota's Corolla*

**BYD F3**



**Toyota's Corolla**



**Exhibit 11***Passenger Vehicle Sales by China-Based Manufacturers in 2010*

Manufacturer	Units Sold	Market Share (%)
SAIC-GM-Wuling	1 135 600	8.3
Shanghai GM	1 012 100	7.4
Shanghai Volkswagen	1 001 400	7.3
FAW Volkswagen	870 000	6.3
Chongqing Changan	710 000	5.2
Beijing Hyundai	703 000	5.1
Chery	674 800	4.9
Dongfeng Nissan	661 000	4.8
BYD	519 800	3.8
Toyota	505 900	3.7

Source: Baker, Mark and Markus Hyvonen (2011), "The Emergence of the Chinese Automobile Sector," Industry report. <http://www.rba.gov.au/publications/bulletin/2011/mar/pdf/bu-0311-4.pdf>

**Exhibit 12***Top 20 Passenger Car Brands in China*

<b>Brand</b>	<b>Unit Sales</b>	<b>Market Share (%)</b>
Volkswagen	410,923	13.7
Hyundai	234,258	7.8
Honda	202,393	6.7
Toyota	198,857	6.6
Nissan	183,567	6.1
Chery	164,162	5.5
Buick	157,387	5.2
BYD	139,249	4.6
Suzuki	99,832	3.3
Geely	96,897	3.2
Chevrolet	94,684	3.2
Ford	82,965	2.8
Kia	73,807	2.5
Xiali	65,454	2.2
Mazda	64,061	2.1
Audi	55,466	1.8
Citroen	52,999	1.8
FAW	50,328	1.7
Great Wall	48,020	1.6
JAC	44,658	1.5

Source: June 22nd, 2009, China Automotive Monthly, <http://www.autoline.tv/journal/?p=4593>



**Exhibit 13**  
*BYD's F3DM Model*



**Exhibit 14**  
*Comparison of F3DM and Prius*

	<b>BYD F3DM</b>	<b>Prius 1.5</b>
<b>Official Price</b>	Around 150,000 RMB	259,800RMB
<b>Hundred-meter acceleration</b>	9 sec	9.9 sec
<b>Weight</b>	1.54 ton including battery	1.35 ton
<b>Engine</b>	BYD371QA 1.0L, all-Al motor, permanent magnet synchronous motor, F3DM output power reaches 125kW	1.5L 57kW L4
<b>Accelerating Chamber</b>	Twin-motor acceleration, CVT	Single-motor acceleration, reacher CVT
<b>Petrol consumption/100km</b>	Electric mode 100km+hybrid	4.3 (1/100km)

Source: [http://pk.315che.com/puruisi/biyadi\\_f3dm.htm](http://pk.315che.com/puruisi/biyadi_f3dm.htm)

**Exhibit 15**  
**BYD K9**



**Exhibit 16**  
**Key Players in the Electric Car Market**

**A selection of all-electric cars:**

BYD E6 (<http://www.byd.com/e6.html>)

- Up to 400 km on a full charge.
- Top speed of 185 km/h.
- Battery uses ferrous ion.
- Sales to the general public began in Shenzhen on October 26, 2011
- **US\$35,000**
- BYD Auto, China



Citroën C1 evie

(<http://www.theelectriccarcorporation.co.uk/evie.php>)

- Up to 112 km on six-hour charge.
- Top speed of 95 km/h.
- Lithium-ion battery.
- \$30,890 USD
- Electric Car Corporation, UK



Mini E (<http://www.miniusa.com/minie-usa/>)

- Lithium-ion battery.
- Not for sale; Only for use in trial by 500 members of public.



**Exhibit 16 (cont'd)**  
**Key Players in the Electric Car Market**

Mistubishi I MiEV (<http://www.mitsubishi-motors.com/special/ev/>)

- 160 km on single charge.
- Top speed of 130 km/h.
- Lithium-ion battery.
- Released in 2009 in Japan.
- Wider release due April 2010.



Nissan Leaf (<http://nissan.ca/en/default.aspx>)

- Up to 160 km on single charge.
- Top speed of 122 km/h.
- Lithium-ion battery.
- Release set for 2010 in Japan and selected North American markets.
- Price: 38,395USD

**Nissan LEAF™**

66 judges  
24 countries  
ten finalists  
one winner  
zero gas

**2011 World Car of the Year**



Tesla Roadster

(<http://www.teslamotors.com/goelectric>)

Up to 390 km per charge.

Top speed of 200 km/h.

Lithium-ion battery.

Costs \$109,000 U.S.

THE NEW  
ROADSTER



Source: <http://www.electricdrive.org/index.php?ht=d/sp/i/11551/pid/11551>

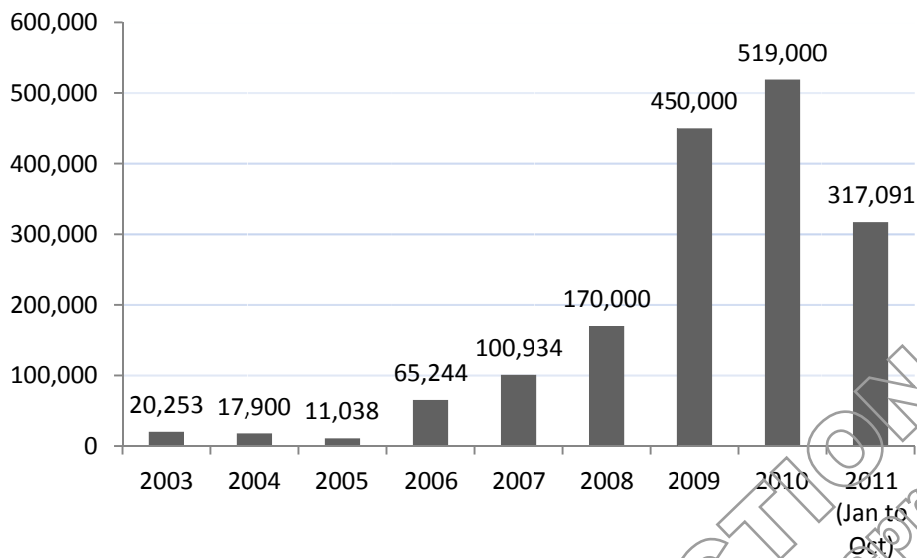
**Exhibit 17**  
**BYD Performance**

**Stock Performance 2008-2012**



Source: <http://www.bloomberg.com/quote/1211:HK/chart>

**Auto Sales by Year: 2003-2011**

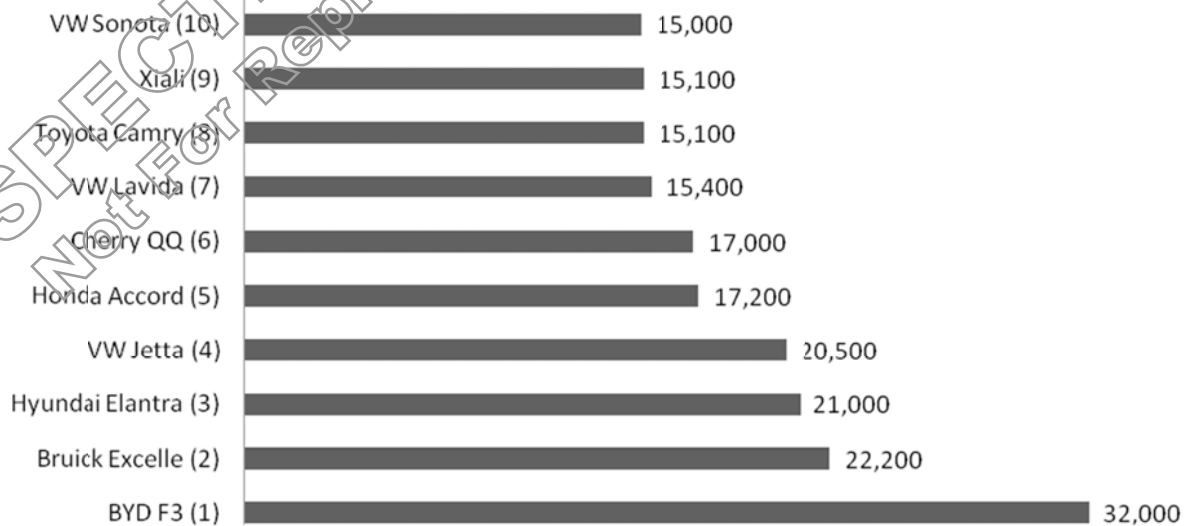


Source: data compiled from statistics by China Automotive Review  
<http://statistics.chinaautoreview.com/StatsModules/MonthlyStats/MonthlyStatsIndex.aspx?statsIDX=1>

**Exhibit 18**

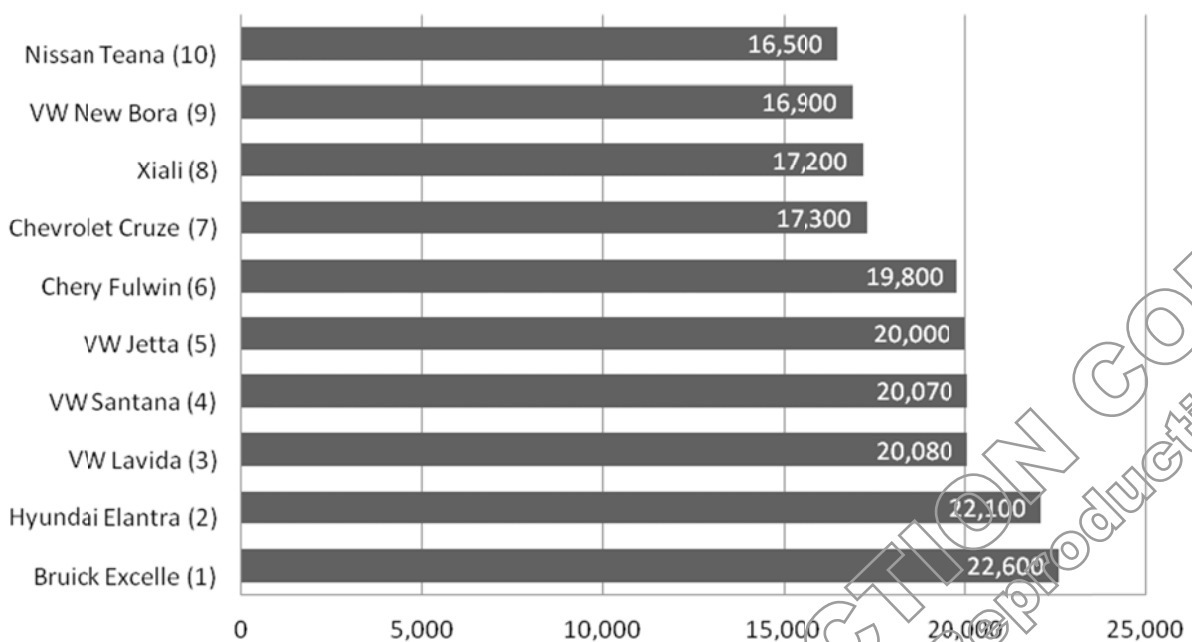
*BYD's Competitive Sales Performance November 2009 & September 2010*

**Top 10 Car Models by Sales in November 2009  
(China, in Units)**



Source: China Automobile Association Report, 2009, <http://auto.sohu.com/s2009/sar020/>

**Top 10 Car Models by Sales in September 2010  
(in Units)**



Source: 中汽协 2010 年 9 月车产销分析 <http://auto.sohu.com/s2010/sar042/>  
<http://www.carnewschina.com/2011/08/31/byd-planning-layoffs-in-sales-marketing-units/>

**Exhibit 19**  
*Auto Sales in China December 2011*

No.	Enterprise	sales	Brand	sales	Model	sales
1	SVW	104928	VW	153361	Honda Accord	25036
2	Dongfeng Nissan	77260	Toyota	86596	Volkswagen Sunny	24071
3	SGM	76779	Nissan	77260	Great Wall Hover H3	20776
4	FAW-VW	65989	Honda	74578	Volkswagen Bora	19271
5	Beijing Hyundai	63925	Hyundai	63925	Toyota Corolla	18481
6	Chery	61310	Chery	58382	Chevrolet Sail sedan	18321
7	FAW-Toyota	60733	BYD	52009	Honda Fengfan	17846
8	BYD	52009	Chevrolet	47060	Chevrolet Cruze	17493
9	Guangqi Honda	51522	Kia	45076	Honda CR-V	17380
10	Geely	45213	Great Wall	42482	Volkswagen Jetta	16394
11	Dongfeng Yueda Kia	45076	Buick	34916	Nissan Teana	16120
12	Great Wall	42482	Ford	30788	Nissan Sunny	15522
13	Dongfeng Peugeot Citroen	42095	Suzuki	25940	Great Wall Tengyi C30	15317
14	Changan Ford	32588	Haima	24450	FAW Xiali A + sedan	15250
15	Dongfeng Honda	26797	Citroen	22805	BYD S6	15012
16	Guangqi Toyota	25863	Peugeot	19290	BYD F3	14979
17	Haima	24450	Global Hawk	18340	Buick Excelle	13846
18	Changan Suzuki	17945	Benz	17786	Toyota Corolla EX	13686
19	Beijing Benz	17786	Skoda	17556	Chery QQ3	13502
20	Tianjin-FAW	17096	FAW	17096	VW-Polo	13027

Source: <http://baa.bitauto.com/fulwin2/thread-3184026.html>, [http://www.515fa.com/che\\_727.html](http://www.515fa.com/che_727.html)

**Exhibit 20**  
*BYD's Internationalization Steps*

<b>Date</b>	<b>Event</b>
1998. 12	Subsidiary in Europe was established;
1999. 4	Branch in Hong Kong was established;
1999. 11	Subsidiary in the USA was established;
2001. 4	Office in South Korea was set up;
2005. 8	Subsidiary in Japan was established;
2006. 3. 20	Subsidiary in Denmark was established;
2006. 12. 5	Subsidiary in Hungary was established;
2007. 3. 6	Subsidiary in India was established;
2007. 9. 11	Subsidiary in Romania was established;
2008. 1. 3	Subsidiary in Finland was established;
2010. 3. 10	BYD purchased the Japan Diyuanguanlin Factory;
2010. 4. 30	North America headquarter was established in LA, focusing on new energy and auto business, centre of sales, market, development and after-sale services;
2010. 5. 27	BYD signed a contract with Daimler, establishing BYD. Daimler New Tech Co. Ltd. in Shenzhen, taking half the shares each. This joint venture would develops EV for Chinese market;
2010. 7. 20	BYD's M6 went into the global market, beginning to enter the mid and high-end auto market;
2010. 9. 27	Warren Buffet, Charles Munger and Bill Gates came to Shenzhen and visited BYD's industrial parks;
2010. 12. 24	BYD's first E6 was put into market in Holland, marking its official entering into the European market, making it the first Chinese pure EV in the European market.

Source: BYD corporate website