A Work Project, presented as part of the requirements for the Award of a Master Degree in Finance from the NOVA – School of Business and Economics

TESLA INC. EQUITY RESEARCH

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#2388

A Project carried out on the Master in Finance Program, under the supervision of Professor Rosário André

MAY 26TH 2016

TESLA INC.

COMPANY REPORT

CONSUMER GOODS

26 MAY 2017

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Time is running out

Will Tesla start achieving its promises?

- Tesla vehicles are among the highest quality and innovative products in the market, being in the forefront of automotive revolution alongside firms like Uber, General Motors or BMW. However, Tesla will grow its production capability at lower levels than expected, and will not be able to achieve the necessary operational efficiencies to reach profitability in the next 10 years.

- SolarCity's acquisition makes sense strategically, but its business segment will not generate positive cash flows until 2032. The Battery storage segment, although profitable, will be too small to affect the company's value, because it will take some years for a consumer to achieve a clear financial profit of joining batteries with solar systems.

- Tesla's powerful brand recognition, top customer service and technological advanced products will help to stable its delicate balance sheet position, even if we project that the company will not have a lot of difficulty raising more debt.

- We value Tesla in **three business segments**: **Transportation** (automotive business), **Generation** (solar panels and roof) and **Storage** (Powerwall/Powerpack and Gigafactory excessive production). Using Adjusted Present value, with the combination of three scenarios (80:10:10), we reach a **price target FY17 of $285.4,** with a downside of 12.22% and a 12-month return of -19.5%. Thus, we recommend a **sell position** on the stock.

Company description

Founded in 2003, Tesla Inc. is a designer, manufacturer and seller of electric vehicles (Roadster, Model S, Model X and Model 3) and energy storage systems (Powerwall and Powerpack). With last year's acquisition of SolarCity, the company also installs, operates and maintains solar products (solar panels and solar roof).

Recommendation:	**SELL**
Price Target FY17:	**$285.4**
Price (as of 26-May-17)	**$325.14**

Reuters: TSLA.OQ, Bloomberg: TSLA

52-week range ($)	178.19-327.66
Market Cap ($B)	50.31
Outstanding Shares (m)	164.260
Expected Shareholder Return (%)	(12.22)%

Source: Bloomberg

Source: Bloomberg

(Values in $ billions)	2016	2017F	2018F
Revenues	7.646	10.970	14.471
EBIT	(1.291)	(1.549)	(2.079)
Free Cash Flow	(5.311)	(2.394)	(3.438)
Products			
Vehicles Sold (Units)	76,233	107,521	157,505
MW Deployed (Generation)	804	1,038	1,609
MWh Deployed (Storage)	119	149	185

Source: Company Reports

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Executive Summary

We value Tesla in three different segments: **Transportation** (automotive business), **Storage** (energy storage systems and batteries), and **Generation** (solar panels and Solar Roof). Tesla's car business is completely aligned with the **automotive industry** future: dense urban environments will benefit from clean, connected, shareable and autonomous vehicles. We estimate the company vehicle production to grow at a lower rate than expected by the company, which will hurt its future market share and achievement of manufacturing efficiencies, decreasing the firm's profitability. **SolarCity acquisition** is fundamental to Tesla's strategy of **marrying energy storage and generation**, but it will take some years to achieve a clear financial profit of joining batteries with solar systems. Tesla's powerful brand recognition, high quality customer service and technological advanced products will help balance Generation's delicate financial position, but the overall company will portray negative cash flows until 2029.

After the **ponderation of our three scenarios**, our valuation model calculates a **Y17 target price of $285.4**. This represents a -12.22% upside, and a -19.5% 12-month return, enforcing our **sell recommendation**.

Exhibit 1: Weight of every segment on Total Market Value (%) and Valuation Outcome ($)

Segment	Equity Value	Price	%
Transportation	$44,391B	$270.25	94.7%
Generation	$1,755B	$10.68	3.7%
Storage	$0.734B	$4.47	1.6%
Total	$46,880B	$285.4	100%

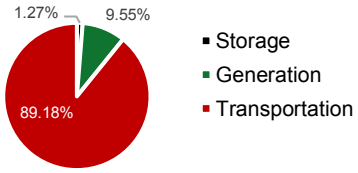
	Target Price	Probability
Bad Case	$179.95	10%
Base Case	$282.24	80%
Good Case	$416.15	10%
	$285.4	
May 26th Share Price	$325.14	-19.5% 12-month return
SELL Recommendation		

Source: Own Estimations

Company Description

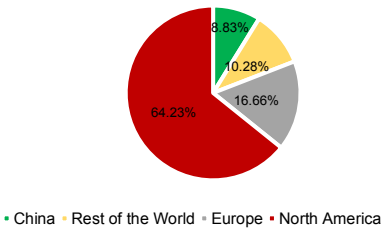
Founded in California on July 1st 2003, Tesla Inc. is a designer, manufacturer, and seller of **electric vehicles** (Roadster, Model S, Model X and Model 3), and **energy storage systems** (Powerwall and Powerpack). The company also sells powertrain components and related services with its cars. With last year's acquisition of **SolarCity**, the firm also installs and maintains **solar products** (solar panels and solar roof). Tesla is considered the only energy company that is vertically integrated, providing solutions on energy consumption (car business), generation and storage. The automaker sells its products directly to customers through their own international network of galleries and service stores (not using dealerships) and through their website. The company went public on June 29th 2010, on NASDAQ, and is the 31st biggest firm of the stock exchange, with a total market capitalization of $51.4B, on May 26th 2017. In 2016, the Automotive Business represented about 90% of Tesla's revenues, while the Energy Generation and Storage businesses accounted for 9.55% and 1.27%, respectively. Revenues grew 72% last year, compared with 28.7%, in 2015. **Geographically**, Tesla's biggest market is North America (64.23%). Europe and China represent 16.66% and 8.83% of TSLA revenues, while Rest of the World (RoW) comprised 10.28%.

Exhibit 2: Revenues by Business Segments (%) in 2016



Source: Company Reports; Own Estimations

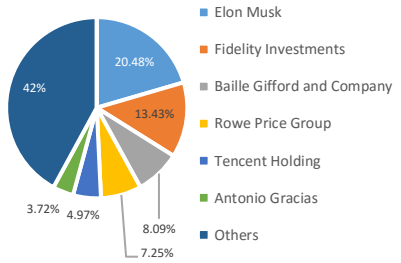
Exhibit 3: Revenues by Geographic Blocks (%) in 2016



Source: Company Reports; Own Estimations

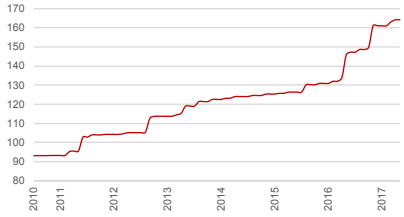
Shareholder Structure

Exhibit 4: Shareholder Structure as % Total Shares Outstanding



Source: Bloomberg, May 26th 2017

Exhibit 5: Monthly number of Total Shares Outstanding (Millions)



Source: Bloomberg, May 26th 2017

As of May 26th, Tesla Inc. held 164.260 million shares outstanding. With 33.6M (20.48%), Elon Musk stands as the biggest shareholder. Right after him, there is Fidelity Investments and Baille Gifford and Company with 22M and 12.3M shares, respectively, accounting for 13.4% and 8.09%, with T Rowe Price Group closing the top four shareholders with 7.25%. The latest changes were the investment on 8.2M shares by Tencent Holding (4.97%) and the attribution of 6.1M shares to Antonio Gracias (3.72%), lead director at the company. It is important to stress out that Tesla has sold convertible bonds maturing in 2018, 2019, 2021 and 2022[1].

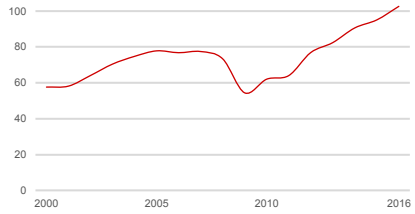
The **original founders** of the company do not possess any stake in the business at this moment. **Musk joined the company in 2004**, as a lead investor in the firm's Series A. Elon Musk has always been the **biggest shareholder of the firm** and is constantly keeping its stake at the same level. It shows that Mr. Musk has confidence in the company's performance, but may also be perceived as the fear of Elon losing control of the company, and a new direction would be taken. We consider Musk's leadership to be decisive when the company went through deep financial distress in 2008, when he managed to raise another funding round and to constantly buy debt with his personal savings. Altogether, we model that Elon Musk will remain Tesla's biggest shareholder and CEO in the future.

"I believe the auto industry will change more in the next 5 to 10 years than it has in the last 50", *Mary Barra, General Motors' CEO and Chairman*

Transportation

Automotive Industry

Exhibit 6: Worldwide Number of Vehicles Sold from 2000 to 2016 (in millions of units)



Source: Motor Industry Association

Note: *In 2008, car sales crashed 20%, but since then, the industry has been able to catch up, achieving an annual growth of 3.6%.*

In these last few years, we have seen the **rise of disruptive movements**[2] triggered by decreasing costs and evolving consumer preferences. Those have already caused significant strategic shifts in existing firms and have opened a highway for new competitors: heavy-weights like Apple and Google, are fighting side by side with startups such as Uber and Lyft, that perceived this industry shift as an opportunity. The main trends for the sector are **connectivity**, **autonomy**, **shared mobility** and **electrification**.

With the avenge of the Internet of Things and Artificial Intelligence, the world has started to understand how **big data & connectivity** can be used to our benefit. **Connected cars will expand at more than 17% per year until 2030**. These will enable engineers to plan roadways and traffic better, while the live connection between vehicles will reduce the number of accidents (80% in the next 25 years).

[1] Holders may convert their Tesla Convertible Notes prior to the agreed maturity, under certain circumstances.
[2] "I believe the Auto Industry will change more in the next 5 to 10 years than it has in the last 50" General Motors' CEO

The biggest barriers to vehicle autonomy are regulatory and engineering challenges, as well as moral issues, pricing and customer acceptance

Passenger miles could grow 25% by 2030

Source: *Bloomberg & McKinsey*

Firms will give consumers access to enhanced services as part of the overall customer experience, opening new routes for **additional revenue** ($23B in 2023). Tied to big data is **autonomy**. Autonomous vehicles will use machine learning to reduce problems related to **traffic and safety**. Low level autonomous vehicles already cruise our roads[3], but fully self-driving vehicles, with the ability to make decisions without the driver's approval, will improve **convenience and well-being** at a colossal scale. Nonetheless, it may be challenging to see a massive selling of driverless cars in the short term, **not before 2020** by McKinsey's math. All in all, fully autonomous cars will represent at least 15% of passenger vehicles sold in 2030, with less advanced models fulfilling the remaining demand.

Car sharing acceptance is growing annually at 30%

Source: *McKinsey*

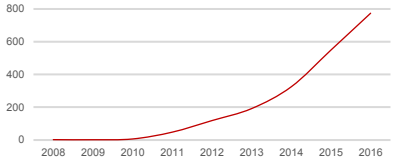
All these trends will be self-fulfilling, with data powering self-driving capabilities that will enable a shared way of travelling

Closing the chapter is **shared mobility**. Most car owners only use their vehicles during 5-10% of the day, and making it available to others during off-time, will enable people to travel faster, cheaper and more. This trend is propelled by new customer behaviours, who give less importance to car ownership. Altogether, while private transportation will never fully be extinct and will be central to this trend, **ride hailing and car sharing** will rise as important complementary services for firms.

Electric Vehicles Market

At the end of 2016, more than **2 million electric vehicles[4] drove on the roads**, with sales increasing 41% last year, compared with 70% in 2015. However, they still only represent **0.1% of the global car stock**. China occupies the first place as the largest electric car market, together with the U.S., the Netherlands and Norway, the four accounting for 70% of EV's worldwide. The other countries where EV market share is above 1% are the U.K., Sweden, Denmark and France. To accurately forecast the growth of the EV market it is important to identify which **Growth Factors** determine its evolution. Joining our research with customer-centred studies done by numerous entities[5], we modelled the following drivers as of: **high importance**, Range & Charging, Purchase Price, EV's Financial & Performance Benefits, Governmental Incentives and Model Diversity; **medium importance**, Environment & Customer Awareness and Commodity Prices; and **low importance**, Technology & Safety.

Exhibit 7: Electric Vehicles Sales (Thousands of Units)



Source: International Energy Agency; EVVolumes.com

- Range & Charging

[3] There are different levels of car autonomy, ranging from AI-controlled steering and accelerating (level 1) to fully-autonomous systems (level 5). Nowadays, we only have level 2 cars, with features including collision avoidance, blind-spot detection and self-parking.
[4] An electric vehicle (EV) stands for battery electric (BEV), plug-in hybrid (PHEV) or fuel-cell vehicle (FCEV). These are different from the traditional hybrids (HEV), Internal Combustion Engine vehicles (ICE) or Alternative Fuels vehicles.
[5] Accenture, Delloite, EY, European Commission, KPMG, PWC, U.S. Department of Energy, University of Vermont

A car with 80 miles range is enough to cover 87% of the daily trips of an ordinary citizen does in a developed country

Source: *Why Range Anxiety for Electric Cars is Overblown* (2016) MIT's Institute for Data System

Median ICE Range: *412 miles*
Maximum BEV Range: *355 miles*

Source: *Clean Technica*

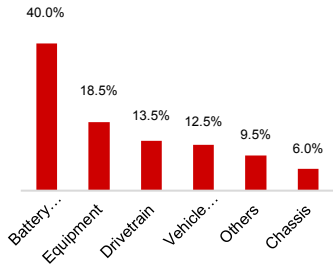
Exhibit 8: Slow (Level 1/2) and Fast (3/4) Chargers Description

Level	Power	Example
Level 1 (AC)	1.6kWh	Normal house outlet
Level 2 (AC)	19.2kWh	Garage outlet
Level 3 (DC)	40-90kWh	Nissan's CHAdeMo & BMW's SAE Combo
Level 4 (DC)	120kWh	Tesla Superchargers

Source: Company Reports; Tesla.com

"[Lithium is a strong contender to] replace gasoline as the primary source of transportation fuel" *according to Goldman Sachs' analysts*

Exhibit 9: Battery Electric Vehicle Cost Breakdown (%) by Component



Source: Research Gate

The Washington Post[6] defines **range anxiety** as the "state of fear drivers experience from knowing that their battery could run out of charge and strand them far from a recharging station". Even if it is almost always the biggest problem to be referred for consumers, a MIT study found range anxiety to be exaggerated (check side bar). Thus, it is not necessarily the fear of how far you can travel, but rather with you being able to easily find and access a charger when you need. Thus, the solution must be centred on the **charging infrastructure**.

China and Japan account for more than 65% of DC charging "plugs," while AC's geographical distribution of publicly accessible outlets is closer to the distribution of EVs (see *Introduction to Electric Vehicles Market*). The market is dominated by Nissan's CHAdeMO and BMW i3's SAE Combo level 3 chargers, and level 4 Tesla Superchargers. However, these are only available outside people's houses, whose access is contingent on distance to closest plug and availability of the equipment. Other problems extend to the lack of information and compatibility across different adapters, deficient 'smart' charging flexible to grid demands, and, above all, low number of fast chargers at public spaces. This last point enhances another cumbersome obstacle: **charging takes a lot of time**, since it takes 45 minutes to charge up 80% of a Tesla Model S' 218 miles range.

Some measures are being taken by corporations: Tesla is developing a CHAdeMO adapter, while BMW and Nissan announced a partnership to install fast chargers in the U.S. and Europe. Furthermore, countries like U.S. ($4.5B investment), France, Denmark and Japan have implemented support programmes for developing nationwide charging network in public spaces. While China aims to deploy 4.3M private chargers and 0.5M public outlets. In Europe, the EU recently approved regulations that require an EV charger to be included in every new and renovated home (starting in 2019), a rule that extends itself to at least 10% of all new car parks in 2023. We model range anxiety decrease as the charging infrastructure successfully spreads across the territory, backed by government and state support, and to be one of the main contributors to the growth of the EV market.

- ## Purchase Price & Cost

Taking manufacturers gross margin and governmental incentives out of the equation for purchase price (check Exhibit 9 for cost breakdown), both analysed further in the report, lets focus on where carmakers can extract more robust cost savings: **battery cost**[7]. Even with the big diversity of batteries today (Lead-Acid,

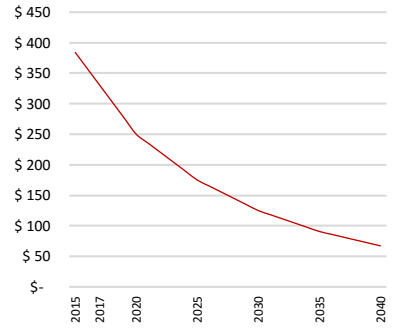
[6] *"Range anxiety" is scaring people away from electric cars – but the fear may be overblown* (2016) Washington Post
[7] This analysis will also be central for the Energy Storage segment, being a fundamental factor for the correspondent market growth

NiCd and NiMH), the majority of manufacturers adopted **Lithium-Ion as the main component**, since it is lighter, can store more energy and can operate at a wider range of temperatures. Each lithium-ion (Li-ion) cell contains **three major parts**: anode (natural or synthetic graphite), electrolyte (lithium salts) and a cathode. This last component is the one that suffers more formulations: Tesla Model S uses 80% Nickel, 15% Cobalt and 5% Aluminium and Powerwall integrates 1/3 of Nickel, Manganese and Cobalt.

Even though the **lithium market** is relatively small, $1B a year (Financial Times[8]), and expected to be up to three times bigger by 2025 (Goldman Sachs), the size of **rechargeable battery market** was around $49B in 2014, with Li-ion based batteries comprising 33.4% of the market (Bernstein AG Research). As a result of increased demand, although the **price of lithium has risen in recent years**, improvements in battery chemistry and manufacturing efficiency, as well as an aggressing pricing strategy by battery producers, the **cost of lithium-ion battery packs** fell from around $1,000 in 2010, to around $384 at the end of 2015. We project Li-ion battery cost, across the market, to continue its decreasing path, from $250/kWh in 2020 to $125/kWh in 2030 (Exhibit 10). These reductions will come from **three different drivers**: a) reduction in raw materials and electronic components prices (20%); b) economies of scale from production increase (35%); c) increase in efficiency and battery power, due to technical improvements in battery technology (45%). Particularly for Tesla, we model a **20% battery reduction cost** because of Gigafactory's scale manufacturing (below Tesla's 30% target). The facility will grow in production capacity over the years, reaching a maximum of 150GWh in 2024, when the company will fully extract its gains. These efficiency improvements will mainly come from economies of scale, reduction of waste and processes optimisation, as result of the vertical integration implemented.

On the **side of supply**, even with the scale up, until 2030, batteries will only consume less than 1% of the discovered reserves of lithium, nickel, manganese and copper, as well as 4% of cobalt. On these markets, as 40% of cobalt is used in batteries, it's expected that, by 2020, its demand will grow by 55%, with prices rising 45%, already up by 16% in 2016 (CRU Group[9]). As for graphite, a market dominated by China, Benchmark Mineral Intelligence forecasts it to triple in since, by the end of 2020. If there is any shock to demand or supply in any of these markets, the growth of the EV market will be deeply compromised.

Exhibit 10: Li-Ion Battery Pack Cost ($/kWh) from 2015-2040



Source: Bloomberg; McKinsey; Own Estimations

Note: *General Motors announced that battery costs had fallen to $145/kWh and has the objective of reaching $100/kWh by 2022. Tesla aims to reach the same milestone two years earlier.*

Tesla has achieved a production cost of $190 per kWh in 2016

Source: Company Reports

- Financial and Performance Benefits

[8] *Lithium: Chile's buried treasure* (July 2016) Financial Times
[9] *CRU's Cobalt Market Outlook* (2016) CRU

"The overall experience and the value proposition of an EV is just so different from a typical gas car"
Nic Nigro, Atlas Public Policy Founder

CO_2 emissions would reduce 58% if we go all-electric, and 45% if we choose PHEV
Source: *U.S. Department of Energy*

There are a lot of advantages of owning a BEV, which the average consumer is not always aware of. For instance, a **BEV is more efficient** than an ICE: only 18.5% of the energy in gasoline is used to propel the car, compared 80.5% in an BEV, making it faster, chargeable at home and having a longer lifetime value (250,000 miles for ICE's versus over 350,000 for EVs). **Financially**, besides less maintenance costs, it is expected that an average citizen will keep in their bank account $50-$90 per 1,000 miles, or $3,500 to $9000 over their lifetime, according to Environment California Research & Policy Centre. Over the first five years, according to International Energy Agency, Europeans will save $3000, more $1000 than Americans (2015 prices). We model the real deal-breaker when comparing an EV to an ICE will be its range, higher price and charging availability.

- Governmental Incentives

Exhibit 11: Types of Incentives for Electric Vehicles Adoption

Policy	Example
Financial Lever	Direct Financial Incentives; Different Taxation
Regulatory Measures	Tailpipe emissions; Fuel Economy New Standards; Non-Financial Credits
Other Instruments	Waivers access restrictions; Parking Fees and Tools

Source: International Energy Agency

Incentives and regulations are positively correlated with the growth of the EV Market Share

A lot of countries have given focus to **financial levers** (Exhibit 11), since they are easy to implement and have an immediate effect. There are several kinds of purchase incentives, like the French and Japanese direct rebate or the British grant. Regarding **taxation exemption**, Netherlands and Norway governments' exempt their EV buyer of registration tax, in addition to providing a no or reduced yearly circulation tax fee for EV[10] (12% of the equivalent to a diesel car in Norway – also existent in Germany, Sweden and Denmark) and discount on company car tax for employees. In China, besides exemption from sales and import tax, buyers will benefit from a $9,300 central government subsidy, plus $9,800 if you live in Beijing (Model S does not qualify). Only Norway gives a **full tax exemption**, and tax credits are provided by Sweden and U.S., where a federal income tax credit is the only strong financial measure in place: $7,500 for BEVs nation-wide[11]. The attribution of this avail is calculated for each carmaker and is dependent on their yearly production. Thus, we estimate this value to decrease for Tesla car buyers from 2019 onwards, when the company reaches 200,000 annual production.

The government must also create room for **other measures**. In California, the Zero-Emission Vehicle program has created a financial support to vehicle manufacturer on R&D and deployment goals, as well as discounted/free electric charging. We can also include other mechanisms: a) China's license plate lottery system for ICEs, that smooths the registration process; b) easy access to bus lanes, city centres or parking; c) exemption from tolls or congestion charges and benefits for charging. In other poorer parts of the world, India has the plan to increase investment but also to liberate permits for battery powered taxis, lower

[10] *Overview and Analysis of EV Incentives applied across Eight Selected Country Markets* (2015) Blekinge Institute of Technology
[11] *Transition to a Global Zero-Emission Vehicle Fleet: A Collaborative Agenda for Governments* (2015) The International

the minimum age to drive and setting up a wider free charging and public parking infrastructure. Additional forms of regulatory measures are **bans**[12]: Netherlands, Norway and Germany, have passed legislation to prohibit ICEs' sales from 2025, 2025 and 2030 onwards, respectively. While bans may be a goal that's yet too distant from achievement, at least for big countries, governments must keep their efforts supporting EV's affordability, while investing in public and private charging infrastructure and expanding emission-free technologies for heavy-duty vehicles. On the other side of the idle, it is also crucial to increase VAT and other taxes, add parking fees and toll roads for polluting cars and use more realistic methods to measure emissions, while limiting subsidization to the oil industry. We model the phased drawback or extinction of some of these measures to affect the decrease of the growth rate of the EV evolution between 2020 and 2030.

- Customer Environmental Awareness

Transport accounts for about **23%**, **26%** and more than **25%** of total greenhouse gas output in Europe, U.S. and China, respectively, from which more than two-thirds are from road vehicles. This fact is well acknowledged by consumers[13] since 70% of them believe that greenhouse gases are the cause of climate change and 72% accept that CO2 emitted by vehicles makes a substantial contribution to that problem. Nonetheless, almost everyone didn't see him or herself as part of the problem because they thought, as individuals, were unable to help minimise the issue. Curiously, the population of the biggest emitters, China and U.S., is the less concerned about the already **present effects of climate change**: 2,580 annual premature deaths, adding to $37B in health costs each year in the U.S., and $1T in OECD countries[14].

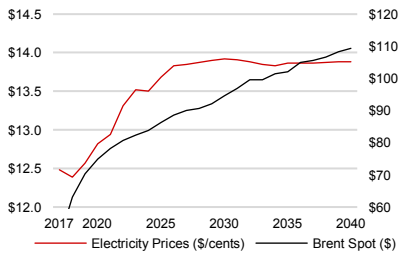
Costs related with Health would decrease more than 20% if EVs account for 100% of new sales in 2050

Source: *Health and Climate Benefits of Zero Emission Vehicles* (2016) American Lung Association

- Commodities Prices & Energy Market

According to the World Energy Council[15], primary and final energy consumption, in 2060, will grow 38% and 25%, respectively, while per capita primary energy demand will peak before 2030. Almost **two-thirds of global oil demand** is used for transportation, of which 84% is road transit. Thus, the oil industry and the development of the EV market are tightly correlated, with one full-electric vehicle displacing an amount of around 15 barrels of oil per year (source: BNEF). According to U.S. Energy Information Administration study[16], oil prices will increase at 3.47% from 2017 to 2040 (Exhibit 12), benefiting the expansion of EVs.

Exhibit 12: Evolution of Electricity Prices ($/cents) and Brent Spot ($), from 2017 to 2040



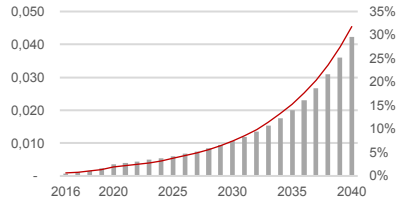
Source: U.S. Energy Information Administration

[12] "Fully eliminating ICE sales by 2025 is simply not realistic. Even 2030 looks very ambitious". Colin McKerracher, BNEF
[13] *The Automotive Industry and Climate Change* (2017) PWC
[14] *The Cost of Air Pollution: Health Impacts of Road Transportation* (2014) OECD
[15] *The Grand Transition* (2016) World Energy Council
[16] *Annual Energy Outlook 2017* (2017) U.S. Energy Information Administration

The **Renewable energy** market is one of the biggest contributors to the oil industry evolution. Globally, **solar and wind energy**, will produce 23.1% and 9.1% of total electricity, respectively, boosted by technology cost reductions. For both resources, the largest additions will be seen in China, India, Europe and North America. Worldwide, it is expected for the average retail price of electricity to grow around 0.47% per year, from $0.123/kWh in 2017 to $0.139/kWh in 2040, mostly due to the rising costs of distribution and generation of electric power, while the demand will not have a significant growth.

Electric Vehicles Market Forecast

Exhibit 13: Electric Vehicles Sales (Millions of Units) and % Percentage of Total LDV Sales



Source: Own Estimations; Navigant Research; International Energy Agency; Bloomberg New Finance; McKinsey

To better understand the evolution of the Electric Vehicle market, we will present the **EV sales as a percentage of the number of total passenger cars sold** (Light Duty Vehicles). Using Navigant Research's values on LDV sales projections until 2040, we model EV sales to be 1.9%, 7.5% and 31.8% of car sales in 2020, 2030 and 2040, respectively, from a starting point of 0.7% last year. With an average annual growth of 19.05%, electric car sales will increase strongly until 2020 (49.22% CAGR), decreasing to an average annual growth of 11.41% until 2030, and 14.88% until 2040. **Geographically**, during the last five years, there has been a volatile sharing of the EV sales around the world, with, for example, the U.S. representing 50% of electric cars purchases, in 2013, but suddenly falling to 20% in 2015. We predict that, in 2017, one-third of EVs will be bought in China, with Europe and U.S., the other two most important markets for Tesla, accounting for 56%. The 'Rest of the World' segment will only represent 11%. Throughout time, we forecast a continuous expansion of this last group, much stronger after 2025, propelled by the strong growth of emerging economies, especially India, Australia, Japan, South Korea and Singapore.

Revenue Segments

▪ Electric Vehicles Analysis

There are clearly **two different markets** in which Tesla is competing: luxury and mass sectors. In the **luxury** layer, the company will join the fight with three vehicles: **Model S**, **Model X** and **Roadster** (Exhibit 14). **Model S** is a luxury sedan, leader in its class (94% of owners stating they would buy the car again), while **Model X** is the company's first SUV. On the mass market, Tesla will bet on **Model 3**, a sedan described by Musk as a "smaller, more affordable version of Model S with less range & power & fewer features"[17].

[17] [Model 3 is] perhaps three to four times more automated than a Model S or a Model X. And much, much simpler to build" Jeffrey Straubel, Tesla's CTO on 2017 1st Quarter Earnings Call

Exhibit 14: Tesla Vehicles Descriptions

Tesla Vehicles Descriptions[18]
Roadster *Sports Luxury Car* **BEV; 53-74kWh; $109,000; 311 miles; 3.6-3.8secs; 2008** *The model was discontinued in 2012, but Version 2 will be launched in 2019* *First BEV to travel more than 200 miles*
Model S *Five-door luxury sedan, third fastest production car* **BEV; 75-100kWh; $69,500; 259-315 miles; 2.7-5.4secs; 2012** ***1)** Motor Trend's 2013 Car of the Year* ***2)** #1 Owner Satisfaction Survey (2015)* ***3)** Broke Consumer Reports rating system, scoring 103 out of 100 possible points*
Model X *Luxury crossover SUV* **BEV; 75-100kWh; $82,500; 237-295 miles; 2.9-6.2 secs; 2015**
Model 3 *Four-door compact sedan* **BEV; 60-75 kWh; $35,000; 215 miles; 2.7-6secs; Late 2017**
All vehicles have 5-star safety rating and include high-end software and hardware: **a) Ludicrous mode** enables the cars to reach 60 mph in 2.5 seconds; **b) Autopilot**, capacitates the vehicle to reach level 2 autonomy.

Source: Company Reports; tesla.com

Exhibit 15: Model X and S Biggest Competitors Description

Model S and X'a Competitors
BMW
BMW i8 – BEV; 300 miles; Early 2017 (Model S)
BMW 7 Series – PHEV; $89,100 (Model S)
Audi
Q6 and Q5 – BEV; $75,000 (Model S)
Three Motor SUV – BEV; 90kWh (Model X)
Mercedes
Sedan – BEV; $200,000; 2018 (Model S)
Mercedes Sports SUV – BEV; 70kWh; >$55,000; 315 miles; 5; 2019 (Model X)
ICE and Hybrids: Audi Series-A, BMW X1 and X5

Source: BMW, Audi and Mercedes website

In the luxury slice of the market, **Model S** and **Model X** are nowadays competing against **Audi A3, BMW X5** and **Porsche Cayenne SE**, but a whole new range of high-end electric vehicles will be launched by either highly regarded car makers or startups. **BMW** will launch 2 electric sedans (**BMW i8** and **BMW 7 Series**), a new BEV Mini Copper and 2 SUVs until 2021. **Audi** is going to compete with Model X with the conversion of its Q6 and Q5 SUV's into all electric, but the biggest introduction will be a new BEV SUV with three motors. On the other hand, **Mercedes** will launch a $200,000 sedan in 2018 and a dual motor sports SUV. Established brands like Jaguar, Porsche, Subaru, and new comers Henrik Fisker and Faraday, will also launch their SUV's between 2017 and 2020, while Aston Martin and Maserati will build their electric sedans to compete against Model S. Entering this market will also be **Ford** and **Volkswagen** with plans to sell a 300 miles' BEV SUV until 2020. On this segment, Tesla has the advantage of a clearly superior product, in terms of performance, technology and attractiveness, with no need to produce in large scale. However, at the cheaper layers of the market, the reasoning is not the same.

Model 3 will meet fierce competition from five main models: **Chevrolet Bolt/Opel Ampera**, ***New* Nissan LEAF**, ***New* BYD e6**, **BAIC E-Series** and **Ford Fusion Model E**. The new BMW i3 (2022)**,** *New* Renault Zoe, Volkswagen ID Concept (2020) and Plug-in Hybrid Toyota Prius (2017) are also cars to take into account. Other brands like **Volvo** (2019) and **Hyundai** (2018) will also enter the market, but with less *gravitas* than the above identified. Comparatively, Model 3 base model outperforms these vehicles in design and technology available, while the charging speed[19] and network will also contribute to its superiority. Range and production scale will be the main pain points for Tesla, with the brand competing against automakers with more than 20 years of experience in this slim-margin portion of the market[20].

Tesla is not only competing against EVs, but also ICEs and Hybrids. **Model S** will battle Audi's A Series, BMW X Series, Lexus LS and Porsche Panamera, while **Model X** will collide with Bentley Bentayga, Mercedes G-Class, Porsche Cayenne and Range Rover. More affordable sedans, like the Chevrolet Malibu, Ford Focus or Volkswagen Golf will go head-to-head against **Model 3**. All in all, what will make or break the decision of choosing a Tesla Model versus an ICE/HEV will be its range and price, affected by existent incentives at the time.

[18] When a new vehicle is presented it will have, in parenthesis or on the side bar, its main characteristics: (EV Category; Battery Power; Price; Range; Acceleration; Release Year). All values will refer to the vehicles' base version.
[19] Tesla superchargers are the most powerful plugs in the market (level 4) while the Chevy Bolt is limited to level 2 charging.
[20] Chevrolet Volt and the Original Nissan LEAF are the two all-time best-selling EVs.

Two points that are important to highlight are the vehicles' **self-driving abilities** and **brands future shared network expectations**. Tesla introduced the first autonomous characteristics in a car in October 2012, and since October last year, every model will include **Enhanced Autopilot**, which will enable all cars to have full self-driving capabilities (level 4). Standalone brands like **Ford**, **BMW** and **Mercedes** or joint forces **Google & Fiat Chrysler**, **Uber & Volvo** or **GM & Lyft** expect to ship their autonomous models between 2021 and 2025, which will add an extra layer of competitiveness in the market. The same firms are also developing their vehicles and specialised software to build an integrated network of autonomous vehicles, which are expected to be functional in 2021 to 2023. We model Tesla's vehicles to acquire level 4 autonomy in 2022 (two years before Musk's target), in the same year the brand's shared network will start to function.

Exhibit 16: Model 3 Biggest Competitors Description

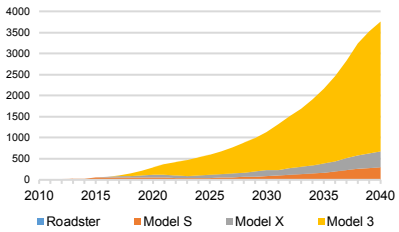
Model 3 Competitors
Chevrolet Bolt BEV; 60kWh; $37,500; 238miles; 6.3s; Early 2017 *2017 Motor Trend Car of the Year*
Nissan LEAF 60kWh; 200miles; 2017-2018
BYD e6 BEV; 82kWh; $30,000; 250 miles
BAIC E-Series 200 miles, 2019
Ford Fusion 200 miles, 2019
ICE and Hybrids: Chevrolet Malibu, Ford Focus, Ford Fiesta and Volkswagen Golf

Source: BMW, Nissan, Renault, Volkswagen, BAIC and Ford's website

▪ Electric Vehicles Revenues

To analyse electric vehicles sales and unfold all the other revenues associated, let's first consider car manufacturing capability. Modelling Tesla's producing capacity as vehicle produced per week, and taking in consideration the company and peers historical growth rate, we estimate Tesla to build 321,262 cars in 2020, reaching 1.8 and 3.9 million in 2030 and 2040, respectively (Tesla target is 0.5M and 1M units in 2018 and 2020). Nonetheless, incorporating Tesla and comparables' ratio of delivered (sold) vehicles over produced vehicles, we estimate the brand to sell 302,307 models in 2020, 1.1M and 3.7 vehicles in 2030 and 2040 (Exhibit 17). Model 3 will increase in importance over the overall automotive production, reaching 82% in 2040, with Model X slightly growing in attractiveness *vis-à-vis* Model S (10% vs 8% weight on total). **North America** will concentrate most of Tesla's sales (52.5% in 2017, 32.2% in 2040), followed by **China** (13% in 2017, 28.71% in 2040) and **Europe** (26.88% in 2017, 19.1% in 2040). Hence, Tesla will always have a higher market share in **Canada and U.S.**, due to its brand recognition and product superiority (above 20% until 2030, decreasing to 13.62% in 2040). In **Europe**, however, it will be harder to reach owners garages, due to the hegemony of brands like Mercedes, BMW, Volkswagen and Renault. **China** will also be difficult since it is very fragmented and crowded by Chinese automakers, specially BYD, BAIC and Zotye. TSLA will never capture more than 11.3% or 9.65% of the European or Chinese market, and will gather between 3-6% of the remaining EV sales around the world.

Exhibit 17: Tesla Vehicles Sales by Number of Cars Delivered (Thousands) from 2009 to 2040



Source: Company Reports, Own Estimations

Note: We only expect Tesla to sell around 9,883 units (almost double the version 1), and discontinue the model in 2023, as it did in 2012, to fully focus on Model 3 production.

Exhibit 18: Tesla Vehicles 2017 Average Selling Price ($) and Annual Price Decrease (%) from 2017 and 2040

Model	2017 ASP ($)	2017-2020 Annual Price Decrease	2020-2030 Annual Price Decrease	2030-2040 Annual Price Decrease
Model S	$83,576	0.96%	0.65%	0.32%
Model X	$100,945	1.13%	0.76%	0.33%
Model 3	$43,014	0.49%	0.25%	0.10%

Source: Company Reports; Own Estimations

Note: *Figures take in consideration historical values and price evolution between quarters. ASP decline over time as the addition of better options within the same model (e.g. Model S 70 vs 70D) may cannibalize more expensive versions.*

Exhibit 19: Regulatory Credits Attribution Formula

Attribution Formula per Car	0.5 + Ponderator * AER (This ponderator will decrease from 0.1 in 2020 to 0.02 in 2024)
Estimated AER for each Tesla Model	**Model S =** 230 miles **Model X =** 240 miles **Model 3 =** 215 miles **Roadster =** 311 miles

Source: Company Reports; California Environmental Protection Agency; Own Estimations

Note: *AER means all-electric range.*

Exhibit 20: Supercharging & Car Sharing Revenue Assumptions

Supercharging	
Tesla Model Annual Miles Travelled	**20,000 miles** (+2% YoY growth)
% Supercharger Use	**20% of total charging** (-1% YoY growth)
Life Expectancy of Tesla Vehicle	**18 years** (or 360,000 miles)
Car Sharing	
Miles of Renting as % of Total Possible Miles	**40,000 miles per year (20%)** 10% Usage corresponds to the 20k miles driven every year by the car original owner
Adoption Rate for each Tesla Model	**Model S/X:** 15% in 2022, to 33% in 2040 **Model 3:** 25% in 2022, to 43% in 2040
Uber Fee per Mile	**$2.5** in San Francisco
Uber & Lyft Commission per Mile	**Uber**: 25% **Lyft:** 43%

Source: Company Reports; Own Estimations; tesla.com

Taking into consideration historical values for TSLA and the industry to shape our price forecast and evolution (Exhibit 18), we estimate 30% and 33% of Model S/X and Model 3 sales, respectively, to be completed through leasing instead of direct sales. Hence, we model Tesla car revenues to grow, on average, 14.14%, between 2017 and 2040, reaching $161B in 2040, comprising 80.97% of the segment sales. We estimate a 2017 **Gross Margin** of 26%, 25% and 7.25% for Model S, X and 3, respectively. When Gigafactory reaches full capacity in 2024, meaning a 20% cost reduction on battery, we estimate Model S, X and 3 gross margin to go up to 36.6%, 35.6% and 17.3% in that year, respectively.

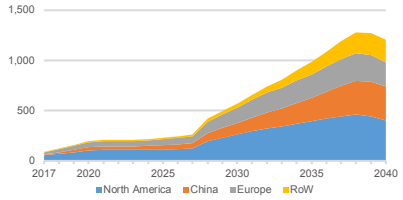
- Services & Other and Regulatory Credits

Services & Others include "repair and maintenance services, sales of electric powertrain components and others" (2017's First Quarter Tesla Report). Consistently with the firm's historical values, we forecast **Services & Others** revenue to be 7.26% of Automotive Revenue, with the ratio increasing to 8.2% in 2040, as we model Tesla to extract increasingly more value from the upgrade of Autopilot systems and other features. Furthermore, we model gross margin increase from 1.9% in 2017 to 21.9% in 2030, in line with the industry figures. Regulatory credits are attributed to car firms that sell zero-emission vehicles in 9 states across the U.S. (52.1% of Tesla's North American sales), and if these carmakers do not reach a certain level of points they may be fined. The only way to avoid this expense is to buy excessive credits awarded to other companies. The credit attribution varies with the all-electric range and drivetrain type (Exhibit 19), and according to the Board's website, Tesla held 5,271 credits on their account in 2015. Over time, since Tesla only builds BEV's, the company will sell these credits to other firms, by $3,000 each, with the price decreasing 3% per year (source: **Electrek**), until the incentive's full extinction in 2025.

- Supercharging & Car Sharing Revenue

The company announced last year that every car bought in 2017 would have a Supercharging credit of 1,000 miles, and then would have to pay a fee per kWh charged at **Tesla's superchargers**. Assuming our modelled assumptions (Exhibit 20, that it takes 0.4kWh to recharge one mile in a Tesla charger and an average electricity price of 0.22$ in 2017 (growing to $0.35 in 2040), we estimate Tesla will generate $268.37 per car in 2017. We estimate **Tesla sharing network** will only be generating cash in **2022**, two years after Musk's predictions mainly due to technological and legal barriers. The system will enable drivers to rent their autonomous car while they are not using it, generating income for them, and for Tesla through the application of a fee (%). Taking into consideration our modelled assumptions (Exhibit 20), we estimate an applicable price per mile for the user of

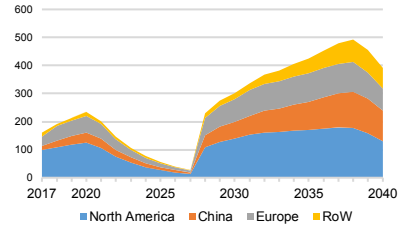
Exhibit 21: New Galleries, Stores and Service Centres to be built by Tesla around the world (units)



Source: Company Reports, Own Estimations

Note: *2,000 cars ratio per store is expected to be reached in 2028, with the average facility costing $500,000 (2015 prices).*

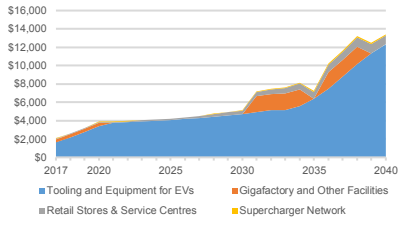
Exhibit 22: New Supercharging Stations to be built by Tesla around the world (units)



Source: Company Reports, Own Estimations

Note: *The number reaches its minimum over time due to the increase of number of stalls per station and the smaller use of Superchargers.*

Exhibit 23: Discrimination of CAPEX per line ($M), from 2017 to 2040



Source: Company Reports, Own Estimations

Note: *New factories construction will start 3 years before battery production, and will take 6 years to reach full capacity (vs 9 for original Gigafactory)*

$0.43 (15%*$2.5 + inflation) in 2017 with a 10% commission for Tesla. This means the average user could generate $15,350 per year in a vehicle, excluding all the cost added, with Tesla earning $1,921 (adjusted for inflation) per user in 2022 (Uber earned more than $4,500 per user in 2015). We further estimate the price per mile to decrease to $0.31 (inflation corrected) in 2040. **Gross margin** for both segments will start at 26% in 2017, and evolve to 30% in 2040.

Operational Efficiency & Investment

We analysed **SG&A** and **R&D** not as % of revenues, but rather as $ per car sold, so that uncommon revenue recognition methods by other firms wouldn't cloud our calculations. With the firm's historical values and industry analysed, we model SG&A and R&D to cost $7,307 and $13,973 per car sold in 2017, respectively, slimming to $3,536 and $6,548 in 2040, in line with the peers' evolution.

CAPEX's first line (Exhibit 21), **Tooling and Manufacturing Equipment for EVs** was forecasted through the same reasoning as OPEX. Considering Tesla's passed performance and sector figures, we forecast this line to reach $14,634 in 2017, only to decrease to an industry average of $2,021 in 2034 (before inflation), maintaining this value until perpetuity. **The company owned galleries, retail stores and service centres** are part of a unique selling model orchestrated by the American manufacturer. Tesla has been spreading those facilities around the world, with the number of cars per facility reaching 710 in 2016. As the firm has been having problems with its stores in Denmark, where customers complain about long waiting lines[21], and a country where the ratio of cars per store is 1,687, we model the optimum ratio to be of about 2,000 cars per store, since Tesla will increase efficiency in its centres. Tesla is expected to open 103 locations in 2017, having over 13,000 in total in 2040, with a cumulative CAPEX of $9.8B until 2040.

Superchargers and destination charging network are fundamental aspects of Tesla's go-to-market strategy, so it's infrastructure must be well spread and in good proportion to the number of cars delivered by the firm. At Q4 2016, Tesla had 39.7 cars per Supercharger stall, with 6 stalls on average per station. With the maximum ratio of 200 cars/Supercharger stall and the number of available outlets per station growing to a maximum of 20, we model Tesla to open 186 in 2017, having more than 7000 locations in 2040. With each station costing, on average, $175,000, we model Tesla to spend almost $1.6B until 2040.

Gigafactory was built with the objective of gathering all the supply chain logistics

[21] *Tesla victim of its own success in Denmark: 2 to 3 months wait for service, some owners are furious* (August 10th 2016) Electrek

in a single location. The batteries produced will be used for EVs, Powerwalls/Powerpacks and Excessive Production that Tesla may sell to other battery manufacturers. Due to the growing production of cars and storage equipments, we forecast the construction of a **new Gigafactory in China** in 2034 and the **extension of the Nevada facility** in 2038 (Tesla may of expand it, at least to 20 times the initial size). All in all, overall **CAPEX** will grow in line with the industry's values.

Risks & Competitive Analysis

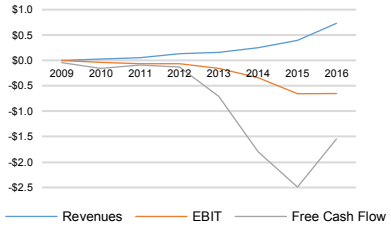
Exhibit 24: Tesla History of Delays and Recalls

Delays	**Roadster:** 3 months **Model S**: 9 months **Model X:** 18 months
Recalls	**April 2016:** all Model X units sold recalled due to a problem in the third-row seat **April 2017:** 53,000 Models X and S recalled due to brake malfunction

Source: Company Reports

Tesla cars are in the front row of quality[22], technological and performance innovation in the automotive business – we estimate Tesla to deliver the first fully autonomous vehicle in the market and be the first to open a network of shared vehicles. Tesla's automotive business biggest problem will be the **execution risk** (Exhibit 24) **–** the failure to increase production – something that might decrease the company's credibility and image (we model Tesla will produce 32% of their 2020 goal). These problems will be mainly caused by the construction and technological complexity that Tesla wants to imprint on their cars. We model the company to have problems with the production ramp-up of its models as well in achieving the necessary operational efficiencies to lead the segment into profitability as fast as it needs.

Exhibit 25: SolarCity Financial Performance ($B), from 2009 to 2016



Source: Company Reports, Own Estimations

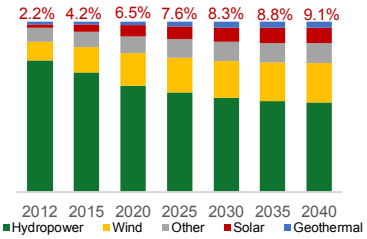
Energy Generation

This segment corresponds to the original SolarCity (SCTY). The company started in 2006, had the aim of selling solar panels with a long-term perspective, through leasing deals instead of a direct purchase. This strategy made solar panels, once extremely expensive, accessible to a lot of people, who had to spend no upfront cash. SCTY became the leading-full service solar provider and one of the largest installers of solar PV panels in the U.S., with 300,000 commercial and residential customers. SCTY's performance[23] began to deteriorate in 2013 and even more in the following years (Exhibit 25). The company's MW installations were below expectations, to which unpredicted delays in large projects contributed a lot. With the increasing rumours of financial distress, on June 21st, Tesla announced to investors a **call to discuss an offer to acquire SolarCity**. Exactly three months after, the acquisition is concluded and Tesla unveiled a new product – the **solar roof.**

[22] Tesla cars retain a 62% resale value after three years, vis-à-vis 31% and 22% for a Chevrolet Volt or a Nissan Leaf, respectively. Source: Pricing Authority Black Book

[23] "They're [SolarCity] losing money on every installation and making it up on volume, and that's a problem when you have a levered balance sheet" Jim Chanos, billionaire hedge fund manager

Exhibit 26: Renewable Energy Generation by Source (%)



Source: International Energy Agency

Note: *Solar Renewable Generation includes: Solar Photovoltaic (PV), Solar Heat, Solar Termal Electricity and Solar Fuels*

Exhibit 27: Solar Generation Growth Drivers

Factors
Governmental Regulations & Incentives
Renewable Energy Market & Electricity Price[24]
Upfront & Maintenance Cost
System Financial Benefits
Environmental Awareness
Brand Name & Purchase Options

Source: *Own Estimations; Studies*[25]

Exhibit 28: Types of Incentives for Solar Panels Adoption

Policy	Examples
Market-based Mechanisms	Certificate Schemes, Auctions; Renewable Portfolio Standards; VAT Exemption; Accelerated Depreciation
Feed-in Tariff	Utility buys a specific amount of kWh generated by the user at a minimum pre-determined price
Production based Incentives	Tax Credits; Quota Systems

Source: *Seventh Clean Energy Ministerial* (2016) Michael Liebreich

Introduction

A study[26] found that the **maximum worldwide power consumption**, at any given moment, is about 12.5 Trillion Watts (TW), provided mainly through fossil fuels, and that this value will increase to 16.9 TW in 2030. The document also claims that solar energy could supply 580 TW of usable energy, but we only take advantage of 0.008 TW of sun's power, 0.0014% of its total potential. Solar generation through Photovoltaic or Solar PV (Exhibit 26) is the primary focus of **Generation's** business segment. There are **two main objectives** of producing energy with a **solar generation system**: **a)** decrease electricity expenses and take advantage of incentives (usually homeowners); **b)** sell electrical power (more often landowners). The first factors to consider when buying a solar panel system are: **a) your energy consumption**; **b) product characteristics** (aesthetics, type of panel, warranty, inverter and others); **c) location**; **d) roof characteristics** (size, degradation state, remaining life years, slope and orientation). To complete this analysis, and similarly to what was done in *Transportation*, we will analyse the Solar PV market through the identification of growth drivers (Exhibit 27).

▪ Governmental Regulation & Incentives

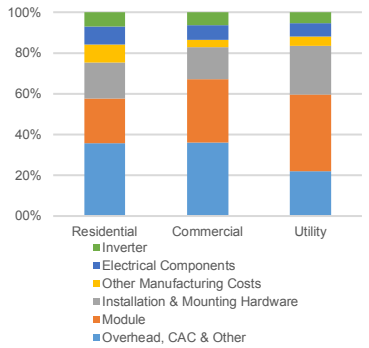
Almost every developed country has auction programmes (quite relevant in U.K. and France) in place[27]. While the U.S., Canada, Spain, Russia and Northern Europe have with exclusively market-based incentives (Exhibit 28), nations like China, the EU, Australia, India and South America have mixed policies in place, i.e., feed-in tariffs combined with market-based incentives. In the U.S., two of the most impactful regulations are **U.S. Solar Investment Tax Credit** (ITC) and **Net Metering**. The first is a 30% tax credit on the price of solar panels installation. Originally planned to start ending in 2017, the credit will drop to 26% in 2020, 22% in 2021; 10% in 2022 and end in 2023. Regarding **net metering**, solar PV generation has one **big obvious problem**: maximum production (midday) does not match maximum consumption (6-8am and after evening). To combat this problem, the U.S introduced the biggest U.S. subsidy for solar power: **net metering**. These rules state that electric utilities must buy any excessive electricity from private producers, that they do not use, at the retail prices. Over time, this ruling lead to a deep rumble on utilities financial health and, several American states have already applied cuts or rolled back this rule. We model the legislation to be intact until 2020 and to be gradually extinct over the next decade. Still in the

[24] Already analysed in *Transportation – Electric Vehicles Market*
[25] Deloitte, Deutsche Bank, European Photovoltaic Energy Association, Green Rhyno Energy, International Energy Agency, International Renewable Energy Agency, LedWatcher, University of Science in Malaysia, Sungevity.
[26] *A Plan to Power 100 Percent of the Planet with Renewables* (2009) Mark Jacobson (Uni. Stanford) and Mark Delucchi (Uni. California)
[27] Presentation at the *Seventh Clean Energy Ministerial*, on May 2nd 2016, by Michael Liebreich, Chairman of BNEF's Advisory

regulatory landscape, even with President Trump on the White House, we model a small effect of his policies on the Solar Industry, due to the sector's recent growth and its weight on the overall job creation in the U.S., employing almost two times the amount of people working in the fossil-fuels industry[28].

- Solar Panels Cost & Financial Benefits

Exhibit 29: Cost Structure of a Solar PV Generation System (%) by Component, across sectors

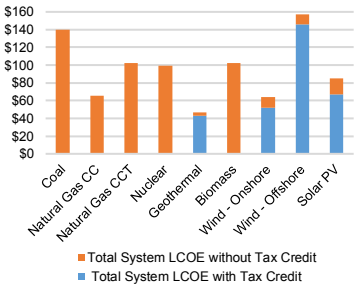


Source: National Renewable Energy Laboratory

Note: *Residential (3-10kW); Commercial (10kWh-2MW); Utility (>2MW)*

Solar energy generation systems are constituted of several components (Exhibit 29), with solar modules as one of the elements that weighs more on the total cost. Solar cells' costs have decreased, on average, 13.37% over the last 38 years, while prices have decreased 30% in the last 6 years. Thus, solar now portrays a **levelised cost of energy** (LCOE[29]) lower than coal, nuclear and most natural gas technologies (Exhibit 30), but is still very dependent on the application of tax credits and other incentives. We estimate **cost reduction drivers**, over time, for solar generation systems to be: a) **technological advancements**, that will cut hardware costs; b) **production efficiency gains**, which will lower the amount of energy needed and raw materials; c) **installation efficiency gains**, with the process becoming increasingly simpler. With Solar PV costs decreasing at these rates, we expect small-scale PV to reach **grid parity** in all major developed economies by 2020.

Exhibit 30: Average LCOE (2016 $/kWh) for New Generation Sources

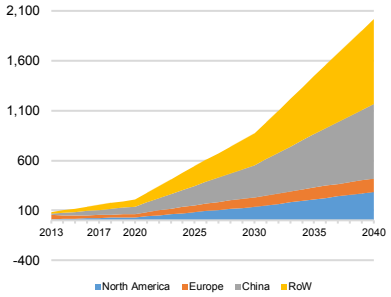


Source: Energy Information Administration

Financially, a solar panel yields quite considerable benefits over the long-term. Besides requiring low maintenance, the system will bring value through **three main aspects**: **a) decrease overall electricity cost**, **b) earn tax credits and incentives**, nation-wide and per state/district, as well as Solar Renewable Energy Credits; **c) increase home value**[30] ($5,911 increase in resale value[31]). Production wise, the most recent document is a 2011's study by Clean Power Research, which stated that, in America, monthly savings from having a solar panel are, on average, $84. This means that, over 20 years, the consumer will save $20,080, with a payback period of 14.3 years (assuming a solar system cost of $17,056 and $3,052 average annual energy costs[32]).

[28] *U.S. Energy & Employment Report* (2017) U.S. Department of Energy
[29] Energy system's expected lifetime costs (construction, financing, maintenance, insurance, etc.) divided by its lifetime expected power output (kWh). LCOE should include externalities' costs.
[30] In the case of the Solar Roof, replacing your roof can raise the value of the house by $12,000 (Source: *Increase Your Home's Value with a New Roof* (2016) Home Advisor).
[31] *Benefits of Solar Power* at http://www.solarresourceguide.org/benefits-of-solar/ by *Solar Guide*
[32] U.S. Green Building Council

Exhibit 31: Solar PV Worldwide Annual Deployment by Geographic Block (GWh), from 2013 to 2040



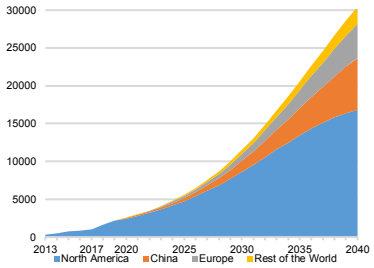
Source: International Energy Agency

Solar PV Market

In line with the forecast by the International Energy Agency[33], we model the whole Solar PV market to grow annually at 4.72% until 2040, producing 9.1% of the total energy generated worldwide. Solar PV will increase 11.8%, annually, in GW installed. Until 2020, the growth will remain at 10.6%, exploding in the following decade to 15.3%. Between 2030 and 2040, Solar PV installed capacity will increase 8.8% annually, fixing at 2,018 GWh in this last year. In this sector, we expect Europe to be the one which grows annually slower (6.4%), and the Rest of the World only slightly above China (13% against 12.5%). PV installations will mainly occur in residential spaces (47% in 2040 compared with 57% in 2016), while the Utility and Commercial deployments will grow at 12.6% and 12.5% per year, respectively, over the forecasted period.

Solar Panels Installations & Revenue

Exhibit 32: Generation MW Deployment by Geographic Block (MW), from 2013 to 2040



Source: Company Reports, Own Estimations

Note: ***Tesla's global market share*** *will grow from 0.67% in 2016 to 1.51% in 2040.*

Bearing in mind that SolarCity has only sold its products in the United States, we model Tesla to expand its operations to Canada and Europe in 2018 and to China and other countries in 2019. With deployment reaching a CAGR of 16.35%, during the forecasted period, we forecast North America to remain Tesla's biggest market, gathering 55.3% of the company deployment, with 22.4% and 14.9% of its production going to China and Europe, respectively. We model that, in 2017, Residential and Commercial will occupy 78.99% and 20.38% of total capacity, while Utility will capture 0.63%. This mix will evolve until 2040, where Residential, Commercial and Utility Deployed Capacity will account for 63.52%, 23.29% and 13.19%, respectively.

Exhibit 33: Price and Cost Evolution per Sector (%) at each decade

Price Decrease per Decade

	Commercial	Residential	Utility
2015-2020	6,11%	5,98%	7,33%
2020-2030	2,04%	1,95%	2,13%
2030-2040	1,66%	1,26%	1,34%

Cost Decrease per Decade

	Commercial	Residential	Utility
2015-2020	5.43%	5.43%	6.78%
2020-2030	1.96%	1.87%	2.01%
2030-2040	1.61%	1.55%	1.65%

Source: *GTM Reports, Own Estimations*

Another growth driver that influences a solar system purchase is the **purchase model**. Solar firms created several different customer options, besides a direct cash purchase: **Power Purchase Agreements**, **Leases** and **Loans** (SolarCity's MyPower), to increase the attractiveness of a solar generation system to the customer. These create a big **financial risk**[34] for the company, since the company installs the equipment with no upfront cost, and will recognise revenue over time. We model Generation segment's revenues to decrease this year, as the firm reorganizes operations, balances its financials and PPA & Leases lose weight in Tesla's deployment mix (88.6% in 2016). After that, we estimate the company performance to improve, due to the increase in deployment but mainly due the increase in importance of Cash Purchases and MyPower sales. PPA & Leases,

[33] *World Energy Outlook 2016* (2016) International Energy Agency

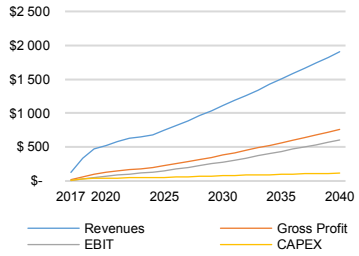
[34] "The [solar generation] industry has borrowed a total of $200 billion since 2010, (…). Industry-wide operating cash flows, meanwhile, declined $3 billion during that period." in *Musk touts SolarCity Deal Synergy, but it may be about Debt* (June 23rd 2016) Bloomberg

Exhibit 34: Generation Available Purchase Model Characteristics[35]

	PPA	Lease	Cash Purchase	MyPower
Down Payment	$0	$0	Full	$0
Ownership	TSLA	TSLA	Customer	Customer
Tax Credits	No	No	**Yes**	**Yes**
Monthly Payments	Pay for energy produced	Pay for energy produced	None	Fixed
Payment Term	20 Years	20 Years	Paid in Full	10-20 Years

Source: *Company Website*

Exhibit 35: Solar Roof Business Financials ($Millions), from 2017 to 2040



Source: Own Estimations

Note: *We estimate an average house to have a 30-square feet roof, and 45% of sales will be through Direct Cash and 55% through MyPower loans.*

We also model that gross margin (15.57% in 2017, growing to 30.7% in 2040), SG&A and R&D will grow in line with the industry[36].

Cash and MyPower Sales yield 78.55%, 18.77% and 30.87% gross margin in 2017, resulting in a combined 34.1% for the global operation in 2017. This value will decrease, stabilising in 30.7% over time (these figures do not include Solar Roof). On panel efficiency, we model Tesla to achieve a value of 23% in 2017 (vs Sun Power's 24.1%), to which the partnership with Panasonic to produce solar cells will contribute substantially.

Solar Roof

Tesla unveiled **Solar Roof** back in October 2016, at the time, in a partnership with SolarCity. The objective was basically to capture the layer of the market that will **not install solar panels for two reasons**: **a)** they are aesthetically bad; **b)** their roof conditions are not appropriate (it must have at least 10 years of useful life). Hence, Tesla created electricity generating tiles that can achieve 98% efficiency of the common solar panels, look like regular shingles, are lighter and 3 times more resistant to damage. Taking in consideration the expected population growth and the number of elements per household, we estimate that the number of new houses built, per year, will reach 162.3M in 2040[37], and a 1.9B square foot worth of addressable space to install solar shingles in the same year[38]. With Tesla's installations starting in the U.S. market in 2017, and expanding to other geographies in the following years, we model Tesla to capture 0.1% of the whole sector in 2017 (2.84% in 2040)[39]. With the financial details disclosed by the company in May 10th, we calculate Solar Roof to generate $42M in sales this year, rising to $1.9B in 2040 (3.13% of total Generation sales). These values are reached under the following figures: **a)** 35% of total roof is covered by solar shingles (reaching 40% in 2040); **b)** price of non-solar tiles of $11 (decreasing 0.5% per year); **c)** price of solar shingles of $42 (decreasing to $22.92 in 2040, in line with Solar Panels' price evolution).

Risks & Competitive Analysis

Tesla will bet on differentiation through price, solar panel efficiency and vale proposition

Even if we model opportunities for solar PV to be **quite big in the long-term**, it is important to stress that the industry is **highly cyclical,** so companies must be prepared, both financially and operationally, to react to sudden shifts in demand. On this, Tesla's unbalanced weight of PPA & Leases on total sales, will be the biggest threat to long-term profitability. **Sun Power**, **First Solar** and **Vivint Solar**

[35] Energy Produced = (Solar Insolation x System Size) x Energy Contract Price. In the case of PPA and Leases, the price has a 2% annual escalator. We also considered solar panel efficiency and panel annual degradation (0.43%).
[36] Tesla biggest competitors will be Dow Chemical (only publicly traded), SunTegra and Certain Teed.
[37] Sources: U.S. Census Bureau; Eurostat; United Nations; Chinese Government
[38] Note that Tesla will install the total extension of the roof, i.e., solar and non-solar tiles.
[39] We estimate that Tesla will sell mostly to the Rest of the World (70.4%), followed by China (23.6%) and N. America + Europe (0.2%).

are the main competitors in the market. They all have a massive network of distribution throughout the whole world and the ability to offer product integration across its systems. On a lower scale, Tesla will also have to take in consideration the **regional installers** potential, since these smaller players can compete on cost through exploitation of overhead and installation costs.

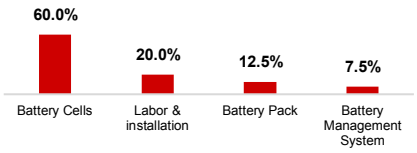
Energy Storage

Exhibit 36: Energy Storage Uses for Different Types of Consumers

Residential & Commercial	Power provision during Blackouts Grid independence Tariff Arbitrage
Utilities	Balance Power Grid[40] (reduce fluctuation of energy generation from various sources)

Source: International Renewable Energy Agency

Exhibit 37: Energy Storage System Cost Breakdown (%) by Component



Source: International Renewable Energy Agency

Storage will open a lot of possible streams of revenue to consumers, through stabilisation of the grid supply or establishment of a closed network.

According to a 2011 study[41], around the world, only 2.2% of the electricity generated is stored. Energy Storage Systems (ESS) have the principal **objective** of retaining energy for later use when its needed[42], providing the perfect complementation to production fluctuation of solar panels, wind turbines or hydro generators. Overall, ESS will increase capacity utilization for renewable energy generation, and help to develop and strengthen the energy transmission and distribution infrastructure. Following the reasoning of previous chapters, we identify the following aspects as **growth drivers**[43] for the energy storage market: a) **Battery Cost & Financial Benefits**; b) **Energy Renewable Market & Electricity Price**; c) **Government Regulations & Incentives**; d) **Product Design, Efficiency and Performance**; e) **Brand Name**.

- Cost of Storage Systems & Financial Benefits

We estimate Tesla Li-Ion cells to decrease 20% in cost when Gigafactory reaches full capacity in 2024. We also model that Tesla will achieve a 5% cost reduction over the other battery components over time, since we expect few manufacturing or efficiency gains on these elements. In terms of **financial benefits**, besides getting advantage of **tariff arbitrage** and avoiding demand charges, a 13.5kWh battery can store about 4000 kWh of energy, in a sunny climate, which would cover almost 4.5 months of the year of an average American house.

- Governmental Incentives & Regulations

Several countries introduced **financial incentives** and other mechanisms throughout the years, focused on sparking high efficiency battery installation. These regulations include Energy Storage Portfolio Standards (China and U.S.), direct tax credits (Japan) or guaranteed feed-in tariff (Germany). **Japan**, producer of almost half of the world's batteries, **Australia** and **Germany** are the countries which are investing harder on this type of technology, for example, with the

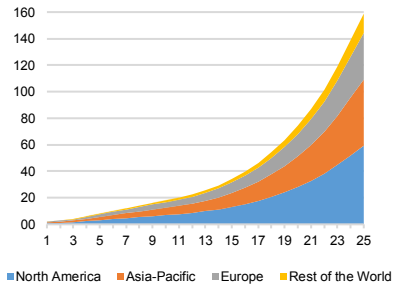
[40] *Global Trends in Renewable Energy Investment* (2016) Bloomberg New Energy Finance and University of Frankfurt
[41] *Annual Electric Generator Report* (2011) U.S. Energy Information Administration
[42] "Without a home battery, excess solar energy is often sold to the power company and purchased back in the evening [at a higher price]. The mismatch adds demand on power plants and increases carbon emissions"
[43] Battery Cost and Energy Renewable Market were analysed in *Transportation – Purchase Price & Cost*

Japanese government setting a *Lithium-Ion Subsidy* that covers 2/3 of the cost of residential and commercial ESS. On the other hand, countries like the **U.S.** are taking alternative approaches, with the open access to data and agreements between power companies and ESS developers to deploy smart energy devices. All in all, we model that **governments will expand laws to increase the adoption of energy storage systems** over time, particularly in emergent markets that are initiating the transition from the cheaper lead-acid batteries to lithium-ion ones.

Energy Storage Market

We model the **global energy storage market deployment** to grow at 18.84% CAGR through the forecasted period, with an impressive 38.75% annual growth until 2020, with 159GWh of total battery storage deployed in 2040. The biggest markets will be the United States and Japan, followed by Germany and Australia. We expect adoption rates to be higher where electricity is more expensive, with Europe and North America to account for almost 60% of the worldwide demand for energy. **Behind-the-meter**, which is the segment that will include Powerwall installations, will grow even more (24.67% until 2040). While in 2017, the sector will only account for 4.3% of total market deployment, its weight will reach 72.1% in 2040. Over time, eight countries, including Japan, China and the U.S., will reach a cumulative behind-the-meter storage power exceeding 1 GWh, where behind-the-meter will account for 45% of the total deployment (versus 10% now).

Exhibit 38: Global Energy Storage Market Deployment by Geographic Block (GW), from 2016 to 2040

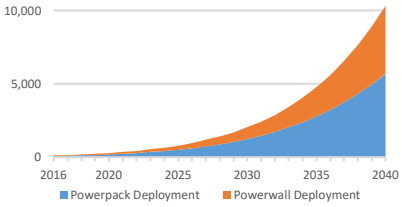


Source: Own Estimations; Bloomberg New Energy Finance[44]

Deployment & Revenues

When analysing the most suitable energy storage system, we must first take in consideration some aspects relevant for consumers: **a) energy consumption; b) battery size and aesthetics; c) grid connection; d) efficiency and performance characteristics.** Tesla will bring to the market **two storage products:** Powerwall 2 and Powerpack 2, both upgrades of older versions, and are smaller and aesthetically superior to its peers. **Powerwall 2** (13.5kWh storage capacity) will be targeting the residential market and can power a four-bedroom home for a complete day. For the commercial and utility slice of the industry, Tesla has launched **Powerpack 2** (200kWh per pack). When comparing batteries principal performance features (Exhibit 40), we can see that the five biggest players, in quality terms, are Tesla, GCL, DCS, Pylontech and Ampetus. However, only Tesla, with Powerwall, is perceived by the market as one of the best battery sellers, alongside Sonnen, Enphase, LG & SunRun and Sunverge. This introduces

Exhibit 39: Tesla Powerwall and Powerpack Deployment (GWh), from 2016 to 2040



Source: Own Estimations

Note: *The weight of Powerwalls and Powerpacks on Tesla's average sales is modelled to be 30%/70% in 2017, respectively, taking in consideration CTO JB Straubel[45] words. We model it to evolve until a deployment mix of 45%/55% in 2040..*

[44] *New Energy Outlook 2016* (2016) Bloomberg New Energy Finance
[45] "About 70% of the reservations have been for the Powerpack, said CTO JB Straubel, and 30% for the residential Powerwall." in article Forbes Article, *Elon Musk: Tesla Powerpack doesn't need Renewables, Battery Market 'Staggeringly Gigantic'* (2015)

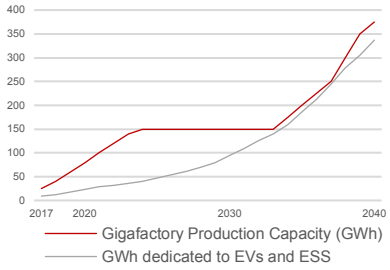
us to the importance and power of **brand awareness** for ESS purchase, and why Tesla has to be careful when competing with these firms.

Exhibit 40: Energy Storage System (ESS) Features Comparison

ESS Features Comparison	
Usable Storage Capacity (kWh)	**Power (kW) per $**
#1: Tesla	**#1:** BMZ
#2: GCL	**#2:** Pylontech
#3: Ampetus	**#3:** GLC
#4: Alpha-ESS	**#4:** Ampetus
#5: LG	**#5:** LG (6# Tesla)
Cost per Warranted kWh	**Life Cycles per $ (Note)**
#1: Ampetus	**#1:** Enphase
#2: Tesla	**#2:** Pylontech
#3: GCL	**#3:** SimpliPhi
#4: DCS	**#4:** ELMOFO
#5: LG	**#5:** DCS *(No info on Tesla)*

Source: Solar Quotes; Company Reports

Exhibit 41: Gigafactory Total Capacity (GWh) versus GWh required for Production of modelled Electric Vehicles and ESS



Source: Company Reports; Own Estimations

Note: *We model the average battery for Model S/X and 3 to be of 86kWh and 70kWh[46] in 2017, and growing to 100kWh and 84kWh in 2040.*

Though Solar PV is already less expensive in some countries than conventional electricity, the electrical grid still offers the lowest prices if we add a battery to the equation.

All in all, we model Tesla to deploy an MWh output of 149MWh in 2017, growing to 10,309MWh in 2040 (20.24% CAGR). We model TSLA to gather 6.5% of the global market in 2040[47], compared to 5% in 2017. It will evolve, in terms of MWh deployed, in line with the peers' installations growth rate, with our estimation being more conservative until 2020, but then exploding in the next two decades. Geographically, the deployment will follow the overall market tendency. Although most deployed capacity is focused on Powerpack in 2017, over time the split will become more balanced, due to the increasing benefits of pairing both solar PV and ESS as well as the staggering growth of behind-the-meter market, compared to the overall market (Exhibit 40). We forecast Powerpack and Powerwall prices to reach $609.13/kWh and $5,174 in 2017, respectively. We model a 11.84% and 5.9%[48] yearly decrease on price until 2020, for Powerpack and Powerwall prices, respectively. After that, we model the price to evolve negatively to $3,190 and $226.7/kWh in 2030, and $2,889 and $185.7/kWh in 2040. We then model a 20% and 20.5% 2017 gross margin for Powerwall and Powerpack, reaching 36.78% and 37.28% in 2040.

The final stream of revenue is the **excessive Gigafactory production**, i.e., the amount of batteries in GWh that will not be used for EVs or Powerwall/Powerpacks. We can clearly see that GWh requirements for cars and batteries almost never reach the factory's[49] full capacity (Exhibit 41), so we expect Tesla to sell some of the unused battery cells, to consumer electronics, aircrafts or EVs producers[50]. We also project that Tesla will not sell all of its excess production, achieving a 5% gross margin in 2017 (3% in 2040), in line with the Li-Ion battery manufacturing industry.

Wrapping up on this matter, it is important to make the **connection between Storage and Energy Generation**, more specifically the combination of Residential Solar Deployment & Powerwall MW sales and Commercial/Utility Deployment with Powerpack MW sales. In 2017, we model that 11.89% of Residential Solar Systems will be covered by a storage battery (51.64% in 2040), while we model that 67.3% of the Commercial/Utility systems owners will install storage equipments (72% in 2040).

[46] Model 3 base model is 60kWh, but we expect a lot of people will buy the upgrade version, hence the $43,014 ASP and not $35,000
[47] These calculations consider the capture of 5.9% market share Energy Storage Sector in 2016, since Tesla does not disclose values for Storage deployment
[48] In line with *US Solar Power Growth through 2040* (2015) Deloitte
[49] Or factories, since we model the opening of a new facility in China in 2034 and the extension of the Nevada facility in 2038
[50] Actual sales were calculated with the consideration of the evolution of the overall Li-Ion Battery Market (source: Allied Market Research). In 2028, when Tesla will sell more battery cells, it will reach a 9.64% market share of the overall Li-ion Battery Market.

Valuation

Overall Risks & Competitive Analysis

Exhibit 42: Tesla Customer Experience and Brand Power

Customer Service	**1)** Ranked as the **best customer service at its stores**, superior to car brands like BMW, Nissan or Audi **2) Best automotive brand** (followed by BMW) in the Experience Index
Brand Value	**1) 10th most valuable car brand** by research firms WPP and Millward **2)** Brand Valued at and its brand was **valued at $4B** by Interbrand.

Source: Sierra Club; Group XP; Interbrand

Tesla wants to make a **one stop shop for three products** centred in energy consumption, storage and production. The company has a **unique business model**, owning the galleries where customers test their products, but only buy them online. This enables the company take full control of the customer service provided at their stores. However, compared with GM, Nissan or Ford dealerships, these last ones exist in much higher quantities and can spread at much lower costs. This is also valid for the company's maintenance and repair shops, that are still few and with an unbalanced global spread, even if they provide an overall good service to all owners.

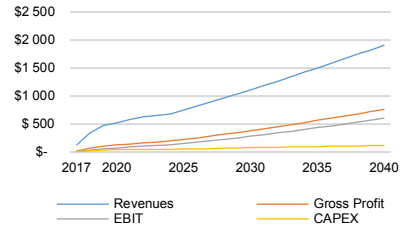
Technological and design innovation are two core principles of Tesla, leveraging its qualities through advanced engineering and revolutionary manufacturing techniques. Nonetheless, the company still presents a high cost structure: Tesla has always reported operational losses, even with the positive effect of vertical integration and scale production. Tesla will portray a negative EBIT until 2026. The company will benefit from the substantial growth of the sector it operates at, but this can also bring some problems, related with the growing competition in those markets and an exaggerated escalation of the price of raw materials. Across all segments, Tesla will compete against experienced, globally expanded and financially healthy opponents, that can either decrease prices, improve their value proposition or acquire other companies to gain market share, something that will hurt Tesla's penetration rate.

"We are highly dependant on the services of Elon Musk"
Tesla's 2017 1st Quarter Earnings Report

Finally, probably the greatest strength or weakness of the company is its CEO, Elon Musk. The outspoken entrepreneur has the tendency to over-estimate his companies' performances and is spread too thin over many different and demanding projects. This may bring customers and prospective clients to a breaking point, when they see the company always setting more ambitious milestones but their orders are yet to be fulfilled.

Financial Forecast & Notes on Valuation

Exhibit 43: Transportation, Storage and Generation Free Cash Flows ($Millions), since 2009 to 2040



Source: Company Reports, Own Estimations

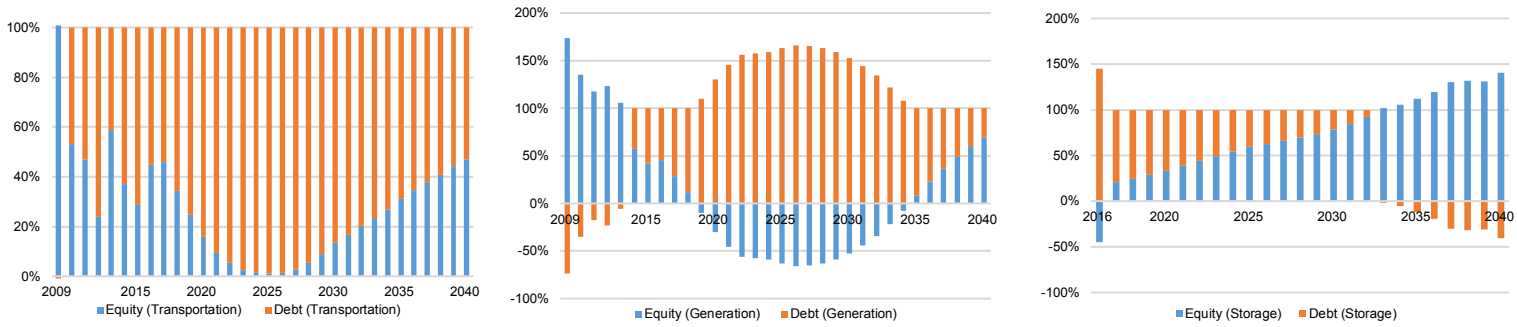
Note: *Tesla will reach a positive EBIT and Free Cash Flow in 2026 and 2030, respectively, across segments. For more data check Appendixes 2, 5 and 8.*

Overall, we forecast Tesla revenues to grow until 2040 at 14.86% annual growth rate, with the strongest increase being portrayed by Generation (20.67% CAGR). Transportation will represent the biggest share of revenue (70-77%), with Generation growing in importance from 2017 (7.3%) to 2040 (22.86%). Overall Gross margin (GM) will increase from 20.76% to 24.1% at the end of the forecasted period. The solar generation segment will be making the biggest contribution to this figure (average 31.99% GM), with Storage being the one which grows more: from 6.26% (2017) to 22.46% (2040), due to Gigafactory's revenues deceleration. We forecast **Generation** S&M, R&D, G&A and CAPEX through cost per watt deployed. 2017 values reach $0.56, $0.25 and $0.24, for S&M, G&A and CAPEX, respectively, stabilising at $0.068, $0.063 and $0.09, in line with peers' figures and historical growth rates. Research and Development will evolve to $0.078 per watt deployed. For **Storage**, R&D will correspond to 6.79% of Revenues in 2017, and will decrease over time (6.08% in 2040). As for SG&A, we estimate it to be 19.84% of sales in 2017 (16.21% in 2040), and Capital Expenditures to reach sector's 1st Quartile in 2020, maintaining that value (2.98% of sales) until perpetuity. Overall R&D and SG&A expenses will decrease from 8.07% and 21.78% in 2017, to 4.07% and 7.88% in 2014, respectively.

Using the APV Approach on our valuation model, we calculate **debt** as % of Tesla operations (revenues). We also project that, if there is excess cash available, after being used for investments, it will be used to repay any existing debt. This is justified by **a)** Tesla past behaviour of paying debt as soon as they can, as they did, 5 years earlier, with a Department of Energy loan; **b)** having negative free cash flows will deteriorate Tesla's risk profile, which is an incentive for the company having as less debt as possible.

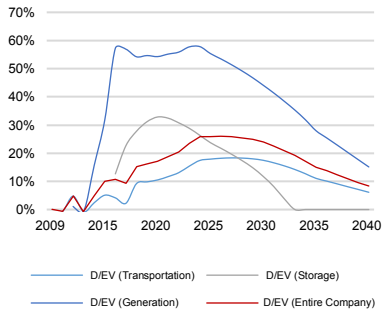
Examining Tesla's historical and forecasted financial performance, (Exhibit 43), it's imperative to analyse the firm's ability to demonstrate that it will succeed in the long-term, enabling it to raise the cash needed to fund its operations. **Generation** and **Storage** segments will hold large percentages of debt, compared with the respective industries, which may be a warning signal. However, if we look at the company as a whole, it will reach a **maximum D/EV of 26.05%**, in 2026, a figure that is less than half of the automotive sector respective ratio.

Exhibit 44: Transportation, Generation & Storage Sources of Financing – Equity or Debt (%), from 2009 to 2040



Source: Company Reports, Own Estimations

Exhibit 45: Transportation, Storage, Generation and Tesla Net Debt/Enterprise Value (%), from 2009 to 2040



Source: Bloomberg, Company Reports, Own Estimations

Note: *Perpetuity Net Debt/EV will reach 6.35%, 16.72% and 0% in Transportation, Generation and Storage, respectively*

Hence, the company may have more difficulty in raising debt, especially between 2018 and 2026, but this hardship may be the reason for its focus on profitability, explaining the automaker's growth after that period. Nonetheless, even if it doesn't go on financial distress, this can be a factor that will affect Tesla's performance throughout the ramp-up of Model 3 production and Generation deployment, and will delay or cancel any plans for acquisitions or launches of other vehicles (we project a $0 expect value for these products' cash flows). Its product superiority and growing market share across segments will help the company's credibility with investors, and we project that even Elon Musk himself and any other company he is in, may also contribute to the financing of Tesla's operations. All in all, we model **each segments' perpetuity Net Debt/EV to be at the same level of 2040**, with the value for whole company reaching 8.27%, in line with the firm's historical figures. We also model that Tesla's business to benefit from **Tax Loss Carryforwards** according to the U.S. and Delaware state law[51]. Regarding **Capital Raises**, since Tesla has already performed that operation last March 16th, we forecast no capital raise until the end of this year. We also forecast the firm to pay **dividends** (constant 2% pay-out ratio), starting in 2034, after the first profit in 2029, when there is certainty their operation is growing on a stable route.

Financial Valuation

For Tesla's financial valuation, we used the **APV Method** for each of the three segments, since it was the most appropriate to deal with the changing levels of net debt. Thus, we discounted our unlevered cash flows and tax shields at the unlevered cost of equity, since the outstanding debt fluctuates with the value of operations.

[51] 26 U.S. Code – 172: Net Operating Loss Deduction

We apply CAPM[52] to compute **unlevered cost of equity** of each segment, using a **risk-free rate** of 2.26% (10yr U.S. government bond as the proxy for the risk-free asset) and a 6% **market risk premium**[53]. After collecting the levered beta for our respective peer group (check Appendix 9), calculated by the 10-year monthly excess returns of the comparables group, in correlation with the S&P. After unlevering the peers' industry beta, and picking the median beta[54], we reach an unlevered beta of 0.785, 0.824 and 1.052 for Transportation, Generation and Storage, respectively. Applying CAPM equation, we have the following values for **unlevered cost of equity**: **6.97%**, Transportation; **7.2%**, Generation; **8.57%**, Storage. For **terminal growth rate**, we use the annual average real growth rate of global GDP, between 2040 and 2060[55], **1.794%**, and we added the expected long-term inflation for the American economy, **1.962%**, computed by the difference between U.S. 10-year Treasury Inflation Protected Securities and U.S. 10-year Government Bonds. Therefore, we achieve a terminal growth rate of **3.756%**.

Exhibit 46: Tesla's Financial Valuation ($Millions)

	Transportation	Generation	Storage
NPV Explicit CF	(8 432)	(9 931)	152
NPV Annuity (CF)	12 121	3 799	
NPV Perpetuity (CF)	37 462	12 480	700
NPV Explicit TS	2 921	220	52
NPV Annuity (TS)	218	3	0
NPV Perpetuity (TS)	672	8	46
Enterprise Value	44 926	6 480	899
Net Debt	1000	3 688	203
Noncontrolling Interests	0	1 051	0
Equity Value	43 925	1 740	695

Source: Own Estimations

We only applied this terminal rate, directly after the explicitly forecast period, in the **Storage** segment. Gigafactory's excessive production is the main cause for the cash flows volatility, but we expect this value to tend to 0, in perpetuity, since Tesla's production of cars and batteries will grow at a more predictable percentage. Hence, we model g (=ROIC*RR), to be 3.76% in perpetuity, right after 2040, in the case of Storage. For **Transportation** and **Generation**, since cash flows are quite volatile and ROIC*RR is higher than the terminal growth value, we apply to both segments, a 10-year annuity with cash flow CAGRof **5.91%** for Transportation and **9.1%** for Generation. We reach these values through a ponderation of expected ROIC*RR for the next 10 years, 2040's revenue growth rate and the modelled terminal growth rate. After 2050, we apply the perpetuity formula, using the terminal growth rate indicated above for both segments. Taking these values in consideration, our **base case** target price reaches **$282.24**, representing a **13.19%** downside (vs $325.14 May 26th share price), and -19.5% 12-month return. Solely based on this scenario, our recommendation would be a **sell** position on the stock.

Scenario Analysis & Valuation Outcome

[52] CAPM: Risk Free + $Beta_{Unlevered}$ * Market Risk Premium
[53] *Measuring and Managing the Value of Companies* (2016) McKinsey, 6th Edition – page 278
[54] *Measuring and Managing the Value of Companies* (2016) McKinsey, 6th Edition – page 286
[55] *GDP Long-Term Forecast, 2009 to 2060* (2015) OECD

In the **good case scenario**, we will follow BNEF's forecast for the EV market, with EV sales accounting for 35% on new car sales in 2040. We model **Transportation** to reach a market share of 9% in 2040, with the company producing and delivering Model 3 on time (40,496 in 2017 and 80,893 in the following) and being able to gather a good chunk of the market right from the start. In the **Generation** segment, we expect MW deployments to be 8.39% higher, in 2040, happening mostly due to the increase in deployment over the next few years, and a slight improvement of the purchase mix. In **Storage**, we expect the battery deployment market to grow at 21.12%, as an average growth rate. We model Storage deployment to reach 6% market share in 2040, with an average 22.08% yearly growth.

Exhibit 47: Valuation Scenarios Indicators and Final Target Price

	Battery Cost Decrease with Gigafactory	2040 Market Share (T; G; S)	PPA & Leases Weight on Deployment Mix (2035)	Target Price	Prob.	12-month return	Recommendation
Bad Case	18%	(8.6%; 1.39%; 7.9%)	14%	$179.95	10%	-62.7%	SELL
Base Case	20%	(8.9%; 1.51%; 6.5%)	10%	$282,24	80%	-21%	SELL
Good Case	24%	(9%; 1.64%; 6%)	8%	$416.15	10%	50.9%	BUY
				$285.40		-19.5%	SELL

Source: Own Estimations
Note: *Target Price calculated with a ponderation of 10:80:10, for bad, base and good scenarios, respectively. Good, Base and Bad Cases yield 27.99%, -13.19% and -44.66% upsides, respectively.*

Higher investment in the charging infrastructure and bigger decrease in battery cost ($110/kWh in 2030), will support the evolution of the EV market

In the **bad case scenario**, we model a slower evolution of the EV market, with electric vehicles representing 28% of the new vehicles sales in 2040. **Transportation**'s production will also be affected, with problems of manufacturing and production scale decreasing Tesla's growth of vehicles built per week. These issues will delay Model 3 deliveries, with only about 5,611 sold by the end of 2017, and 30,650 in 2018 (vs 16,128 and 63,002 in base case). This lack of activity by Tesla will give room for other companies, especially General Motors and Nissan to take a lot of potential Model 3 consumers from Tesla. In **Generation**, the whole solar and renewable market will grow at roughly the same rate, but solar panel deployment will be slower, with a market share 0.65% in 2017, and 1.39% in 2040. In **Storage**, we expect the market to grow at an annual growth rate of 18.01% (vs 18.9%), and the Powerwall & Powerpack deployment to evolve at 18.65% CAGR (vs 20.24% in base case). Taking in consideration the modelled probabilities, we project a **YE 2017 target price of $285.40**, reinforcing our base case **sell recommendation**.

Slower decrease in the battery cost ($165/kWh in 2030), bigger effect of the governmental incentives drawback and oil prices at a low level for more than anticipated will explain the evolution of the EV market

Multiples & Sensitivity Analysis

Exhibit 48: Multiples Valuation of Tesla's Segments, using EV/Sales and Price/Book

	EV/Sales *Our Forecast*	EV/Sales *Market Average*
Transportation	5,14x	0,70x
Generation	0,43x	1,15x
Storage	2,38x	3,25x

	Price/Book *Our Forecast*	Price/Book *Market Average*
Transportation	9,49x	1,29x
Generation	12,11x	3,09x
Storage	0,76x	2,57x

Source: Bloomberg, Own Estimations

Note: *We used the peers of the Cost of Equity calculation*

Exhibit 49: Maximum and Minimum Results for Sensitivity Analysis ($)

Segment	Δ Ru and Terminal Growth Rate	Δ Ru and Annuity Value
Transp.	$223.84 **$267.42** $323.15	$230.82 **$267.42** $309.4
Gen.	-$2.31 **$10.6** $27.05	-$0.23 **$10.6** $22.96
Storage	$3.67 **$4.23** $4.90	-

Source: Own Estimations

Note: *Cost of Equity, Terminal Growth Rate and Annuity Value fluctuated 0.2% in each direction. Values in bold represent the forecast target price in our base case for comparison.*

Exhibit 50: Weight of every segment on Total Market Value (%) and Valuation Outcome ($)

	Target Price	Probability
Bad Case	$179.95	10%
Base Case	$282.24	80%
Good Case	$416.15	10%
	$285.4	
May 26th Share Price	**$325.14**	**-19.5%** 12-month return
SELL Recommendation		

Source: Own Estimations

"I do believe this market cap is higher than we have any right to deserve"

Elon Musk on May 19th, when TSLA's share price was at $310.83

We performed a multiples-based valuation for Tesla, taking in consideration peers' figures for each segment. However, as Tesla's EBITDA, EBIT and Net Income values stand negative in 2017, we focused on Price/Book ratio (PB) and EV/Sales (EV/S). **TSLA currently trades at 5.84x sales and 8.4x PB**, against a market weighted-average ratio of 0.77x sales and 1.48x book value. We project its **2017 market capitalization to be 4.65x and 9.63x of its revenues and book values**, respectively. While Storage seem to be undervalued by our APV valuation, Transportation segment portrays figures quite above its comparables. Using industry numbers would leave us at a YE2017 target price of $62 and $73.16, with the biggest difference being on Transportation, with an equity value of less than $6B. These disparities can be explained by the fact that Tesla is a growth stock and most companies included are already mature firms, especially in the Transportation segment. We also conducted a **sensitivity analysis** on some specific indicators that are central to Tesla's value. We project Generation to have the highest target price volatility, when cost of equity, terminal growth rate or 2040-2050 annuity growth rate fluctuate (Exhibit 49). We also performed a small sensitivity analysis to **gross margin** across every segment. 1% increase of this ratio, every year, would mean a variation of 12%, 118.4% and 10.67% in the target share price for Transportation, Generation and Storage business parts. We can clearly see how crucial COGS are for Tesla's future profitability, hence our careful study of cars, solar generation and storage systems cost structure study.

Final Remarks on Tesla Valuation

Tesla is in the forefront of the technological revolution in the automotive sector, selling high-quality electric vehicles, in terms of performance, technology and efficiency, with the perspective of becoming autonomous and shared. The company plans to sell its Model 3 at the end of this year, but problems with the production ramp-up will affect Tesla's sales in a market crowded with experienced and cash-filled players. SolarCity's acquisition will play a central role in Tesla's strategy, but the fact that it will take some time to PV solar and battery systems to be clearly financially profitable, combined with the segments's unbalanced customer portfolio and operational inefficiencies, this will all contribute to the generation of negative cash flows over a long time. All in all, Tesla will benefit for its customer satisfaction and brand commitment, but that won't be sufficient for the company to generate profits and positive FCF in the next 10 years. After the ponderation of the base, good and bad case scenarios, our valuation model calculates a **target Y17 price** of $285.4, which means we consider the market to be overvaluing the company. This leads to our **sell recommendation** on the stock (-19.5% 12-month return).

Appendix

Appendix 1 – Transportation Income Statement

(in Million $)	2015	2016	2017F	2018F	2019F	2020F	2021F	2022F	2023F	2024F	2025F	2026F	2027F	2028F	2029F	2030F	2031F	2032F	2033F	2034F	2035F	2036F	2037F	2038F	2039F	2040F
E. Vehicles	3 633	6 159	7 700	9 557	12 929	15 457	17 908	19 588	21 670	24 332	27 218	30 534	34 477	39 002	44 218	50 348	56 968	65 159	72 620	82 188	92 619	105 134	120 060	136 376	149 670	161 255
R. Credits	108	192	243	334	447	581	570	499	410	302	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Services & Others	305	468	576	722	981	1 183	1 370	1 497	1 654	1 855	2 060	2 323	2 636	2 998	3 416	3 909	4 445	5 110	5 723	6 509	7 372	8 409	9 650	11 014	12 146	13 149
Car Sharing	-	-	29	74	142	239	366	517	699	914	1 172	1 478	1 843	2 277	2 794	3 411	4 174	5 089	6 159	7 430	8 934	10 666	12 587	14 595	16 424	17 755
Superchargers	-	-	-	-	-	-	-	179	395	640	911	1 203	1 514	1 842	2 186	2 548	2 944	3 367	3 781	4 218	4 673	5 176	5 742	6 356	6 893	7 307
Total Revenues	4 046	6 819	8 548	10 687	14 499	17 460	20 213	22 280	24 827	28 044	31 363	35 538	40 470	46 119	52 615	60 216	68 531	78 725	88 282	100 345	113 597	129 385	148 038	168 341	185 133	199 465
E. Vehicles	2 823	4 750	6 056	7 716	10 324	12 322	14 365	15 827	17 646	19 526	21 801	24 420	27 541	31 118	35 237	40 065	45 513	51 982	57 909	65 454	73 676	83 492	95 199	108 005	118 557	127 785
R. Credits	-	472	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Services	299	-	565	693	923	1 089	1 234	1 318	1 424	1 560	1 691	1 860	2 058	2 340	2 667	3 052	3 470	3 989	4 468	5 082	5 755	6 565	7 533	8 598	9 482	10 265
Car Sharing	-	-	21	55	105	177	269	380	512	668	854	1 074	1 336	1 646	2 015	2 454	2 994	3 641	4 395	5 289	6 342	7 552	8 888	10 279	11 536	12 437
Superchargers	-	-	-	-	-	-	-	132	289	468	664	874	1 098	1 332	1 577	1 833	2 112	2 409	2 698	3 002	3 317	3 665	4 054	4 476	4 841	5 118
Total COGS	3 123	5 223	6 643	8 465	11 352	13 588	15 868	17 657	19 871	22 221	25 010	28 229	32 033	36 437	41 495	47 403	54 089	62 021	69 470	78 827	89 090	101 273	115 675	131 358	144 416	155 606
Gross Profit	924	1 596	1 905	2 222	3 147	3 872	4 345	4 623	4 956	5 823	6 354	7 309	8 437	9 682	11 120	12 814	14 442	16 703	18 812	21 518	24 507	28 112	32 363	36 983	40 717	43 860
R&D	439	335	786	988	1 190	1 398	1 461	1 415	1 371	1 330	1 302	1 475	1 674	1 903	2 169	2 478	2 866	3 295	3 662	4 160	4 695	5 370	6 167	7 033	7 665	8 176
SG&A	922	1 395	1 502	1 769	1 995	2 195	2 149	1 948	1 887	2 132	2 412	2 732	3 100	3 525	4 017	4 590	5 309	6 103	6 782	7 704	8 694	9 946	11 421	13 025	14 195	15 143
EBITDA	(438)	(134)	(383)	(535)	(39)	278	735	1 260	1 698	2 361	2 640	3 102	3 664	4 254	4 934	5 745	6 267	7 305	8 368	9 655	11 118	12 796	14 776	16 925	18 857	20 541
Depreciation	279	477	497	634	802	1 004	1 192	1 373	1 547	1 715	1 879	2 040	2 198	2 364	2 533	2 704	2 994	3 286	3 569	3 867	4 087	4 485	4 949	5 484	5 937	6 422
EBIT	(717)	(612)	(880)	(1 170)	(841)	(726)	(457)	(113)	151	645	761	1 062	1 466	1 890	2 401	3 041	3 273	4 019	4 799	5 788	7 031	8 311	9 827	11 440	12 919	14 119
Interest Expense	159	190	55	165	279	417	531	633	738	827	911	981	1 032	1 068	1 083	1 068	1 109	1 128	1 128	1 104	990	926	840	731	527	309
EBT	(876)	(802)	(935)	(1 335)	(1 121)	(1 142)	(988)	(746)	(587)	(182)	(150)	81	434	822	1 319	1 973	2 163	2 891	3 671	4 684	6 041	7 385	8 987	10 709	12 393	13 809
Taxes	(13)	(26)	209	298	250	255	221	166	131	41	34	-	-	-	-	-	-	(305)	(819)	(1 046)	(1 349)	(1 649)	(2 006)	(2 391)	(2 766)	(3 083)
Net Income	(889)	(828)	(726)	(1 037)	(870)	(887)	(768)	(579)	(456)	(141)	(117)	81	434	822	1 319	1 973	2 163	2 586	2 851	3 638	4 693	5 737	6 981	8 319	9 626	10 727

Appendix 2 – Transportation Cash Flow Statement

(in Million $)	2015	2016	2017F	2018F	2019F	2020F	2021F	2022F	2023F	2024F	2025F	2026F	2027F	2028F	2029F	2030F	2031F	2032F	2033F	2034F	2035F	2036F	2037F	2038F	2039F	2040F
EBIT	(717)	(612)	(880)	(1 170)	(841)	(726)	(457)	(113)	151	645	761	1 062	1 466	1 890	2 401	3 041	3 273	4 019	4 799	5 788	7 031	8 311	9 827	11 440	12 919	14 119
Taxes	(41)	(99)	189	240	152	109	35	(55)	(127)	(249)	(285)	(343)	(361)	(374)	(379)	(374)	(388)	(700)	(1 214)	(1 432)	(1 695)	(1 973)	(2 300)	(2 647)	(2 951)	(3 191)
NOPLAT	(757)	(710)	(690)	(930)	(689)	(616)	(423)	(168)	24	397	476	719	1 104	1 517	2 022	2 667	2 884	3 319	3 585	4 356	5 336	6 339	7 527	8 794	9 969	10 928
Depreciation	279	477	497	634	802	1 004	1 192	1 373	1 547	1 715	1 879	2 040	2 198	2 364	2 533	2 704	2 994	3 286	3 569	3 867	4 087	4 485	4 949	5 484	5 937	6 422
Gross Cash Flow	(479)	(233)	(194)	(295)	113	388	770	1 205	1 571	2 112	2 355	2 759	3 303	3 881	4 555	5 372	5 878	6 605	7 153	8 223	9 423	10 823	12 476	14 278	15 906	17 350
CAPEX	1 853	2 657	2 062	2 616	3 223	3 906	3 903	3 972	4 052	4 141	4 241	4 352	4 477	4 752	4 958	5 175	7 169	7 493	7 633	8 164	7 249	10 215	11 633	13 189	12 459	13 401
Change in NWC	(117)	354	(528)	(90)	(160)	(125)	(116)	(87)	(107)	(135)	(140)	(176)	(208)	(238)	(273)	(320)	(350)	(429)	(402)	(508)	(558)	(664)	(785)	(855)	(707)	(603)
Free Cash Flow	(2 214)	(3 244)	(1 728)	(2 822)	(2 950)	(3 394)	(3 017)	(2 681)	(2 374)	(1 894)	(1 746)	(1 418)	(966)	(634)	(130)	516	(941)	(459)	(77)	567	2 732	1 273	1 628	1 943	4 154	4 552
Change in Assets	1 076	1 709	949	1 429	1 200	2 173	2 034	1 846	1 261	1 465	1 840	2 264	2 589	2 968	3 417	3 985	4 518	5 309	5 392	6 149	6 730	8 168	9 632	11 044	10 329	8 720
Change in Liabilities	1 402	1 251	1 674	1 591	1 445	2 351	2 314	2 174	1 476	1 653	2 067	2 574	2 948	3 379	3 888	4 529	5 142	6 034	6 199	7 018	7 668	9 280	10 932	12 577	11 963	10 193
Adjusted FCF	(1 888)	(3 702)	(1 003)	(2 660)	(2 704)	(3 216)	(2 737)	(2 353)	(2 159)	(1 706)	(1 519)	(1 108)	(607)	(223)	341	1 060	(317)	266	729	1 436	3 670	2 385	2 927	3 476	5 788	6 025
Change in Debt	953	(549)	(157)	2 768	2 886	3 487	3 082	2 764	2 638	2 244	2 111	1 745	1 278	918	363	(366)	1 038	467	4	(600)	(2 873)	(1 599)	(2 158)	(2 732)	(5 130)	(5 463)
Interest	159	190	55	165	279	417	531	633	738	827	911	981	1 032	1 068	1 083	1 068	1 109	1 128	1 128	1 104	990	926	840	731	527	309
Tax Shield	28	73	19	58	98	146	186	221	258	289	319	343	361	374	379	374	388	395	395	386	346	324	294	256	184	108
Change in Equity	1 066	4 369	1 196	-	-	-	-	-	-	0	(0)	0	-	-	-	-	-	-	-	(118)	(154)	(184)	(223)	(269)	(316)	(361)
Cash Flow from Financing	1 888	3 702	1 003	2 660	2 704	3 216	2 737	2 353	2 159	1 706	1 519	1 108	607	223	(341)	(1 060)	317	(266)	(729)	(1 436)	(3 670)	(2 385)	(2 927)	(3 476)	(5 788)	(6 025)

Appendix 3 – Vehicles Sold

In Thousands of Units	2015	2016	2017F	2018F	2019F	2020F	2021F	2022F	2023F	2024F	2025F	2026F	2027F	2028F	2029F	2030F	2031F	2032F	2033F	2034F	2035F	2036F	2037F	2038F	2039F	2040F
Model S	50,66	50,52	53,76	50,40	53,02	54,42	46,00	43,58	37,48	42,34	47,89	54,25	61,56	70,00	79,77	91,15	105,43	121,20	134,69	152,99	172,67	197,52	226,81	258,67	281,91	300,73
Model X	0,21	25,72	37,63	44,10	57,44	66,51	64,40	60,18	56,22	63,51	71,84	81,38	92,34	105,00	119,66	136,73	131,78	151,50	168,36	191,24	215,83	246,90	283,51	323,34	352,38	375,91
Model 3			16,13	63,00	109,36	178,36	253,93	309,22	374,77	423,40	478,92	542,51	615,61	699,97	797,73	911,53	1 080,61	1 242,30	1 380,56	1 568,13	1 769,83	2 024,54	2 324,78	2 651,41	2 889,55	3 082,45
Roadster					1,10	3,02	3,68	2,08																		

Appendix 4 – Generation Income Statement

in (Million $)	2015	2016	2017F	2018F	2019F	2020F	2021F	2022F	2023F	2024F	2025F	2026F	2027F	2028F	2029F	2030F	2031F	2032F	2033F	2034F	2035F	2036F	2037F	2038F	2039F	2040F
Op. leases and solar energy systems incentives	294	422	144	185	230	269	313	363	419	482	552	629	713	805	903	1 008	1 118	1 228	1 336	1 433	1 519	1 610	1 697	1 772	1 836	1 899
Solar energy systems and components sales	106	308	535	1 006	1 740	2 552	3 215	3 821	4 052	4 434	5 628	7 031	8 678	10 602	12 845	15 451	18 379	21 679	25 359	29 454	33 955	38 101	42 504	47 132	51 943	56 888
Solar Roof	-	-	127	339	474	525	579	634	654	676	746	817	888	960	1 033	1 110	1 187	1 264	1 343	1 422	1 502	1 582	1 663	1 744	1 825	1 906
Total Revenues	400	730	806	1 530	2 444	3 346	4 107	4 818	5 125	5 593	6 925	8 477	10 278	12 367	14 781	17 569	20 683	24 172	28 038	32 309	36 977	41 293	45 864	50 648	55 604	60 692
Op. leases and SE systems incentives	166	254	31	38	46	53	61	70	80	92	104	118	133	150	167	186	206	225	244	260	273	290	305	319	331	342
Solar energy systems and components sales	115	225	395	745	1 291	1 895	2 373	2 786	2 871	3 050	3 875	4 854	6 013	7 378	8 980	10 855	13 022	15 472	18 210	21 238	24 545	27 483	30 566	33 763	37 043	40 366
Solar Roof	-	-	107	275	373	401	434	469	474	481	522	564	604	645	686	728	770	812	854	896	938	979	1 021	1 062	1 104	1 145
Total COGS	281	479	534	1 058	1 711	2 350	2 868	3 325	3 425	3 622	4 501	5 536	6 750	8 173	9 834	11 769	13 998	16 509	19 308	22 394	25 757	28 753	31 892	35 144	38 477	41 853
Gross Profit	119	251	272	472	733	997	1 239	1 493	1 700	1 970	2 424	2 941	3 528	4 194	4 948	5 800	6 685	7 663	8 730	9 916	11 220	12 540	13 972	15 503	17 127	18 839
Sales and Marketing	457	501	582	822	1 022	1 095	1 171	1 250	1 331	1 415	1 500	1 587	1 675	1 764	1 854	1 944	2 023	2 090	2 143	2 180	2 201	2 204	2 191	2 160	2 113	2 050
General and Administrative	221	228	277	416	537	596	672	756	845	944	1 056	1 178	1 311	1 456	1 613	1 784	1 958	2 133	2 307	2 476	2 638	2 789	2 926	3 046	3 146	3 224
Research and Development	65	113	90	145	197	230	267	310	359	414	479	552	636	730	837	958	1 088	1 226	1 372	1 524	1 681	1 839	1 997	2 151	2 300	2 439
EBITDA	(625)	(591)	(677)	(911)	(1 023)	(924)	(871)	(823)	(835)	(803)	(611)	(376)	(94)	244	644	1 115	1 616	2 213	2 908	3 735	4 701	5 708	6 859	8 146	9 569	11 126
Depreciation	23	60	47	80	120	162	206	251	298	347	399	453	511	572	636	704	780	864	956	1 056	1 161	1 273	1 388	1 507	1 627	1 747
EBIT	(648)	(650)	(725)	(991)	(1 143)	(1 087)	(1 077)	(1 074)	(1 133)	(1 150)	(1 009)	(829)	(604)	(328)	8	411	837	1 349	1 951	2 680	3 540	4 436	5 471	6 640	7 942	9 379
Interest expense, net	118	170	103	62	70	61	71	82	116	118	76	72	67	59	49	34	22	9	8	7	7	6	5	5	4	3
Income before Taxes	(765)	(821)	(827)	(1 053)	(1 213)	(1 147)	(1 148)	(1 156)	(1 249)	(1 268)	(1 085)	(902)	(671)	(387)	(41)	377	814	1 340	1 943	2 672	3 533	4 430	5 466	6 635	7 938	9 376
Income tax (provision) benefit	(3)	0	69	88	101	96	96	97	104	106	91	75	56	32	3	-	-	-	-	-	-	(324)	(457)	(554)	(663)	(783)
Net Profit	(769)	(820)	(758)	(965)	(1 112)	(1 051)	(1 052)	(1 059)	(1 144)	(1 162)	(994)	(826)	(615)	(354)	(37)	377	814	1 340	1 943	2 672	3 533	4 106	5 009	6 081	7 275	8 592
Net loss attributable to noncontrolling and redeemable noncontrolling interests	(710)	(1 059)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net loss attributable to stockholders	(58)	239	(758)	(965)	(1 112)	(1 051)	(1 052)	(1 059)	(1 144)	(1 162)	(994)	(826)	(615)	(354)	(37)	377	814	1 340	1 943	2 672	3 533	4 106	5 009	6 081	7 275	8 592

Appendix 5 – Generation Free Cash Flow Statement

(in Million $)	2015	2016	2017F	2018F	2019F	2020F	2021F	2022F	2023F	2024F	2025F	2026F	2027F	2028F	2029F	2030F	2031F	2032F	2033F	2034F	2035F	2036F	2037F	2038F	2039F	2040F
EBIT	(648)	(650)	(725)	(991)	(1 143)	(1 087)	(1 077)	(1 074)	(1 133)	(1 150)	(1 009)	(829)	(604)	(328)	8	411	837	1 349	1 951	2 680	3 540	4 436	5 471	6 640	7 942	9 379
Provision from Taxes	(4)	(59)	33	66	77	75	71	68	64	65	64	50	33	12	(14)	(12)	(8)	(3)	(3)	(3)	(2)	(326)	(458)	(556)	(665)	(784)
NOPLAT	(652)	(710)	(691)	(924)	(1 066)	(1 012)	(1 006)	(1 006)	(1 069)	(1 085)	(945)	(779)	(572)	(316)	(6)	399	829	1 346	1 949	2 677	3 537	4 109	5 013	6 084	7 277	8 594
Depreciation & Amortization	23	60	47	80	120	162	206	251	298	347	399	453	511	572	636	704	780	864	956	1 056	1 161	1 273	1 388	1 507	1 627	1 747
Gross Cash Flow	(628)	(650)	(644)	(844)	(946)	(850)	(800)	(755)	(771)	(738)	(546)	(326)	(61)	256	630	1 103	1 609	2 210	2 905	3 733	4 699	5 382	6 401	7 591	8 905	10 342
CAPEX	210	42	267	402	518	573	632	695	760	830	908	990	1 078	1 171	1 268	1 371	1 529	1 694	1 862	2 032	2 201	2 367	2 526	2 675	2 810	2 930
Change in Net Working Capital	(85)	(71)	(88)	(296)	(395)	(420)	(387)	(388)	(221)	(308)	(757)	(913)	(1 096)	(1 310)	(1 561)	(1 855)	(2 138)	(2 466)	(2 815)	(3 199)	(3 596)	(3 507)	(3 820)	(4 116)	(4 394)	(4 648)
Free Cash Flow	(754)	(621)	(824)	(951)	(1 069)	(1 003)	(1 046)	(1 062)	(1 310)	(1 260)	(697)	(404)	(43)	396	923	1 587	2 217	2 983	3 857	4 899	6 093	6 522	7 695	9 032	10 488	12 060
Change in Assets	2 517	2 059	2 790	4 176	5 599	6 370	7 061	8 148	9 443	11 628	14 270	16 301	18 578	21 127	23 971	27 145	30 441	33 929	37 511	41 209	44 927	48 381	52 585	56 686	60 607	64 259
Change in Liabilities	780	1 132	2 413	4 439	5 791	6 289	6 581	7 350	7 898	9 950	13 220	15 040	17 093	19 403	21 994	24 907	27 884	31 062	34 293	37 602	40 846	42 622	45 891	48 910	51 610	53 903
Adjusted Free Cash Flow	(2 491)	(1 548)	(1 201)	(688)	(877)	(1 084)	(1 526)	(1 861)	(2 856)	(2 937)	(1 747)	(1 665)	(1 529)	(1 328)	(1 054)	(651)	(341)	116	639	1 291	2 012	763	1 001	1 255	1 490	1 705
Change in Debt	1 447	298	1 202	729	922	1 124	1 572	1 914	2 931	3 014	1 796	1 712	1 572	1 367	1 086	673	355	(110)	(634)	(1 280)	(1 999)	(749)	(986)	(1 238)	(1 471)	(1 683)
Interest	118	170	103	62	70	61	71	82	116	118	76	72	67	59	49	34	22	9	8	7	7	6	5	5	4	3
Tax Shield	1	60	36	22	24	21	25	29	41	41	27	25	23	21	17	12	8	3	3	3	2	2	2	2	1	1
Change in Equity	1 161	1 361	65	-	-	-	-	-	-	-	-	-	-	0	0	0	-	-	-	(6)	(8)	(10)	(12)	(15)	(17)	(20)
Cash Flow from Financing	2 491	1 548	1 201	688	877	1 084	1 526	1 861	2 856	2 937	1 747	1 665	1 529	1 328	1 054	651	341	(116)	(639)	(1 291)	(2 012)	(763)	(1 001)	(1 255)	(1 490)	(1 705)

Appendix 6 – Generation & Storage MW and Solar Roof Deployment

in MW (except Solar Roof, which is in Thousands Square Feet)	2015	2016	2017F	2018F	2019F	2020F	2021F	2022F	2023F	2024F	2025F	2026F	2027F	2028F	2029F	2030F	2031F	2032F	2033F	2034F	2035F	2036F	2037F	2038F	2039F	2040F
Solar Panels	778	804	1 038	1 609	2 193	2 576	3 021	3 534	4 126	4 807	5 588	6 482	7 503	8 666	9 988	11 486	13 110	14 852	16 696	18 626	20 619	22 648	24 682	26 686	28 623	30 455
Solar Roof			1 429	8 791	10 446	12 151	13 888	15 671	17 501	19 378	21 303	23 262	25 269	27 324	29 427	31 579	33 749	35 965	38 227	40 536	42 892	45 284	47 723	50 210	52 745	55 329
Powerwall		36	46	58	73	93	117	146	183	228	282	349	430	528	645	786	954	1 154	1 391	1 670	1 998	2 382	2 829	3 349	3 948	4 639
Powerpack		83	103	127	157	193	236	287	349	423	510	614	736	879	1 047	1 242	1 469	1 731	2 033	2 378	2 773	3 223	3 731	4 305	4 950	5 670
Gigafactory		7 845	11 917	17 107	23 094	28 196	32 639	37 268	41 176	44 645	46 846	48 372	48 845	47 750	42 988	35 136	22 951	10 216	15 818	13 920	12 142	5 612	20 731	43 387	36 868	7 845

Appendix 7 – Storage Income Statement

(in Million $)	2016	2017F	2018F	2019F	2020F	2021F	2022F	2023F	2024F	2025F	2026F	2027F	2028F	2029F	2030F	2031F	2032F	2033F	2034F	2035F	2036F	2037F	2038F	2039F	2040F
Powerwall & Powerpack	97	142	157	173	189	220	255	294	339	389	445	508	578	656	742	868	1 012	1 176	1 361	1 571	1 808	2 073	2 369	2 698	3 063
Gigafactory	-	1 475	2 097	2 806	3 513	3 952	4 187	4 338	4 304	4 196	4 302	4 337	4 274	4 075	3 576	2 847	1 811	784	1 180	1 009	854	383	1 370	2 776	2 281
Total Revenues	97	1 617	2 254	2 979	3 702	4 172	4 441	4 632	4 643	4 585	4 747	4 845	4 852	4 731	4 318	3 715	2 822	1 960	2 542	2 580	2 662	2 456	3 739	5 474	5 344
Powerwall & Powerpack	96	114	124	133	141	159	177	198	220	252	288	328	372	422	477	556	647	751	868	1 000	1 148	1 314	1 499	1 704	1 931
Gigafactory	-	1 402	1 996	2 673	3 349	3 771	3 998	4 146	4 118	4 018	4 122	4 160	4 103	3 916	3 439	2 741	1 744	756	1 139	974	826	370	1 327	2 690	2 212
COGS	96	1 516	2 120	2 806	3 490	3 930	4 176	4 344	4 337	4 270	4 410	4 488	4 475	4 337	3 916	3 297	2 392	1 507	2 007	1 974	1 974	1 684	2 826	4 394	4 143
Gross Profit	2	101	134	173	212	243	266	288	305	315	336	357	377	394	403	418	431	453	535	606	688	771	913	1 080	1 200
R&D	10	10	10	10	12	13	15	18	21	24	27	31	35	40	45	53	62	71	83	96	110	126	144	164	186
SG&A	17	28	30	32	33	37	41	48	55	63	72	82	94	106	120	141	164	191	221	255	293	336	384	437	497
EBITDA	(26)	63	94	131	168	192	209	222	230	229	237	244	248	247	237	225	205	191	231	256	285	309	385	478	518
Depreciation	4	9	14	20	26	31	36	41	46	51	55	60	64	68	71	73	73	73	73	73	73	73	75	80	84
EBIT	(30)	55	81	111	142	161	173	181	184	178	182	184	184	180	167	152	132	118	159	183	212	236	310	399	434
Interest Expense	(1)	8	11	14	17	19	19	20	19	18	18	17	16	15	12	9	4	-	-	-	-	-	-	-	-
EBT	(29)	47	69	97	125	142	153	161	165	160	164	167	167	165	154	143	128	118	159	183	212	236	310	399	434
Taxes	10	(10)	(24)	(34)	(44)	(50)	(54)	(56)	(58)	(56)	(57)	(58)	(59)	(58)	(54)	(50)	(45)	(41)	(56)	(64)	(74)	(83)	(109)	(139)	(152)
Net Income	(19)	37	45	63	81	93	100	105	107	104	107	108	109	107	100	93	83	77	103	119	138	153	202	259	282

Appendix 8 – Storage Free Cash Flow Statement

(in Million $)	2016	2017F	2018F	2019F	2020F	2021F	2022F	2023F	2024F	2025F	2026F	2027F	2028F	2029F	2030F	2031F	2032F	2033F	2034F	2035F	2036F	2037F	2038F	2039F	2040F
EBIT	(30)	55	81	111	142	161	173	181	184	178	182	184	184	180	167	152	132	118	159	183	212	236	310	399	434
Taxes	10	(13)	(28)	(39)	(50)	(56)	(60)	(63)	(64)	(62)	(64)	(65)	(64)	(63)	(58)	(53)	(46)	(41)	(56)	(64)	(74)	(83)	(109)	(139)	(152)
NOPLAT	(19)	42	52	72	92	105	112	118	119	116	118	120	119	117	108	99	86	77	103	119	138	153	202	259	282
Depreciation	4	9	14	20	26	31	36	41	46	51	55	60	64	68	71	73	73	73	73	73	73	73	75	80	84
Gross Free Cash Flow	(15)	51	66	92	118	136	148	159	166	166	174	179	183	185	179	172	159	150	176	192	211	227	277	339	366
CAPEX	84	93	113	129	139	136	132	138	138	137	141	144	145	141	129	111	84	58	76	77	79	73	111	163	159
NWC	(38)	148	44	49	49	32	18	13	1	(4)	11	7	0	(8)	(28)	(41)	(61)	(59)	40	3	6	(14)	88	119	(9)
Free Cash Flow	(61)	(191)	(90)	(86)	(70)	(32)	(2)	8	26	34	21	28	38	52	79	102	136	150	60	112	126	168	78	57	215
Change in Assets	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Change in Liabilities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Adjusted Free Cash Flow	(61)	(191)	(90)	(86)	(70)	(32)	(2)	8	26	34	21	28	38	52	79	102	136	150	60	112	126	168	78	57	215
Change in Debt	61	157	97	96	82	44	15	5	(14)	(22)	(9)	(17)	(28)	(42)	(70)	(96)	(133)	(150)	(57)	(107)	(120)	(160)	(69)	(47)	(204)
Interest	(1)	8	11	14	17	19	19	20	19	18	18	17	16	15	12	9	4	-	-	-	-	-	-	-	-
Tax Shield	(0)	3	4	5	6	7	7	7	7	6	6	6	6	5	4	3	2	-	-	-	-	-	-	-	-
Change in Equity	-	39	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	(4)	(5)	(6)	(7)	(9)	(10)	(12)
Cash Flow from Financing	61	191	90	86	70	32	2	(8)	(26)	(34)	(21)	(28)	(38)	(52)	(79)	(102)	(136)	(150)	(60)	(112)	(126)	(168)	(78)	(57)	(215)

Appendix 9 – Comparables Betas

Transportation					
Firm	Unlevered Beta	Raw Beta	Firm	Unlevered Beta	Raw Beta
BMW	0,57	1,515	Volkswagen	-0,09	0,613
BYD	1,04	1,358	**Volvo**	**1,12**	**1,874**
Daimler (Mercedes)	0,03	1,852			
Ford	-1,62	2,028			
General Motors	-0,01	1,665			
Honda	0,74	0,797			
Hyundai	0,94	1,174			
KIA	1,18	1,344			
Mazda	1,33	1,674			
Mitsubishi	0,79	1,022			
Nissan	-0,25	1,279			
Suzuki	0,93	0,689			
Tata Motors	1,49	2,354			
Tesla	0,83	0,685			
Toyota	0,71	0,653			

Storage		
Firm	Unlevered Beta	Raw Beta
LG	1,339	1,025
GCL	1,945	1,413
Delta	0,951	1,052
Panasonic	0,974	0,981
Enphase	0,905	0,890
ABB	1,361	1,239
Samsung	1,078	1,222

Generation					
Firm	Unlevered Beta	Raw BETA	Firm	Unlevered Beta	Raw BETA
SolarCity	0,835	2,083	SolarEdge	0,393	-0,071
Eve Energy	0,689	0,533	Vivint Solar	0,102	-0,19
Foshan Electrical Light	0,928	0,689			
Furukawa Electric	0,736	1,051			
GS Yuasa	0,801	0,865			
Nuode Investment	0,824	0,756			
Qingdao Hanhe Cable	0,841	0,752			
Shenzhen Clou Electronics	0,840	0,802			
Wolong Electric Group	0,843	0,841			
Xiamen Kehua Kengsheng	0,798	0,7			
First Solar	5,712	1,522			
SunPower	0,845	2,284			
Trina Solar	0,845	2,736			
Canadian Solar	0,634	3,171			
SunRun	-0,023	-0,588			

Appendix 10 – Tesla Balance Sheet

in Million $	2015	2016	2017F	2018F	2019F	2020F	2021F	2022F	2023F	2024F	2025F	2026F	2027F	2028F	2029F	2030F	2031F	2032F	2033F	2034F	2035F	2036F	2037F	2038F	2039F	2040F
Assets																										
Excess Cash	1 493	3 770	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	82	190	310	470	539	586	789
Operational Cash	87	76	219	289	398	490	570	631	692	766	857	975	1 112	1 267	1 443	1 642	1 859	2 114	2 366	2 704	3 063	3 467	3 927	4 455	4 924	5 310
Restricted cash & Marketable Securities	74	178	172	232	307	378	436	488	506	536	631	740	863	1 002	1 160	1 339	1 533	1 746	1 975	2 222	2 483	2 712	2 946	3 182	3 417	3 648
Accounts receivable	203	553	460	618	866	1 073	1 256	1 402	1 537	1 714	1 961	2 260	2 608	3 006	3 460	3 986	4 560	5 238	5 904	6 701	7 568	8 518	9 604	10 767	11 769	12 654
Inventory	1 621	2 187	2 916	4 080	5 826	7 328	8 646	9 732	10 608	11 781	13 659	15 910	18 530	21 530	24 967	28 937	33 294	38 370	43 504	49 525	56 076	62 969	70 723	78 986	86 379	93 144
Prepaid Expenses & Other Assets	217	280	841	1 241	1 743	2 215	2 573	2 843	3 005	3 166	3 497	3 945	4 434	4 960	5 521	6 083	6 652	7 233	7 851	8 969	10 003	11 009	12 012	13 463	14 949	15 850
Total Current Assets	3 694	7 044	4 608	6 460	9 140	11 484	13 481	15 096	16 348	17 963	20 606	23 830	27 547	31 765	36 551	41 987	47 898	54 701	61 625	70 203	79 383	88 985	99 683	111 392	122 024	131 396
PP&E	3 666	5 908	7 778	10 181	13 109	16 535	19 777	22 917	25 981	28 982	31 938	34 874	37 804	40 872	44 003	47 199	52 162	57 208	62 164	67 441	71 647	78 477	86 299	95 208	102 996	111 234
Operating lease vehicles	1 791	3 134	4 389	5 777	6 903	9 019	10 999	12 805	14 017	15 419	17 195	19 377	21 870	24 729	28 020	31 857	36 213	41 325	46 531	52 445	58 918	66 780	76 050	86 699	96 702	105 143
Restricted cash	32	261	41	52	70	85	98	108	120	136	152	172	196	224	255	292	332	382	428	486	551	627	718	816	897	967
Solar energy systems – leased and to be leased	4 376	5 829	6 264	6 789	7 362	7 850	8 409	9 037	9 723	10 475	11 320	12 259	13 297	14 434	15 669	16 997	18 398	19 852	21 335	22 819	24 268	25 733	27 187	28 598	29 932	31 149
Build-to-suit lease Asset	285	808	574	1 089	1 740	2 382	2 924	3 430	3 649	3 981	4 930	6 035	7 318	8 805	10 523	12 508	14 725	17 209	19 961	23 002	26 325	29 398	32 652	36 058	39 586	43 209
Intangible Assets	517	462	451	442	436	429	423	417	410	404	398	392	385	379	373	366	360	354	347	341	335	328	322	316	309	303
MyPower Notes Receivable	488	517	1 631	3 010	4 960	7 347	10 134	13 463	17 662	22 821	28 726	35 467	43 148	51 885	61 801	73 036	85 692	99 846	115 558	132 885	151 859	172 776	195 659	220 497	247 244	275 810
MyPower Deferred Costs	216	232	433	818	1 301	1 772	2 165	2 527	2 675	2 905	3 580	4 360	5 261	6 298	7 490	8 858	10 376	12 064	13 922	15 961	18 173	20 189	22 308	24 505	26 762	29 057
Other assets	316	556	1 755	3 166	5 171	7 601	10 428	13 788	18 023	23 230	29 182	35 984	43 738	52 556	62 567	73 913	86 690	100 993	116 844	134 346	153 514	174 660	197 815	222 949	249 941	278 715
Total Non-Current Assets	11 686	17 707	23 316	31 325	41 052	53 021	65 357	78 492	92 260	108 354	127 421	148 920	173 018	200 181	230 701	265 026	304 948	349 233	397 091	449 726	505 589	568 968	639 008	715 647	794 371	875 587
Total Assets	15 380	24 751	27 925	37 785	50 192	64 504	78 838	93 588	108 608	126 317	148 026	172 750	200 565	231 946	267 251	307 013	352 845	403 933	458 716	519 929	584 972	657 953	738 690	827 039	916 395	1 006 982
Liabilities																										
Accounts payable	1 281	1 438	2 505	3 611	5 237	6 679	7 949	9 033	9 846	10 945	12 863	15 161	17 850	20 954	24 538	28 700	33 315	38 671	44 251	50 732	57 833	65 139	73 283	81 972	90 105	97 859
Accrued liabilities	693	1 078	1 235	1 898	2 823	3 673	4 410	5 057	5 471	6 046	7 216	8 602	10 218	12 087	14 244	16 743	19 520	22 702	26 088	29 950	34 176	38 370	42 967	47 841	52 549	57 146
Deferred revenue	527	1 122	1 124	1 479	1 867	2 433	3 049	3 630	4 159	4 773	5 514	6 381	7 370	8 497	9 783	11 255	12 918	14 810	16 828	19 049	21 513	24 336	27 547	31 128	34 733	38 139
Resale value guarantees	137	119	599	749	1 017	1 224	1 417	1 562	1 741	1 966	2 199	2 492	2 837	3 234	3 689	4 222	4 805	5 520	6 190	7 036	7 965	9 072	10 379	11 803	12 980	13 985
Customer Deposits	290	564	302	386	529	643	749	830	921	1 037	1 170	1 336	1 531	1 755	2 013	2 314	2 645	3 045	3 429	3 905	4 427	5 029	5 732	6 494	7 141	7 706
Distributions payable to noncontrolling and redeemable noncontrolling interests	27	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
Deferred U.S. Treasury grant	15	14	49	96	156	218	273	327	355	394	497	619	764	936	1 137	1 375	1 645	1 954	2 302	2 695	3 132	3 551	4 004	4 487	4 998	5 534
Transportation Debt	633	651	214	876	1 567	2 402	3 140	3 801	4 433	4 970	5 475	5 893	6 199	6 419	6 506	6 418	6 666	6 778	6 779	6 635	5 948	5 565	5 048	4 394	3 166	1 858
Storage Debt	215	17	300	356	426	512	632	779	1 003	1 233	1 370	1 501	1 621	1 725	1 808	1 860	1 887	1 878	1 830	1 732	1 579	1 522	1 447	1 352	1 240	1 111
Current Solar Bonds	178	185	250	296	354	426	526	647	833	1 025	1 139	1 247	1 347	1 434	1 503	1 546	1 568	1 561	1 521	1 440	1 313	1 265	1 203	1 124	1 031	924
Solar Asset-Backed Notes	14	52	19	23	28	33	41	50	65	80	89	97	105	111	117	120	122	121	118	112	102	98	94	87	80	72
Other Current Liabilities	-	42	366	510	674	838	944	1 005	1 048	1 051	1 038	1 074	1 096	1 098	1 071	977	841	639	443	575	584	602	556	846	1 239	1 209
Total Current Liabilities	4 010	5 305	6 987	10 305	14 703	19 105	23 154	26 745	29 897	33 544	38 594	44 428	50 964	58 274	66 432	75 554	85 956	97 703	109 804	123 885	138 596	154 574	172 283	191 554	209 285	225 568
Deferred revenue	1 457	1 650	4 359	7 157	10 768	14 992	19 812	25 396	32 364	40 972	50 712	61 700	74 061	87 957	103 562	121 073	140 655	162 403	186 247	212 249	240 365	271 156	304 572	340 441	378 183	417 309
Resale value guarantee	1 294	1 462	3 185	4 198	5 007	6 481	7 895	9 351	10 272	11 256	12 503	14 075	15 871	17 928	20 295	23 050	26 191	29 863	33 680	37 978	42 608	48 252	54 867	62 555	70 047	76 541
Long-term deferred tax liability	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Deferred U.S. Treasury grant	382	343	781	1 502	2 430	3 369	4 187	4 972	5 353	5 911	7 407	9 172	11 250	13 692	16 550	19 892	23 677	27 973	32 799	38 201	44 183	49 859	55 953	62 424	69 231	76 327
Build-to-suit lease liability	285	808	574	1 089	1 740	2 382	2 924	3 430	3 649	3 981	4 930	6 035	7 318	8 805	10 523	12 508	14 725	17 209	19 961	23 002	26 325	29 398	32 652	36 058	39 586	43 209
Transportation Debt	2 082	3 883	679	2 785	4 979	7 632	9 976	12 078	14 085	15 792	17 398	18 725	19 697	20 395	20 671	20 392	21 182	21 537	21 540	21 083	18 898	17 681	16 040	13 962	10 060	5 905
Storage Debt	-	65	218	315	411	493	537	552	556	542	521	511	494	467	424	354	258	124	-	-	-	-	-	-	-	-
Convertible Senior Notes	895	885	1 253	1 485	1 778	2 136	2 637	3 247	4 181	5 141	5 713	6 258	6 759	7 194	7 540	7 755	7 868	7 833	7 631	7 223	6 586	6 347	6 033	5 639	5 171	4 635
Solar Bonds	36	150	50	59	71	85	105	130	167	206	228	250	270	288	302	310	315	313	305	289	263	254	241	226	207	185
Solar Asset-Backed Notes	396	549	554	657	787	945	1 166	1 436	1 849	2 274	2 527	2 768	2 990	3 182	3 335	3 430	3 480	3 464	3 375	3 195	2 913	2 808	2 669	2 494	2 287	2 050
Other Debt (Generation)	1 076	1 174	1 506	1 785	2 138	2 569	3 171	3 904	5 026	6 181	6 869	7 524	8 126	8 650	9 066	9 323	9 459	9 417	9 174	8 684	7 919	7 632	7 254	6 780	6 217	5 572
Other long-term liabilities	644	1 591	1 040	1 665	2 516	3 311	3 996	4 608	4 964	5 470	6 586	7 902	9 435	11 209	13 257	15 628	18 266	21 271	24 504	28 159	32 158	36 052	40 285	44 758	49 156	53 509
Total Non-Current Liabilities	8 546	12 560	14 198	22 698	32 626	44 394	56 407	69 104	82 467	97 727	115 393	134 921	156 272	179 767	205 525	233 715	266 075	301 407	339 217	380 064	422 218	469 440	520 568	575 337	630 145	685 241
Total Liabilities	12 556	17 865	21 186	33 003	47 329	63 499	79 560	95 849	112 365	131 270	153 986	179 349	207 236	238 041	271 958	309 269	352 031	399 110	449 021	503 948	560 814	624 014	692 851	766 891	839 430	910 808
Stockholders' Equity																										
Additional paid-in capital	4 610	8 874	8 874	8 874	8 874	8 874	8 874	8 874	8 874	8 874	8 874	8 874	8 874	8 874	8 874	8 874	8 874	8 874	8 874	8 874	8 874	8 874	8 874	8 874	8 874	8 874
Acc. Other Comprehensive Loss	(4)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)
Accumulated deficit	(2 639)	(3 016)	(4 463)	(6 420)	(8 339)	(10 197)	(11 925)	(13 464)	(14 959)	(16 155)	(17 162)	(17 801)	(17 873)	(17 297)	(15 908)	(13 458)	(10 387)	(6 379)	(1 507)	4 907	13 251	23 231	35 374	49 975	67 135	86 736
Noncontrolling interests	535	708	708	708	708	708	708	708	708	708	708	708	708	708	708	708	708	708	708	708	708	708	708	708	708	708
Redeemable noncontrolling interests in subsidiaries	321	344	344	344	344	344	344	344	344	344	344	344	344	344	344	344	344	344	344	344	344	344	344	344	344	344
Cash In/Out	-	-	1 300	1 300	1 300	1 300	1 300	1 300	1 300	1 300	1 300	1 300	1 300	1 300	1 300	1 300	1 300	1 300	1 300	1 172	1 005	805	562	270	(73)	(465)
Total Stockholders' Equity	2 824	6 886	6 739	4 782	2 863	1 005	(723)	(2 261)	(3 757)	(4 953)	(5 960)	(6 598)	(6 671)	(6 094)	(4 706)	(2 256)	815	4 824	9 695	15 981	24 158	33 939	45 839	60 148	76 965	96 174
Total Liabilities + Equity	15 380	24 751	27 925	37 785	50 192	64 504	78 838	93 588	108 608	126 317	148 026	172 750	200 565	231 946	267 251	307 013	352 845	403 933	458 716	519 929	584 972	657 953	738 690	827 039	916 395	1 006 982

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Buy	Expected total return (including expected capital gains and expected dividend yield) of more than 10% over a 12-month period.
Hold	Expected total return (including expected capital gains and expected dividend yield) between 0% and 10% over a 12-month period.
Sell	Expected negative total return (including expected capital gains and expected dividend yield) over a 12-month period.

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