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TESLA MOTORS

BUSINESS MODEL CONFIGURATION

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Case Study Update

From Tesla Motors to Tesla

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"*These guys want us to die so bad they can taste it.*"
Elon Musk on short-sellers of Tesla shares, June 2017

Since 2014, Tesla developed at high speed. There was almost no week without a new announcement by its CEO, Elon Musk. Many things happened that shows Tesla wants to revolutionise the mobility business and wants to be more than a car producer – much more. His vision and goals are very ambitious, and the pressure on execution is extreme.

All our patents belong to you

11 June 2014 saw the removal of a wall of Tesla patents in the lobby of its Palo Alto headquarters. Musk said that Tesla would "*will not initiate patent lawsuits against anyone who, in good faith, wants to use our technology*."[1] A key goal is to accelerate the adoption of sustainable transportation with an open- source approach to Tesla's patents. Tesla announced that it will continue to file for patents of future technologies, but only to prevent other companies from patenting its own innovations. A major argument for open patents is that the electric car technology platform was not adopted by traditional manufacturers swiftly enough. "*Our true competition is not the small trickle of non-Tesla electric cars being produced, but rather the enormous flood of gasoline cars pouring out of the world's factories every day*," Musk noted. Experts comment that Tesla intends to expand the current size of an increasingly competitive market (Figure 1). As the pie grows, everyone gets a larger slice. At the same time, Tesla is using its patent pool to turn its own electric vehicle (EV) technology into industry standards.[2]

Others argue that Musk tries to continuously anchor the Tesla brand in the public's view to achieve and retain top-of-mind awareness, all the time, by doing things differently to conventional industry logic. Creating big buzz allows Tesla to pursue a $0 marketing budget strategy – no spending on advertising, agencies, or dealers.

A close look reveals that Musk's announcement to open its patents was made only a few weeks before Toyota's decision to phase out its collaboration with Tesla. Just one week, later Toyota unveiled its first hydrogen fuel-cell car and announcing that it would offer its powertrain technology patents royalty-free starting from 2020.[3]

Master Plan Part Deux

In 2006, Musk unveiled his initial master plan for Tesla, setting out to start manufacturing electric cars and increasing their scale so as to be affordable to a mass market. In 2016, a decade later, he outlined his Master Plan Part Deux for the electric car and battery-storage company's future: (1) create stunning solar roofs with seamlessly integrated battery storage; (2) expand the EV product line to address all major segments; (3) develop a self-driving capability that is 10 times safer than manual via massive fleet learning; and (4) enable your car to make money for you when you aren't using it.[4] The business has always been about the "*bigger picture*", Musk said. The update to his master plan is evidence of this (Figure 2).

In July 2016, Musk revealed that, in 2018, Tesla will turn towards two new EV types: "*heavy-duty trucks and high passenger-density urban transport*".[5] In October 2016, Tesla announced that all Tesla vehicles produced – including the Model 3 – will have the hardware needed for full self-driving capability at a safety level which twice as safe as a human driver, or better. Once the new features are sufficiently validated, Tesla will roll out the autopilot features via over-the-air updates, pending regulatory approval.[6]

Building an ecosystem for the mass market

Automobiles

Driven by two high-end products - the Model S and Model X – worldwide sales jumped from just over 5,000 vehicles in 2012 to more than 76,000 in 2016. Revenues have also jumped up to $7 billion as a result, from a mere $200 million five years earlier. This success seems to have continued in 2017. Tesla posted a $2.7 billion in revenue for the first quarter of 2017 – this is more than double the $1.15 billion the company posted in the same period the year before. This success has been appreciated by the capital markets, in which Tesla overtook Ford and GM in value. Its market capitalisation reached $57 billion (4 August 2017) – more or less the same worth as BMW (€52 billion), which produces 30 times more vehicles than Tesla.

The Model 3

The new Model 3 is Tesla's attempt at mass-market electric car with a range of approximately 350 km and a top speed of 208 km/h. Musk has tried to cool high expectations by informing customers that the modestly-priced Model 3 is not the 'next big thing' from Tesla. Musk has said the company is now "anti-selling" its newest car by reminding customers how much better the Model X SUV and Model S luxury sedan are – if they're willing to pay much more.

At the end of July 2017, Tesla delivered (on schedule) the first 30 Model 3s to clients in a big event at the Tesla factory in Fremont. To date, the company has missed every one of its deadlines for new car launches. Aware of these challenges, Musk sought to counter them with a new strategy aiming for "a simpler design". Tesla took the wise decision to simplify the production process, part of which includes limiting the number of possible configurations from the outset.

For the Model 3, there was already a waiting list of more than 500,000 pre-orders, each reserved with a deposit of only $1,000. The Model 3 will retail for as low as $35,000 (basic model), which is about half the base sticker price of its high-end Model S. The reaction of the press was very positive. But improvements in the autopilot functionality are needed to stay ahead of the – growing – competition.

Production of 500,000 Model 3 vehicles is planned for 2018 – getting a relevant long-term market share as a target to decrease the costs per vehicle. Currently, the challenge is to make such mass production happen. In August 2017, workforce representatives already complained in a letter to the board about the comparably low salaries (starting at $18/h) and insufficient working conditions that resulted in many accidents.

Energy

Several companies are competing globally (Figure 3) to get a large share of the increasing global battery demand (Figure 4). In April 2015, Tesla unveiled the Tesla Powerwall – a set of high-capacity batteries that can be used for home energy storage and to charge EVs. The batteries store the electricity generated by solar panels; this can then be used at night or during peak grid times to save money on one's electricity bill. The system is connected to the Internet. According to Musk, the system can be used to create smart micro-grids. From May 2015, Powerwalls were sold to companies, including Solar City and Ouxo Energy, which managed the installation. In early 2017, the Powerwall 2 was introduced at $5,500; when fully charged, it can run many homes for two or three days without outside power.

Tesla also introduced a larger battery called the Powerpack developed for businesses, in industrial applications, and even public utility companies. It comes in 100 kWh battery blocks developed as an "infinitely scalable system". In early 2017, Tesla and a public utility provider in California completed an 80 MWh energy storage station that holds enough energy to power more than 2,500 households for a day.

Tesla's future battery supply will be secured by the Gigafactory, the world's largest factory and a cooperative effort between Tesla and Panasonic. It began mass-producing cells in January 2017. Some estimates put Tesla at a cost advantage, stating that prices per kWh are 30% cheaper than its closest competitor.[7] Jeff Evanston, Tesla's VP of Investor Relations, revealed the last-known official number on Tesla battery costs to be under $190 per kWh as of April 2016. A Bloomberg forecast estimates that cell prices will drop to $100/kWh by 2020.[8]

SolarCity

In November 2016, Tesla completed its $2.6 billion acquisition of SolarCity, to move beyond cars and become a vertically integrated sustainable energy company. Musk noted: "*Just like with electric cars where electric cars originally didn't look good, they had low range… they were like a golf cart, so people had a real hard time buying electric cars. And I think something similar needs to happen to solar. We really need to make solar panels as appealing as electric cars have become*."

Tesla leverages its brand and retail network via SolarCity's network of solar installers by turning Tesla stores into one-stop shopping visits, where customers can purchase solar panels, electricity storage, and electric vehicles. By integrating its Solar Roof with the Powerwall, Tesla's technology allows one to produce, store, and use solar energy at any time.

This change was reflected in the company rebrand, dropping 'Motors' from its name. The change indicates a rebrand from a primary focus on the company's signature EVs to clean energy solutions. Musk revealed that Tesla's solar roof would cost less than a regular roof – even before accounting for energy production (Figure 5).

In April 2017, Tesla started taking orders and has sold out it stocks a mere 16 days after starting pre-sales. Two of the four solar roof tile styles were available with a deposit of a mere $1,000 deposit. Made of tempered glass, Solar Roof tiles are more than three times stronger than standard roofing tiles. Tesla offers an infinite warranty on the product as a roof tile and guaranteed that they will provide 30 years of solar power. Musk promised that, "*when you have this installed on your house you will have the best-looking roof in the neighborhood*".[9][10]

A boring company

For some time, there has been talk of Musk building and running hyperloops – a network of tunnels to carry cars at high speed on electric sleds, for instance, under Los Angeles. In July 2017, Musk did first tests with a car elevator with a Tesla Model S, and a first tunnel segment was completed. A key challenge for the project is the costs of drilling tunnels (about $1.6 billion per mile in L.A.). To make this more efficient, Musk is working with the German company Herrenknecht, a specialist and world market leader in tunnel boring machines.[11]

New partnerships

(1) *Tencent*: In March 2017, Tencent, Asia's second most valuable tech firm, bought a 5% share in Tesla for $1.8 billion.[12] While Tencent's intention is not clear, the alliance could significantly boost Tesla's presence in China. As one of the biggest investors in Chinese ride-sharing giant Didi Chuxing, Tencent is known to be interested in developing artificial intelligence (AI) technology for driverless cars. In June 2017, Tesla closed a deal for local production of its cars near Shanghai – a move that will significantly lower costs. It will also help Tesla avoid China's 25% import tax currently placed on Tesla cars produced in the U.S. Since Tencent has strong backing from the Chinese government, it may play a crucial role in Tesla's international expansion to increase its global EV market share (Figure 6).[13]

(2) *Panasonic*: Panasonic has intensified its partnership with Tesla, becoming the exclusive supplier of batteries for Tesla's Model S in a joint factory in Buffalo, NY. More recently, Panasonic has expressed interest in extending its partnership with Tesla beyond batteries into self-driving technology, as the Japanese conglomerate continues to shift its focus to the – profitable – automotive business. Teaming with Panasonic could help Tesla to move more sensor technology in-house to build more integrated systems with lower component costs over time.[14]

(3) *Grohmann*: In late 2016, Tesla acquired the German engineering firm Grohmann Engineering, reconstituting it as Tesla's new Advanced Automation facility based in Germany. Tesla Grohmann Engineering is a new subdivision of the automaker dedicated to driving "exponential improvements" in its production process in terms of both speed and output quality, while simultaneously reducing the cost per vehicle.

The outlook – clouds loom ahead

Betting on batteries is a risky business. Worldwide, prices dropped by 22% in 2016. A further price decline of up to 20% is expected for 2017, according to forecasts by Bloomberg New Energy Finance. For makers of EVs, this is not a good thing; for battery producers, it will create serious challenges. Building the largest factory worldwide that nearly doubles the world's production of lithium-ion batteries is seen by many as a big bet.[15]

Integrating SolarCity with Tesla made Musk the chief executive of three enterprises, further stretching his already stretched attention span and financial resources, which may not be infinitely elastic. Some of this risk is mirrored in sceptical analyst reports and Tesla's stock, which dropped from $240 to $140 in early 2016 before more than doubling its value again (Figures 7).

Tesla is among the most heavily shorted stocks in the world, with over $10 billion, or approximately 24% of all free-floating shares, betting against it. So far, in 2017, Tesla short-sellers have suffered paper losses of 27%, equivalent to $2.25 billion, according to the financial analytics firm S3 Partners. However, if Tesla experiences delays in realising its projected timelines and its cost and volume targets for Model 3 production, the sceptical scenario may come true. Analysts criticise that, even with a 100% share of the segment Tesla owns, it is still losing money after 13 years.

At the same time, competitors are ramping up their efforts. Daimler is on its way to become Tesla's biggest battery rival by focusing on three key areas: electric SUVs, home batteries, and electric trucks. New competitors such as Nio, Lucid, or Faraday are worth close scrutiny. According to PitchBook, Chinese venture capital investors have poured more than $1.4 billion into EV and battery startups in the past three years, compared to $2.1 billion in total global venture capital funding for the sector.[16]

Backed by aggressive government policies – ranging from subsidies for EVs to restrictions on foreign rivals – China's battery companies are starting to dominate an industry. For instance, CATL says that, by 2020, it plans to produce more than the Gigafactory does (Figure 3).[17] Driven by high levels of air pollution China introduced large governmental incentives heavily favoring Chinese EV car manufacturers that are increasingly on the rise. The largest Chinese EV car manufacturer BYD now owns a 30% share in plug-in sales of the dynamically growing Chinese EV market (Figure 1).

Irrespective of how the story ends, Elon Musk is an archetype of an entrepreneur. Today, Tesla is a global pioneer at the forefront of new technologies and business models. Musk combines vision, ambition, and execution in unique ways. His activities are challenging incumbents worldwide. He focuses on the big picture, on clients' needs by pushing industry envelopes. Let's see what the next surprises will be…

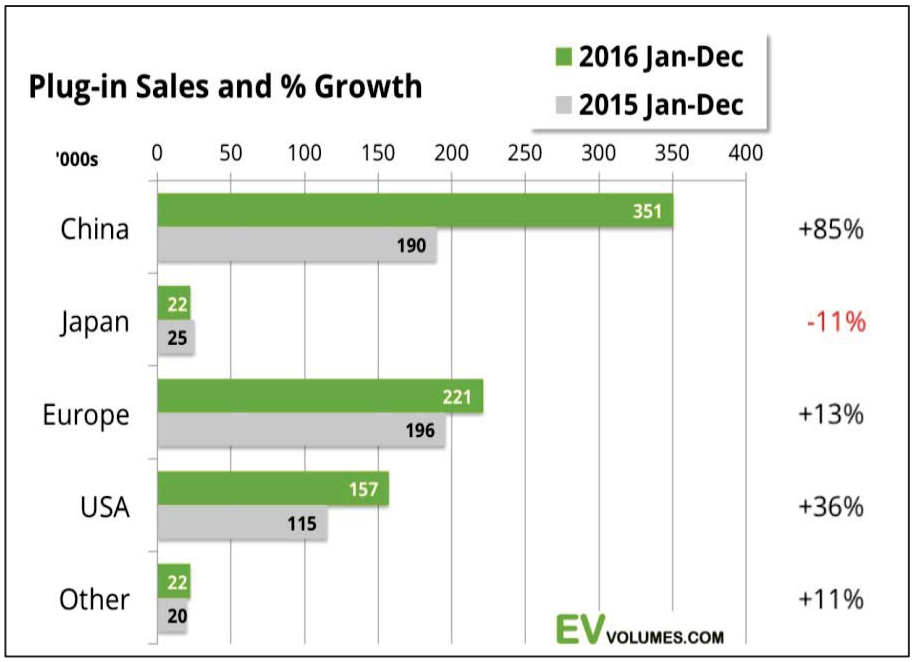

Figure 1: Plug-in sales and growth in major markets in 2016 (source: ev-volumes.com)

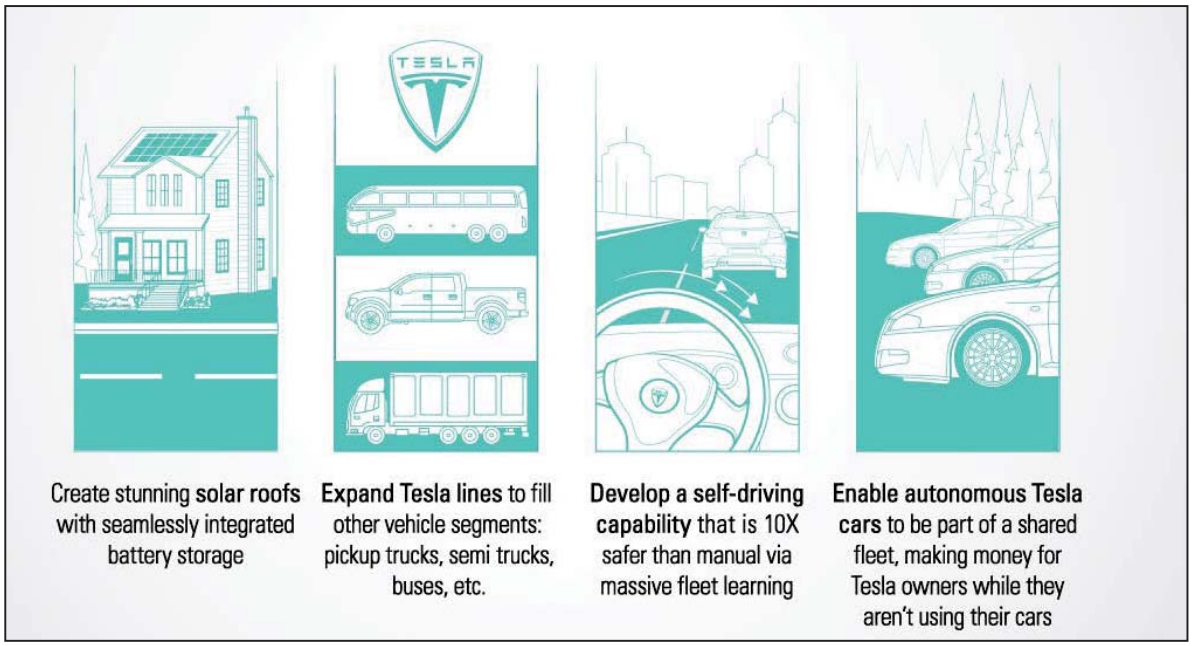

Figure 2: Master Plan Part Deux (source: visualcapitalist.com)

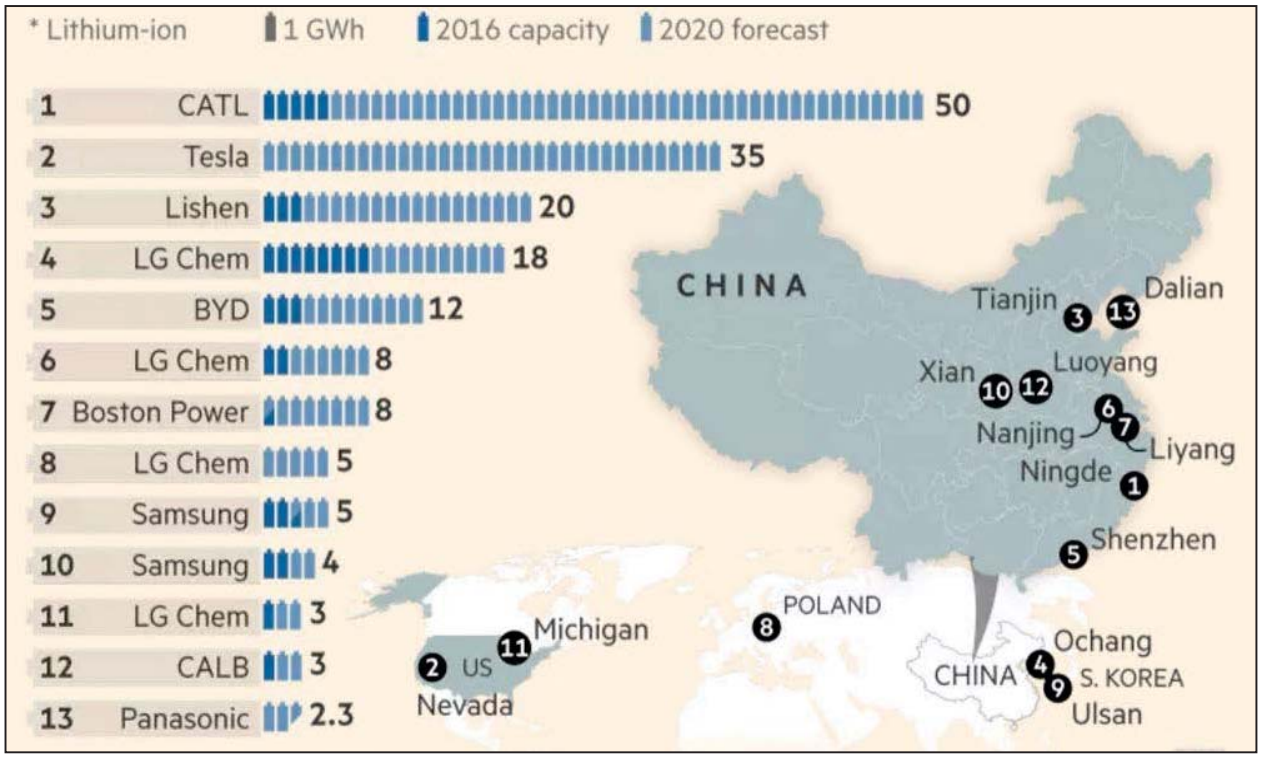

Figure 3: The largest battery producers by GWh (2016 - 2020)* (source: Benchmark Mineral Intelligence)

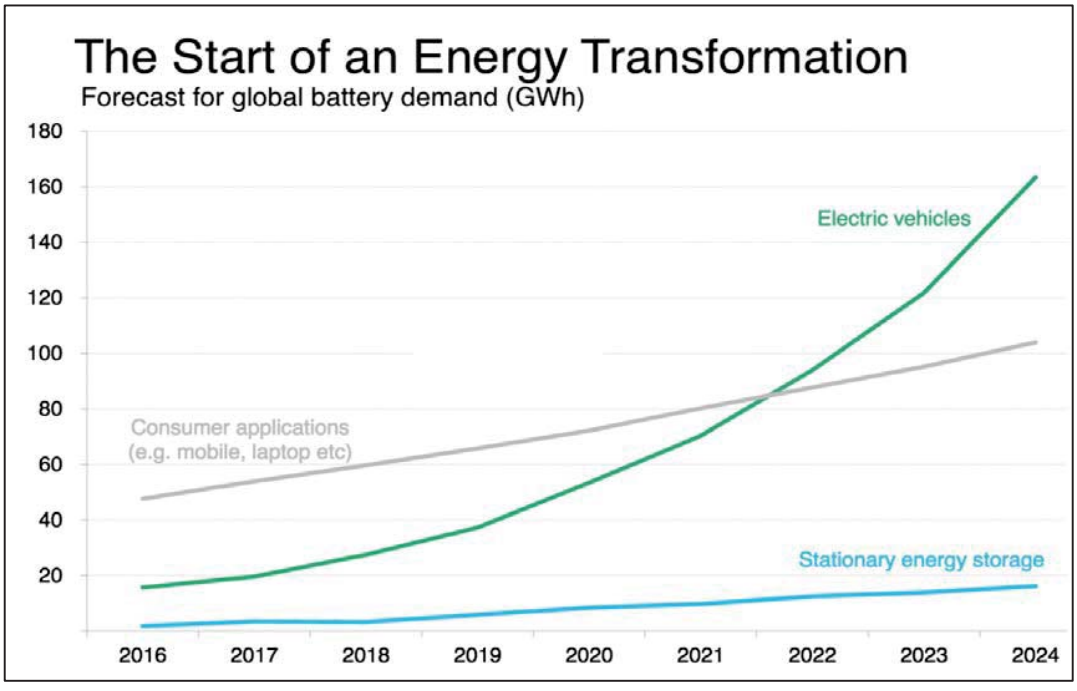

Figure 4: Forecast for global battery demand (GWh) (source: bloomberg.com)

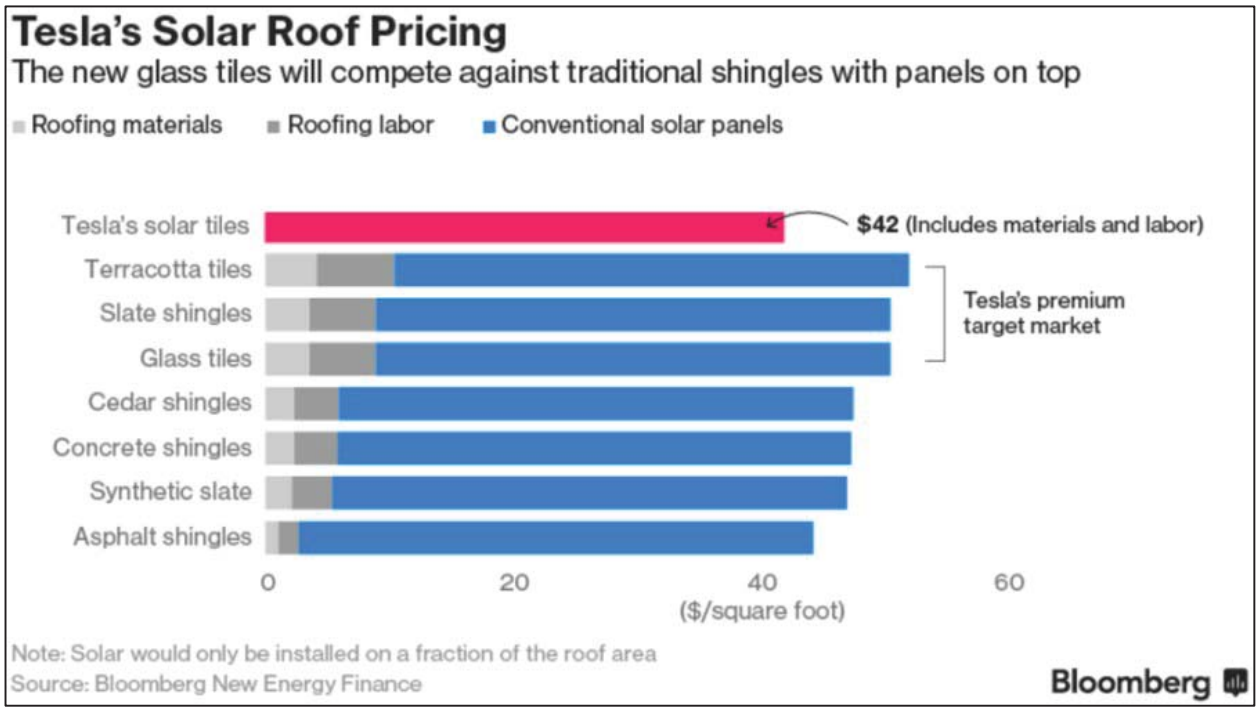

Figure 5: Comparison: Solar roof pricing: Tesla's solar tiles vs. traditional shingles (source: Bloomberg New Energy Finance)

Global	EVVOLUMES.COM	Segment	2016 Qtr-4	Change YoY	2016 Jan-Dec	Change YoY
1.	Tesla Model S	E	12 721	-24%	50 935	+2%
2.	Nissan Leaf EV	C	11 813	+3%	49 818	+7%
3.	BYD Tang PHEV	SUV	4 617	-64%	31 405	+71%
4.	Chevrolet Volt EREV	C	9 370	+39%	28 295	+67%
5.	Mitsubishi Outlander PHEV	SUV	6 935	-53%	27 850	-36%
6.	BMW i3 EV / EREV	MPV	8 294	+6%	25 576	+0%
7.	Tesla Model X	SUV	9 512	+4473%	25 372	+11756%
8.	BYD Qin PHEV	D	3 477	-39%	21 868	-31%
9.	Renault Zoe EV	B	5 813	-17%	21 626	+16%
10.	BYD e6 EV	MPV	7 716	+147%	20 609	+193%
11.	Zhidou D1/D2 EV	A	7 774	+87%	20 392	+231%
12.	BAIC E-Series EV	B	3 357	-45%	18 814	+14%
13.	BAIC EU 260 EV	D	8 658	+2532%	18 805	+5616%
14.	Geely Emgrand EV	D	9 822	-	17 181	-
15.	Zotye Z100 / Cloud EV	A	8 692	+0%	16 417	+6%
16.	Chery eQ EV	A	7 290	+111%	16 017	+121%
17.	Ford Fusion Energi PHEV	D	4 291	+49%	16 009	+62%
18.	BYD e5 EV	D	6 476	+398%	15 639	+997%
19.	JAC J3 iEV	B	4 657	+5%	15 409	+48%
20.	SAIC Roewe e550 PHEV	D	2 072	-35%	15 145	+41%
21.	VW Passat GTE PHEV	D	5 803	+30%	13 251	+183%
22.	Zotye E200 EV	A	7 368	-	13 154	-
23.	VW Golf GTE PHEV	C	2 968	-51%	12 372	-28%
24.	Volvo XC90 PHEV	SUV	3 322	+14%	12 129	+316%
25.	BMW X5 PHEV	SUV	2 932	+18%	12 103	+363%
26.	Audi A3 e-Tron PHEV	C	3 853	+1%	11 610	-5%
27.	JMC E100 EV	A	3 472	+14%	10 823	+105%
28.	BYD Qin EV300	D	3 858	-	10 656	-
29.	VW e-Golf EV	C	2 281	-46%	10 610	-31%
30.	Mercedes C350e PHEV	D	2 727	-18%	9 947	+79%
	Others		68 634	+27%	183 726	+28%
	Total		250 575	22%	773 563	42%

Figure 6: Top-selling electric vehicles by volume, growth rate, and segment in 2016 (source: ev-volumes.com)

Figure 7: Tesla stock price: 2012 to 2017 (source: nasdaq.com)

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