

## California Dreaming: How a Chinese Battery Firm Began Making Electric Buses in America

June 2015



## Preface

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For decades, bilateral investment has flowed predominantly from the United States to China. But Chinese investments in the United States have expanded considerably in recent years, and this proliferation of direct investments has, in turn, sparked new debates about the future of US-China economic relations.

Unlike bond holdings, which can be bought or sold through a quick paper transaction, direct investments involve people, plants, and other assets. They are a vote of confidence in another country's economic system since they take time both to establish and unwind.

The Paulson Papers on Investment aim to look at the underlying economics—and politics—of these cross-border investments between the United States and China.

Many observers debate the economic, political, and national security implications of such investments. But the debates are, too often, generic or take place at 100,000 feet. Investment opportunities are much discussed by Americans and Chinese in the abstract but these discussions are not always anchored in the underlying economics or a realistic investment case.

The goal of the Paulson Papers on Investment is to dive deep into various

sectors, such as agribusiness or manufacturing—to identify tangible opportunities, examine constraints and obstacles, and ultimately fashion sensible investment models.

Most of the papers in this Investment series look ahead. For example, our agribusiness papers examine trends in the global food system and specific US and Chinese comparative advantages. They propose prospective investment models.

But even as we look ahead, we also aim to look backward, drawing lessons from past successes and failures. And that is the purpose of the case studies, as distinct from the other papers in this series. Some Chinese investments in the United States have succeeded. They created or saved jobs, or have proved beneficial in other ways. Other Chinese investments have failed: revenue sank, companies shed jobs, and, in some cases, businesses closed. In this sense, past investments offer a rich set of lessons to learn.

Damien Ma, Fellow of The Paulson Institute, directs the case study project.

For this case study of BYD Auto, we are grateful to Noah Shaw, a talented University of Chicago undergraduate working with the institute, for his research and enthusiasm for the project.

Case studies are reconstructed on the basis of the public record, personal interviews with participants, and journalistic accounts. They aim to reflect a best reconstruction of the

case. But they may have gaps and other inadequacies where the record is incomplete, facts are murky, or players chose not to share their views.

Cover Photo: Reuters/Mark Blinch

## Timeline

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- 1995** Wang Chuanfu founds BYD Company as a battery manufacturer in Shenzhen, Guangdong.
- 2002** BYD Co. lists on the Hong Kong Stock Exchange.
- 2003** BYD Auto Ltd. is created as a wholly owned subsidiary of BYD Company, following its acquisition of Qinchuan Auto Company.
- 2008**
- April* At the Detroit Auto Show, BYD Auto marks its North American debut with the F6DM hybrid.
- September* American investor/financier Warren Buffett purchases a 10 percent stake in BYD Co. for \$230 million through MidAmerican Energy Holdings Co., of which Buffett's Berkshire Hathaway owns 87 percent.
- 2009** BYD unveils its first pure electric vehicle, the e6, at the Beijing and Detroit Auto Shows.
- 2010** Los Angeles officials seal the deal with BYD to establish its American base in the city.
- 2011** BYD Auto opens its US headquarters in Los Angeles.
- 2012** BYD Auto undergoes a change in business strategy in the US market, switching from consumer cars to fleets and electric buses.
- 2013**
- March* BYD wins its first major US contract in an agreement with Long Beach Transit to supply 10 electric buses to that city by 2014.
- May* BYD opens two manufacturing facilities—an electric bus assembly plant and a separate battery factory—in the town of Lancaster, Los Angeles County.

- June* BYD wins a contract with the Los Angeles County Metropolitan Transportation Agency for five all-electric buses, with the option to purchase up to 25 buses.
- October* Following investigations in September, the California Department of Industrial Relations fines BYD nearly \$100,000 for labor violations.
- 2014**
- January* BYD delays to March the initial production date of buses at its Lancaster plant.
- February* The California Department of Industrial Relations drops the vast majority of the fines levied for labor violations.
- April* The Antelope Valley Transit Authority receives the first two buses produced at the Lancaster facility. Meanwhile, BYD's contract with Long Beach Transit for ten buses is terminated by mutual consent due to miscommunication at the time of contracting regarding the Disadvantaged Business Enterprise regulation.
- May* BYD's all-electric 40-foot bus passes in just 116 days the Altoona structural integrity tests required by the Federal Transit Authority for all bus production that aims to be eligible for federal funding.

## Players

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### United States

#### *City of Los Angeles, California*

Most populous city in California and second-most populous city in the United States.

#### *City of Lancaster, California*

Major industrial hub located in the Mojave Desert, approximately 70 miles outside downtown Los Angeles.

#### *Long Beach Transit*

Municipal transit agency with a fleet of 220 buses, operated by the Long Beach Public Transportation Company.

#### *California Department of Industrial Relations*

Part of the California Labor and Workforce Development Agency, which is responsible for workers' health and safety and firms' labor standards and compensation.

#### *Federal Transit Administration*

Agency within the US Department of Transportation that provides technical and financial assistance to local transportation systems.

### China

#### *BYD Company, Ltd.*

Headquartered in Shenzhen and listed on the Hong Kong Stock Exchange, a manufacturer of rechargeable lithium-ion batteries, petrol-powered economy cars, and hybrid and pure electric vehicles.

#### *BYD Auto, Ltd.*

Wholly owned subsidiary of BYD Co., founded in 2003 following the firm's acquisition of Qinchuan Automobile Company.

## Introduction

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In early 2014, fully electric buses began to roll off an assembly line in the Lancaster, California facility of BYD Auto, a Chinese manufacturer only recently arrived in the United States. These were the first Chinese electric buses ever produced in America. And the partnership they reflected—a tie-up between BYD (short for “Build Your Dream”) and the State of California—underscored the heady optimism that accompanied the dramatic growth of Chinese direct investment in the Golden State.

These buses ostensibly meant the culmination of years of work by Chinese and Americans—an upstart auto manufacturer in southern China and the local governments of Los Angeles and Lancaster. But the story of this venture was not, in fact, an easy one. Indeed, the BYD Auto venture in the United States had a rocky start. As early as 2008, BYD had aimed to enter the US electric vehicle (EV) market, but the company faced a series of challenges and complex situations. These soon dampened the firm’s initial fervor and high expectations, which persisted even as the company opened its US headquarters in 2011.



Photo: Flickr/Bunnicola

In one important sense, however, BYD’s major investment in California reinforced the transformation of a company founded in the 1990s as a battery manufacturer. In its earliest incarnation, BYD supplied high quality but affordable batteries to cell phone makers around the world. But in subsequent years, and after a series of risky investments by the company’s chairman, BYD began to remake itself into a vehicle manufacturer.

The company’s potential did not go unnoticed. As early as 2008, it had caught the attention of savvy investors, like US investment titan, Warren Buffett, even at a time when few Americans had heard of this

little-known, Shenzhen-based Chinese battery manufacturer. Buffett, through one of his investment vehicles, bought a 10 percent stake in the company, suddenly catapulting it into the global spotlight.

Within two years of Buffett’s initial investment, BYD Auto had solidified its deal with Los Angeles County and opened its North American headquarters within that city’s limits. Just over a year later, BYD made a major greenfield investment to build two separate manufacturing plants in Lancaster, California. The company’s

intent was to build and sell leading hybrid and EVs in the US market, which, it argued, would help cut carbon emissions, provide a boost to the local California economy, and gain for BYD a foothold in the still-nascent American EV market.

Some boosters and enthusiasts even viewed BYD's move as transcending a business case, arguing that it could become an important symbol of bilateral collaboration between the United States and China in the pursuit of clean energy technologies and solutions. For instance, then Mayor of Los Angeles Antonio Villaraigosa gushed at the company's ribbon-cutting ceremony: "We see BYD's Los Angeles opening as a catalyst that will usher in good jobs, global investment, and a more sustainable future."<sup>1</sup>

Suffice it to say that BYD rode a wave of high expectations across the Pacific Ocean onto American shores. The company's arrival in 2011 was heralded as a veritable new beginning for foreign direct investment, technological innovation, economic prosperity, and job creation in Los Angeles.

But that enthusiasm was quickly interrupted: Beneath the glowing rhetoric, a series of challenges to BYD soon arose. These threatened to derail its prospects of selling and producing electric cars and buses in America at nearly every turn.

BYD encountered an intricate ecosystem of business interests, advocacy groups, government agencies, and skeptical independent news outlets, not to mention a thicket of regulations. BYD struggled to navigate these challenges from the outset.

Even with its seemingly unlimited access to capital and big ambition, BYD soon found that dealing with the US political and media landscape could be fraught with obstacles for a foreign investor. This was especially true in the BYD case because it was a Chinese investor. Many Chinese firms, including BYD, as this case will demonstrate, initially perceive the US business environment and political climate to be similar to the Chinese landscape. Often, these assumptions are flat-out wrong.

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What follows in this case study is a detailed account of the various factors that threatened to turn BYD's California dream into a potential nightmare. But ultimately, the case is not a story of failure. Instead, BYD's story offers a cautionary tale about the pitfalls and complexities that confront ambitious Chinese investors in the United States.

After floundering initially, the company seems, as of this writing, to have regained its footing and moved into a position to continue manufacturing electric buses in the United States.

But the story is not over. Whether BYD continues to adapt—and thrive—in the American political and media environment remains a more open question.

The BYD/California case enlivens several important issues:

- How entering an emerging industry—in this case the EV market—can level the playing field for Chinese firms vis-à-vis their US competitors in a mature economy like the United States. This lesson has implications relevant to Chinese investment in other advanced economies—for example in Europe.
- How local government outreach and incentives—at both the state and municipal levels—can play a role in determining whether, where, and how Chinese firms choose to invest.
- How overly optimistic public pronouncements, promises, and high expectations can eventually prove counterproductive for both a Chinese investor and its American counterparts. Inevitably, difficulties arise and overly optimistic expectations can come back to bite a firm.
- How foreign investors, particularly Chinese consumer product makers, need to carefully manage intense media and political scrutiny. That scrutiny can be overwhelming, and the spotlight shines all the brighter

on Chinese firms operating in the United States compared to their homegrown American competitors.

- How US federal, state, and local regulations have the potential, whether deliberately or not, to deter a Chinese investor unfamiliar with US safety, quality, management, and human capital standards and practices.
- And finally, how Chinese firms that invest heavily in public relations can become more resilient. Taking a proactive, rather than a reactive, stance can be effective in the long run.

This case study begins by recounting BYD's origins as a battery maker. It then proceeds to discuss the firm's evolution into a car and bus manufacturer, as well as its subsequent decision to enter the US market.

More important than the initial BYD investment in California—although that certainly constitutes an important part of the context—were the post-investment challenges BYD was forced to confront. The case concludes by examining some of the issues BYD continues to face, notwithstanding its drive to establish a distinctive brand in the US market.

## BYD's Own Great Leap Forward: From Batteries to Cars

Wang Chuanfu, the driven man behind BYD's rapid ascent and seemingly overnight success, had been a chemist, before founding and becoming chairman of the company. Like many Chinese entrepreneurs and founders of his generation, Wang transcended his humble beginnings to forge a reputation both at home and abroad for risk-taking and strategic vision. One of Buffett's top executives, Charlie Munger, has described Wang as a "combination of Thomas Edison and Jack Welch," a high compliment from a tough-minded critic.<sup>2</sup>



Photo: Flickr/Mark Turnauckas

But unlike other entrepreneurial founders in China, Wang made a conscious decision not to establish a cult of personality. No photos or portraits of Wang plaster the halls of BYD's Shenzhen headquarters, although he does insist that all of his employees adopt his enthusiasm for physical fitness by participating in daily calisthenics and exercise.<sup>3</sup>

After completing his undergraduate studies at the Central South University of Technology in Hunan province and then a graduate degree from

the General Research Institute for Non-Ferrous Metals in Beijing, Wang quickly became convinced that China's underdeveloped battery industry had the potential to rival Japan's.<sup>4</sup>

To achieve such a goal, Wang needed significant capital to found his own company, so he tapped his personal network in pursuit of investors. One of these early investors was his cousin,

Lu Xiangyang. Lu, a successful businessman in his own right, founded the Guangzhou New Science Industrial Company in 1993, and then the Guangzhou Rongjie Investment Company in 1995.<sup>5</sup>

Lu agreed to take the plunge and invested in Wang's new venture, putting up about one-third of the initial capital through his Guangzhou-based company.<sup>6</sup>

The two other early investors in BYD were the Shenzhen Metallurgical and Mining Corporation, a conglomerate of smaller holdings, and the Shenzhen Lidasi Company Ltd. Each stakeholder took 64.4 and 4.5 percent, respectively. With total registered capital of 4.5 million yuan (\$500,000), BYD was born in January 1995.

But a mere two years later, in 1997, the Shenzhen Metallurgical and Mining Corp sought to exit its position in BYD to focus on its other business lines. This launched a process of several stock transfers, beginning with a shift of stocks to Guangzhou Rongjie, Wang Chuanfu himself, and Xia Zuoquan, a Hubei businessman who is credited with co-founding BYD but remains more in the background than Wang. In 2001, through another stock transfer, Wang and Xia came to own 50 percent of the company, with Lu’s entity holding the other 50 percent.<sup>7</sup>

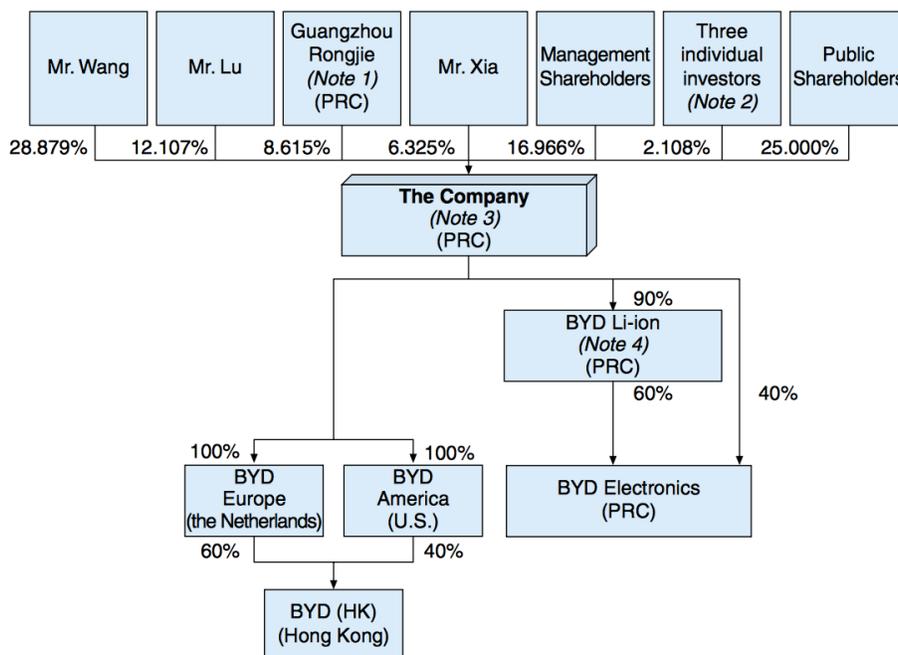
In preparation for listing the firm, the three shareholders diluted their holding again by forming a limited liability

company that, in 2002, distributed shares to a much larger group of about 40 shareholders. At this point, Wang held the largest stake at 38.5 percent, followed by Lu at 16.1 percent and Xia at 8.4 percent. In effect, Wang and Lu had control of the company. After the share offers, the structure of the company was as depicted in Figure 1.

**Battery Power**

Shareholding aside, to understand the full trajectory of BYD’s business, it is important to note that BYD did not begin as an EV manufacturer, but with a focus on the batteries that now power them. When it was founded in 1995, BYD

**Figure 1. BYD’s Ownership Structure after Hong Kong Listing**



Source: BYD Hong Kong Stock Exchange Prospectus, 2002.

arrived on the scene at a time when the battery industry in China showed signs of imminent take-off, and global demand was also starting to rise rapidly.

The company immediately focused on rechargeable batteries, which typically fall into four categories: nickel cadmium (Ni-Cd), nickel metal hydride (Ni-MH), lithium-ion (Li-ion), and lithium polymer (LIP).<sup>8</sup>

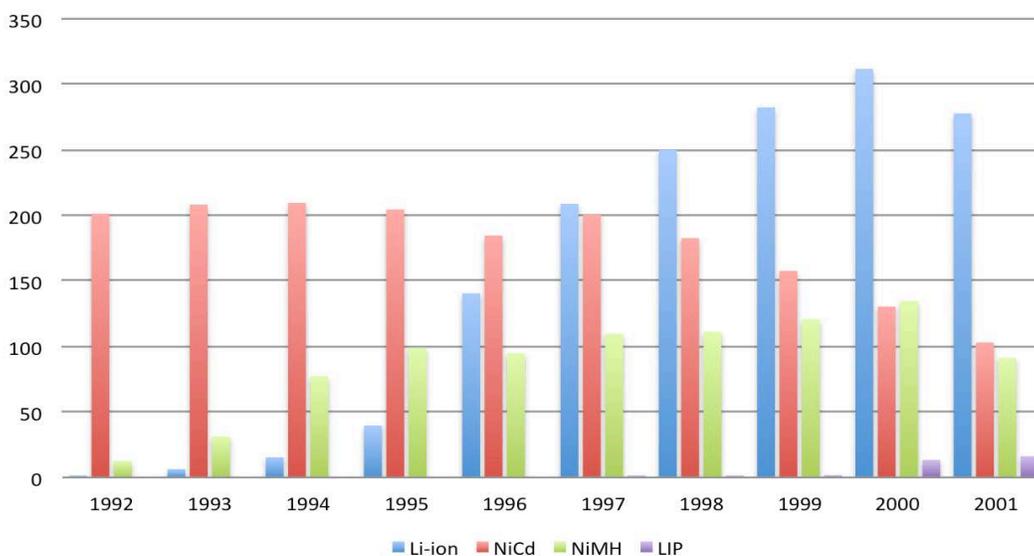
The battery industry, both in China and globally, grew on the back of the explosion in electronics and mobile devices that started in the 1990s. Countless products, from the Sony Walkman to earlier generations of cell phones, all needed rechargeable batteries of one form or another. And because Japan dominated the global electronics and gadgets market in the 1980s and

1990s, it also became the leading producer of the batteries that powered these personal devices.

Compared to these Japanese competitors, who dominated the high-end market with their advanced products, the early Chinese battery industry was small in scale, low in quality, and inefficient in its business practices. In fact, Japan had captured nearly 80 percent of the rechargeable battery market by 2001, making it difficult for new market entrants from other countries to compete.<sup>9</sup>

In its early years, BYD began to manufacture Ni-Cd batteries, which can be more environmentally damaging and potentially hazardous because of the presence of cadmium. But as Figure 2 shows, such a focus made economic

**Figure 2. Global Rechargeable Battery Shipments (billion Japanese yen)<sup>10</sup>**



Source: IIT Report, 2001.

sense for a young firm seeking to break into the market because Ni-Cd batteries dominated the market at the time of BYD’s entry. However, as the market shifted from these batteries, BYD proved nimble by adjusting its strategy and production capacity, moving quickly to manufacture Ni-MH batteries. Within another few years, the company had also moved into Li-ion batteries, adjusting to new market conditions as demand for this type of battery grew.

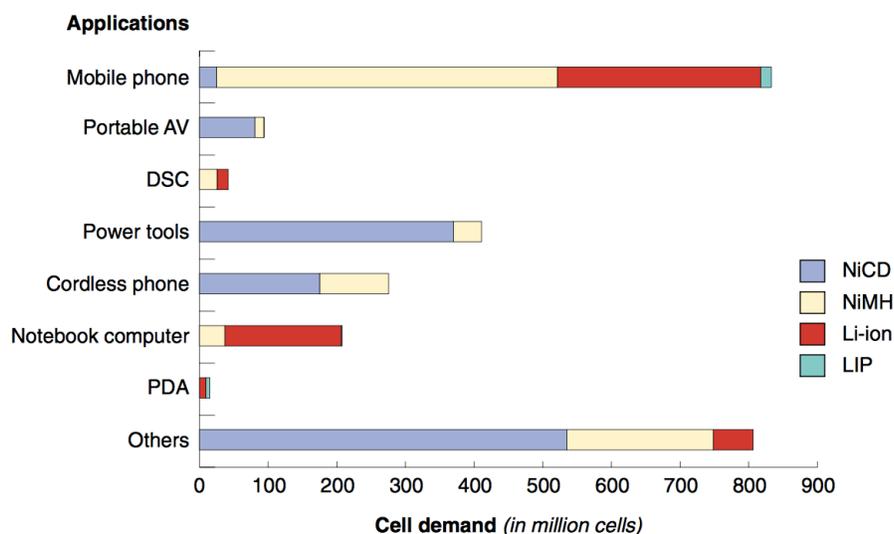
The Li-ion battery was in high demand at this time because of its energy density and lower environmental impact. Skyrocketing demand for Li-ion batteries was tied directly to the proliferation of mobile phones and laptops, where Li-ion became the preferred choice because of its unique properties. Riding this wave,

BYD listed in Hong Kong in 2002 with a workforce of more than 15,000 and producing 300,000 units of Li-ion and two million units of Ni-Cd and Ni-MH daily.<sup>11</sup>

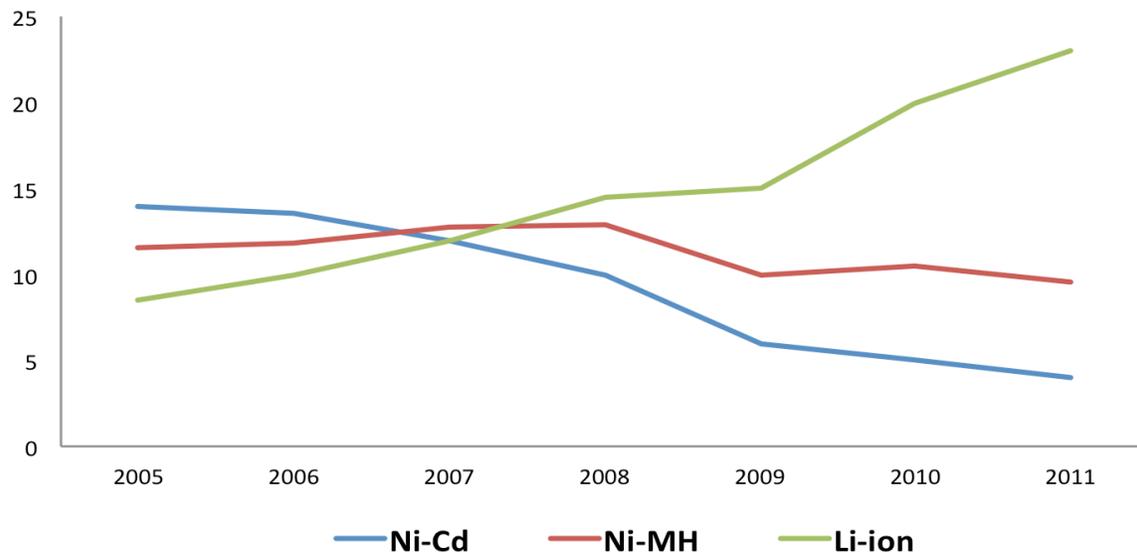
Figure 3 underscores the fact that mobile phones and laptops had become major drivers of Li-ion battery demand by 2001, even before smart phones had arrived on the scene. Since the manufacture and final assembly of these products subsequently migrated almost entirely to China during the 2000s, it made much sense for the batteries that would end up in these devices to be also made in China.

For firms in this market, close proximity to end users was advantageous and could help reduce costs. Ultimately, this allowed BYD to become a major supplier to device makers, and provided the company with

**Figure 3. Various Demand Drivers of Rechargeable Batteries<sup>12</sup>**



Source: IIT Report, 2001.

**Figure 4. Chinese Battery Production, 2005-2011 (in 100 million)**

Source: China Industrial Association of Power Sources.

an incentive to expand production. (BYD counted US Motorola and Korean Kyocera, among others, as some of its top customers.)

### **Competition**

At this point, many still believed that Japan would continue to corner the market for the foreseeable future. But BYD did not sit on the sidelines—Wang always intended to compete and chip away at Japan’s market share, particularly in the Li-ion market segment. Trends since the mid-2000s reflect this change: Chinese firms moved aggressively into producing this type of battery (see Figure 4).<sup>13</sup>

Amid a fragmented domestic battery industry—with no less than 1,000 distinct

Chinese battery makers, most of which were small and micro firms—BYD was able to maintain a strategic focus and become a dominant player in the Li-ion battery segment. This transition took place within about a decade (see Table 1).

BYD was able to wrest market share away from Japanese and Korean producers, although it still trailed behind foreign invested joint ventures, such as Tianjin Samsung and Sony Wuxi, in production volume. Nevertheless, BYD, along with its biggest domestic competitor Tianjin Lishen Battery, dramatically climbed the rankings to become among the top five global Li-ion battery producers. By the end of 2011, with the emergence of several major Chinese players, China had captured about 30 percent of the Li-ion market, while Japan and Korea each

**Table 1. Top Ten Battery Producers in China**

Rank	Company	Production (units)
1	Tianjin Samsung SDI Co. Ltd.	261,000,000
2	Sony Electronics (Wuxi) Co. Ltd.	235,000,000
3	BYD Co. Ltd.	216,000,000
4	Amperex Technology Ltd.	199,000,000
5	Tianjin Lishen Battery Co. Ltd.	157,000,000
6	Shenzhen BAK Battery Co. Ltd.	155,000,000
7	Shenzhen B&K Technology Co. Ltd.	108,000,000
8	Sanyo Energy (Beijing) Co. Ltd.	105,000,000
9	Zhongshan Tianmao Battery Co. Ltd.	99,000,000
10	Jiangxi First New Energy Co. Ltd.	75,000,000

Source: China Industrial Association of Power Sources.

held 30 and 34 percent, respectively. The three Asian giants effectively monopolized the global Li-ion battery industry.

To outmaneuver and catch up to these incumbent players, Wang bet that China had one crucial comparative advantage that Japanese manufacturers did not: abundant and cheap labor. Sony and Sanyo, the leading Japanese battery makers, relied on expensive machinery to churn out their batteries. By contrast, BYD deployed a manufacturing technique dubbed “human-based automation.”

This meant that machines were swapped out for human assembly lines, composed of thousands of workers on BYD factory floors. In fact, just two years after its establishment, BYD already had over 1,000 employees. This was a labor-intensive production model that soon

became closely associated with China, and especially so with Shenzhen, which became ground zero for the rise of China as a global manufacturing powerhouse in these consumer electronics and other market segments.

The extreme systematization of manual labor in China dramatically reduced costs, while still allowing BYD to beat its domestic Chinese competitors in product quality.<sup>14</sup> Although this did mean that BYD had to compromise on production efficiency—for example, Japanese batteries took approximately 20 steps to construct, while BYD’s took about 200—it was nonetheless able to slash costs and consistently under-bid the Japanese producers for contracts.<sup>15</sup>

Another factor in BYD’s low cost model was that the company did not have to invest much, if anything,

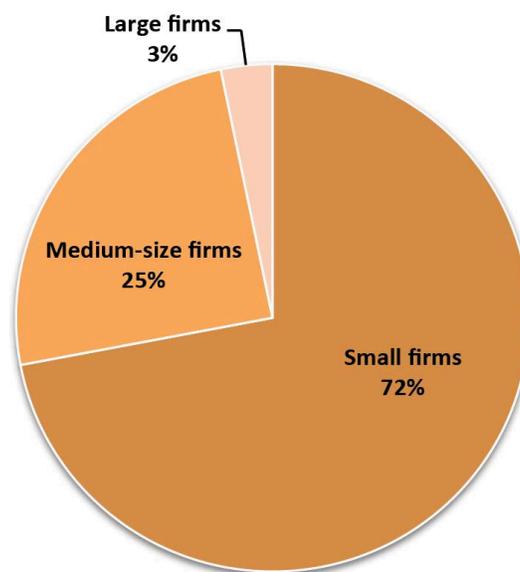
in inventing new technologies or research and development (R&D). BYD simply imitated Japanese batteries so closely that product differences were negligible, so BYD could subsequently sell them at a cheaper price.

This “digestion, then reproduction, of existing technology” model has been responsible for the rapid pace at which numerous Chinese manufacturers have caught up with their global competition. It is a central factor in the rise of the so-called “China price.” (Indeed, critics of BYD Auto would later point to the firm’s imitation of German and American automobile designs when Wang transitioned the company into mostly a vehicle manufacturer.)

In its financial results, however, BYD’s strategy seems clearly to have paid off. When BYD listed its shares in Hong Kong in 2002, it was the top Chinese manufacturer of rechargeable batteries. Moreover, the decision to move from simple nickel-based to more complex Li-ion batteries, although considered risky at the time, turned out to be a good bet. By the end of the 2000s, BYD had become one of the world’s leading suppliers of Li-ion batteries.<sup>16</sup>

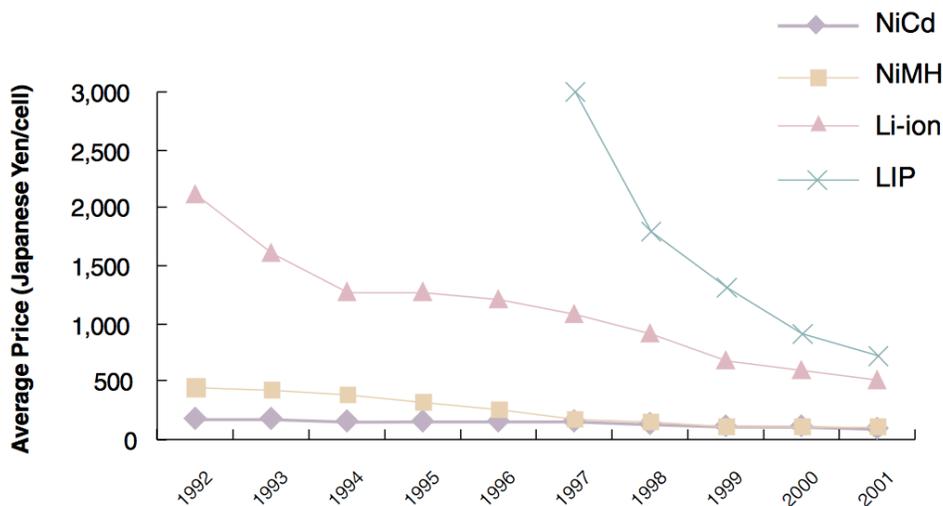
To be sure, few outside observers, nor most of the executives within the company for that matter, likely understood Wang’s motivation for taking the company public. But in hindsight, it seems evident that Wang moved toward an initial public offering (IPO) at an early

**Figure 5. Small Firms Dominate Chinese Battery Industry**



Source: China Industrial Association of Power Sources.

Figure 6. Price Declines for Battery Types<sup>20</sup>



Source: IIT Report, 2001.

date because he already had designs to execute the next phase of the company’s evolution. And for that, he needed to raise significant capital.

**Gambling on Cars**

Simply put, that decision involved making a transition from manufacturing batteries to manufacturing vehicles. And Wang’s decision to do so would alter the entire identity of the company. It proved pivotal in turning BYD from a battery firm into the EV maker that it is today.

In 2003, BYD decided to purchase Shaanxi Qinchuan Auto Company (Qinchuan Auto), an ailing state-owned automaker that was formerly a munitions factory and part of China’s military industrial complex.<sup>17</sup> With a price tag of 254 million Hong Kong dollars, BYD took a controlling

77 percent stake in the automaker, effectively bringing this state asset into private ownership.<sup>18</sup> Instead of purchasing Qinchuan Auto to gain hold of its existing manufacturing infrastructure, however, Wang apparently bought the company to access its production license.

That’s because production licenses are notoriously difficult to obtain in China, since the central government in Beijing limits the number of licenses issued. Without such licenses, it is very difficult for a new company to enter into passenger vehicle manufacturing.<sup>19</sup> So despite the protestations of his own board of directors and shareholders, Wang pushed forward with his ambition to become one of the world’s leading auto manufacturers, leveraging advantages from BYD’s labor-intensive assembly production lines.

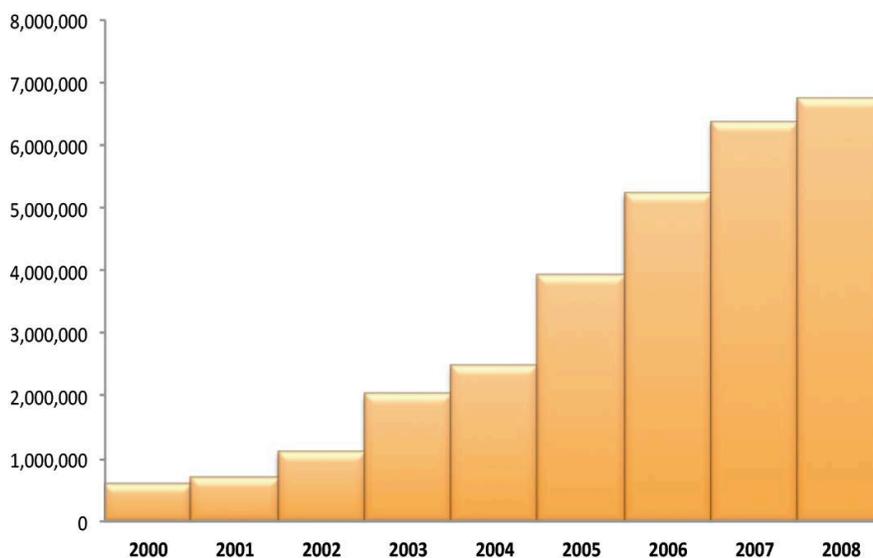
With production license in hand, and the begrudging support of his board, Wang in 2003 set up a wholly owned subsidiary, BYD Auto, which would first-and-foremost produce passenger vehicles. To be sure, Wang’s decision was not made in a vacuum. Profit margins for batteries were being squeezed by an inundation of Chinese competitors throughout the early 2000s, so Wang sought new ways to maximize BYD’s profits as price per unit for batteries dropped.

Chinese battery makers were small and fragmented, and they were not competitive threats to BYD in and of themselves. Yet collectively, these small firms made the market more saturated (see Figures 5 and 6).

At the same time, starting in the early 2000s, China experienced significant growth of its automobile industry, with many foreign manufacturers flocking to the country in pursuit of market opportunities (see Figure 7). Just as BYD rode a wave of consumer adoption of mobile devices, Wang believed that the future of the company lay in making sophisticated batteries for cars, which would actually focus the firm on developing even more advanced battery technologies.

But this was not all: Wang also seems to have believed that his company could build cars around its battery technology, making BYD into a vertically integrated firm. In other words, BYD made a strategic decision to diversify its portfolio at this critical point in its corporate history.

**Figure 7. China’s Automobile Production Annual Growth, 2000-2008<sup>21</sup>**



Source: OICA.

## BYD's Place in the Chinese Auto Industry

In 1995, Chinese consumers were buying fewer than 1.5 million passenger cars per year. But by the time BYD purchased Qinchuan Auto in 2003, vehicle sales in China had swelled to over 4.5 million annually and growing.<sup>22</sup> Chairman Wang clearly wanted to participate in this burgeoning Chinese auto market. But BYD faced the strategic challenge of competing as a latecomer in an industry that was already chock full of local auto champions.

China has a notoriously fragmented auto industry, with over 50 different domestic manufacturers, including well-known brands such as Anhui-based Chery, Hubei-based Dongfeng, and Zhejiang-based Geely. The central government has repeatedly tried to consolidate this industry, yet its efforts have been met with intense resistance.

Local protectionism is strong, and intra-provincial competition has yielded a fierce defense of local industry by provincial governments. Many Chinese provincial governments have aimed to have a leading automaker in their jurisdiction, in a bid to create their own version of a “Chinese Detroit.”

In this context, foreign investors have established numerous joint ventures (JVs) with local Chinese automakers to dominate the high-end market in

China (see Table 2). Shanghai GM, for example, is one of the largest foreign auto manufacturers in China, selling 3.16 million units in 2013.<sup>23</sup> In the typical auto sector JV model, the company is structured so that, for example, US-based General Motors can own 50 percent, while the remaining stake in the JV is owned by a Chinese firm—in this case, the Shanghai Automotive Industry Cooperative (SAIC). (Another example is Beijing Hyundai, a Sino-Korean JV that has an identical ownership structure to Shanghai GM, with 50 percent owned by Korea-based Hyundai and the other 50 percent by the Beijing Automotive Industry Holding Co., Ltd.).

And yet this fragmentation of the auto industry meant that, in acquiring Qinchuan, BYD could quickly move into the market without having to start from scratch to catch up with incumbent players. In particular, BYD wanted to

**Table 2. Foreign JV Market Share (%)<sup>24</sup>**

Company	2013 Market Share
Volkswagen	15.1
General Motors	14.5
Hyundai	7.6
Nissan/Renault	4.8
Changan	4.7
Ford	4.6
BAIC	4.4

Source: IHS Automotive.

compete with the likes of Geely, also a relatively successful and privately-owned car company. BYD believed that just as it had done in the battery industry, it would eventually come to dominate the Chinese auto industry.

But things did not go precisely according to plan. As it turned out, making a successful car that Chinese consumers wanted and would find credible was a different sort of enterprise from manufacturing batteries. BYD could indeed produce a vehicle that competed well with other domestic manufacturers, yet it was a taller order to compete with the likes of Volkswagen, Hyundai, and Toyota, whose JVs all produced high quality automobiles based on rich design and production experiences in the global industry.

Perhaps not surprisingly, then, BYD Auto ran into difficulties from the outset. For instance, in 2004, when the company rolled out its first model, Wang decided to scrap this first vehicle because he found the design to be substandard. “It was a hard decision, and a lot of people in the company opposed it,” Li Qian, Director of BYD investor relations, has recalled. “But Chairman Wang decided the car wasn’t good enough and we had to start over.”<sup>25</sup>

Only in 2005 did the company’s first model, the F3, finally go on sale,

priced at a little over \$10,000. The F3 proved to be commercially viable, partly because the quality of Chinese domestic automobiles was still quite poor at the time and it could compete. By 2009, five years after the launch of the F3, BYD had essentially completed its transformation from battery producer to automaker. That year, BYD became one of the top three homegrown car brands in China, and the F3 compact car became its best-selling model, with sales of more than 22,000 vehicles in the month of April 2009 alone.<sup>26</sup>

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*Making a successful car that Chinese consumers wanted and would find credible was a different sort of enterprise from manufacturing batteries.*

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While BYD still maintained its battery production, that market segment

became a coda to its new main profit center in the auto market. To illustrate, from January to June 2009, BYD generated \$1.28 billion in revenues from auto sales and just \$190 million from battery sales.<sup>27</sup>

Part of BYD Auto’s success flowed from the fact that the firm followed a deliberate strategy to distinguish itself from domestic competitors. Those firms generally offered dozens of car models. In contrast, BYD was careful not to inundate the market and thus confuse consumers with a large array of vehicles. It opted instead to roll out a selective number of models, and to do so slowly. That strategy, in turn, allowed the company to corner a no-frills yet reliable niche in the domestic market.

As a result of these developments, BYD acquired a reputation in the Chinese auto industry for three things: producing only a small number of car models, producing these few models cheaply, and producing them at a quality considered “good enough” by first-time Chinese car buyers.

### ***Combining Strengths***

But the central challenge for BYD still rested on how it would compete with more advanced foreign players. If the company could not compete *directly* with established players in the existing class of products, then it needed to forge an alternative way to offer other products that would have market appeal.

To put this a bit differently, as a latecomer to the Chinese auto industry, BYD judged that it had one major advantage that could turn it into a first-mover and level the playing field: namely, its core competence in battery manufacturing.

Indeed, at this time, BYD was one of the only companies in the world that was both a Li-ion battery producer and a car manufacturer. So while it would be difficult for BYD to dethrone companies such as VW and Hyundai in the high end gasoline vehicle segment, there was yet no clear frontrunner in the hybrid and EV segment.

The batteries within EVs are, in fact, complex and sophisticated. BYD

reasoned that it could leapfrog to close the gap with foreign competitors. Starting in 2009, therefore, once BYD Auto had finally established itself as a leading domestic auto manufacturer, the firm began to move seriously into the electric and hybrid vehicle industry.

Several domestic and external factors likely prompted the company to jump into this new sector. For one thing, demand for alternative energy vehicles was heating up in 2007-2008, as rising oil prices began to hit consumers’ pocket books.

Second, the market was far from mature and saturated, providing an opportunity for an ambitious new entrant. For instance, while Japan’s Toyota and Honda had some success with the Prius and Civic hybrids in the early 2000s, for the most part, they struggled to establish dominant market positions quickly. The Prius, perhaps the most successful hybrid vehicle in the world, sold just about 158,000 units in 2008 in the US market, while the Camry sold nearly three times more units in the same year.<sup>28</sup>

Third, pure EVs were even less mature, both in terms of technology and marketplace, with high-end makers, such as Tesla and Fisker, not faring well with their initial attempts. The Tesla Roadster, while much anticipated by consumers and media, was never going to carve out huge market share because of its six-figure price tag. In fact, Tesla ended the production of

Roadsters at 2,500 units.<sup>29</sup> Likewise, major automakers, such as GM, Chrysler, Nissan, and Mitsubishi, were just rolling out their EV prototypes.<sup>30</sup> In other words, BYD had some potential to produce a pure EV that would be cheaper and have mass-market appeal.

One last consideration: BYD seems to have had a good nose for sniffing shifting political winds. The Chinese government was keen not to miss out on a presumed “third industrial revolution,” which was said to include new energy and other information technology sectors. Beijing wanted, as a matter of policy, to back promising new industries and technologies that would align with its broader goal of creating an innovative and value-added economy in China.

As early as 2008, therefore, the Chinese central government made clear that it was going to support this nascent industry. That year, 13 cities were chosen as pilots for EV adoption.<sup>31</sup> And by 2010, support had coalesced around the EV industry as one of a small number of so-called “strategic emerging industries (SEIs),”<sup>32</sup> eventually formalized into the national Chinese “Energy-Saving and New Energy Vehicles Industry Development Plan (2012-2020),” released two years later.



Photo: Flickr/Abdullah AlBargan

By 2012, China already had more than 11,000 pure EVs on the road, constituting 6.2 percent of total global EV stock.<sup>33</sup> And consistent with the influence of policy considerations, the vast majority of these vehicles were not privately owned, but were essentially sold through heavily subsidized local government procurement programs to fill out taxi fleets.

Yet the national EV industry plan had wildly ambitious targets, such as having 500,000 EVs on the road by 2015 and 5 million by 2020, which were unlikely to be met.<sup>34</sup> But as part of a concerted effort to reach these

goals, Beijing offered a very generous consumer subsidy of up to 60,000 yuan (\$10,000), with cities such as Hangzhou in Zhejiang province boasting an even higher subsidy.<sup>35</sup>

To be sure, this was not so simple for the consumer: the BYD e6 pure EV still costs nearly 370,000 yuan (about \$60,000) after the subsidy is applied.<sup>36</sup> And while some cities have moved to build up EV charging infrastructure, there remains a large infrastructure deficiency with no coherent, national plan to expand the infrastructure. Yet for all these constraints, EVs looked like a smart investment.

Despite the severe economic downturn triggered by the global financial crisis, BYD was moving into a sector that had strong government support. EVs appeared to be a fairly wide open market, characterized by pent-up demand. BYD also judged that it had some technological advantages that could allow it to compete successfully. Fundamentally, if BYD succeeded in its EV endeavor, it would lead the industry in this product category and be hailed as a national champion.

### ***Not Just Cars, But Buses Too***

Beyond the passenger vehicle industry, BYD also invested heavily in the electric bus segment, an endeavor for which it had almost no existing competition in China. Backed by central and local government support, BYD began to invest heavily in bus-

related facilities in Changsha, Hunan province, which would produce EV buses domestically.

These buses fit nicely into BYD's existing EV lineup since their main component, the battery, only needed to be enlarged from a car to a bus-sized unit, but without having to adapt the battery in any significant way. And since BYD could already build a car, it was not a significant leap to make buses as well.

In 2011, BYD sold 200 electric buses to its home city of Shenzhen, but was also able to sell to the cities of Changsha and Xi'an, among others.<sup>37</sup> With this modest but initial success in its domestic market, as well as confidence in its technology and manufacturing capability, BYD began to seriously consider the idea of bringing these products to the US market.

## Looking Across the Pacific

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Between 2004 and 2008, BYD more than quadrupled its revenues on the back of the success of its auto subsidiary.<sup>38</sup> In 2008, BYD Auto made its North American debut at the Detroit Auto Show, showcasing its hybrid F6DM mid-size sedan, likely in an attempt to test the waters of the US market. Later that year, BYD's F3DM compact sedan, which was based on its domestic best-selling F3 model, gained the distinction of being the world's first full plug-in hybrid (PHEV) to reach market.<sup>39</sup>

### **The "Buffett Bump"**

The accumulation of BYD successes apparently attracted

the attention of Warren Buffett, the renowned investment guru who is also widely admired in China. Seemingly impressed by Chairman Wang's business acumen and BYD's potential for leadership in the EV market, Buffett's MidAmerican Energy purchased a 10 percent stake in BYD. As reported in the *Financial Times*, the chairman and chief executive of MidAmerican Energy David Sokol said, "BYD is at the cutting-edge of battery technology and we believe electric vehicles are ultimately where all technologies will go."<sup>40</sup>

This "Buffett bump" helped to send BYD's share price soaring—jumping nine-fold within a year. That also helped

to catapult this hitherto successful but little-known Chinese company onto the global stage. BYD's share price on the Hong Kong Stock Exchange skyrocketed from HKD 7.61 on September 23, 2008 to HKD 85.50 on October 23, 2009.<sup>41</sup>

This US investment gave BYD the global recognition it believed it needed to prepare for entering the US auto market. In fact, BYD had been exporting batteries to the United States for a decade, but establishing a footprint in the

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*BYD had been exporting batteries to the United States for a decade, but establishing a footprint in the competitive US auto market was a high hurdle.*

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competitive US auto market was a high hurdle. Still, Wang expressed confidence in his understanding of the political and

economic environment in the United States. He reflected on his experience with batteries and clearly viewed the economic downturn of 2008 as an opportunity for overseas expansion.

### **Entering the US Market: Timing is Everything**

The precise timing of BYD's decision to enter the US market is important. Two factors, beyond the publicity the Buffett-sponsored investment attracted, bolstered BYD's case for expansion into the United States.

First, in response to domestic economic troubles, Beijing unleashed

a gargantuan 4 trillion yuan (~\$600 billion) economic stimulus, aimed in part at supporting SEIs. A combination of grants, subsidies, and cheap loans from state-owned banks were accompanied by tax breaks to consumers who purchased alternative energy vehicles.<sup>42</sup>

The Chinese government's motivations for encouraging alternative energy industries were manifold, but the most important was an export sector in free fall, as demand from developed economies severely contracted during the global recession. The economic crisis laid bare longstanding vulnerabilities in a Chinese economy that had over-relied on producing low-cost goods for export to foreign markets.

Policymakers in Beijing now proposed to dramatically reduce the economy's reliance on low-margin, low-value-added exports and instead to create more innovative, high-tech industries with greater brand equity. In addition, supporting new-energy vehicles fulfilled another policy objective: Beijing could help to reduce the level of urban pollution and China's dependence on imported foreign oil. Both of these were major conundrums for the Chinese government.

In the United States, meanwhile, a similar dynamic was taking place. As part of President Barack Obama's nearly \$800 billion stimulus package, authorized by the American Recovery and Reinvestment Act of 2009, \$2.4

billion in federal grants were pledged to US manufacturers to develop next-generation vehicles and batteries.<sup>43</sup> The federal government had already created a \$25 billion "Advanced Technology Vehicles Manufacturing Loan Program" as part of the 2007 Energy Independence and Security Act to help revive the ailing American auto industry.<sup>44</sup> These generally took the form of bridge loans, \$465 million of which went to Tesla in 2009.<sup>45</sup>

On the demand side, the US government had taken other steps, such as the "Energy Improvement and Extension Act of 2008," which contained a new tax credit for plug-in hybrids and EVs for less than a year after the first 250,000 units were sold. This credit provided a base of \$2,500, plus \$417 for each kWh of battery pack capacity in excess of 4 kWh.<sup>46</sup> And on top of these federal subsidies, many US states, notably California, have offered additional incentives aimed at lowering the cost of hybrids and EVs.

But even beyond industry-specific support, the US market held considerable appeal for a company like BYD. The EV market in the United States was, and remains, largely devoid of major incumbents. Besides the Chevy Volt, the Nissan Leaf, and the Tesla, the EV market is mostly made up of various hybrids, with the most successful being the Prius. While companies such as Tesla have commanded outsized publicity, their current market positions are still

quite modest. Indeed, these three major EVs constitute only a small percentage of the overall alternative energy vehicle market and a miniscule share of the overall auto market.

As late as 2014, for example, the three companies, taken together, sold only about 7,000 EVs per month to American consumers,<sup>47</sup> compared to about 1.3 million/month total cars sold in 2013.<sup>48</sup> And there is a good reason for the slower rate of EV adoption: unlike hybrids, EVs require the appropriate infrastructure ecosystem to support it, in particular charging stations.

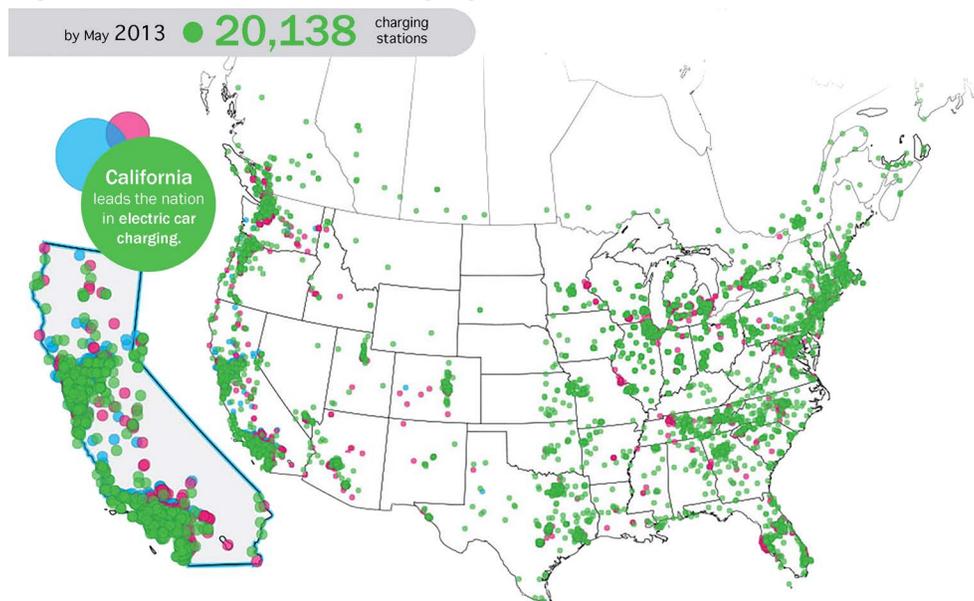
In 2011, the United States had just 1,972 charging stations, with most of these located in California. So even though EVs

have been largely marketed as commuter cars—a vehicle to shuttle people back and forth from home to work—the dearth of charging stations may be a significant psychological impediment for the American consumer, limiting the market potential of EVs generally.

But BYD calculated that this could soon change. As seen below, the number of charging stations had increased to 20,138 by mid-2013, mostly concentrated along the coasts and with a few even scattered across the interior of the United States (see Figure 8). That figure is about one-eighth the estimated number of gas stations in America.<sup>50</sup>

In short, while Americans are unlikely to take an EV on a cross-country road

**Figure 8. Distribution of Charging Stations Across the United States<sup>49</sup>**



Source: Ecomento.com.

trip anytime soon, the improvement in infrastructure has enabled companies such as Tesla to finally thrive and thus allow consumers to become more comfortable with EV technology. There was yet another factor at work for BYD: state governments across the United States were scrambling in the wake of the financial crisis to create “shovel-ready” jobs. Governors, legislatures, and other state and municipal leaders saw foreign investment as one tool to help reverse the economic downturn.

Even as the crisis began to subside, foreign capital was not flooding America’s shores, as many advanced

markets continued to reel from the economic downturn.

Yet China and many Chinese firms had weathered the economic storm better than OECD countries, relatively speaking. Consequently, the wave of Chinese outbound foreign direct investment (OFDI) picked up steam. For instance, while it still trailed countries such as the United States and Japan, China achieved a compound annual growth rate of 23 percent in outbound investment projects from 2006-2010.<sup>51</sup> Not surprisingly, many cash-strapped US state and municipal governments, hoping to revive their local economies, competed to attract Chinese capital.

## BYD Moves Toward a US Investment

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**A**s early as 2008, when there were virtually no EVs on American roads, BYD had begun to consider a direct investment in the United States. In China, BYD had already become a large supplier of taxi fleets to local municipalities, and the firm had established a large network of buses in a few of these Chinese cities. The company deduced that if it entered the US market with a viable alternative EV model, it could have some success given the potential for growth and the lack of extant competition.

By 2009, as noted earlier, BYD had made its first splash on US soil at the Detroit Auto Show by showcasing the world's first pure EV, the e6 plug-in crossover.<sup>52</sup> The battery technology in the e6 has been compared to the Chevy Volt, which can travel 40 miles on a single battery charge. BYD's e6, some claimed, could travel as much as 250 miles on a single charge.<sup>53</sup> In addition, EV batteries have been known to be unstable and potentially flammable, but the e6 has not had a confirmed battery incident to date.

In 2010, further fueling BYD's overseas ambitions, *Bloomberg BusinessWeek* ranked BYD the world's eighth most innovative company, placing it ahead of established automakers, such as Ford, VW, and BMW. The magazine even put BYD first in its annual Tech 100 ranking, beating out Apple, Amazon, and Tencent.<sup>54</sup>

BYD's rise had been meteoric, and the praise lavished on the company significantly raised its global profile, especially in the United States. BYD Auto, when it first planned to sell cars in the US, intended to make the e6, along with the F6DM, the company's flagship car.

### *From Shenzhen to the City of Angels*

To execute this plan, the firm looked to California. On face value, the state seemed a good fit for BYD—famous for its progressive ethos, receptivity to green energy technology, and consumer willingness to pay at a higher price point. These factors alleviated one of BYD's general concerns—that it locate in a market ready for its EVs (see Box).

More broadly, California's advantages include its behemoth \$2 trillion economy—a single state economy analogous in size to the entire Italian economy. California encompasses vibrant and diverse industrial and manufacturing sectors that align well with demand drivers in China, namely high tech, agriculture, luxury real estate, and a global entertainment industry. It was little surprise, then, that the state's endowments would have appeal to Chinese investors in the first place. Moreover, trade and investment between California and China had already been robust.

But the state did not simply wait for BYD—it courted Chinese firms. With a track record as a “gateway state” for many Chinese investors, California has consistently tried to position itself as an attractive place for China’s OFDI. In recent years, this effort has seemingly paid off, with California attracting fully 29 percent of all US-bound Chinese investment from 2000 to 2011, more than any other US state.<sup>55</sup> And Chinese investments in California have included some of that country’s most prominent firms, including Internet giants Sohu and Baidu.<sup>56</sup>

In 2005, building on these formidable advantages, then California

Governor Arnold Schwarzenegger joined forces with ambitious local leaders and business executives to launch a

campaign to court Chinese investors.<sup>57</sup> One such leader was Los Angeles Mayor Villaraigosa. Facing an unemployment rate of 12 percent and the exodus of several major corporations in search of lower-tax locales for their headquarters, Villaraigosa sought to stimulate the city’s economic base and create new and preferably high-paying jobs.<sup>58</sup>

So in 2010, he established the municipal Office of Economic and Business Policy and appointed First Deputy Mayor Austin Beutner as its chief executive. Beutner, a co-founder of one of the world’s leading private equity firms Evercore Partners,

ultimately played a key role in bringing BYD Auto to the city.<sup>59</sup>

Still, Los Angeles was not the first choice for BYD Auto when it sought to locate its North American headquarters. The city’s complex regulations, such as long wait times for project approvals through city government, and a multiplicity of tax regimes not found elsewhere, gave BYD pause. So the company was simultaneously scouting US locations across the state, including in Apple’s northern California hometown of Cupertino, as well as in Texas and New York in search of a more favorable business environment.<sup>60</sup>

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*With a track record as a “gateway state” for many Chinese investors, California has consistently tried to position itself as an attractive place for China’s OFDI.*

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The city of Los Angeles went on the offensive, however, reaching out to BYD through Bill Allen,

who at the time ran the Los Angeles Economic and Development Council. Allen knew BYD executives personally and was able to get them to the table with Villaraigosa and Beutner. To keep BYD at the negotiating table, Beutner wooed its executives with a package of incentives that included nearly \$2 million in tax breaks and another \$2.4 million in federal loan guarantees to pay for a facility in the downtown business district. BYD would also benefit from being included in the “State Enterprise Zone,” which offers incentives, such as “employer hiring credits, sales and use tax credits, and net interest deduction.”<sup>61</sup>

Nor was that all. Los Angeles also sought to piggyback on the state government's generous consumer rebates of up to \$5,000, under its Clean Vehicle Rebate Project for zero-emission vehicles (BYD's e6 qualifies for \$2,500).<sup>62</sup> And Los Angeles officials also offered free publicity, showcasing BYD vehicles at LAX airport and even pledging to persuade a celebrity to show up in a BYD vehicle at the Academy Awards.<sup>63</sup>

Ultimately, favorable subsidies at the state and municipal levels, as well as

the targeted package of incentives put together by city officials, convinced BYD to situate its US headquarters in Los Angeles and to begin its American campaign.

Led by senior executive Stella Li, BYD Auto opened its North American headquarters in 2011 to some fanfare. In its press release, BYD announced its intention to bring "150 green-collar engineering and management jobs focused on research and development to Los Angeles." The company also promised that "green technology

### BYD Gets Its Feet Wet in California

Even before BYD broke ground on its Los Angeles headquarters, the automaker made its first major move into the American market by establishing a hybrid/EV testing program with the Housing Authority of the City of Los Angeles (HACLA). In late 2010, BYD agreed to lease ten F3DM sedans to HACLA for \$400/month for one year, replacing the agency's existing fleet of Toyota Priuses.

HACLA uses vehicles to facilitate site visits for its employees. The cars are used throughout the day on a rotational basis, based on which employees are going on site visits, in a model very similar to a fleet structure. Because of the cars' high usage rate,<sup>64</sup> HACLA tends to procure the most energy efficient cars as a cost-saving measure. And while the Toyota Prius had been the preferred choice for HACLA, once BYD entered the US market, the organization decided to give BYD's hybrid sedans a try.

This deal was significant for BYD because it gave the firm its first opportunity to showcase its product and brand to a wider American audience. And BYD was helped by the fact that the arrangement was through a reliable government procurement process, something that resonated with BYD's experience with Chinese local governments. The BYD-HACLA deal also gave the Chinese automaker an opportunity to see how its cars would perform on American roads.

The results of HACLA's first-year trial led to a second-year extension upon completion of the one-year contract.<sup>65</sup> The vehicles were reported to have lived up to the expectations set by BYD, traveling up to 60 miles daily on pure electricity and managing to lower fuel costs by 76 percent compared to previous HACLA fleets. The BYD cars can also be switched to PHEV mode to travel more than 60 miles if necessary. The Prius, by contrast, works only as a PHEV and can never go fully electric. This means that for the majority of short trips, which are under 60 miles, the F3DM had no gas cost. Additionally, the F3DM did not need to undergo significant EPA and NHSTA testing because the car was not available for sale to the public.

investment will generate hundreds of additional jobs in the region.”<sup>66</sup>

BYD initially wanted to create a nationwide network of privately owned, exclusive dealerships, which would “sell BYD’s landmark dual-mode e6 pure EV to consumers and commercial fleets, long-range commercial eBuses, rapid charging stations, LED and solar-powered street and parking light systems, residential solar systems, and replacement parts.”<sup>67</sup> This was essentially BYD mirror-imaging the Tesla business

model, since that firm, too, had sought to set up an exclusively branded shop to sell its own products without having to deal with distributors. Like Tesla, BYD bet that this model could have a significant influence in raising brand awareness among consumers.

For his part, Villaraigosa voiced full-throated support for BYD’s expansive aspirations. The mayor lauded its potential to realize “our vision of a more sustainable future.”<sup>68</sup> In short, expectations for BYD in 2011 could not have run higher in Los Angeles.

## Reality Sets In: BYD Pivots to a New Business Model

The honeymoon period, however, was fleeting, as doubts soon began to creep in. Capital alone could not buy success. Nor could it buy local knowledge, experience in post-investment management, public acceptance, consumer confidence, or market demand. These elements would come only with time and experience. And that was just one of the lessons BYD learned in the three years that followed its ostensibly triumphant debut in Los Angeles.

In fact, a shadow already hung over BYD's newly announced headquarters from the get-go. The company had anticipated setting up shop by the end of 2010 and hiring up to 150 employees by the end of 2011. But the company had missed that ambitious timeline by nearly a year, postponing its arrival in Los Angeles to October 2011. Instead of 150 employees, the firm took on just 20 staff initially.<sup>69</sup>

What happened? One problem was due to delays in the permitting process. Another involved slow-moving building renovations. But the larger reasons, which foreshadowed BYD's subsequent tough road, touched the company's

inadequate understanding of US regulations. Equally important, the firm soon began to reconsider its initial enthusiasm for an "exclusive dealership" business model.

Although BYD Auto had some experience operating in the US market through its battery subsidiary, the car market is an entirely different beast. Unless there are serious defects,

batteries are usually treated as indistinguishable commodity products to which few consumers give a second thought. But a car, much less an electric one, requires a very high level of credibility with consumers and

brand awareness. To many Americans, EVs are still a rarity—an unproven technology—so the burden shifts to the automaker to ensure that consumers trust their products.

In this regard, BYD Auto made several missteps at the outset that subsequently made its life in the US market difficult.

For one thing, BYD seemed not to have considered the experience of Geely and Chery, two Chinese competitors that



Photo: Flickr/LA OEBP

had already attempted to enter the US market but failed to gain traction.

Second, BYD's ambitious plans to sell its products were stymied in part by industry and consumer skepticism about Chinese-branded vehicles.

Third, BYD significantly underestimated the difficulty of establishing a network of exclusive dealerships.

The fact is, the advanced and mature American auto industry is replete with entrenched interests and integrated ecosystems, including dealerships. Market entry for any new player is already very challenging, let alone a foreign investor. For instance, it took Japanese automakers many years before they became successful in the US market, and even then, Japanese brands did not establish their own exclusive dealerships.

So the Chinese automaker faced the broad-based difficulty of persuading American consumers to adopt almost an entirely new technology, and with a car costing about the same as higher end luxury US and Japanese gasoline sedans.<sup>70</sup>

BYD responded, first, by mounting a marketing campaign, but the company tied its own hands by eschewing a high-profile brand awareness strategy. Micheal Austin, a Vice President at BYD, put it this way: "Chairman Wang wants our technology to speak for itself. He

prefers for BYD Auto to remain out of the limelight and doesn't believe in flashy advertising campaigns."<sup>71</sup> That strategy could still yield results in an under-developed Chinese auto market, but was no match for the aggressive advertising campaigns and budgets of American, German, and Japanese automakers in the saturated US market.

What's more, despite California's consumer rebates for zero-emission vehicles, sales of pure EVs across the market proved underwhelming at the time of BYD's entry in 2011. That year, Californians registered a total of 6,964 all-electric and PHEVs.<sup>72</sup> But market growth proved more robust in subsequent years, even beating some estimates of EV sales.<sup>73</sup> Still, pure EVs commanded a miniscule market share in California, which was due in part to a lack of public charging infrastructure and lingering "range anxiety" of running entirely on battery.<sup>74</sup>

Finally, concern over vehicle safety remained, especially when it came to a Chinese brand in an environment of tough motor vehicle regulations and rigorous safety standards at both the state and federal levels. It was up to BYD itself to convince consumers that their products were safe.<sup>75</sup>

Although BYD had made repeated appearances at the annual Detroit Auto Show since its 2008 debut there, consumer skepticism and inadequate EV charging infrastructure likely led

the company by late 2011 to shelve its aggressive plans for cracking the American consumer auto market.

At this point, it appeared that BYD's California dream was being deferred. But it turned out the company was more resilient and nimble than this early experience might have suggested. In fact, BYD did not leave the US market, but instead focused on another business line. As it turned out, the firm had settled on a more successful strategy.

### ***Forget Cars, Let's Make Buses***

Instead of quitting the US market, this initial setback prompted the firm in 2012 to begin repositioning its US business line to focus on fleet sales.

As previously noted, BYD cars made their first appearance on American roads through an agreement with HACL to lease ten vehicles as part of a small municipal test fleet. The new strategy built on this experience.

Fleets had several advantages over run-of-the-mill consumer vehicle sales: Their centralized charging stations compensated for a lack of public charging infrastructure; they also offered brand visibility. And fleet operators have greater buying power than the ordinary consumer.

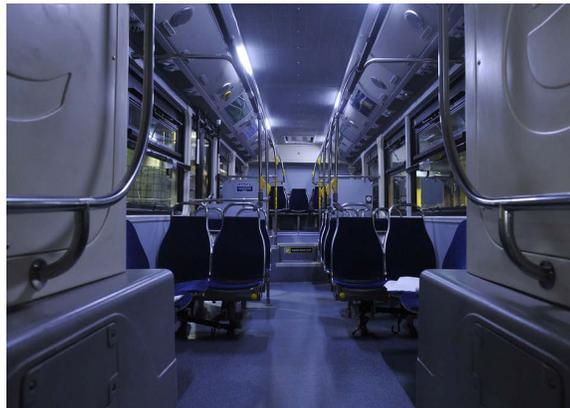


Photo: Flickr/Marc A. Hermann

In addition, the cost equation was compelling for fleet operators. The high initial cost of purchasing hybrids and EVs could be partially recovered through the lower operating costs of a fleet model. These savings accrue faster for fleets because of fleet vehicles' high utilization rates.

For example, if a taxi company is about to purchase ten vehicles, it can choose to buy either ten hybrid-EVs or ten gasoline-powered vehicles. While the

ten hybrid EVs might cost 25 percent more per unit, they can also save almost 75 percent in fuel costs.<sup>76</sup> But in a fleet model, these taxis will be running many more hours compared to individual consumer vehicle usage. This

means that over an extended period of time, a hybrid EV can more quickly recoup the additional sticker price for the fleet operator.

BYD came to favor fleets because they could rescue the company from its own brand and marketing conundrum. Rather than pouring money into a major advertising campaign aimed at building its brand by reshaping fickle consumer perceptions, BYD could instead focus on enticing fleet managers, who had high purchasing power, less concern for brand image,

and greater sensitivity to the cost equation.

Convinced of the commercial viability of the fleet model, BYD pursued such a modest but effective strategy. It centered its operations on one distinct business line within fleet operation that had less competition and the greatest potential for fuel economy savings: electric buses.<sup>77</sup>

This was an interesting choice because the company did not have much experience in the US market with electric buses, with the sole exception of selling just one single shuttle vehicle to the car rental firm Hertz at Los Angeles International Airport (LAX). But BYD did have significant experience with buses internationally, particularly in China where it had adopted this model.

For example, BYD signed an agreement in 2011 with the Shenzhen municipal government, its hometown, to provide up to 300 electric buses, making that city's public transportation system the world's largest pure electric system. One year later, Shenzhen decided to increase the number of electric buses to 1,500.<sup>78</sup> BYD had also seen some modest successes beyond its Chinese home base, signing deals to supply a small number of the buses to Frankfurt, Germany and Singapore.<sup>79</sup>

The positive experience with these small initial orders reinforced BYD's assessment of high margins and strong projected growth in the electric bus market. So BYD calculated that buses would be a good fit for its efforts in the US market as well.<sup>80</sup>

From a business strategy point of view, electric buses gave BYD a back door into advanced economies like the United States that were only just building out these fleets. The firm could count on the United States requiring some lag time to develop public charging infrastructure, even as BYD gained exposure to the US market along heavily traveled transit networks. Ultimately, BYD decided it could earn consumers' trust on the roads of major American cities.

Hertz offered a positive example: on the back of that single bus sale, the rental car giant subsequently made a deal to add BYD's e6 pure EVs to its consumer rental fleet in New York City, presumably because of a positive experience with the shuttle in Los Angeles.<sup>81</sup> For a company like BYD still struggling to gain a foothold in the United States, electric buses seemed to offer a gradual and long-term strategy that would, in time, allow it to ramp up in the target market.

And there was one more consideration: the electric bus market in the United States was even less developed than the consumer EV market. It was almost

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*Electric buses gave BYD a back door into advanced economies like the United States that were only just building out these fleets.*

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completely up for grabs, with only one other serious competitor: Proterra, a new upstart whose buses use a battery technology quite different from BYD's.

BYD's buses can run up to 155 miles on a single charge, requiring an overnight charge lasting three to four hours. Proterra's buses, in contrast, use a lithium-titanite battery that requires continual rapid (as quick as five minutes) charging throughout the day. Proterra buses did have one major advantage: they can be recharged in a much shorter timeframe than BYD's but can only go up to 26 miles on a single charge.<sup>82</sup>

This has its own complications: For Proterra's bus routes to be functional, overhead rapid charging stations

need to be set up along its routes at additional cost. Not all cities are capable of setting up overhead charging infrastructure, so Proterra could only win contracts in cities willing to make major investments in such infrastructure.

In short, Proterra bet that rapid charging would ultimately win the day because it allows a bus to run all day without needing to be put out of commission for up to four hours.

Both BYD and Proterra offered advantages and disadvantages, but because of these differences, the general lack of alternatives, and high barriers to market entry, BYD bet that, at minimum, there was room for both competitors to grow.

## Designed in China, Made in America

Still, BYD's new strategy had a problem. The biggest buyers of buses in the United States were public transit agencies, which were entitled to incentives for zero-emission investments and subject to strict rules on where precisely that money could be spent.

As the target of more government energy mandates than the average consumer, transit agencies were usually earlier adopters of EV technology. This was good news for BYD because it had a solid EV offering.

But the bad news was that BYD was a Chinese company attempting to sell to a public sector client bound by so-called "Buy America" provisions.

In 2000, California had adopted the Fleet Rule for Transit Agencies that required 15 percent of all buses procured to be zero emissions by 2008 (the regulation is currently on hold and undergoing review and amendments, however).<sup>83</sup> In 2009, in concert with the passage of the ARRA, the Federal Transit Administration (FTA) initiated a program to allocate nearly \$50 million to transit agencies for capital investments

aimed at curbing greenhouse gases and reducing energy consumption.<sup>84</sup>

This program, "Transit Investments for Greenhouse Gas and Energy Reduction" (TIGGER), disbursed nearly \$360 million from 2009-2011, but was not renewed in the 2012 fiscal year budget. The 2012 federal transport bill included a

provision that at least 65 percent of funding for bus deployment be made available for zero or near-zero emission models.<sup>85</sup> With both the federal and state governments pushing for electric buses, public sector

transit agencies looked increasingly like promising customers for BYD.

At the same time, transit agencies with federal funding were bound by "Buy America," and such a clause in the ARRA called for at least 60 percent of any publicly procured bus to be manufactured in the United States.<sup>86</sup>

This meant that state transit agencies hoping to receive funding from the US Department of Transportation needed to procure electric buses primarily manufactured in the United States. State agencies were by no means required to only purchase buses that



Photo: Flickr/Marc A. Hermann

were Buy America-compliant, but they had strong incentives to conclude contracts from suppliers that complied because that would entitle the agencies to generous subsidies.

The question facing BYD, therefore, was how to comply with local production requirements if it hoped to go head-to-head with American competitors and more easily tap the state government procurement market. To be Buy America-compliant, BYD would need to establish its own US-based manufacturing facility. BYD was by no means the only Chinese firm that confronted this issue. Suntech, a Chinese solar company that entered the US market in Arizona, also faced similar challenges with the Buy America provision.<sup>87</sup>

### **Lancaster and BYD**

So BYD looked to a greenfield manufacturing option. In May 2013, the company opened two production plants in the city of Lancaster, California—one for Li-ion iron phosphate batteries and the other for electric buses—70 miles from downtown Los Angeles. The initial capital investment was not made public, but Austin put the total “in the tens of millions, but not above \$50 million.”<sup>88</sup>

As with the opening of BYD’s Los Angeles headquarters, the Chinese firm’s arrival

in Lancaster was greeted with local optimism. BYD was the first Chinese automaker to manufacture in the United States. It aimed to produce 50 buses in 2015 and eventually ramp up to 1,000 buses annually in a couple decades. The local work force, claimed Lancaster Mayor R. Rex Parris, could look forward to “hundreds of jobs as BYD expands its operations here in the US.”<sup>89</sup>

Parris had expended some political capital as he aggressively courted BYD for his city. He sensed that Chinese investment offered a winning ticket to Lancaster after years of malaise in the local economy. In 2008, Lancaster’s unemployment stood at 14 percent and its property foreclosure rate was the second highest in the nation.

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*As with the opening of BYD’s Los Angeles headquarters, the Chinese firm’s arrival in Lancaster was greeted with local optimism.*

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A small city, Lancaster was no industrial hub. But its proximity to Los Angeles, Parris argued, could offer certain advantages to a Chinese investor. For one, the mayor could expedite contracts and permits through city hall quickly, instead of the snail pace it often took in large municipal bureaucracies such as Los Angeles itself. He was also prone to give foreign investors red carpet treatment, earning the approval of Li, the BYD executive, “They ask what you need and they do it.”<sup>90</sup>

And Parris was anything but subtle in his attempt to persuade BYD to come to Lancaster, stating that “the fate

of my city and the fate of BYD are deeply intertwined, we both rely on each other.”<sup>91</sup> Parris also told the *Los Angeles Times*, “Hopefully, Lancaster will become the largest Chinese corporation area in California. How cool is that? The little town of Lancaster.”<sup>92</sup>

After first meeting BYD executives in 2008, a session facilitated by the County Supervisor, Parris led a trade mission to China in 2010 and visited BYD’s international headquarters in Shenzhen. Parris was impressed with a fully self-sustaining residential model unit he toured on site. The unit had been built on the BYD campus as a model for potential future energy-efficient homes and utilized green technologies.

Soon after his return, however, Parris concluded that to work with BYD in future, he would first need to demonstrate his ability to expeditiously clear red tape. He sought to showcase his and his city’s bona fides by jointly working on some smaller projects first.

One project involved reproducing the Shenzhen green residential unit in Lancaster, with the help of BYD and US home manufacturer KB Homes. Parris hoped that this project would inspire green innovation and lead to independence from the power grid. But the project was also Parris’ way of trying to bank on his pledge that he could clear red tape and regulations while executing a local project with BYD.

The project turned out well enough: the residential unit ended up paying minimal energy costs—and seemed to demonstrate to the Chinese firm that the mayor could indeed push permits through the local government and cut through red tape with relative ease.<sup>93</sup>

So, when BYD executives began scouting locations for their electric bus operations in 2012, they recalled this experience with Parris several years earlier and so gave Lancaster a second look.

At this stage, however, it was not clear that Lancaster was even on BYD’s short list. The company quickly ruled out Los Angeles itself, noting, among other issues, its stringent air quality standards. It turned instead to other sites, such as a small factory in Roswell, New Mexico, or even an old Orient factory in Oriskany, New York.<sup>94</sup>

But Lancaster put on the hard sell. The city was once a hotbed for recreational vehicles (RV) manufacturing, and offered BYD the opportunity to take over the ailing RV plant, which already had the proper permits in place and a group of trained personnel who could remain in place to manage plant renovation.<sup>95</sup> The proposal called for retrofitting this factory into an electric bus plant. RVs and buses share a number of parts, such as upholstery and fiberglass, so the retrofit process would theoretically be easier than altering or building another industrial manufacturing site from scratch.

Siting a plant in Lancaster, it was argued, would also allow BYD to tap into an existing network of suppliers that had grown up around the local RV industry and could be quickly retooled to service bus manufacturing. And BYD did eventually hire the previous owner of the RV plant, William Rex. Moreover, the company could also rely on US suppliers to meet the Buy America stipulation of 60 percent local content requirement. This eventually included out of state suppliers: BYD buses use Alcoa's aluminum from Pennsylvania and tires manufactured in Michigan.<sup>96</sup>

These various factors persuaded BYD to greenlight the deal, but Parris, for all his enthusiasm, was actually surprised by the choice. "We had all but given up any hope that BYD would decide to come to Lancaster. Then, seemingly out of the blue, I got a call from Stella [Li, the BYD Auto executive], telling me that they had decided on Lancaster. The next day the bulldozers were on site."<sup>97</sup> Clearly, the mayor's relationship with BYD helped to clinch its decision on Lancaster.

BYD then went a step further. It decided to acquire a second manufacturing facility for its Li-ion iron phosphate batteries used to power the buses. Housed in a retrofitted former

Budweiser beer factory, this battery plant would allow the company to be almost completely vertically integrated, without much need to import major parts from BYD facilities China. BYD appeared poised to begin production later that year.

On the sales side, the firm had begun to find demand for its electric buses from local transit agencies. In April, BYD scored its first victory with a contract to build 10 buses for Long Beach Transit (LBT) to the tune of \$12.1 million.<sup>98</sup>

In July, it signed another deal with the LA Metro system to deliver five electric buses, with the potential to deliver another 20, subject to quality, for a total of \$30 million.<sup>99</sup>



Photo: Flickr/Chris Chan

BYD's buses are priced higher than most diesel buses, but the addition of a large rechargeable battery brings the total to around \$800,000 per unit.<sup>100</sup> (While Proterra's bus is cheaper, its additional charging infrastructure can run up costs per unit.)

With the LBT and LA Metro successes, BYD seemed to be racing ahead of its American competitor locally, outbidding it on price, range, and battery life. Recalls Richard Hunt, the LA Metro General Manager, "BYD's specifications for travel distance and

time far exceeded any of its competitors throughout the bidding process.”<sup>101</sup>

Shortly after the smooth launch, the firm became embroiled in controversy. When BYD’s contracts with LA Metro and LBT became public, they immediately triggered a media firestorm. The boards of directors at LBT and LA Metro had voted for BYD’s buses based on technical specifications, but the subsequent publicity focused on the bidding process.

***“The Red Army Marching In ... ”***

California is the single largest recipient of Chinese capital of any US state. But ironically, the BYD deal quickly came under attack and Parris, who had brought BYD to Lancaster, now found himself on the defensive. During his second mayoral campaign, he argues, “They [my opponents] were running commercials with the Red Army marching into Lancaster ... those goose stepping Red Army pictures from the 60s.”<sup>102</sup>

BYD itself took a passive approach to the maelstrom, mostly hunkering down to wait for the media uproar to blow over. That proved to be a mistake—the controversy intensified with time, damaging BYD’s reputation and ability to operate in California.

The initial public outcry focused on the quality of BYD products. This ended up delaying the production of its buses. In July 2013, just two months after BYD

opened its manufacturing facilities, cracks were discovered in the rear of one of its electric buses undergoing federal safety testing at Altoona. (All buses purchased by transit agencies that have received federal funding are tested at the Altoona center at Pennsylvania State University.)

Cracks and other problems are not unheard of in this industry (the relevant test was specifically designed to capture structural robustness, since buses undergo much wear and tear), but BYD’s test bus had been shipped from China and was almost certainly under heightened scrutiny as a result. Even though BYD planned to manufacture all of their US-bound buses at the Lancaster plant, not at China-based factories, it could not begin operations until its China-made test bus was certified at Altoona.

According to Austin, “BYD had eight ‘failures’ at its Altoona testing by around 8,000 miles. By comparison, Proterra’s bus had 29 ‘failures’ when it reached 6,600 miles of testing.” But the final report produced by the testing center cited BYD for 49 total failures and Proterra’s bus for just 38.<sup>103</sup> Despite its belief that it had achieved superior results at Altoona, BYD found itself subjected to an additional year of testing at the facility. Some media sources have suggested that the FTA rationale was that the bus being tested at Altoona was not the same model contracted to LBT and LA Metro.

Austin argues that this was unfair and untrue. While the bus undergoing tests at Altoona was indeed made at a BYD facility in China, not in the Lancaster facility, any foreign bus maker moving into the US market would have to test a model produced elsewhere, not at the future US-based facility.

For example, when Scottish bus manufacturer Alexander Dennis entered the United States, the bus it had tested at Altoona was manufactured abroad. Likewise, Sweden's Volvo tested a non-US made bus at Altoona before it entered the US market. The overseas automaker, says Austin, has no incentive and often no ability to produce at the domestic facility, which is typically under construction as products are undergoing testing for certification in the United States. This would be true even if the bus that eventually rolls out of the American plant is a different model from the testing bus produced abroad, according to Austin.

BYD, say its representatives, followed a standard script: the manufacturer would make a special model of the bus that matches the one to be eventually manufactured in the United States, and that is the model that would be tested in Altoona. But whatever the exact circumstances, the "made in China" label seemed to have caused enough of a concern within the FTA to halt the testing in an effort to confirm that the

test bus matched the one that would ultimately end up on California roads.

This debacle forced BYD to hire an FTA-certified engineer to confirm that the bus being tested at Altoona was the same from a structural standpoint as the one to be produced in Lancaster.<sup>104</sup> But the media furor, and the federal government's action, pushed the company's production schedule back to March 2014, nearly two years after its first contract was inked.

Eventually, BYD's bus completed its testing at Altoona in a net total of 116 "track" days (the entire process took about two years, but the bus was only tested for a

small portion of this time).<sup>105</sup> Reports from the Altoona testing facility suggest that this was competitive with Proterra, whose first bus completed its testing in approximately 11 months.<sup>106</sup> (But during the period that BYD was delayed at Altoona, Proterra was able to begin producing a 40-foot electric bus in direct competition with BYD.)

### **A Labor Relations Fiasco**

This was not the only challenge facing BYD, either. A second and perhaps more significant problem involved alleged labor violations toward Chinese workers that the company was said to have imported to the San Gabriel Valley.

*BYD itself took a passive approach to the maelstrom, mostly hunkering down to wait for the media uproar to blow over.*

The *New York Times* reported that California state officials opened an investigation into BYD's labor practices and fined the company about \$100,000 for violating the state's minimum wage laws. The same report also alleged that BYD was paying its workers as little as \$1.50 per hour plus a \$50 per day allowance.<sup>107</sup>

Calls by labor rights activists, such as Madeline Janis, National Policy Director of the Los Angeles Alliance for the New Economy (LAANE), helped to spur the investigation that became a public relations fiasco for BYD.<sup>108</sup>

In Los Angeles, these activists gathered to lead protests in an effort to force LBT and LA Metro to cancel their contracts with BYD. These protests were relatively small in scale but caused enough uproar to garner widespread media coverage.<sup>109</sup> Looking back, Janis argued in a telephone interview, "BYD came into the California market with a genuine lack of understanding, however this does not excuse their labor violations."<sup>110</sup>

Amid the brouhaha, BYD peculiarly chose to forego a media and public relations effort to counter the accusations. The company ran no television ads, launched no publicity campaigns, and wrote no newspaper responses. BYD's strategy was premised on a belief that merely addressing the claims would amount to validating them. But this "ignore" strategy turned out to be ineffective in the US context.

Not only did the labor abuse story not fizzle as BYD had hoped, but rumors of labor abuse persisted even after these labor citations were fully investigated and found to be predominantly inaccurate. Nor have the activists backed down completely. Janis argued, "I honestly believe that BYD has fixed the problem," suggesting a softened rather than a full recanting of her original views.<sup>111</sup>

Still, with the investigation subsequently backtracking from most of the original charges, the alleged labor violations have become murkier with time.

In March 2014, a few months after the citations were brought, the California Labor Commission reduced the total fines to approximately \$38,000 from the initial nearly \$100,000, due to "good faith technical errors," according to BYD.<sup>112</sup> Some of those errors apparently involved allowing several workers one 20-minute break so they could have breakfast together rather than two 10-minute breaks) and paying its workers in Chinese yuan as opposed to US dollars in accordance with California labor law.<sup>113</sup>

For its part, BYD stated, "We are especially happy that the false charge, unfortunately widely published in local and national media, of payments to five temporary Chinese professionals below California's minimum wage was dropped by the Commissioner before the hearing."<sup>114</sup>

Parris, who is a trained attorney, scoffed at the whole episode during an interview: “This labor ‘scandal’ should hardly qualify as scandalous. This is the sort of thing that many American companies mess up themselves. California labor laws are complex.”

But BYD learned a tough lesson: charges were dropped but they would still stick in the mind of consumers. A tarnished reputation at the outset of operations could well damage BYD’s prospects in the US market in the long run. Once the company woke up to this fact, it began by late 2013 to shift its approach by bringing aboard Lanny Davis, a seasoned lawyer and consultant who had served as special counsel to President Bill Clinton from 1996 to 1998. Davis managed to successfully quiet

some of the major PR disasters by finally addressing the media and attempting to refute the unsubstantiated claims.<sup>115</sup>

After the media tumult died down, Davis and BYD parted ways. But the firm had become convinced that it needed to change the way it handled its government affairs and other relationships in the United States.

While Chairman Wang continued to deemphasize consumer advertising, the company did establish a stronger government relations practice. It retained two firms, Paul Dean Associates and Mark Whiterman to serve as a point of contact with federal and state governments in the hope of better managing future problems and media crises.<sup>116</sup>

## Persistence in the US Market

In the first few months of 2014, BYD faced new setbacks. The most prominent of these was the cancellation of its contract with LBT. After the contract was dragged out and postponed, due to testing hold ups and other concerns, LBT finally canceled the \$12.1 million contract almost three years from its inception.<sup>117</sup> This was the first major bus contract BYD Auto had inked, and it had, in large part, justified the establishment of the Lancaster facility.

What happened? BYD and LBT decided to mutually terminate their contract because the funding (\$9.6 million of the total \$12.1 million) that LBT relied on to procure these buses was withdrawn

due to a technical problem in the initial bidding process. When BYD first won the contract, it was not actually eligible to participate in the grant program that LBT used to pay for the buses.

Austen recounts it this way: BYD had not obtained approval for the “Disadvantaged Business Enterprise” (DBE) program, and each bus company that plans to operate in the United States using federal funding must have approval of a plan to utilize a certain percentage of DBEs.



Photo: Flickr/Marc A. Hermann

This was largely a technical error, and BYD gained approval and was therefore eligible to participate in the grant program just a few weeks after the bidding ended. But the FTA required LBT to reopen bidding on the contract, not to mention continued political controversy involved in the process. At time of this writing, BYD had plans to again bid on the contract once this process restarts. Nonetheless, this appears to be a major blow to the still fragile BYD business model.

Despite these unexpected twists, BYD has scored some successes. For one, it has finally managed to roll out the first buses from its Lancaster factory. These buses meet the Buy America federal provision

and are now destined to ply the streets of Lancaster itself. The transit agency of the surrounding area, Antelope Valley Transit (AVT), will be the first public transit system in the United States to use BYD’s “Made in America” electric buses.<sup>118</sup> And AVT is said to be placing an order for an additional ten buses.

LA Metro will be the next US transit system to follow in AVT’s footsteps. Meanwhile, one of the first private purchasers, Stanford University, is looking

to double down on its existing BYD fleet by acquiring another 20 electric buses.<sup>119</sup>

BYD has also moved into creating a new line of 60-foot buses, which, once produced, will be the largest electric bus in its class.<sup>120</sup> The company has secured its first taxi fleet contract in the United States, building on its track record in London and other global cities, which have had BYD cars in their fleets for years. BYD has also signed a deal for 35 taxis to be used on the streets of New York City. Another small fleet will be found in Chicago in the near future.<sup>121</sup>

### **Looking Ahead**

The company has continued to test its buses around the United States and the greater North America region. BYD buses have been tested in Portland, Oregon, and in both Spokane and Seattle, Washington, as well as in numerous Canadian cities. The buses have been tested in the “toughest and snowiest conditions,” says an optimistic Austin.<sup>122</sup> The company is also working on ten different RFQ bids for various transit systems throughout North America.<sup>123</sup> BYD’s hope is that if it can secure enough contracts in North America, it will finally have the brand and quality recognition to expand into its original target: the EV consumer market.

Such progress is crucial for a company like BYD. The increase in charging stations has made consumers more comfortable with EVs generally, and has delivered returns to EV manufacturers

as consumers come to feel safer with this new technology. BYD has no plans to become a direct competitor to Tesla’s \$80,000 Model S sedan, at least not in the US market. But it does hope that the average American consumer will ultimately become more inclined to purchase a cheaper BYD vehicle.

When BYD first tried to enter the US consumer market in 2011, it clearly lacked brand awareness and sufficient understanding of market dynamics. But the company seems to believe that by the end of 2015, it will have achieved the credibility—in part by leveraging the four distinct high-quality consumer vehicle models it believes are necessary—to finally gain a foothold in a rapidly expanding American market.

In 2011, BYD offered just one car to American consumers, and this would have made it difficult for any effort to establish exclusive US dealerships. But with four brands, the possibility of such dealerships beckons anew, since the company will at least have achieved some variety and diversity in its offerings.

BYD was clearly somewhat rash when it first sought to enter the American EV market. But four years and a spate of sobering experiences later, the company is learning to be patient. This onetime battery startup that grew out of the swamps of Shenzhen, China is determined to put down some new roots in America.

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## The Paulson Institute's Program on Cross-Border Investment

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There are compelling incentives for the United States and China to increase direct investment in both directions. US FDI stock in China was roughly \$60 billion in 2010, yet a variety of obstacles and barriers to further American investment remain. Meanwhile, Chinese FDI stock in the United States has hovered at around just \$5 billion. For China, investing in the United States offers the opportunity to diversify risk from domestic markets while moving up the value-chain into higher-margin industries. And for the United States, leveraging Chinese capital could, in some sectors, help to create and sustain American jobs.

As a nonprofit institution, The Paulson Institute does not participate in any investments. But by taking a sector-by-sector look at opportunities and constraints, the Institute has begun to highlight commercially promising opportunities—and to convene relevant players from industry, the capital markets, government, and academia around economically rational and politically realistic investment ideas.

The Institute's goal is to focus on specific and promising sectors rather than treating the question of investment abstractly. We currently have two such sectoral efforts—on agribusiness and manufacturing.

The Institute's aim is to help develop sensible investment models that reflect economic and political realities in both countries.

The Paulson Institute currently has four investment-related programs:

### ***US-China Agribusiness Program***

The Institute's agribusiness programs aim to support America's dynamic agriculture sector, which needs new sources of investment to spur innovation and create jobs. These programs include:

- A US-China Agricultural Investment Experts Group comprised of some of the leading names in American agribusiness. The group brainstorms ideas and helps in the Institute's effort to develop innovative investment models that reflect economic and technological changes in global agriculture.
- Periodic agribusiness-related investment workshops, bringing key players and companies together. The Institute held the first workshop in Beijing in December 2012. Attendees included CEOs and experts. It has since held smaller, sessions in the United States focused on specific technologies or aspects of agribusiness.

- Commissioned studies that propose specific investment models, including for commodities, such as pork, or value chain opportunities, such as collaborative research and development (R&D).

### ***US-China Manufacturing Program***

In June 2013, the Institute launched a program on trends that will determine the future of global manufacturing and manufacturing-related capital flows. We aim to identify mutually beneficial manufacturing partnerships that would help support job growth in the United States. The Institute's principal manufacturing programs include:

- Investment papers that the Institute is co-developing with private sector and academic partners.
- Periodic workshops in Beijing and Chicago with Chinese, American and global CEOs and executives, focused on technological change, sectoral trends, and investment opportunities.

### ***Case Study Program***

The Institute publishes in-depth historical case studies of past Chinese direct investments in the United States, examining investment structures and economic, political, and business rationales. These detailed studies are based on public sources but also first-hand interviews with deal participants on all sides. They aim to reconstruct motivations and actions, and then to draw lessons learned.

### ***State-Level Competitiveness Program***

The Institute works closely with several US governors to help them hone their teams' approach to attracting job-creating foreign direct investment. Our core competitiveness program is a partnership with states in the Great Lakes region, but we work with other governors as around the United States as well.

- Paulson Institute-Great Lakes Governors Partnership: Working closely with the Council of Great Lakes Governors, the Institute is honing pilot strategies to help match the "right" investors and recipients to the "right" sectoral opportunities. Work is also focusing on how to connect Great Lakes/St. Lawrence-based R&D and innovation to foreign deployment opportunities while opening markets in China. The Council includes the governors of Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin, as well as the Canadian premiers of Ontario and Quebec.

- American Competitiveness Dialogues: The Institute convenes an ongoing series of competitiveness forums around the United States. These aim to address the implications of the changing global economy for US competitiveness, opportunities and challenges associated with foreign direct investment.
- R&D+Deployment (“R&D+D”): Working with partners, including McKinsey & Company and a small number of universities, the Institute is exploring new models that would link Chinese investors to the US innovation engine, especially in areas linked to demand-side needs in the China market. The aim is to design fresh models that capture value in both countries but do not sacrifice America’s innovation edge or intellectual property protection. Our dialogue in this area aims, ultimately, to lead to a pilot initiative.

## About The Paulson Institute

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The Paulson Institute, an independent center located at the University of Chicago, is a non-partisan institution that promotes sustainable economic growth and a cleaner environment around the world. Established in 2011 by Henry M. Paulson, Jr., former US Secretary of the Treasury and chairman and chief executive of Goldman Sachs, the Institute is committed to the principle that today's most pressing economic and environmental challenges can be solved only if leading countries work in complementary ways.

For this reason, the Institute's initial focus is the United States and China—the world's largest economies, energy consumers, and carbon emitters. Major economic and environmental challenges can be dealt with more efficiently and effectively if the United States and China work in tandem.

### Our Objectives

Specifically, The Paulson Institute fosters international engagement to achieve three objectives:

- To increase economic activity—including Chinese investment in the United States—that leads to the creation of jobs.
- To support urban growth, including the promotion of better environmental policies.
- To encourage responsible executive leadership and best business practices on issues of international concern.

### Our Programs

The Institute's programs foster engagement among government policymakers, corporate executives, and leading international experts on economics, business, energy, and the environment. We are both a think and "do" tank that facilitates the sharing of real-world experiences and the implementation of practical solutions.

Institute programs and initiatives are focused in five areas: sustainable urbanization, cross-border investment, climate change and air quality, conservation, and economic policy research and outreach. The Institute also provides fellowships for students at the University of Chicago and works with the university to provide a platform for distinguished thinkers from around the world to convey their ideas.

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