

CASE 29

Tesla Motors: Charging into the Future?

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Tesla Motors

Since its inception in 2003, Tesla Motors has made significant breakthroughs in the electric vehicle (EV) market with its proprietary power-train technology. Its first Roadster model provided a driving experience that was on par with a traditional gas engine and was the precursor for considerable success in the automobile market over the last few years. However, as the production of the most recent Roadster model winds down, Tesla is faced with a challenging situation that might determine the future direction of the company and ultimately its survival.¹

In July 2012, Tesla released its EV family sedan, the Model S, priced at the upper range of the luxury vehicle market.² This sedan represents Tesla's first foray into the family segment of the automobile market, providing a significant opportunity for company growth. Tesla currently takes only limited orders for the vehicles and expects the production capacity to be built up over the next few years. This model is intended to serve as a good introduction of Tesla's EV capabilities to the public and allay concerns about performance and reliability of EVs before its Model X crossover is introduced into the market.³ The Model X will not be ready for delivery until 2014, but it will be the first mid-sized vehicle produced by Tesla. Between these two vehicles, Tesla has an impressive product pipeline lineup that has the potential to appeal to middle-class consumers and to expand Tesla's current consumer base comprising high-net worth early adopters. However, Tesla is not the only manufacturer looking to develop EVs. Most automobile manufacturers have developed or are in the process of developing their own EVs—the Chevy Volt being the most well known.

Toyota is developing an all-electric version of its RAV4 as part of a contract with Tesla.⁴ Currently, Tesla's vehicles have greater range and offer better performance, but these major automakers represent a significant threat to the viability of Tesla.

Tesla is thus confronted with two issues: How to move forward and in which direction? Tesla could maintain its status as a niche manufacturer of high-quality, high-performance EVs, or it could seek to leverage its first mover advantage and therefore gain market share with expanded, affordable access to EVs in the greater automobile market. Tesla is limited in its ability to manufacture vehicles due to its size and access to resources, which puts it at a disadvantage in comparison to other automakers. However, if Tesla fails to act in a decisive way, it risks losing its technological advantage and opens the door for other manufacturers to develop their own EV models and crowd Tesla out of the lucrative automobile market. How will Tesla maintain its technological lead over its competitors? How will Tesla shift from targeting early adopters to reaching the larger consumer market—and should it? How will it deal with the lack of infrastructure to support these new vehicles? Finally, how will Tesla deal with the environmental effects of more EVs on the road and will these effects ultimately conflict with its founding principles?

Company History

Tesla Motors Inc., a Silicon Valley-based company founded in 2003, designs, manufactures, and sells zero-emission electric cars and power train parts, such as lithium-ion battery packs. These power train components are then bought and used by other carmakers,

such as Toyota.⁵ Tesla's vision is to "create the most compelling car company of the 21st century by driving the world's transition to electric vehicles."⁶ Tesla's mission has three elements: to build and sell its own EVs, to sell patented electric power train parts to other car manufacturers, and to serve as a role model to speed the transition to EVs. Thus far, Tesla is uniquely positioned to be the only company that sells "pure electric" vehicles.⁷ Its first model, the Tesla Roadster sports car, has been on the market since 2008, followed by Tesla S and X sedans in 2012 and 2014, respectively.⁸ Tesla investors include Daimler (\$76 million), Toyota (\$50 million), Panasonic (\$30 million), and the U.S. Department of Energy (\$464 million).⁹ Through its initial public offering (IPO) on June 29, 2010, Tesla raised \$226 million in capital.¹⁰ Tesla currently has more than 1,200 employees, a new 5 million square-foot factory in Fremont, CA, and 18 showrooms in the United States and Europe.^{11,12}

Leadership Team

Tesla Motors' executive and management team has guided the company through the design and production of its first vehicle and its expansion into the larger automobile market and has played an important role in shaping the strategic vision of the company. Some team members have been with the company since its inception.

Elon Musk – Chairman, Product Architect, and CEO

As co-founder of Tesla Motors, Musk has been a force to reckon with. During the company's initial founding, Musk was appointed chairman and product architect (responsible for design vision and execution), while Martin Erberhard was named CEO, and JB Straubel was the CTO (chief technology officer).

During his time as chairman and product architect, Musk had a significant role in designing the Tesla Roadster, for which he won an Index and Global Green Award in 2008. In addition to leading the development of the Tesla Roadster, Musk was also the initial controlling investor in the company. He worked to secure additional investments from a wide variety of firms ranging from Google to Daimler. With Daimler, Musk was able to establish a strategic partnership in 2009, which included \$50 million in investments. In 2008, Musk took on the additional role of CEO. Musk has continued spearheading changes within the company's products, including the development of the company's newest vehicle, the Model S sedan. In 2011, Musk was named Innovator of

the Year in Technology by the *Wall Street Journal*.¹³ Musk is also the CEO of SpaceX and chair of SolarCity.¹⁴

JB Straubel – Chief Technology Officer

Straubel has been the CTO of Tesla since its inception. As a co-founder of the company, Straubel has played a guiding role in the company's technical and production divisions beginning with the Tesla Roadster and continuing down to the latest sedans, the Model S and Model X. Together with a team of engineers, he developed the Roadster to prove EVs can provide just as much power as a traditional high-performance sports car.¹⁵ He is involved with every stage of production—from the preliminary design stages through vehicle systems testing, which he manages directly. Straubel also evaluates new technologies for the company and interfaces with key vendors to ensure that the best products and technologies are integrated into Tesla's vehicles.

Deepak Ahuja – Chief Financial Officer

Ahuja became the CFO of Tesla in 2008. Then-CEO Zeev Drori said, "Deepak's experience as CFO of multi-billion dollar business units with global sourcing and manufacturing operations makes him the ideal person to lead our finance organization through the company's next period of rapid growth."¹⁶ Ahuja's experience in the automotive industry ranges from composites engineering to finance. Ahuja was the controller of Small Cars Product Development for Ford, which had the goal of bringing fuel-efficient cars to North America. Prior to this, he was the CFO for Ford in South Africa. He worked as a composites engineer for Kennametal, in Pittsburgh, before he joined Ford.¹⁷

Since Ahuja joined Tesla, he has helped the company accumulate \$660 million in liquid assets, acquire a new manufacturing facility in California, and guide the company's financial team with a target of manufacturing 20,000 cars per year, the level at which the company expects to report a net profit from its operations.¹⁸

In addition, many of Tesla's senior executives have had prior experience with other automakers (see Exhibit 1). Aside from Ahuja, who came from Ford, company executives include Franz von Holzhausen, Chief Designer, who previously designed cars for Mazda, Volkswagen, Audi, and GM; Gilbert Passin, VP Manufacturing, who had previously worked at Toyota; Peter Rawlinson, VP and Chief Engineer, who came from Jaguar; and John Walker, VP North American Sales, who was previously employed by BMW, Audi, and GM. Apart from providing expertise and unique "know-how" related to EV technologies, the experience of the top management team in

Exhibit 1 Tesla's Management Team

Elon Musk CEO, Product Architect	JB Straubel CTO	Deepak Ahuja CFO	Franz von Holzhausen Chief Designer
SpaceX Solar City PayPal	MIT Innovator of the Year	Ford Kennametal	Mazda Audi General Motors
Arnon Geshuri VP, Human Resources	Greg Reichow VP, Powertrain Operations	Gilbert Passin VP, Manufacturing	Peter Rawlinson VP & Chief Engineer
Google	SunPower	Toyota Mack Trucks	Corus Jaguar Lotus
Jim Dunlay VP, Hardware	George Blankenship SVP, Sales	John Walker VP, N. American Sales	Jérôme Guillen Director, Model S
Hewlett Packard Sun Microsystems	Apple Gap	BMW Audi General Motors	Daimler Mercedes-Benz

Source: Tesla Motors Company Overview, Summer 2011, "World Class Applied Tech & Auto Experience," http://files.shareholder.com/downloads/ABEA-4CW8X0/1459391711x0x494001/dd297293-ec2d-4dc5-8db4-63d491fb6bd0/Company_Overview_Q3_2011.pdf

the automobile industry provided Tesla with significant institutional knowledge and credibility in the market.

Social and Economic Trends Influencing Tesla's Business Model

Tesla's innovation and focus is driven by a strong concern for the environment. In particular, the looming threat of global climate change has significant implications for the widespread acceptance of its products.¹⁹ The company believes that environmentally conscious and well-informed consumers will become more and more interested in environmentally friendly products. These products include zero-carbon emission EVs that can be recharged using electricity from renewable sources such as wind and photovoltaics.²⁰

Public concern over global climate change is likely to cause concomitant changes in political and legal trends, such as government mandates to significantly decrease greenhouse gas emissions. For example, by 2020 the United States has pledged to reduce greenhouse gases by 28 percent, and Europe is planning to supply 20 percent of its energy via renewable sources.²¹ Furthermore, a number of countries have already enacted a carbon tax,²² and more are likely to follow suit, which will give Tesla's EVs a competitive advantage over fossil-fuel-powered automobiles. In addition, some countries (including Japan) offer zero or low taxes and green subsidies for EVs, thereby increasing their appeal to consumers.²³ Since 2010, the United States has provided a federal tax credit of \$7,500 toward the purchase of pure EVs.²⁴

Continuous and rapid improvements in lithium-ion battery technology are also vital in reducing the cost of EVs while increasing their driving range (per charge). It has been claimed that lithium-ion batteries will be the preferred choice in the twenty-first century.²⁵ Recently, Stanford University researchers discovered that they can increase the lifespan of lithium-ion batteries by 10 times.²⁶ Although Tesla Motors is not waiting for this technology to be developed, it is actively involved in a partnership with Panasonic to accelerate the development of high-efficiency nickel-based lithium-ion battery cells specifically designed for EVs.²⁷

Global changes in consumer demographics are also likely to significantly increase the demand for emission-neutral vehicles. Global population growth, particularly in India and China, together with economic development have increased worldwide demand for automobiles. The number of passenger vehicles has exhibited rapid growth, from 53 million in 1950 to 622 million in 2008, and is expected to increase.²⁸ Furthermore, because of the sociocultural and political/legal trends mentioned earlier, the composition of the world's automobile fleet is expected to change to include more emission-neutral EVs. These two factors—population growth and a shift in consumer preference—are said to create a significant growth in the global market for EVs.

In addition, increasing crude oil prices have increased interest in renewable sources of energy as well as in conservation of energy. Such interest has led nations and governments to consider alternative modes of transportation such as bicycling and/or investing in public transport such as buses, subways, and trains. These choices

represent different cost-benefit analyses at societal levels and could pose a significant threat to the auto industry in general. However, increased fuel prices are more likely to affect traditional gasoline-based automobiles, potentially shifting personal auto demand toward EVs. Thus there is considerable uncertainty as to how increased fuel prices might affect demand for the auto industry and, in particular, for EVs.

Finally, global economic trends, particularly changes in currency exchange rates and free trade agreements, while currently not of prime concern to Tesla Motors, may determine how the company expands its operation and sales in Europe, Asia, and elsewhere, in the future.

Key Suppliers and Customers

Like all other car manufactures, Tesla Motors depends on a large number of global suppliers for automobile parts.²⁹ Critical to Tesla's operations are the suppliers of components, such as lithium-ion battery packs. In order to protect its proprietary battery technology and at the same time outsource the mass-production of a battery pack consisting of 18,650 cells, Tesla formed a partnership with Panasonic to develop the next-generation EV battery system.³⁰ Panasonic invested \$30 million for the collaboration in battery cell development.³¹

Tesla customers include both the individuals purchasing a Tesla EV as well as the other automakers who procure Tesla EV power train components. Individual customers have a wide range of options in this market. While a pure electric high-performance sports car such as the Roadster has no equivalent models (see Exhibit 2), the newer models such as Model S or Model X have a wide range of potential competitors that include hybrids and traditional gasoline-powered vehicles. Even within the hybrid or pure electric segments, many companies such as BMW, Daimler, Lexus, and Cadillac have these competing options (see Exhibit 2).

As an original equipment manufacturer (OEM), Tesla has entered into partnerships with Daimler and Toyota to enable the development of EV components. Daimler has incorporated Tesla's battery packs and chargers into Daimler's electric smart cars, while Toyota, as noted earlier, invested \$50 million in a collaborative partnership with Tesla to develop and mass produce an electric version of the Toyota RAV4 in 2012.³² Both these partnerships have significant implications for Tesla's growth. On the one hand, it could increase future demand for Tesla EV components and expertise. On the other, it could create potential competitors who have deeper pockets and wider reach and thereby inhibit Tesla's growth in an individual market.

Key Competitors

Toyota Motor Company

Toyota Motor Company is a large multinational based in Japan and is currently the world's largest automobile manufacturer based on sales and production volume.³³ The company also owns the luxury brand Lexus. Japan and North America account for the bulk of Toyota's sales with 26 percent and 28 percent, respectively, and Asia and Europe account for 11 percent and 17 percent, respectively.³⁴ While it is a global company, Toyota's focal market is Japan, where its goal is to achieve 40 percent of market share.³⁵ Toyota primarily seeks to "localize global operations with targeted regional strategies; promote key initiatives globally; diversify into automotive-related business sectors; maintain financial strength; and focus on shareholder value."³⁶ The company has also sought to expand research and development, increase efficiency, and focus on financing operations.³⁷ Toyota has been consistently profitable and is usually the most profitable automobile company based on net income.³⁸

Toyota has a partnership with Tesla for procuring EV power train components for its RAV4. The Toyota RAV4 is one of Toyota's first all-EV along with another offering based on its small IQ car model; both were introduced into the market in 2012.^{39,40} These models, however, are designed for short commutes and have limited ranges. The RAV4 has a base price of \$50,610 (\$43,110 net after the federal rebate), but it is expected to have a range of only 100 miles.⁴¹

General Motors

General Motors (GM) is the world's second largest manufacturer by volume and is still the largest automotive company in the United States.⁴² Its brands include Chevrolet, GMC, Buick, and Cadillac after discontinuing or selling its Hummer, Pontiac, Saab, and Saturn brands.⁴³ GM recently emerged from bankruptcy protection, which it had filed for in 2009 after becoming insolvent during the 2008 financial crisis. GM's primary market is North America; however, it has seen tremendous growth in China, where it recently surpassed sales of 2 million units in a year.⁴⁴ GM also expects to see sales grow by 25 percent in South America over the medium term⁴⁵ and has seen significant growth of 21 percent in the Middle East as of October 2011.⁴⁶ GM's strengths tend to be in the broad range of trucks and SUVs.

GM's most recent offering for the EV market is the Chevy Volt. However, the Volt is not a "pure electric" vehicle and is more of a hybrid. Its battery range is only 35 miles but has a total range of 407 miles when its gas

Exhibit 2 Tesla's Market Position

	Internal Combustion	Hybrid Electric	Plug-in Hybrid	Pure Electric
Performance Vehicles	Porsche Aston Martin Ferrari Mercedes-Benz Corvette		Fisker	Roadster
Premium Vehicles	BMW Mercedes-Benz Lexus Audi	BMW Mercedes-Benz Cadillac Lexus	Fisker BMW	Model S Model X
Small Premium Vehicles	BMW Mercedes-Benz Volkswagen Audi	Lexus Mercury		Gen III
Family Vehicles	Toyota Nissan Ford Hyundai	Toyota Nissan Ford Honda	Toyota Chevrolet BYD Volkswagen	Nissan BYD Ford
Subcompact/City Vehicles	Volkswagen Suzuki Toyota Honda			Mini Mitsubishi Smart BMW

Source: Tesla Motors Company Overview, Summer 2011, "Uniquely Positioned in Large Market," http://files.shareholder.com/downloads/ABEA-4CW8X0/1459391711x0x494001/dd297293-ec2d-4dc5-8db4-63d491fb6bd0/Company_Overview_Q3_2011.pdf

range is included⁴⁷ and is priced at \$31,645.⁴⁸ GM has had trouble meeting sales goals for the Volt and has recently come under investigation for fires associated with the Volt's battery.⁴⁹ GM also plans to develop a pure EV as part of a Chinese joint venture with the Shanghai Automotive Industry Corporation, to take advantage of its market position in China.⁵⁰

Ford Motor Company

Ford Motor Company is North America's second largest manufacturer of cars and trucks and produces many of its own subcomponents.⁵¹ Like GM, Ford's primary market is in the United States; however, its international business is not as large as GM's. Recently, Ford has been challenged by increasing competitive pressures, primarily from Asian manufacturers.⁵² As a result, Ford has focused on trimming its product lines by focusing more on its Ford and Lincoln brands while discontinuing or selling its controlling shares in Mercury, Mazda, Land Rover, and Jaguar.⁵³

Early in 2011, Ford unveiled plans for its first pure electric car, the Focus Electric. The Focus Electric is said to be competitive in terms of range with the

Nissan Leaf and the Chevy Volt which would be in the range of 50 to 100 miles.⁵⁴ It features a regenerative braking system and a braking coach to maximize driving efficiency.⁵⁵ It is also priced slightly higher than its competitors, at \$39,990.⁵⁶ Ford also has an all-electric minivan, the C-Max, which has been rolled out to market. By 2020, Ford expects 25 percent of its fleet to be EVs.⁵⁷

Honda Motor Company

Honda is a large multinational company based in Japan and is a diversified manufacturer of automobiles, motorcycles, and power products.⁵⁸ Automobile sales accounted for 76 percent of total sales with 79 percent of its net sales coming from outside Japan.⁵⁹ Honda vehicles are known for their efficiency and durability and have seen significant growth around the world, with over 10 percent of the U.S. vehicle market share.⁶⁰

In late 2010, Honda introduced an EV concept based on its existing Fit model.⁶¹ The Fit EV is expected to have a range of 100 miles and features a three-mode electric drive system that allows drivers to select between economic, sport, and normal modes to adjust the driving

experience to allow for different levels of performance or conservation.⁶² The Fit EV launched in 2012⁶³ was priced lower than the Nissan Leaf, at around \$29,900.⁶⁴

Nissan Motor Company

Nissan is a Japanese auto manufacturer that has experienced significant growth over the last decade. Recently, it launched a global initiative called “Nissan Power 88” that calls for “accelerated growth across new markets and segments” over the next six years.⁶⁵ By 2017, Nissan aims to have a global market share of 8 percent with a sustainable operating profit of 8 percent.⁶⁶ The company expects to have a global portfolio of 66 vehicles that cover 92 percent of all markets.⁶⁷ Currently, Japan, North America, and Europe account for 15 percent, 33 percent, and 17 percent of unit sales, respectively, and overall sales were up by 23 percent in 2011.⁶⁸

The company has increased its focus on EVs and expects to sell 1.5 million EVs by 2017.⁶⁹ Recently, Nissan introduced its first EV Leaf, which has performed well by selling over 20,000 units. In addition to acceptance in the market, Leaf has won several awards—the Japan Car of the Year award in 2011–2012, the 2011 European Car of the Year, and the 2011 World Car of the Year.⁷⁰ The Nissan Leaf features a range of 100 miles, seats five people, and is priced at \$33,000.⁷¹ Nissan is aggressively pursuing the EV segment⁷² and has an ongoing partnership with Renault to continue manufacturing EVs.

Other Motor Companies

The automobile market is highly competitive, and many other auto manufacturers have a significant presence in the United States and abroad. Companies such as Hyundai and Daimler have yet to field an EV but have announced plans to do so over the next few years. Many manufacturers are introducing hybrid vehicles, but these companies look to be late entrants into the EV segment. While pure EV players like Tesla are relatively rare in this market because of the need for significant capital requirements, the range of current and potential EV options available to customers (hybrid electric, plug-in hybrid, pure electric) from these existing conventional automobile manufacturers indicates that competition in this segment is likely to increase over the next few years. In addition, these competitors are well-established automobile companies with extremely large-scale operations, significant brand equity, and established customer loyalty. In addition, access to financial resources may be the most significant advantage that these firms have over smaller companies like Tesla, as they not only have

significant cash reserves but also because they can leverage their positions to issue debt and raise more cash. Finally, most of these firms have extensive dealership and service networks. Smaller firms and newer entrants such as Tesla in contrast have a very limited distribution and service network at present.⁷³ Replicating such networks takes significant time and cost to develop for a company like Tesla. Thus, the competitive environment for Tesla provides significant challenges for Tesla as well as others looking to enter the automobile industry.

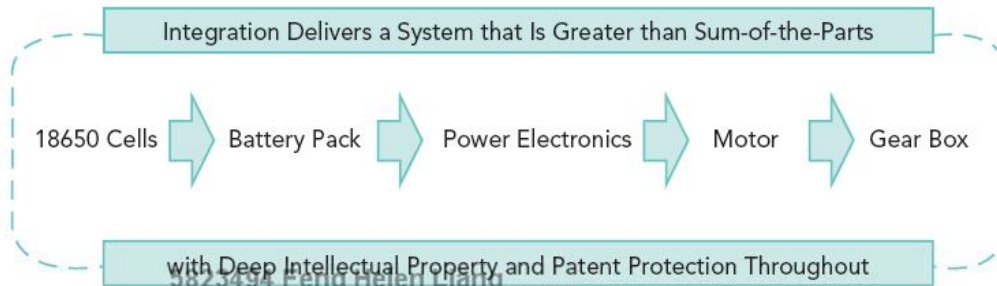
Tesla's Operations

Given the significant challenges in its competitive environment, Tesla has focused on positioning itself as a different kind of automobile company. Tesla views itself as a Silicon Valley company focused on technology disruption that is leading the technological revolution in the automobile industry. Tesla's co-founder, Elon Musk, considers Tesla to be more aligned “to an Apple, or Google, than a GM or Ford,” while describing Tesla as a “technology velociraptor.”⁷⁴ What Tesla is doing, Musk continues, “is mind-blowing for the car business, but par for the course in Silicon Valley.”⁷⁵ It has sought to promote an image that is considered innovative, smart, and cool. It is this vision of an innovative technological revolutionary that has driven many of Tesla's choices and decisions across several elements of its operations in order to separate itself from the status quo of traditional automobile manufacturers.

Technology

As one of the pioneers in the field of EV, Tesla has developed a comprehensive, integrated, proprietary electric power train technology (see Exhibit 3) consisting of lithium-ion cells with a unique chemistry and high-energy density, an actively cooled battery pack, a compact set of software-controlled power electronics, a highly efficient A/C induction motor, and a high RPM single-gear gear box. Both the motor and gear box are manufactured in-house. Each of these power train components are synergistically integrated to provide superior performance in terms of range and cost (see Exhibit 4). The ranges of the Tesla Model S and the Tesla Roadster are 300 and 245 miles, respectively, much greater than the ranges of competitors, such as the Ford Focus EV (100 miles), Nissan Leaf (73 miles), and Chevy Volt (35 miles). Furthermore, Tesla also leads the market in low-priced batteries, at about \$400 per kWh, compared to the average of its competitors of \$650 per kWh (see Exhibit 4).

Exhibit 3 Tesla's Power Train Technology

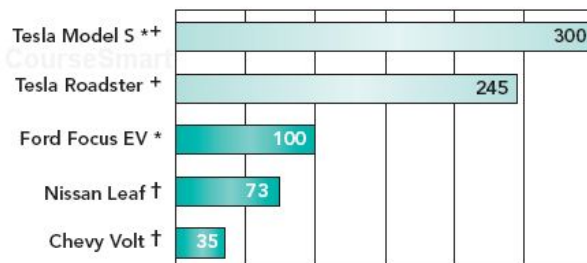


- Unique Chemistry
- Proprietary Cathode Geometry
- Automotive-Grade Construction
- Passive Safety Features
- Modified Cell Case
- High Energy Density
- Active Cooling
- Mfg Trade Secrets
- Charge Balancing
- Active Safety Features
- Power Mgmt Software
- 2 Way Inverter
- Charge Mgmt Software
- On Board Charger
- Flux Phasing & Mgmt
- Compact Design
- Thermal Mgmt Software
- Instant Peak Torque
- A/C Induction Motor
- No Rare Earth Metals
- 87% Avg Efficiency
- In House Mfg
- Proprietary Design
- Up to 18,000 RPM
- No Shifting
- In House Mfg

Source: Tesla Motors Company Overview, Summer 2011, "Comprehensive, Proprietary Technology", http://files.shareholder.com/downloads/ABEA-4CW8X0/1459391711x0x494001/dd297293-ec2d-4dc5-8db4-63d491fb6bd0/Company_Overview_Q3_2011.pdf

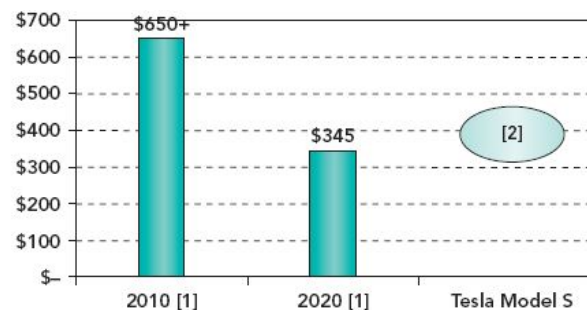
Exhibit 4 Tesla's Electric Vehicle Leadership on Range and Cost

1. Tesla Leads on Range (maximum miles per single charge)



* - Estimated
+ - EPA 2-cycle city/highway test
† - EPA derived 5-cycles test

2. Tesla Leads on Cost (battery pack cost in \$/kWh)



[1] Cost Survey: Roland Berger Study
LiB Value Chain and Cost Model (March 2010)
[2] Tesla Model S - Projected cost not disclosed.
Includes all cells, electronics, packaging, and labx costs

Source: Tesla Motors Company Overview, Summer 2011, "EV Leadership on Range and Cost," http://files.shareholder.com/downloads/ABEA-4CW8X0/1459391711x0x494001/dd297293-ec2d-4dc5-8db4-63d491fb6bd0/Company_Overview_Q3_2011.pdf

Product-Market Approach

As a pioneer in the EV segment of the market, Tesla has adopted a three-pronged approach to increase the number and variety of EVs available to mainstream consumers: by selling its own vehicles in a growing number of company-owned showrooms and online; by selling its patented electric power train components to other automakers so that they may get their own EVs to customers sooner; and by serving as a catalyst and positive example to other automakers, demonstrating that there is an overwhelming demand for vehicles that are both fun to drive and environmentally safe.⁷⁶ Part of the objective in selling power train components to other automakers was to leverage its technology to cover its operating costs while also moving forward with its personal car-building objective so that, eventually, it can become a BMW of EVs—with a target of 15 percent profit margins.⁷⁷

Tesla's first EV model was the Roadster. The Roadster was a pioneering EV in many dimensions—performance: 0 to 60 MPH in 3.7 seconds; range: 245 miles; development cost: \$125 million; and time: launched three models in two years.⁷⁸ It was targeted at the high-performance, high-end segment of the EV market. At a base price of \$89,000, the Roadster prompted media criticism that the company was catering exclusively to affluent consumers. While Tesla's goal is to sell EVs to mainstream consumers at more affordable prices, Tesla purposely aimed its first production vehicle at “early adopters” so that the company could optimize the technology before cascading it down to less-expensive vehicles. Tesla's Model S sedan, launched in 2012, was priced at a more affordable \$49,900 after tax credits,⁷⁹ which was roughly half the price of the Roadster. Such a dramatic reduction in price seems to be following an approach adopted by Silicon Valley firms and the global technology industry, where prices for cellular phones, laptop computers, and flat-screen televisions drop dramatically every product cycle. However, this approach has been rare in the global auto industry, where the prevailing business model has been one of mass production in assembly plants optimized to build hundreds of thousands of vehicles per year with comparatively low sticker prices.⁸⁰ With the introduction of the Model S sedan at a lower price, Tesla began making a strategic shift from a targeted high-end market segment to reach the broader family sedan market. The Model S sedan also has several distinguishing features to enable it to compete in this segment, including more cargo room than any other sedan, five-star crash rating, 17-inch touchscreen computer and 4G wireless connectivity, performance up to 300 miles per charge, 45-minute quick charge, rapid 1-minute battery swap,

0 to 60 MPH in less than six seconds, and exceptional handling.⁸¹ Tesla already has more than 6,000 orders for the all-electric sedan that will sell anywhere between \$57,400 and \$77,400 depending on the range and trim level.⁸² Tesla plans to provide additional offerings using the Model S platform as it targets different customers with different needs in the family sedan market. Thus, it hopes to launch a number of other cars ranging from sedans, cabriolets, vans, crossovers, and SUVs based on its adaptable common power train. Building each one may take little additional investment since Tesla is building each from the Model S platform.⁸³

Distribution Network

Tesla has developed a different distribution network driven by an ambitious effort to take control of its own sales and service operations and capture the revenue and customer feedback that traditional auto manufacturers cede to a network of dealers. It has developed a storefront approach to automotive sales and delivery versus the more traditional dealer network. In Musk's view, the current automotive distribution system is extremely inefficient—it puts dealers at odds with the OEMs regarding service and inventory. Instead of having tens of thousands of cars on dealer lots, Tesla uses a just-in-time delivery system with cars being made to order.⁸⁴ Since there is no need to carry a large inventory, the stores do not have to be large or include extensive floor space. That is a major departure from the traditional model.⁸⁵ While this revolutionary approach has many advantages, it does not come without risks. Legal challenges lie ahead for Tesla's distribution model of selling its own vehicles at stores (rather than through franchised dealerships) and over the Internet. As Tesla notes, “Many states have laws that may be interpreted to prohibit internet sales by manufacturers to residents of the state or to impose other limitations on this sales model, including laws that prohibit manufacturers from selling vehicles directly to consumers without the use of an independent dealership or without a physical presence in the state.” As a result, Tesla may have to change its sales model for at least some states or find itself shut out of a big portion of the U.S. market.⁸⁶

Marketing and Sales

Tesla has also adopted a marketing and sales approach that resembles a Silicon Valley firm more than a traditional automobile manufacturing firm. Tesla is seeking to create an experience that is similar to the retail strategy used by Apple with its storefronts. To accomplish this, the firm hired George Blankenship as VP of Sales

and Ownership Experience. Blankenship, who was previously the architect of the Apple retail model, introduced his ideas into Tesla stores using top-notch technology. As Blankenship says, "Tesla stores are designed to let people explore and learn about Tesla's technology for themselves. You'll never see a 'Don't Touch' sign in a Tesla store. We want everyone—from kindergartners to grandparents—to come in and see for themselves why driving electric is the future."⁸⁷ Tesla's mission is to reinvent the way people buy cars. Breaking from the traditional dealership model, Tesla stores seek to entice, inform, and engage prospective customers with innovative touchscreen interfaces, knowledgeable product specialists, and a virtual design studio where they can customize their own premium Model S sedans.⁸⁸

A key enabler in achieving this store experience is Tesla's use of cutting-edge software integrated into the many touchscreens located around the sales floor. Design Studio is a software tool that allows consumers to customize, view, and share their own Tesla EVs on the Web, on their smartphones and iPads, and at Tesla stores. Using HTML5 for cross-platform compatibility, the Design Studio makes the buying experience flexible, engaging, and interactive.⁸⁹ "The Design Studio's goal is to personalize the Tesla experience," said George Blankenship. "It's the most advanced configuration any automaker has come up with, letting you choose exactly what you want, look at it from every angle, and see it in the wild."⁹⁰ All of this technology may or may not impact customers; besides, Tesla product specialists are also equipped with iPads when they walk prospective customers through the process and explore their options. Tesla's new Santana Row showroom also offers the capability for customers to "throw" their design to a large screen at the back of the store with a swipe of their hand.⁹¹ Not only has Tesla tried to alter the experience inside the store from the traditional dealership, but they have also pushed this progressive model out to the exterior appearance and location.

Since opening its first American showroom in Santa Monica, California, in 2008, Tesla has targeted high foot-traffic retail locations across the country to better acquaint casual shoppers with its electric cars.⁹² Tesla's retail locations are more like galleries than stores and are not dealerships in the traditional sense. All of them have a Model S sedan and hands-on exhibits highlighting what Tesla has to offer—a kind of place where a wealthy customer shopping the likes of Tiffany and Gucci will wander in and get a taste of what Tesla is all about.⁹³ The firm currently operates 16 stores in the United States, 2 in Canada, 13 in Europe, and 3 in Asia/Pacific with an

ambitious expansion targeting a 50-showroom global network coinciding with the launch of the Model S sedan in 2012.⁹⁴

By integrating distribution, marketing, and sales in this way, Tesla believes that it will be "able to better control costs of inventory, manage warranty service and pricing, maintain and strengthen the Tesla brand, and obtain rapid customer feedback."⁹⁵

Service

An example of customer feedback driving additional value into Tesla's operations is the mobile service concept that the firm has adopted. Tesla relied on customer feedback when putting together its service strategy, as did online shoe retailer Zappos.com and the Best Buy computer repair service "Geek Squad." Similar to the Best Buy concept, the Tesla retail stores are the service hub for mobile service rangers that provide house calls to perform annual inspections and firmware upgrades.⁹⁶ The service costs \$1 per mile each way, with a \$100 minimum. The fee will not cover its expenses, but Tesla says surviving the loss is cheaper than building more service centers.⁹⁷

By adopting this overall model, Tesla believes it "will avoid the conflict of interest in the traditional dealership structure inherent to most incumbent automobile manufacturers where the sale of warranty parts and repairs by a dealer are a key source of revenue and profit for the dealer but often are an expense for the vehicle manufacturer."⁹⁸

Corporate Culture

A significant part of creating a different kind of company has been the focus on building a corporate culture that emphasizes the values and vision espoused by the leadership team. The culture Tesla strives to create starts from the type of people it seeks to hire, as the front page of the career section on its Web site proclaims. "Do you question tradition and constantly think of ways to improve the status quo? Do you thrive in environments where brilliance is common and challenge is the norm?" the Web site asks. "Are you excited by challenge because you're among the best in your field? If so, you'd be in good company at Tesla Motors."⁹⁹ For the task of building this entrepreneurial startup-like culture, the firm turned to Arnon Geshuri, who was successful in building a similar culture at Google. Geshuri has a good track record in assembling great teams and putting people to work. His reputation as a Silicon Valley legend in the realm of staffing and recruiting was cemented at Google, where he managed a recruiting staff of 900 employees who fielded

Exhibit 5 Balance Sheet

Tesla Motors, Inc. Consolidated Balance Sheets (in thousands, except share and per-share data)		
	December 31, 2012	December 31, 2011
Assets		
Current assets		
Cash and cash equivalents	\$201,890	\$255,266
Short-term marketable securities	—	25,061
Restricted cash	19,094	23,476
Accounts receivable	26,842	9,539
Inventory	268,504	50,082
Prepaid expenses and other current assets	8,438	9,414
Total current assets	524,768	372,838
Operating lease vehicles, net	10,071	11,757
Property, plant and equipment, net	552,229	298,414
Restricted cash	5,159	8,068
Other assets	21,963	22,371
Total assets	\$1,114,190	\$713,448
Liabilities and Stockholders' Equity		
Current liabilities		
Accounts payable	\$303,382	\$56,141
Accrued liabilities	39,798	32,109
Deferred revenue	1,905	2,345
Capital lease obligations, current portion	4,365	1,067
Reservation payments	138,817	91,761
Long-term debt, current portion	50,841	7,916
Total current liabilities	539,108	191,339
Common stock warrant liability	10,692	8,838
Capital lease obligations, less current portion	9,965	2,830
Deferred revenue, less current portion	3,060	3,146
Long-term debt, less current portion	401,495	268,335
Other long-term liabilities	25,170	14,915
Total liabilities	989,490	489,403
Commitments and contingencies (Note 14)		
Stockholders' equity:		
Preferred stock; \$0.001 par value; 100,000,000 shares authorized; no shares issued and outstanding	—	—
Additional paid-in capital	1,190,191	893,336
Accumulated other comprehensive loss	—	(3)
Accumulated deficit	(1,065,606)	(669,392)
Total stockholders' equity	124,700	224,045
Total liabilities and stockholders' equity	\$1,114,190	\$713,448

(continued)

Exhibit 5 (continued) Balance Sheet

Tesla Motors, Inc. Consolidated Balance Sheets (in thousands, except share and per-share data)		
DOE Loan Facility draw-downs have been as follows (in thousands):		
	Loan Facility Available for Future Draw-downs	Interest Rates
Beginning balance, January 20, 2010	\$465,048	
Draw-downs received during the three months ended March 31, 2010	(29,920)	2.9%–3.4%
Draw-downs received during the three months ended June 30, 2010	(15,499)	2.5%–3.4%
Draw-downs received during the three months ended September 30, 2010	(11,138)	1.7%–2.6%
Draw-downs received during the three months ended December 31, 2010	(15,271)	1.7%–2.8%
Remaining balance, December 31, 2010	393,220	
Draw-downs received during the three months ended March 31, 2011	(30,656)	2.1%–3.0%
Draw-downs received during the three months ended June 30, 2011	(31,693)	1.8%–2.7%
Draw-downs received during the three months ended September 30, 2011	(90,822)	1.0%–1.4%
Draw-downs received during the three months ended December 31, 2011	(51,252)	1.0%–1.5%
Remaining balance, December 31, 2011	188,797	
Draw-downs received during the three months ended March 31, 2012	(84,267)	0.9%–1.6%
Draw-downs received during the three months ended June 30, 2012	(71,274)	1.0%–1.3%
Draw-downs received during the three months ended September 30, 2012	(33,256)	1.0%–1.2%
Remaining balance, December 31, 2012	\$	—

Source: Tesla Motors. "Quarterly Report Form 10-Q." Financial Statements. November 14, 2011, p. 3.

2.5 million job applications in one year.¹⁰⁰ The brand of creative energy and drive for innovation created at Tesla is said to be different, something that sets it apart from the established competition in Detroit and elsewhere in the United States. As in most Silicon Valley companies, there are no walls within the company's working area. Tesla strives for an open work environment to foster a creative, cooperative, and idea-driven workforce.¹⁰¹

Tesla Financials

Due to Tesla's current state of development and the high costs associated with the research and development of electric power trains and vehicle designs, Tesla has realized significant losses since its inception in 2003. From 2003 to December 2012, total losses were \$1.065 billion (see Exhibit 5),¹⁰² including a reported loss of \$396.3 million or \$3.69 per share for year 2012 (see Exhibit 6). In the summer of 2010, Tesla entered into a loan facility from the Department of Energy program designed for Advanced Technology Vehicles Manufacturing in the amount of roughly \$465 million.¹⁰³ Since then Tesla has had consistent draw-downs on the debt facility to cover operations; and as of December 31, 2012, had avoided

itself completely of this loan facility (see Exhibit 7). However, Tesla ended the year with \$221 million cash on hand (see Exhibit 5), and with the recent announcement that it would report a profit for the first time, for the first quarter 2013 operations, Tesla seems to have sufficient cash on hand to sustain operations for some time.

Tesla also has significant cash flows coming from a developmental contract with Toyota for electric power trains for an electric version of the Toyota RAV4. The total contract is worth \$60 million of which Tesla has received \$35.5 million through September 30, 2011.¹⁰⁴ The rest of the contract will be paid as the contract nears completion and will serve as a source of cash flow over the next few years. For the second phase of the agreement, Tesla expects to receive roughly \$100 million from Toyota between 2012 and 2014 based on delivery of power train components.¹⁰⁵ Between this contract and sales of the Model S, Tesla has the potential to experience significant growth in sales over that timeframe.

Strategic Challenges

Tesla Motors is presently positioned as the sole manufacturer of fully electric vehicles in the automobile

Exhibit 6 Income Statement

Tesla Motors, Inc. Consolidated Statements of Operations (in thousands, except share and per-share data)			
	Year Ended December 31,		
	2012	2011	2010
Revenues			
Automotive sales	\$385,699	\$148,568	\$97,078
Development services	27,557	55,674	19,666
Total revenues	413,256	204,242	116,744
Cost of revenues			
Automotive sales	371,658	115,482	79,982
Development services	11,531	27,165	6,031
Total cost of revenues	383,189	142,647	86,013
Gross profit	30,067	61,595	30,731
Operating expenses			
Research and development	273,978	208,981	92,996
Selling, general and administrative	150,372	104,102	84,573
Total operating expenses	424,350	313,083	177,569
Loss from operations	(394,283)	(251,488)	(146,838)
Interest income	288	255	258
Interest expense	(254)	(43)	(992)
Other expense, net	(1,828)	(2,646)	(6,583)
Loss before income taxes	(396,077)	(253,922)	(154,155)
Provision for income taxes	136	489	173
Net loss	\$(396,213)	\$(254,411)	\$(154,328)
Net loss per share of common stock, basic and diluted	\$(3.69)	\$(2.53)	\$(3.04)
Weighted average shares used in computing net loss per share of common stock, basic and diluted	107,349,188	100,388,815	50,718,302

Source: Tesla Motors. "Quarterly Report Form 10-Q," Financial Statements, November 14, 2011, p. 4.

industry. It has enjoyed first-mover advantage with the Tesla Roadster sports car, and Tesla hopes to enjoy future success with its Model S sedan and Model X crossover. These two vehicles will allow Tesla to gain a new customer base beyond the more affluent individuals who were targeted for the Roadster. With environmental concerns and the rising price of gasoline, an electric car does fulfill the needs of a niche market looking for an environmentally friendly car. However, Tesla competes against a large number of automobile makers who have access to a much larger resource pool and market share. Tesla's range and better performance of its EV may not be enough to compete successfully.

With a commitment to developing a car that is better for the environment, Tesla may also take into consideration how the lithium-ion batteries will affect the

environment over time and if it will conflict with one of its founding principles. The public concern over global climate change is likely to lead to more government mandates concerning carbon emissions. This could provide Tesla an advantage over other automobile makers. The partnership with Panasonic to develop high-efficiency nickel-based lithium-ion battery cells will definitely provide Tesla with future opportunities. By providing Tesla EV parts to companies such as Daimler and Toyota, Tesla has a large future growth potential as well. Being a young company and competing against larger, established companies may force Tesla to make some hard decisions regarding its product and whether it should diversify its portfolio. Also, the threat of potential newcomers into the EV market is high, especially since manufacturers like Toyota, Chevrolet, Ford, Honda, Nissan,

Exhibit 7 Department of Energy Loan Facility

DOE loan facility draw-downs have been as follows (in thousands):		
	Loan Facility Available for Future Draw-downs	Interest rates
Beginning balance, January 20, 2010	\$465,048	
Draw-downs received during the three months ended March 31, 2010	(29,920)	2.9%–3.4%
Draw-downs received during the three months ended June 30, 2010	(15,499)	2.5%–3.4%
Draw-downs received during the three months ended September 30, 2010	(11,138)	1.7%–2.6%
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Draw-downs received during the three months ended December 31, 2011	(51,252)	1.0%–1.5%
Remaining balance, December 31, 2011	188,797	
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Draw-downs received during the three months ended September 30, 2012	(33,256)	1.0%–1.2%
Remaining balance, December 31, 2012	\$	—

Source: Tesla Motors. "Quarterly Report Form 10-Q" Financial Statements. November 14, 2011, p. 14

and Daimler are already in contention in the EV market. Tesla would not have the economies of scale to compete, not to mention the resources to do so, in comparison to the vast resources these companies can bring to any development project.

Tesla has financed much of its business through debt. This leaves the company operating with a continued negative net income. High sales volume will be needed to make a profit and pay down some of the debt. It is a concern whether Tesla is capable of generating sufficient profit in order to lower its debt. Overall, demand for the fully electric car is relatively low. Tesla faces the challenge of increasing the demand for its cars over the cars of the larger rival automobile companies. To create demand, Tesla must demonstrate that its cars compete favorably on the basis of performance, driving range, price, safety, and durability. There are other pressing issues that Tesla needs to address as well. Should Tesla continue to compete in the automobile market, or should they allow itself to be bought out? As it stands, Toyota already owns a

significant amount of the firm's shares. If it does choose to compete, would a different approach provide the company with a better market share and position within the industry, as compared to a focus on the relatively high-end and environmentally conscious segment of the market? Can a firm with a Silicon Valley approach succeed in the more traditional automobile sector? Should Tesla expand its focus to include trucks and SUVs, or stick to just high-performance and luxury cars? What market segments should it pursue? And, to combat the debt and increase sales, how should Tesla pursue its expansion on the retail side of things? Is complete control of the stores better than franchising to dealerships? Another issue the key decision makers, such as CEO Elon Musk, face is how to address the maintenance of the cars, the network it would require, and how that fits in with the firm's strategy.

Tesla's future direction and ultimately its success or failure will rely on how management answers these questions over the next few years.

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102. Tesla Motors. Fourth Quarter & Full Year 2012 Shareholder Letter. www.sec.gov/Archives/edgar/data/1318605/000119312513067177/d462441dex991.htm. "Quarterly Report Form 10-Q." Financial Statements. November 14, 2011, p. 6.
103. Tesla Motors. "Quarterly Report Form 10-Q." Financial Statements. November 14, 2011, p. 14.
104. Ibid, p. 17.
105. Ibid, p. 22.