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

Tesla: Driving a winding road

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Abstract:

This research evaluates Tesla, a company with no consensus about its investment case. It operates in exciting and leading future industries (automotive and energy generation and storage), being its products key to build a sustainable world.

We used a DCF model to better account for the company's specific business, and we assessed vital risks. For that, it was inferred about the above industries, their key variables, their present, their future, and the transition.

Despite believing in the company's future, we believe the implicit growth rate behind the current share price is too high to be fairly valued. Our recommendation: Sell.

Keywords: Finance, Tesla, Sell, Equity Research

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This report is part of the Tesla Inc. Equity Research: 2021-22_Fall_31876_Laura Silva_Parte2 report and should be read has an integral part of it.

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Company overview

Company description

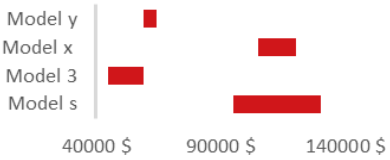
Tesla is an electric vehicle (EV) and solar energy system manufacturer. It was founded in 2003, as a project of two engineers, Martin Eberhard and Marc Tarpenning, with a dream of proving to the world, electric cars could be better, in all aspects, than the traditional fossil fuel vehicles. As a result, the first prototype was released in 2006, the **Tesla Roadster**, known as the first all-electric car (or Battery Electric Vehicle – BEVs[1]). Furthermore, Roadster was the first **BEV** with a battery able to meet the power needed to achieve a highway speed, within an **affordable cost-price ratio**, becoming, in this way, the first fully electric car legally allowed to drive on a highway. Recently, it was announced its successor would be launched in 2023, wrapped in huge expectations on what was announced as the fastest car in the world, with an acceleration speed from 0 to 100km/h in just 1,9 seconds and reaching an incredible 400km/h. Currently, the company sells four vehicles' models: **Model S, X, 3, Y**.

In 2016, Tesla launched itself in the energy sector and started producing solar generating systems upon the acquisition of **SolarCity**. By the time, Tesla was already producing energy storage products, the **Powerwall and Powerpack**, by taking advantage of the batteries production lines for the automotive segment. The main goal with this merger was to create the first **vertically integrated** sustainable energy company at a global level, with Tesla being the storage and SolarCity the solar. During the last years, the company has launched several innovations to the market as the first solar roof tiles (**Solar Roof**), aiming to solve the big problem of houses ageing roofs, with no capacity for solar panel installations; and the mandatory sale of Powerwalls with energy production systems, allowing the consumers to maximise their **energy efficiency**.

The company is also focused on a long-term strategy to fully integrate the automotive segment, with the last part of the **value chain** already entirely owned by the company. Costumers buy directly to Tesla through stores or the company website, not depending on dealerships. This is a unique business model in the automotive industry, usually dependent on third parties for sales and post-sale customer service. In 2020, the **automotive segment represented 94%** of the business, while the **energy generation and storage segment 6%** (Exhibit 2).

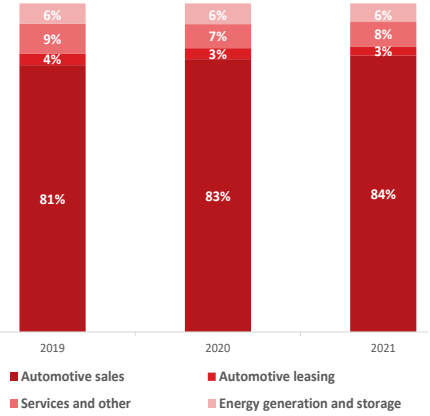
On **geographical** terms, the company's primary market is the **United States** (Exhibit 3); however, it recently started growing its presence in **Europe and China**,

Exhibit 1 - U.S. Tesla car prices by model



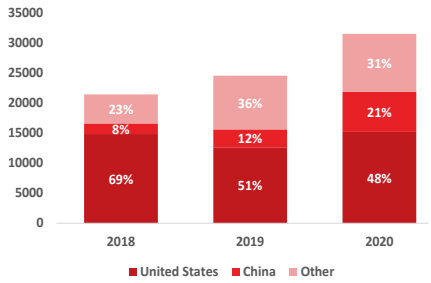
Source: Tesla

Exhibit 2 – Revenues breakdown by segment



Source: Tesla, Company Report

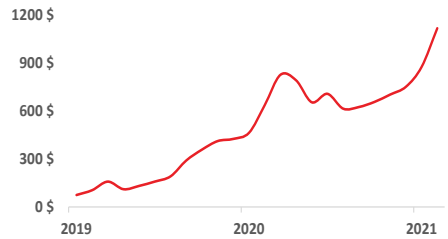
Exhibit 3 – Revenues by geography (Millions of $)



Source: Statista

[1] Electric Vehicles Terminology: Battery Electric Vehicles (BEVs); Plug-in Hybrid Electric Vehicles (PHEVs); Hybrid Electric Vehicles (HEVs)

Exhibit 4 – Tesla Stock price evolution



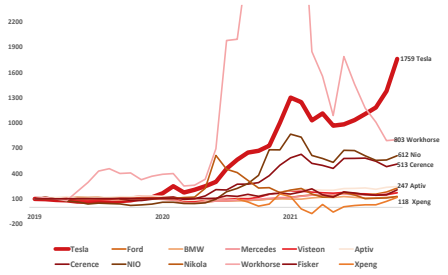
Source: Bloomberg

where two factories are being built to serve the markets directly. China is a crucial market as it represents 20% of the world population, possesses **44% of the world EV's stock**, and is one of the most advanced cultures adopting electric technology, not only in cars but also in motorcycles and other means of micromobility[2].

Tesla's success is often connected to the popularity of its CEO and major shareholder, **Elon Musk**. However, Musk only became part of the company one year after its foundation, after investing $30 million in a Series A founding round.

Tesla is one of the most valued companies on Wall Street, and its entry on the **S&P500** index was controversially denied for some time. First, because it did not meet the **profitability criteria**[3] , and even after consecutive profitable quarters, it kept being rejected by the index committee, even though its market capitalisation was twenty times bigger than other candidates. Some Wall Street analysts speculate the committee was not happy with the stock's volatility, which could risk the index reputation; however, no official statement was ever made. The stock ended up entering the index in December 2020.

Exhibit 5 - Stock performance against peers (Base year: 2019)

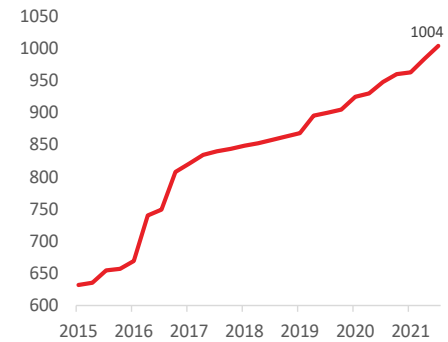


Source: Bloomberg

Share Performance

On June 29, 2010, Tesla's launched its Initial Public Offer (IPO) on NASDAQ. It was issued 13,3 million shares at a price of **$17/share** (Adjusted close price: $4,77[4]). If an investor had invested on that day, the return on December 17, 2021, would be approximately 23.000%[5]. The stock grew gradually and almost **tripled** its **IPO value** during the first three years. In 2014, the stock rose more than **400%** when the auto-pilot function was presented for the first time. In the following five years, the stock price was kept roughly constant. Subsequently, in eight months, ending in February 2020, the share rose 4,5x more due to **better-than-expected results**. Tesla closed a year with a positive net income for the first time.

Exhibit 6 - Evolution of the number of outstanding shares (Millions of shares)



Source: Bloomberg

Nevertheless, the stock price decreased to half of its value one month later, as the **Covid-19 pandemic** hit the economy and investors were reticent to invest money in the market, especially in growth companies[6]. The stock rose sharply in the second half of the year. This time, it benefited from market momentum, **stock split** in August 2020 (5:1), confident analyst coverage, and better-than-expected quarterly results. Additionally, investors were excited that the company could enter the S&P 500. At that time, Tesla's market capitalization went well above its direct peers, including some mature companies in the automotive industry. The stocks

[2] Range of small means of transportation, light weighted and typically operating at a speed below 25km/h.
[3] S&P500 Criteria: "The last quarter's earnings and the sum of its trailing four consecutive quarters' earnings must be positive."
[4] Bloomberg
[5] Note: All share prices used in this Work Project are adjusted closed prices, with adjustments for Stock Splits, Shares Buybacks, etc. Exception: The initial IPO price of 17$.
[6] As the risk and uncertainty become significantly higher, the expected return loses financially attractiveness.

increased 8x in 2020, and the positive trend continued until January 2021. In the following months until September 2021, the growth slowed down slightly, resulting in a nine-month increase of more than $200 per share, or 33% of return. In October 2021, Tesla's market capitalization reached **one trillion dollars** for the first time, after their great quarter results and after the rental car company, Hertz Corporation announced its intentions of ordering **100.000 vehicles**. Historically, only **six** U.S. companies have a **thirteen-digit market capitalization**, and Tesla was the first automaker to achieve such a milestone. Despite this, overall, we observe a highly volatile stock, which represents an additional source of risk for a company already present in a new, unpredictable and fast-growing market, thus significantly impacting the analysis and recommendation. High expected future returns should be carefully outweighed by the additional risk provided by the stock[7].

Exhibit 7 - Tesla Market Cap

Source: Bloomberg

Management Team

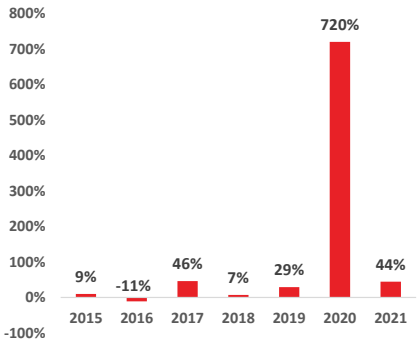
Exhibit 8 - Tesla's Current Board of directors Composition

Source: Tesla

The board of directors is composed of **nine elements**. As board chairman, Elon Musk joined Tesla in 2004, and the board reminded unchanged until 2018 when a **controversial** Musk's tweet stating his intention of taking Tesla private ran the world. The U.S. Securities and Exchange Commission (SEC) charged Tesla for misleading the investors with unsubstantiated affirmations since the deal was far from certain[8]. As a result, SEC and Tesla settled, among other points, Musk should step down as chairman, and an independent substitute should be appointed. Robyn Denholm was selected for the role, being the first board member with **automotive industry experience**, another point Tesla was strongly criticised before. An unchanged board of directors translates in **higher predictability** of the company's decisions, **positively impacting** the stock performance.

Shareholder structure

Exhibit 9 - Annual Total Shareholder Return



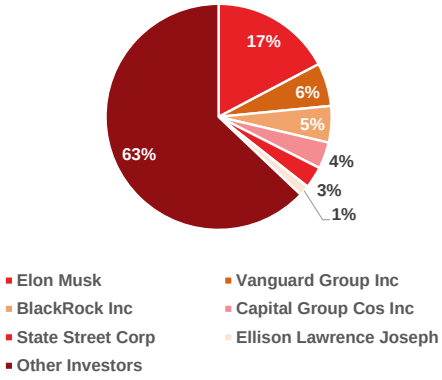
Source: Bloomberg

As of December 16, 2021, Tesla has approximately **1 billion** shares outstanding, amounting to a market capitalization of **$940 billion**. Elon Musk is the biggest shareholder with a **17% position**. Musk has been keeping itself as the largest shareholder since joining the company in 2004, which reveals the strong belief in the company's future success. Indeed, **insiders** make up almost 19% of outstanding shares. Usually, investors see high insider stakes as a good signal, as they invest alongside the public and aligns incentives among management group and shareholders. Following Musk, the most significant shareholders are **institutional investors** as the Vanguard Group, Black Rock and Capital Research

[7] Investing, "Volatility From the Investor's Point of View", Accessed November 29, 2021, https://www.investopedia.com/ask/answers/010915/volatility-good-thing-or-bad-thing-investors-point-view-and-why.asp

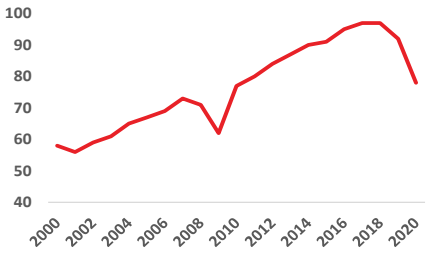
[8] Refer to chapter *Risk Analysis.*

Exhibit 10 - Shareholder structure



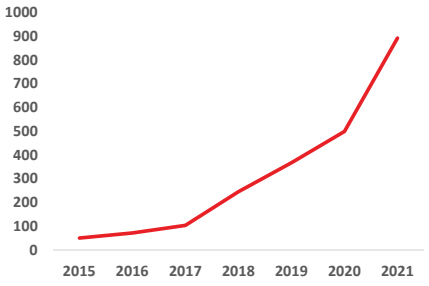
Source: Bloomberg

Exhibit 11 - Estimated worldwide motor vehicle production from 2000 to 2020



Source: Statista

Exhibit 12 - Cars sold by Tesla (Thousands of units)



Source: Tesla Reports

Global Investors, which have stakes ranging from 6% to 4%. Institutional ownership makes up 45% of Tesla, leaving 36% left for general retail investors. The company free float for outstanding shares is 81%.

Tesla's Investment case

Tesla disposes of two forms of investments: **stocks and convertible bonds**. Regarding the rentability of stocks, it is important to note that the company has never paid dividends and is not planning to in the next years. Tesla is in a **high growth stage** and is not generating enough cash to pay dividends. However, paying dividends is a **common practice** in the automotive industry for more mature companies, such as **BMW, Daimler, or General Motors**, and we believe that, in a few years, the company will become profitable enough to start distributing dividends. On the other hand, it is also possible to buy convertible bonds. Tesla has issued convertible bonds since 2013 as a way of financing at a low cost. Their bonds offer a considerably **low coupon** compared with similar bonds. For example, the five-year bond issued in 2014 provided only a **0,25% coupon**. The company is able to offer such low rates by taking advantage of investors hope to see the volatile-share **price appreciating** enough to the point where exercising the option is profitable. At the time of exercising the five-year bonds, in 2019, the share price fell below the conversation price of $359,87. As a result, investors did not exercise the option, and Tesla could finance itself at a price as low as 0,25% without diluting its equity. However, with the latest market capitalization increase, which is deeply overvalued, issuing new convertible bonds might be challenging.

Industry overview

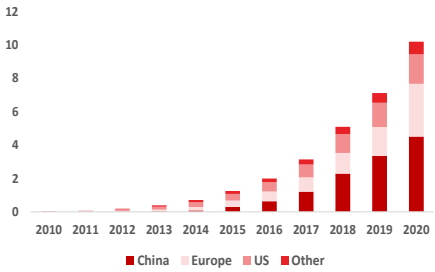
Automotive Sector

Historically, the automotive sector has been perceived as an essential pillar of **economic development**. Worldwide, the automotive sector represents **3 to 3,5% of the world GDP**, and according to Behzad Saberi's research[9] related to the importance of the automotive sector on developed economies, 1% growth of this industry is able to trigger **1,5% of GDP growth**. This effect happens because the automotive sector is strategically centred in the middle of other business segments, fostering a multiplier effect on economic growth. In 2021, the automotive market value was estimated to be **$3,6 trillion**[10]. In addition, the

[9] Saberi, B. 2018. "The role of the automobile industry in the economy of developed countries" *International Robotics & Automation Journal 4, nº3.*

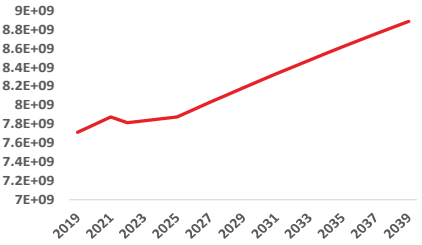
[10] Ibis World, "Global Car & Automobile Sales - Market Size 2005–2027", Accessed September 9, 2021, https://www.ibisworld.com/global/market-size/global-car-automobile-sales/

Exhibit 13 - Global electric passenger car stock, 2010-2020 (Million people)



Source: Statista

Exhibit 14 - World population projection



Source: United Nations

emerging of electric cars as a new form of mobility is rapidly growing, fostered by environmental concerns, government incentives and energy crises.

External Determinants

Greenism/ Customer Awareness

Greenism, or environmentalism, aims to **raise awareness** of the importance of the human impact on Earth. What was born as a simple idea back in the sixties, is nowadays a way of life.

It is estimated that a **single passenger vehicle** emits **4,6 metric tons of CO_2**[11] every year[12]. Overall, the car industry emits **9% of the total annual global greenhouse gas emissions**, roughly 4,8 gigatons of CO_2. According to the European Parliament, transports account for **30% of the CO_2 emissions of the European Union**, and 72% of this comes only from road transportation. Over the last years, while other industries are reducing their environmental impact, transportation emissions have kept growing.

Environmental concern increased the EV's market share as a proportion of total sales worldwide, which in 2020 was **3,6%**. The demand for EV[13] **increased 43%** between 2019 and 2020, and **719%** over the last five years, reaching in 2020 the milestone of 10 million worldwide units. As a result, and with the help of an increasing population, the EV market is expanding, and Tesla is leading. Benefiting from an early entrance into this market, its products please customers, and orders are higher than the production capacity. Nevertheless, it is a temporary gain. As soon as other grown automotive competitors develop their EV technology, Tesla will see its market share shrinking.

Government incentives and regulations

Not only is the public demanding a cleaner alternative, but governments are also putting pressure on carmakers for a quick change in the industry. For example, the new *Fit for 55'* program comprises several proposals by the European Commission to **reduce the carbon emissions by 55%** until 2030, compared to 1990's values, and simultaneously get **30 million zero-emission cars** on the European roads.

Several governments implemented programs to foster the development and research of new clean technologies. One example is the California Zero-Emissions Vehicle Mandate, which sets several regulations that require manufacturers to dispose to the customer a certain number of clean alternatives and regulates several rules for tailpipes. Another measure widely used is **regulatory credits**. For

[11] According to MIT Climate Portal, one metric ton is equivalent to 1 000 kg, or the same as the volume of a cube with 8x8x8 cubic meters.
[12] EPA, "United States Environmental Protection Agency", Acessed September 8, 2021, https://www.epa.gov/
[13] Including BEV (Baterry-Powered Electric Vehicles) and PHEV (Plug-in Hybrid Electric Vehicles)

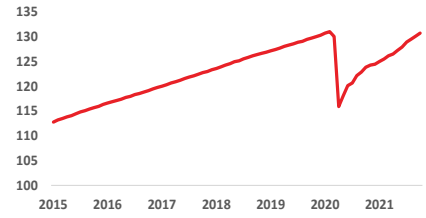
Tesla, earning those credits does not translate into additional cost, however, they account for the revenues when they are traded. Its price constantly changes according to supply and demand, and Tesla has made significant profits by selling these credits[14]. While credits demand will be higher than supply in the short-term, the scenario will quickly invert due to the energy transition, and Tesla will not be able to rely on high profit from it as previously happened.

Governments are also working on the **demand side** to foster the purchase of EV cars. They use financial **incentives** and tax benefits, such as tax reductions or exemptions, access to restricted zones in the city centres, bus/taxi lanes, and yet heavy discounts on public parking. Finally, the extreme measure, probably still far from happening, **ban the sale**, and later, the circulation of internal combustion engine cars (ICE). Several companies such as BMW and Daimler are committed to finishing combustion cars production between 2030 and 2035, and totally replaced its offer with electric vehicles. However, the total replacement of ICE vehicles is still a remote scenario of happening in the near future.

Exhibit 15 - Oil price ($/bbl)

Source: Bloomberg

Exhibit 16 - U.S. Economic Activity



Source: FRED

Commodity prices

During the covid-19 pandemic, the oil market registered historical swings. Even though there is a considerable demand reduction during 2020 and 2021, the oil price has already surpassed the pre-pandemic levels ($50 to $55 per barrel of oil). According to the FRED, the U.S. economic activity is reaching pre-covid-19 levels[15]. After a historically low price of **$18**, with intraday prices going **negative**, the oil price is now around **$75** per barrel. It is not expected to decrease significantly in the short term, as demand is expected to grow consistently until 2040[16]. In 20 years, it will be needed more **30 million barrels per day** in the market, which puts massive pressure on natural resources.

Additionally, it is also important to keep in mind the electricity prices, which increased of up to 500% this year, depending on the location, while the world is facing an energy crisis.

Nevertheless, we trust the electricity price increase is temporary while the oil price increase might last longer, since electricity can be produced almost infinitely, while oil is a **scarce** natural resource. We believe this is a crucial point to consider when

[14] Nasdaq, "Will Regulatory Credits Continue to Bolster Tesla's Profits?", Accessed November 22, 2021, https://www.nasdaq.com/articles/will-regulatory-credits-continue-to-bolster-teslas-profits
[15] FRED, "U.S. Economic Activity Index", Accessed September 28, 2021 https://fred.stlouisfed.org/series/USPHCI
[16] McKinsey and Company, "Global oil supply-and-demand outlook to 2040", Accessed September 15, 2021, https://www.mckinsey.com/industries/oil-and-gas/our-insights/global-oil-supply-and-demand-outlook-to-2040 &. McKinsey and Company, "Global Energy Perspective 2021" Accessed September 13, 2021, https://www.mckinsey.com/industries/oil-and-gas/our-insights/global-energy-perspective-2021

evaluating Tesla's future. The higher the cost of oil, the quicker consumers will move to EV cars.

Current Technology

The 2021 Electric Vehicle Experience Ownership Study concluded four main aspects consumers consider when deciding to buy an EV: The range of **battery duration**, the **charging infrastructure**, how **enjoyable** and **safe** it is to drive an EV[17], and the **lower operating costs** compared with ICE counterpart, during its useful life.

"Tesla, a battery company that sells cars"
Jamie O'Donoghue

Source: MyWallSt

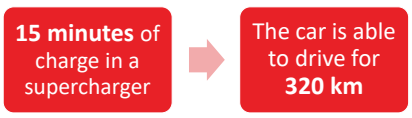
Battery durability

The battery is the most expensive piece of the car, and its durability is an important part when considering acquiring an EV. It is one of the pieces where producers have concentrated most of the R&D. The manufacturing **price has decreased more than 80% since 2010**[18]**.** Manufactures nowadays use techniques, like buffers, to prevent the complete discharge of the battery and thus preserve battery cycles[19]. As a result, a battery can now **last as long as 10 to 20 years**[20].

Another widely expressed concern is the anxiety range, that is, the anxiety the owner run out of battery before getting to a charging point. Several studies show this concern is still present when deciding which type of car to buy. Nevertheless, it is mainly caused by **misinformation**.

Charging points

Exhibit 17 - Charging time vs Autonomy



Source: Tesla

There are two types of electricity: A.C. (Alternative Current) and D.C. (Direct Current). A.C. is the type of electricity that comes from the grid, and D.C. is the only electricity an EV can receive, which means **it needs to be converted first**. Developments were made to speed up the charging process, and the supercharges now deliver D.C. power directly to the EV battery, which turns a process that used to take hours now into some minutes. Tesla has a unique program that has delivered 25.000 superchargers worldwide, intending to allow Tesla users the freedom of travelling without borders, always guaranteeing a charging point whenever needed. In fact, in October 2021, the first Tesla charging point was installed in Africa, Morocco. Time is crucial in this process, and other manufacturers could not replicate the size of the movement. Tesla gained competitive advantages through its network of supercharging points, which enable Tesla's customers to charge their cars at nearly **twice the speed** of a standard

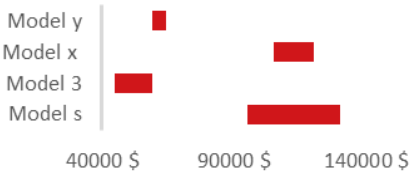
[17] EV are smoother, quieter, calmer to drive than the traditional combustion cars, and yet more technologically advanced.
[18] In 2010, a KWh costed around 1.000€ on average; in 2019 it cost less than 160€, on average.
[19] Batteries are composed of several battery cycles, which can be charge and discharged several times. Battery cycles are limited and represent the battery lifespan. Every time a cycle is used, the battery is one cycle closer to the end of their useful life.
[20] EDF, "All about electric car batteries" Accessed September 29, 2021, https://www.edfenergy.com/electric-cars/batteries

charger. The lack of charging facilities is still a reality. It may represent a strong barrier to the industry's prosperity if there is not enough investment in infrastructure and technology[21]. Indeed, this is a significant disadvantage compared with ICE cars, still driving some consumers preference to the traditional form of mobility, impacting the demand negatively in the EV market.

Safety and delight (Autopilot)

Tesla has made clear that they wanted to be pioneers in **autopilot systems**, and the first model with an initial autopilot software was released in 2014. Computers are more reliable than humans when analysing multiple variables. The main goal is to reduce the number of road accidents by eliminating the human factor, as 85% of the accidents happens due to human error. Nevertheless, it is **controversial** and requires governments to revise traffic rules and car manufacture regulations. Tesla is the only company with enough technology to commercialise the autopilot features, a considerable advantage. Nevertheless, the topic is widely debated, and it is also essential to have in mind that un-updated systems or machine errors, despite being less probable, may cause significantly **more damage** than human fault. Autopilot breaks the status quo of automobility as known today, and shifting people minds to accept the technology will be **challenging**.

Exhibit 18 - U.S. Tesla price by model



Source: Tesla

Lower operating costs

One of the most significant advantages of having an EV is in its maintenance costs. Firstly, charging an **EV battery is far cheaper** than a full gasoline or diesel tank. Additionally, an **EV has lower detrition pieces**, meaning there is no need of replacing components like oil and filters.

Exhibit 19 - Global plug-in EV market share in the first half of 2021, by main producer

Source: Statista

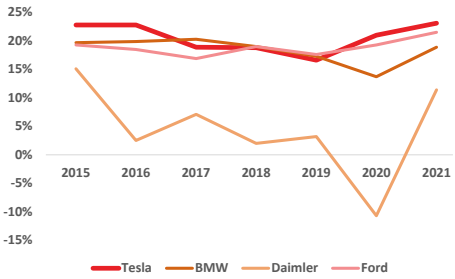
However, the initial investment required is still **costly** compared with an ICE. Several brands' options start at 20.000-30.000€, making EV still unavailable for the middle-low class and limiting the market's total demand. Nonetheless, we forecast that factors such as the entrance of more competitors, development of new technologies, decrease in production costs, and increase in economies of scale will strongly influence the introduction of more affordable models in the next ten years. Tesla is also making efforts to **enter the mass markets**, with its latest vehicle, Model 3. As a result, as the **demand for cheaper models increases**, Tesla's average price will unavoidably **decrease**.

Competition and Market players

When talking about the major player in the EV market, one can follow several approaches. We can divide the purely EV manufacturers from those that traditionally manufacture ICE vehicles, but recently entered the EV market. We can

[21] Reducing charging time as much as possible

Exhibit 20 - Gross Margin Tesla and some comparable companies

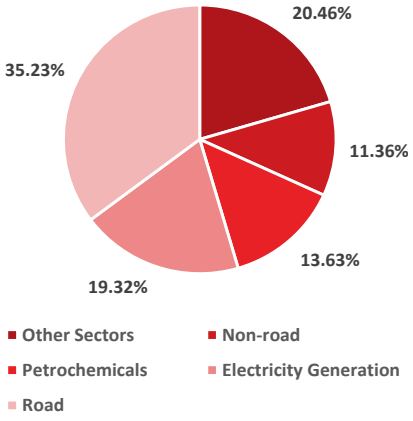


Source: Bloomberg

"None. There are no competitors to Tesla. But when they come, they'll be Chinese"
Sandy Munro

Source: Insider

Exhibit 21 - Top oil consuming sectors worldwide



Source: Statista

also separate the premium/luxury manufactures from the mass manufacturers. Tesla is characterised as an intersection between premium and purely EV manufacture. As Sandy Munro, a prestigious automotive engineer stated: Tesla competition at the moment is "***None. […] But when they come, they'll be Chinese***". In fact, the major competitors for Tesla, totally dedicated to EV's are emerging from China (NIO, Xpeng, BYD). Nevertheless, **American names** are also popping up in the market, as Rivian and Lucid. Rivian is 20% owned by Amazon, and in 2019, Ford Motors Co invested $500 million in a partnership for developing EVs. Lucid only started delivering its first models in October 2021 but has already a market capitalization of $62 billion. Its cars promise to be as technological advance as Tesla, which might become a significant threat for Tesla.

On the premium side of the market, there are three **big players**: Daimler, BMW, Audi[22]. All these manufactures have already entered the EV market with premium models.

However, Tesla's competitors should not be restricted to these criteria, since several non-premium brands are building strong positions in the EV emerging market. For example, in 2021, Volkswagen group held a market share of 13%[23], the second largest after Tesla. General Motors, with 8,5%, also presents itself as a big mover in the market, with more affordable models.

Tesla has been long seen as the pioneer in the EV world. Still, its **leadership position is threatened daily**, with traditional ICE manufacturers entering the market with more affordable prices. Tesla might keep several competitive advantages, however, in our opinion, big competition will arise from brands as Mercedes and BMW, historically known as luxury and status brands, with loyal customers, turning more difficult their shift to other brands. The new merging competition will indeed **question Tesla high margins**. With more and more competitors, prices might need to decrease.

Industry Future

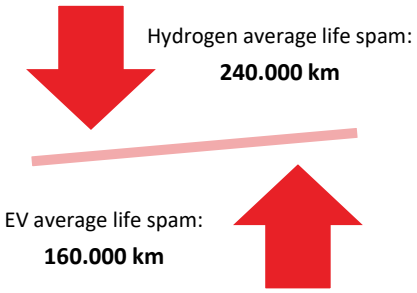
The world has evolved extremely fast over the last century as we discovered **oil**. It entirely changed the lifestyle in the whole world. However, this is **not sustainable**, and we must focus on green substitutes to preserve our current lifestile.

Two technologies are emerging as the future of power: **hydrogen and batteries**. Green hydrogen is a hydrogen fuel coming from the electrolysis of water with low-carbon electricity, for instance, electricity produced from renewable energy. It contributes to a greener future as it **emits zero CO_2** in the production process. On

[22] Excluding super-premium brands as Porsche, Ferrari, Lamborghini.
[23] Statista, "Global plug-in electric vehicle market share in the first half of 2021, by main producer", Accessed September 4, 2021, https://www.statista.com/statistics/541390/global-sales-of-plug-in-electric-vehicle-manufacturers/

the other hand, batteries are produced mainly with lithium, a natural resource, still in the early exploration stage compared to petroleum, which is reaching its natural limits. As the hydrogen case, batteries, when charged with renewable energy, reduce the overall production of CO_2. The truth is that no technology is strictly better than the other.

Exhibit 22 - Technology average life spam



Source: My EV

EVs take too long to charge compared to fossil fuels and hydrogen. This might be a problem for all EVs, but it is being slowly solved. This year, Eni and XEV partnered to build a swap battery system where cars may change their battery to a fully charged one, and the process takes only a few minutes. More, Tesla has built a supercharger that takes 15 minutes to recharge 320 km. Nevertheless, both of these solutions must be applied on a big scale and be widely accessible.

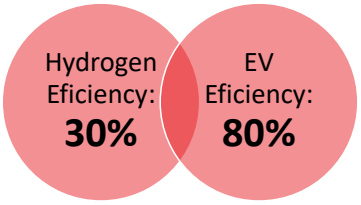
On the other hand, hydrogen-powered vehicles have **longer autonomy** because they are more power-dense than batteries are so far. Once again, the problem is being studied, but it is an obstacle until being solved.

Moreover, hydrogen-powered vehicles tend to **last longer**. A battery has an average life span of, on average, 10 to 20 years or 160.000 km, while a fuel cell (a key component of hydrogen-powered cars) lasts, on average, 5.000 hours in utilisation or 240.000 km.

Additionally, producing hydrogen with renewable energy sources leaves **zero residuals** or greenhouse gas emissions behind when the vehicle is no longer useful. When we talk about batteries, they are very **pollutant to dismantle**, and it is still not clear how companies will deal with large scale end-of-life batteries. Nevertheless, it is important to note that some companies are already converting old car batteries into **home batteries** for storing solar energy.

Furthermore, hydrogen is **riskier to transport** and store when compared to common batteries, turning the process much more **expensive**. It needs to be compressed at 700 times the atmospheric pressure and being at -253ºC, resulting in a higher risk of explosion.

Exhibit 23 - Engine overall efficiency: Hydrogen vs. EV



Source: Volkswagen

Besides, hydrogen is **less efficient** than EV batteries. While EVs can convert almost 80% of the energy storage into moving the vehicle, hydrogen cannot even reach half of this number[24]. Moreover, batteries quickly get too **large and heavy** while hydrogen does not. For this reason, this solution is being mainly considered for aeroplanes and long-distance boats. We believe hydrogen-powered cars are a solid **substitute for EV cars**. Although it is not as developed as EV, this technology may jeopardise the **company's future**.

[24] Volkswagen, "Battery or fuel cell, that is the question", Accessed December 12, 2021, https://www.volkswagenag.com/en/news/stories/2020/03/battery-or-fuel-cell--that-is-the-question.html

The truth is that the energy source is a crucial point, but we have to look at the car industry in an enlarged way. Several scenarios might impact the way the **industry is perceived today**. One scenario is the replacement of vehicles for smaller individual vehicles to avoid the **parking problem** in the cities while reducing **CO_2 emissions**. In fact, there are already some automotive brands specialising in it, such as Citroen, Smart, or Renault, or some brands created just for this purpose, such as Daihatsu or XEV. Tesla's purpose, mission, and goals do not fit here for now. On the other hand, we believe the demand for a greener world will increase pressure for **shared mobility** solutions, just like the increasing importance of shared bicycles in cities nowadays. To be a part of this, Tesla should actively **partner** with the companies providing this type of vehicle. Instead, shared mobility could mean sharing private cars by giving a ride to people wanting to go to nearby places. Once again, it already exists on a small scale, and it is done through an app that joins drivers with people needing a ride. In this case, private cars continue to exist, but in a lower number. Nevertheless, it would imply fewer cars on the street, severely **negatively impacting Tesla**, relying on economies of scale and larger production efficiencies.

Energy generation and storage Sector

Energy storage was developed to serve the need of using energy when it could not be produced. According to the study "*History, Evolution, and Future Status of Energy Storage*",[25] batteries are the most common way to store energy in today's world, as it is one of the most **efficient** technologies discovered so far, despite being far from optimal. Furthermore, it is estimated that the U.S. industry loses $80 billion yearly due to short **power interruptions**, which could be avoided with batteries. Currently, Tesla has three products of energy storage (Tesla Powerwall, Telsa Powerpack, and Tesla Megapack) for both firms and households.

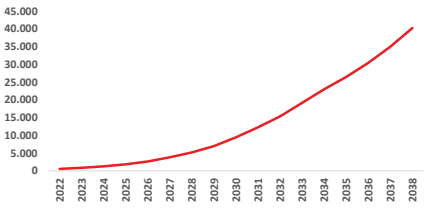
On the other hand, energy generation through the sun started three thousand years ago, but only one century after the **first solar cell** was planned and created. Tesla entered the energy generation market in 2016, after the acquisition of SolarCity. Currently, the company sell three products in the solar generation area (Solar panels, Tesla Solar Roof, and Tesla Solar inverter). This acquisition was very controversial and led the CEO to court. **SolarCity** was owned by Musk's cousins (Musk also had some participation in the company), and at the time of the deal, the company was having with some financial distress issues. Even though the acquisition has been approved by the majority of Tesla shareholders, Elon was accused of putting personal priorities in front of the company's interests.

Exhibit 24 - Market value of energy generation and storage by 2030

Source: Statista

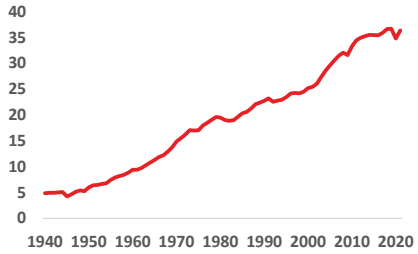
[25] Whittingham, M. S. 2012. *History, Evolution, and Future*. New York: State University of New York

Exhibit 25 - Tesla MW Deployment



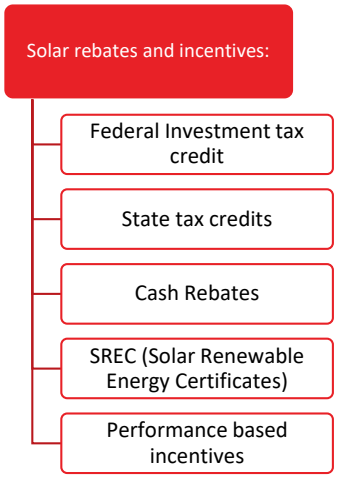
Source: Analyst Estimations

Exhibit 26 - Annual CO_2 emissions worldwide from 1940 to 2020 (in billion metric tons)



Source: Statista

Exhibit 27 - Solar Rebates and incentives



Source: EnergySage

Market

The market for renewable energy is **growing** due to **environmental awareness**, the growing population, and lifestyle improvements. As a result, many experts are **doubling predictions for energy demand** from 2020 to 2027[26], reaching an expected market value of more than one trillion U.S. dollars in 2027.

Companies are **investing in solar panels**, solar roofs, or energy storage products in order to decrease the electricity bill or simply because they want to move faster with the energy transition. For example, Google is already only using renewable energy since 2017 and continues to expand its sun and wind plants. Google performed the biggest deal in the world regarding renewable energy when it bought a $2 billion energy portfolio in September 2019[27]. It owns now enough plants to produce around **5.5 GWh** of energy per year. Additionally, both Apple and Amazon are now making more energy than some energy companies, and they are strongly buying solar and wind plants worldwide. Now, each of them has the capacity (including both in place and at development) to produce more than **8 GWh** of green energy per year. This is equivalent to avoiding more than 15 million metric tons of CO_2 per year (0.4% of the U.S. CO_2 emissions during 2020[28]), equivalent to taking 7 million cars off the road[29]. Besides, as energy is such a critical piece to companies, many are **investing in batteries**, as a backup plan in case of energy failure. In fact, Tesla already has some business **agreements** with companies, like Amazon and Hertz, in the energy generation and storage areas.

Government Incentives / Regulations

In order to incentivise the **energy transition**, the U.S. government[30] are promoting several regulations. For example, **Solar Renewable Energy Certificates** (SRCEs) are received by companies based in the U.S. if they are able to show that a renewable source created a part of the energy used. Companies earn one SRCE for every 1 MWh of renewable energy produced.

On the other hand, **governments** also conceive **incentives** when discussing energy storage. For example, in the U.S., taxes are reduced, and investment tax credits are designed for companies using energy storage systems (Exhibit 27).

[26] Statista, "Renewable energy market size worldwide in 2020, with a forecast for 2027", Accessed September 2, 2021, https://www.statista.com/statistics/1094309/renewable-energy-market-size-global/
[27] The Guardian, "Google signs up to $2bn wind and solar investment", Accessed September 20, 2021 https://www.theguardian.com/technology/2019/sep/20/google-says-its-energy-deals-will-lead-to-2bn-wind-and-solar-investment
[28] Statista, "Carbon dioxide emissions in 2010 and 2020, by select country", Accessed December 9, 2021, https://www.statista.com/statistics/270499/co2-emissions-in-selected-countries/
[29] United States Environmental Protection Agency, "Greenhouse Gas Equivalencies Calculator", Accessed October 2, 2021, https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator
[30] Enelx, "Why is now the best time to think about an energy storage system?", Accessed September 21, 2021, https://corporate.enelx.com/en/stories/2020/12/energy-storage-incentives

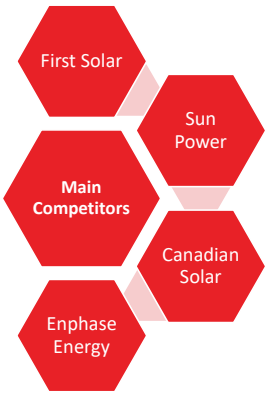
Total cost and Benefits

The year 2021 has been an interesting year for **energy prices**. Gas stock usually increases in the summer and decreases during the winter, as it is intensely used to heat houses all over the world. However, the production has been small this year, and reserves were **low** even before the winter started. On the other hand, CO_2 prices are **rising**. Its value tripled if we look at pre-pandemic levels. This is happening because of more substantial climate policy ambitions and higher financial investment in the market[31].

It is important to remember that **CO_2 prices are incorporated in energy prices**. For instance, the energy produced through coal produces twice the CO_2 compared with power generated using gas. Additionally, China is increasing its demand in the world market, which made gas prices almost triple this year. With gas prices so high, all the other energy sources follow the same direction, since they are perfectly substitutable products, and there is not enough energy to stop using gas. As a result, we are facing what many already call an **energy crisis**. Some energy-intensive firms, such as glass, steel, or fertiliser producers, are limiting their production, constraining international supply chains[32].

The effects of the energy crisis on Tesla are not clear: On the one hand, Tesla can **benefit** from the problem, as the higher the energy price coming from non-renewable sources of energy, the cheaper Tesla's energy generation and storage products are, as the investment payback period becomes lower. On the other hand, energy disruptions might delay raw material supply, **jeopardise** Tesla production capacity, and disable the company to answer the higher demand.

Exhibit 28 - Tesla energy main competitors



Source: Analyst Analysis

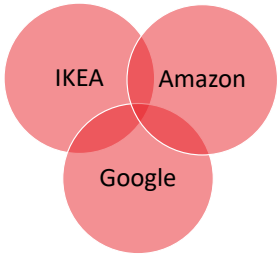
Competition

Industries consume 36% of the total energy consumption in the U.S.[33], making efforts to become self-sustainable. More and **more companies** are producing energy generation and storage products. The world's largest ones are NextEra Energy, Toshiba, Siemens, Panasonic, ABB, Electricite de France, Engie, E.ON, Iberdrola, or Exelon Corp.

Tesla is already one of the largest companies in the energy storage market, although it is not so developed in the energy systems generation area. Tesla's main competitors in this market are First Solar, Sun Power, Canadian Solar, or

[31] CNBC, "Why is now the best time to think about an energy storage system?" Accessed September 25, 2021, https://www.cnbc.com/2021/05/18/why-europes-carbon-market-is-experiencing-a-boom-like-never-before.html
[32] Reuters, "Soaring gas prices ripple through heavy industry, supply chains.", Accessed September 22, 2021, https://www.reuters.com/business/energy/soaring-gas-prices-ripple-through-heavy-industry-supply-chains-2021-09-22/
[33] EIA, "Energy Explained", Accessed November 25, 2021, https://www.eia.gov/energyexplained/use-of-energy/industry.php

Exhibit 29 - Tesla energy potential competitors



Source: Analyst Analysis

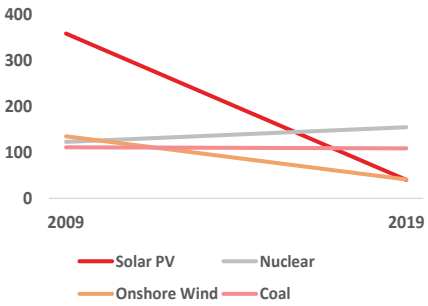
Enphase Energy due to business **model similarities** and **geographical proximity**. In our opinion, Tesla will not be able to significantly increase its penetration rate, since all these companies are already well-established players on the market. Nevertheless, we recognize that the business can rise as the market grows.

In another perspective, as previously explained, some companies are investing in solar panels, solar roofs, and energy storage products, but some companies go beyond that. Some believe it is worth having their own **energy storage subsidiaries**. This is the case with Google[34]. Besides its enormous energy production, the company invests in batteries to not depend on the sun or wind. In fact, although using different technologies, **Google's products** can substitute both, Tesla Powerpack and Tesla Megapack. On the other hand, we have the case with IKEA. The Swedish company produces and installs solar panels and energy batteries, which is an **obstacle** for Tesla to enter the European Market.

We consider these large firms another threat to Tesla's progress in this industry. They have a strong brand and a stable financial position, allowing them to grow faster, stronger and more robustly, which will shrink Telsa's market share.

Industry future

Exhibit 30 - Price of energy per source (€/MWh)



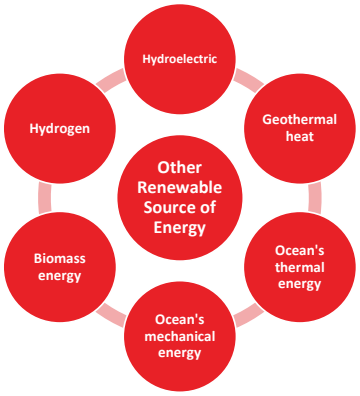
Source: Our world in data

There is a strong consensus that energy in the **future** will be **renewable**. Also, we believe it will be complemented with batteries and other **energy storage** products to decrease constant energy dependence[35]. In fact, besides the environmental benefits, the costs of renewable energy are dropping steeply. According to a study by Max Roser[36], solar panel costs reduced around 90% from 2009 to 2019, and onshore wind fans decreased 70% during the same period. It is predicted that the trend will continue. Nowadays, producing renewable energy through solar panels and wind fans is **cheaper** than almost any other alternative[37], only discussing the average cost or **the Levelized Cost Of Energy** (LCOE).

Moreover, a significant barrier to the spread of renewable energies is its **initial investment**, which can take several years to be paid back. Nevertheless, it is estimated that solar and wind energy allows for 60% of savings compared to the current energy wholesale forward curves. This can be specifically important when talking about **energy-intensive firms**, which are becoming relevant customers in this market, as it constitutes a competitive advantage.

[34] Futurism, "Google's Parent Company Will Soon Compete With Tesla for Energy Storage Solutions", Accessed October 2, 2021, https://futurism.com/googles-parent-company-will-soon-compete-with-tesla-for-energy-storage-solutions
[35] Renewable energy must be consumed in the exact moment of production, when there is no batteries.
[36] Our World in data, "Why did renewables become so cheap so fast?", Accessed December 1, 2021, https://ourworldindata.org/cheap-renewables-growth
[37] IRENA, "Renewable power generation cost 2020", Accessed June 30, 2021 https://www.irena.org/publications/2021/Jun/Renewable-Power-Costs-in-2020

Exhibit 31 - Other Renewable Sources of Energy



Source: International Energy Agency

All in all, we are seeing that solar and wind energy revealed many advantages compared to fossil fuels. However, there are at least seven other sources of **renewable energy.** They are hydroelectric, geothermal heat, the ocean's thermal and mechanical energy, biomass energy, and hydrogen. All these technologies will be available in the near future, and no one is better than all the others. Also, the energy demand is so significant that production must not be limited to only one technology. Renewable energy sources and the **neutralisation of CO_2** emissions are the future, and Tesla must adapt to respond to future needs.

Besides the well-known lithium-ion battery, there are already **different technologies** in the market for energy storage. Hydrogen is also a form of energy storage, from lithium-sulfur to solid-state[38]. Additionally, new batteries are being discovered based on iron and salt. These new technologies can cost **half** of the commonly used lithium-ion technology and store energy for extended periods. This new technology has strong potential as it is as safe as previous technology and is more efficient and cheaper.

Unlike the automotive industry, in the energy generation and storage industries, the significant changes expected are in terms of **technology**. As a result, Tesla must keep **investing in R&D** to maintain its relevance in the market while strong competitors arrive.

[38] Energy Education, "Energy storage", Accessed September 22, 2021 https://energyeducation.ca/encyclopedia/Energy_storage

TESLA, INC.

COMPANY REPORT

AUTOMOTIVE SECTOR

DECEMBER 17, 2021

STUDENT: LAURA DIAS DA SILVA

31876@novasbe.pt

Tesla: Driving a winding road

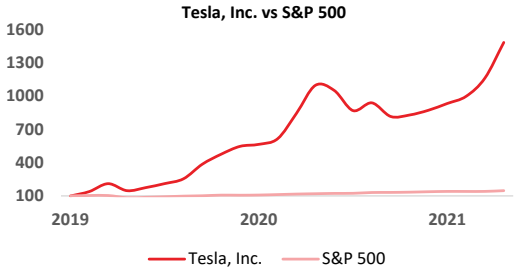
Will Tesla be good enough to thrive the way?

Recommendation:	**SELL**
Price Target FY22:	**561 $**
Price (as of 1-Feb-22)	**927 $**

Reuters: TSLA.OQ, Bloomberg: TSLA

52-week range	1230$ - 563$
Market Cap ($bn)	930
Outstanding Shares (m)	1.004
Expected TSR	-39%

Source: Bloomberg



Source: Bloomberg

- The price target (PT) reference for Tesla, Inc. is **$561** with a sell recommendation. It reflects ours believes on a **long** and **uncertain** path until the company's steadiness, strongly marked by **competitor's arrival**, the uncertain **EV future**, the changing concept of **mobility**, the future **sources of energy,** the entrance in **new markets** and an **energy crisis**.
- We believe the current share price reflects the market **overvaluation of a promising EV industry**. Investors are relying on increasing green government pressures. However, the world takes time to adapt, and neither demand nor revenues will grow exponentially forever.
- Besides this, Tesla Inc. is a very controversial **investment case**, making its share price extremely **volatile**. Since the IPO, the share price has increased approximately **23.000%,** and the 52-week range goes from **$563 (March 8) to $1.130/share (November 4)**, revealing another year with strong stock volatility. The stock is exposed to several types of risk, not only related to the company's operations but also risk related to speculation about the business future.
- With **revenues and the market expected to increase**, competitors and well-established companies see an **investment opportunity**, and several are entering the industry. Ultimately, this will decrease Tesla's **average margin** as it profoundly relies on **economies of scale** and large-scale production to reduce costs.
- Nevertheless, it is expected that the company will keep investing in its operations and R&D, allowing the company to grow in the future.

(Values in $ millions)	2020	2021F	2022F
Revenues	31.536	46.239	71.021
Automotive Sales	26.184	37.296	57.014
Automotive Leasing	1.052	1.865	2.851
Energy Gen. and Storage	1.994	2.820	3.988
Services and Other	2.306	4.258	7.168
Total Costs	24.906	38.413	57.367
EBITDA	6.630	12.810	20.697
EBITDA Growth	62,9%	93,2%	61,6%
EBITDA Margin	21,0%	16,9%	19,2%
Net Profit	862	5.274	10.532

Source: Bloomberg & Analyst Calculations

Company description

Tesla develops, designs, and manufactures electric vehicle and solar energy systems. In October 2021, the company announced it would move to Texas, however its headquarters are still in California, United States. Tesla was a pioneer in the electric vehicle market and is widely known for its futuristic and technologically advanced products and solutions.

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Company overview

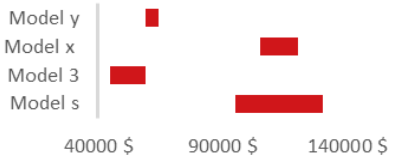
Company description

Tesla is an electric vehicle (EV) and solar energy system manufacturer. It was founded in 2003, as a project of two engineers, Martin Eberhard and Marc Tarpenning, with a dream of proving to the world, electric cars could be better, in all aspects, than the traditional fossil fuel vehicles. As a result, the first prototype was released in 2006, the **Tesla Roadster**, known as the first all-electric car (or Battery Electric Vehicle – BEVs[1]). Furthermore, Roadster was the first **BEV** with a battery able to meet the power needed to achieve a highway speed, within an **affordable cost-price ratio**, becoming, in this way, the first fully electric car legally allowed to drive on a highway. Recently, it was announced its successor would be launched in 2023, wrapped in huge expectations on what was announced as the fastest car in the world, with an acceleration speed from 0 to 100km/h in just 1,9 seconds and reaching an incredible 400km/h. Currently, the company sells four vehicles' models: **Model S, X, 3, Y**.

In 2016, Tesla launched itself in the energy sector and started producing solar generating systems upon the acquisition of **SolarCity**. By the time, Tesla was already producing energy storage products, the **Powerwall and Powerpack**, by taking advantage of the batteries production lines for the automotive segment. The main goal with this merger was to create the first **vertically integrated** sustainable energy company at a global level, with Tesla being the storage and SolarCity the solar. During the last years, the company has launched several innovations to the market as the first solar roof tiles (**Solar Roof**), aiming to solve the big problem of houses ageing roofs, with no capacity for solar panel installations; and the mandatory sale of Powerwalls with energy production systems, allowing the consumers to maximise their **energy efficiency**.

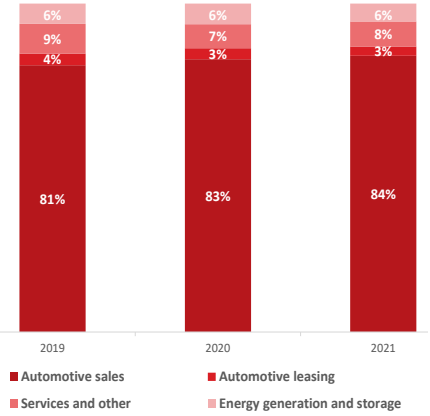
The company is also focused on a long-term strategy to fully integrate the automotive segment, with the last part of the **value chain** already entirely owned by the company. Costumers buy directly to Tesla through stores or the company website, not depending on dealerships. This is a unique business model in the automotive industry, usually dependent on third parties for sales and post-sale customer service. In 2020, the **automotive segment represented 94%** of the business, while the **energy generation and storage segment 6%** (Exhibit 2).

Exhibit 1 - U.S. Tesla car prices by model



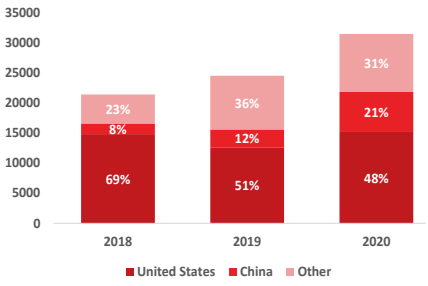
Source: Tesla

Exhibit 2 – Revenues breakdown by segment



Source: Tesla, Company Report

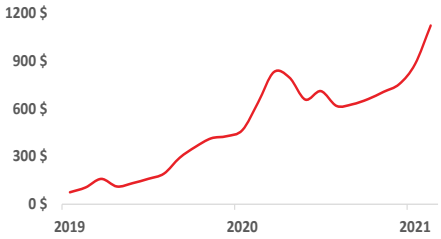
Exhibit 3 – Revenues by geography (Millions of $)



Source: Statista

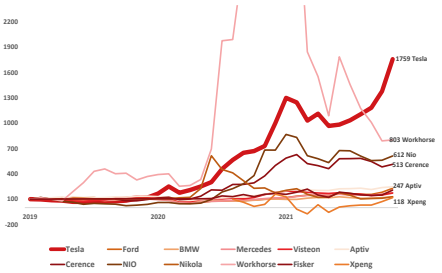
[1] Electric Vehicles Terminology: Battery Electric Vehicles (BEVs); Plug-in Hybrid Electric Vehicles (PHEVs); Hybrid Electric Vehicles (HEVs)

Exhibit 4 – Tesla Stock price evolution



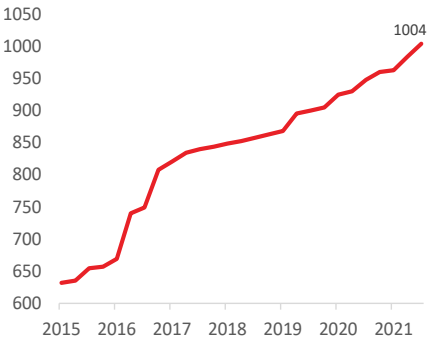
Source: Bloomberg

Exhibit 5 - Stock performance against peers (Base year: 2019)



Source: Bloomberg

Exhibit 6 - Evolution of the number of outstanding shares (Millions of shares)



Source: Bloomberg

On **geographical** terms, the company's primary market is the **United States** (Exhibit 3); however, it recently started growing its presence in **Europe and China**, where two factories are being built to serve the markets directly. China is a crucial market as it represents 20% of the world population, possesses **44% of the world EV's stock**, and is one of the most advanced cultures adopting electric technology, not only in cars but also in motorcycles and other means of micromobility[2].

Tesla's success is often connected to the popularity of its CEO and major shareholder, **Elon Musk**. However, Musk only became part of the company one year after its foundation, after investing $30 million in a Series A founding round.

Tesla is one of the most valued companies on Wall Street, and its entry on the **S&P500** index was controversially denied for some time. First, because it did not meet the **profitability criteria**[3] , and even after consecutive profitable quarters, it kept being rejected by the index committee, even though its market capitalisation was twenty times bigger than other candidates. Some Wall Street analysts speculate the committee was not happy with the stock's volatility, which could risk the index reputation; however, no official statement was ever made. The stock ended up entering the index in December 2020.

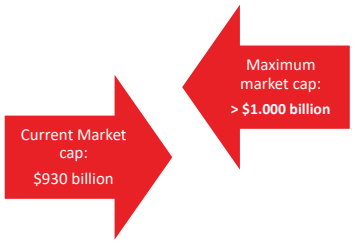
Share Performance

On June 29, 2010, Tesla's launched its Initial Public Offer (IPO) on NASDAQ. It was issued 13,3 million shares at a price of **$17/share** (Adjusted close price: $4,77[4]). If an investor had invested on that day, the return on December 17, 2021, would be approximately 23.000%[5]. The stock grew gradually and almost **tripled** its **IPO value** during the first three years. In 2014, the stock rose more than **400%** when the auto-pilot function was presented for the first time. In the following five years, the stock price was kept roughly constant. Subsequently, in eight months, ending in February 2020, the share rose 4,5x more due to **better-than-expected results**. Tesla closed a year with a positive net income for the first time.

Nevertheless, the stock price decreased to half of its value one month later, as the **Covid-19 pandemic** hit the economy and investors were reticent to invest money in the market, especially in growth companies[6]. The stock rose sharply in the second half of the year. This time, it benefited from market momentum, **stock split**

[2] Range of small means of transportation, light weighted and typically operating at a speed below 25km/h.
[3] S&P500 Criteria: "The last quarter's earnings and the sum of its trailing four consecutive quarters' earnings must be positive."
[4] Bloomberg
[5] Note: All share prices used in this Work Project are adjusted closed prices, with adjustments for Stock Splits, Shares Buybacks, etc. Exception: The initial IPO price of 17$.
[6] As the risk and uncertainty become significantly higher, the expected return loses financially attractiveness.

Exhibit 7 - Tesla Market Cap



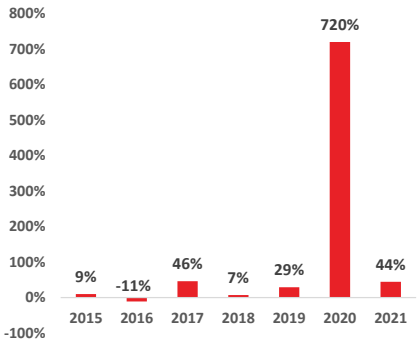
Source: Bloomberg

Exhibit 8 - Tesla's Current Board of directors Composition

Elon Musk	Ira Ehrenpreis
Hiro Mizuno	Kimbal Musk
Robyn M. Denholm	Larry Ellison
James Murdoch	Kathleen Wilson-Thompson

Source: Tesla

Exhibit 9 - Annual Total Shareholder Return



Source: Bloomberg

in August 2020 (5:1), confident analyst coverage, and better-than-expected quarterly results. Additionally, investors were excited that the company could enter the S&P 500. At that time, Tesla's market capitalization went well above its direct peers, including some mature companies in the automotive industry. The stocks increased 8x in 2020, and the positive trend continued until January 2021. In the following months until September 2021, the growth slowed down slightly, resulting in a nine-month increase of more than $200 per share, or 33% of return. In October 2021, Tesla's market capitalization reached **one trillion dollars** for the first time, after their great quarter results and after the rental car company, Hertz Corporation announced its intentions of ordering **100.000 vehicles**. Historically, only **six** U.S. companies have a **thirteen-digit market capitalization**, and Tesla was the first automaker to achieve such a milestone. Despite this, overall, we observe a highly volatile stock, which represents an additional source of risk for a company already present in a new, unpredictable and fast-growing market, thus significantly impacting the analysis and recommendation. High expected future returns should be carefully outweighed by the additional risk provided by the stock[7].

Management Team

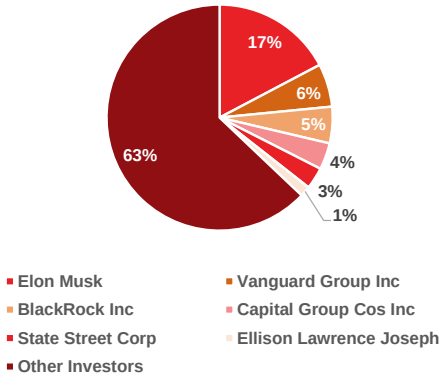
The board of directors is composed of **nine elements**. As board chairman, Elon Musk joined Tesla in 2004, and the board reminded unchanged until 2018 when a **controversial** Musk's tweet stating his intention of taking Tesla private ran the world. The U.S. Securities and Exchange Commission (SEC) charged Tesla for misleading the investors with unsubstantiated affirmations since the deal was far from certain[8]. As a result, SEC and Tesla settled, among other points, Musk should step down as chairman, and an independent substitute should be appointed. Robyn Denholm was selected for the role, being the first board member with **automotive industry experience**, another point Tesla was strongly criticised before. An unchanged board of directors translates in **higher predictability** of the company's decisions, **positively impacting** the stock performance.

Shareholder structure

As of December 16, 2021, Tesla has approximately **1 billion** shares outstanding, amounting to a market capitalization of **$940 billion**. Elon Musk is the biggest shareholder with a **17% position**. Musk has been keeping itself as the largest

[7] Investing, "Volatility From the Investor's Point of View", Accessed November 29, 2021, https://www.investopedia.com/ask/answers/010915/volatility-good-thing-or-bad-thing-investors-point-view-and-why.asp
[8] Refer to chapter *Risk Analysis.*

Exhibit 10 - Shareholder structure



Source: Bloomberg

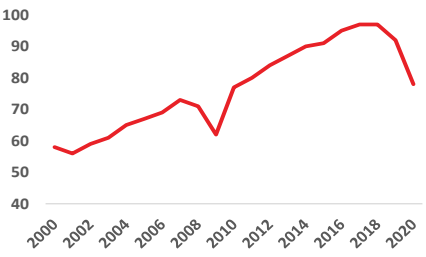
shareholder since joining the company in 2004, which reveals the strong belief in the company's future success. Indeed, **insiders** make up almost 19% of outstanding shares. Usually, investors see high insider stakes as a good signal, as they invest alongside the public and aligns incentives among management group and shareholders. Following Musk, the most significant shareholders are **institutional investors** as the Vanguard Group, Black Rock and Capital Research Global Investors, which have stakes ranging from 6% to 4%. Institutional ownership makes up 45% of Tesla, leaving 36% left for general retail investors. The company free float for outstanding shares is 81%.

Tesla's Investment case

Tesla disposes of two forms of investments: **stocks and convertible bonds**. Regarding the rentability of stocks, it is important to note that the company has never paid dividends and is not planning to in the next years. Tesla is in a **high growth stage** and is not generating enough cash to pay dividends. However, paying dividends is a **common practice** in the automotive industry for more mature companies, such as **BMW, Daimler, or General Motors**, and we believe that, in a few years, the company will become profitable enough to start distributing dividends. On the other hand, it is also possible to buy convertible bonds. Tesla has issued convertible bonds since 2013 as a way of financing at a low cost. Their bonds offer a considerably **low coupon** compared with similar bonds. For example, the five-year bond issued in 2014 provided only a **0,25% coupon**. The company is able to offer such low rates by taking advantage of investors hope to see the volatile-share **price appreciating** enough to the point where exercising the option is profitable. At the time of exercising the five-year bonds, in 2019, the share price fell below the conversation price of $359,87. As a result, investors did not exercise the option, and Tesla could finance itself at a price as low as 0,25% without diluting its equity. However, with the latest market capitalization increase, which is deeply overvalued, issuing new convertible bonds might be challenging.

Strategy

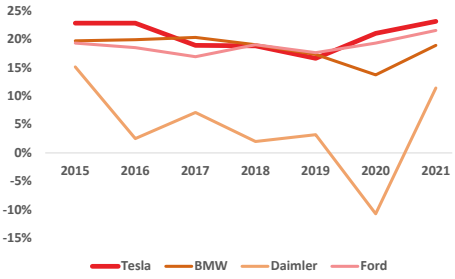
Exhibit 11 - Estimated worldwide motor vehicle production from 2000 to 2020



Source: Statista

Electric cars are more expensive to produce than fossil fuel counterparts, mainly because manufacture's profitability depends on their ability to scale the output and achieve **economies of scale**. Additionally, Tesla believes the true secret for long-term success is becoming the first automotive manufacture to **fully vertical integrating the whole value chain**. The company believes this strategy allows for **cost reduction**, leading to **higher margins** (Exhibit 12) and **higher profit**. Besides, this **strategy decreases dependence on suppliers**, which will allow for

Exhibit 12 - Gross Margin Tesla and some comparable companies



Source: Bloomberg

lower **raw inputs scarcity** and a more consistent production process. As an example: the **2021 Chip Shortage Crisis**. While some competitors closed their plants due to the lack of raw material, Tesla decided differently: they designed a way to find a replacement for this essential piece[9] . Also, on the downstream of the value chain, Tesla can collect quicker feedback from customers, as they sell directly to the final consumer, enabling the company **to improve its products faster and more efficiently**. However, this business segment has constantly provided negative margins during the last years, and it has not breakeven yet.

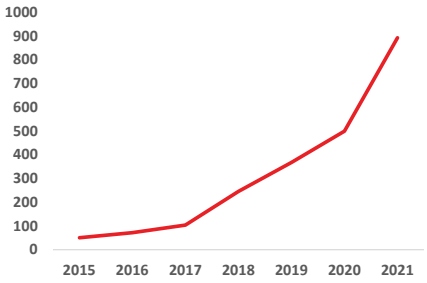
Nonetheless, the company has faced significant production constraints as its backlog keeps growing. Therefore, at the beginning of December 2021, the company announced it would stop accepting car orders from countries outside the United States in order to expedite the existing orders and alleviate the current backlog. Additionally, the company admitted some accumulated orders in the energy segment. The company has not shown a sufficient response to demand with the available factories, and the two factories being built are late in construction.

In the third quarter of 2021, the company registered a **gross margin** in the automotive segment of **30,5%**. When looking at the peers, BMW registers a gross margin of 19% and Ford 22%. Such high margins are only seen in **super-exclusive premium brands** as Porsche and Ferrari. However, with increasing demand for the cheapest models in deterioration of the most expensive ones, the company might not be able to sustain the high margins, converging to the industry levels.

Industry overview

Automotive Sector

Exhibit 13 - Cars sold by Tesla (Thousands of units)

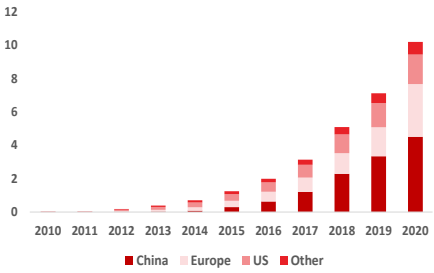


Source: Tesla Reports

Historically, the automotive sector has been perceived as an essential pillar of **economic development**. Worldwide, the automotive sector represents **3 to 3,5% of the world GDP**, and according to Behzad Saberi's research[10] related to the importance of the automotive sector on developed economies, 1% growth of this industry is able to trigger **1,5% of GDP growth**. This effect happens because the automotive sector is strategically centred in the middle of other business segments, fostering a multiplier effect on economic growth. In 2021, the

[9] Tesla found substitute chips and rewrote its software according to their needs.
[10] Saberi, B. 2018. "The role of the automobile industry in the economy of developed countries" *International Robotics & Automation Journal 4, nº3.*

Exhibit 14 - Global electric passenger car stock, 2010-2020 (Million people)



Source: Statista

automotive market value was estimated to be **$3,6 trillion**[11]. In addition, the emerging of electric cars as a new form of mobility is rapidly growing, fostered by environmental concerns, government incentives and energy crises.

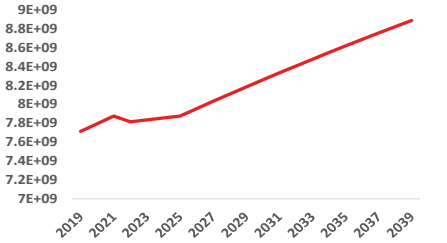
External Determinants

Greenism/ Customer Awareness

Greenism, or environmentalism, aims to **raise awareness** of the importance of the human impact on Earth. What was born as a simple idea back in the sixties, is nowadays a way of life.

It is estimated that a **single passenger vehicle** emits **4,6 metric tons of CO_2**[12] every year[13]. Overall, the car industry emits **9% of the total annual global greenhouse gas emissions**, roughly 4,8 gigatons of CO_2. According to the European Parliament, transports account for **30% of the CO_2 emissions of the European Union**, and 72% of this comes only from road transportation. Over the last years, while other industries are reducing their environmental impact, transportation emissions have kept growing.

Exhibit 15 - World population projection



Source: United Nations

Environmental concern increased the EV's market share as a proportion of total sales worldwide, which in 2020 was **3,6%**. The demand for EV[14] **increased 43%** between 2019 and 2020, and **719%** over the last five years, reaching in 2020 the milestone of 10 million worldwide units. As a result, and with the help of an increasing population, the EV market is expanding, and Tesla is leading. Benefiting from an early entrance into this market, its products please customers, and orders are higher than the production capacity. Nevertheless, it is a temporary gain. As soon as other grown automotive competitors develop their EV technology, Tesla will see its market share shrinking.

Government incentives and regulations

Not only is the public demanding a cleaner alternative, but governments are also putting pressure on carmakers for a quick change in the industry. For example, the new *Fit for 55'* program comprises several proposals by the European Commission to **reduce the carbon emissions by 55%** until 2030, compared to 1990's values, and simultaneously get **30 million zero-emission cars** on the European roads.

[11] Ibis World, "Global Car & Automobile Sales - Market Size 2005–2027", Accessed September 9, 2021, https://www.ibisworld.com/global/market-size/global-car-automobile-sales/
[12] According to MIT Climate Portal, one metric ton is equivalent to 1 000 kg, or the same as the volume of a cube with 8x8x8 cubic meters.
[13] EPA, "United States Environmental Protection Agency", Acessed September 8, 2021, https://www.epa.gov/
[14] Including BEV (Baterry-Powered Electric Vehicles) and PHEV (Plug-in Hybrid Electric Vehicles)

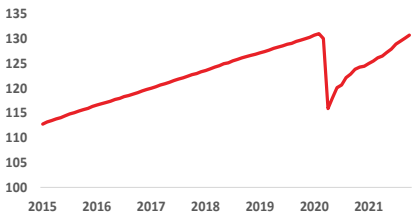
Several governments implemented programs to foster the development and research of new clean technologies. One example is the California Zero-Emissions Vehicle Mandate, which sets several regulations that require manufacturers to dispose to the customer a certain number of clean alternatives and regulates several rules for tailpipes. Another measure widely used is **regulatory credits**. For Tesla, earning those credits does not translate into additional cost, however, they account for the revenues when they are traded. Its price constantly changes according to supply and demand, and Tesla has made significant profits by selling these credits[15]. While credits demand will be higher than supply in the short-term, the scenario will quickly invert due to the energy transition, and Tesla will not be able to rely on high profit from it as previously happened.

Governments are also working on the **demand side** to foster the purchase of EV cars. They use financial **incentives** and tax benefits, such as tax reductions or exemptions, access to restricted zones in the city centres, bus/taxi lanes, and yet heavy discounts on public parking. Finally, the extreme measure, probably still far from happening, **ban the sale**, and later, the circulation of internal combustion engine cars (ICE). Several companies such as BMW and Daimler are committed to finishing combustion cars production between 2030 and 2035, and totally replaced its offer with electric vehicles. However, the total replacement of ICE vehicles is still a remote scenario of happening in the near future.

Exhibit 16 - Oil price ($/bbl)

Source: Bloomberg

Exhibit 17 - U.S. Economic Activity



Source: FRED

Commodity prices

During the covid-19 pandemic, the oil market registered historical swings. Even though there is a considerable demand reduction during 2020 and 2021, the oil price has already surpassed the pre-pandemic levels ($50 to $55 per barrel of oil). According to the FRED, the U.S. economic activity is reaching pre-covid-19 levels[16]. After a historically low price of **$18**, with intraday prices going **negative**, the oil price is now around **$75** per barrel. It is not expected to decrease significantly in the short term, as demand is expected to grow consistently until 2040[17]. In 20 years, it will be needed more **30 million barrels per day** in the market, which puts massive pressure on natural resources.

[15] Nasdaq, "Will Regulatory Credits Continue to Bolster Tesla's Profits?", Accessed November 22, 2021, https://www.nasdaq.com/articles/will-regulatory-credits-continue-to-bolster-teslas-profits
[16] FRED, "U.S. Economic Activity Index", Accessed September 28, 2021 https://fred.stlouisfed.org/series/USPHCI
[17] McKinsey and Company, "Global oil supply-and-demand outlook to 2040", Accessed September 15, 2021, https://www.mckinsey.com/industries/oil-and-gas/our-insights/global-oil-supply-and-demand-outlook-to-2040 &. McKinsey and Company, "Global Energy Perspective 2021" Accessed September 13, 2021, https://www.mckinsey.com/industries/oil-and-gas/our-insights/global-energy-perspective-2021

Additionally, it is also important to keep in mind the electricity prices, which increased up to 500% this year, depending on the location, while the world is facing an energy crisis.

Nevertheless, we trust the electricity price increase is temporary while the oil price increase might last longer, since electricity can be produced almost infinitely, while oil is a **scarce** natural resource. This is a crucial point to consider when evaluating Tesla's future. The higher the cost of oil, the quicker consumers will move to EV cars.

Current Technology

The 2021 Electric Vehicle Experience Ownership Study concluded four main aspects consumers consider when deciding to buy an EV: The range of **battery duration**, the **charging infrastructure**, how **enjoyable** and **safe** it is to drive an EV[18], and the **lower operating costs** compared with ICE counterpart, during its useful life.

"Tesla, a battery company that sells cars"
Jamie O'Donoghue

Source: MyWallSt

Battery durability

The battery is the most expensive piece of the car, and its durability is an important part when considering acquiring an EV. It is one of the pieces where producers have concentrated most of the R&D. The manufacturing **price has decreased more than 80% since 2010[19].** Manufactures nowadays use techniques, like buffers, to prevent the complete discharge of the battery and thus preserve battery cycles[20]. As a result, a battery can now **last as long as 10 to 20 years**[21].

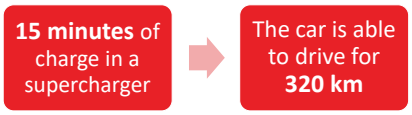
Another widely expressed concern is the anxiety range, that is, the anxiety the owner run out of battery before getting to a charging point. Several studies show this concern is still present when deciding which type of car to buy. Nevertheless, it is mainly caused by **misinformation**.

Charging points

There are two types of electricity: A.C. (Alternative Current) and D.C. (Direct Current). A.C. is the type of electricity that comes from the grid, and D.C. is the only electricity an EV can receive, which means **it needs to be converted first**. Developments were made to speed up the charging process, and the supercharges now deliver D.C. power directly to the EV battery, which turns a

[18] EV are smoother, quieter, calmer to drive than the traditional combustion cars, and yet more technologically advanced.
[19] In 2010, a KWh costed around 1.000€ on average; in 2019 it cost less than 160€, on average.
[20] Batteries are composed of several battery cycles, which can be charge and discharged several times. Battery cycles are limited and represent the battery lifespan. Every time a cycle is used, the battery is one cycle closer to the end of their useful life.
[21] EDF, "All about electric car batteries" Accessed September 29, 2021, https://www.edfenergy.com/electric-cars/batteries

Exhibit 18 - Charging time vs Autonomy



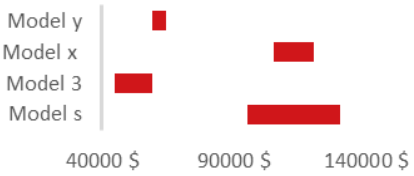
Source: Tesla

process that used to take hours now into some minutes. Tesla has a unique program that has delivered 25.000 superchargers worldwide, intending to allow Tesla users the freedom of travelling without borders, always guaranteeing a charging point whenever needed. In fact, in October 2021, the first Tesla charging point was installed in Africa, Morocco. Time is crucial in this process, and other manufacturers could not replicate the size of the movement. Tesla gained competitive advantages through its network of supercharging points, which enable Tesla's customers to charge their cars at nearly **twice the speed** of a standard charger. The lack of charging facilities is still a reality. It may represent a strong barrier to the industry's prosperity if there is not enough investment in infrastructure and technology[22]. Indeed, this is a significant disadvantage compared with ICE cars, still driving some consumers preference to the traditional form of mobility, impacting the demand negatively in the EV market.

Safety and delight (Autopilot)

Tesla has made clear that they wanted to be pioneers in **autopilot systems**, and the first model with an initial autopilot software was released in 2014. Computers are more reliable than humans when analysing multiple variables. The main goal is to reduce the number of road accidents by eliminating the human factor, as 85% of the accidents happens due to human error. Nevertheless, it is **controversial** and requires governments to revise traffic rules and car manufacture regulations. Tesla is the only company with enough technology to commercialise the autopilot features, a considerable advantage. Nevertheless, the topic is widely debated, and it is also essential to have in mind that un-updated systems or machine errors, despite being less probable, may cause significantly **more damage** than human fault. Autopilot breaks the status quo of automobility as known today, and shifting people minds to accept the technology will be **challenging**.

Exhibit 19 - U.S. Tesla price by model



Source: Tesla

Exhibit 20 - Global plug-in EV market share in the first half of 2021, by main producer

Source: Statista

Lower operating costs

One of the most significant advantages of having an EV is in its maintenance costs. Firstly, charging an **EV battery is far cheaper** than a full gasoline or diesel tank. Additionally, an **EV has lower detrition pieces**, meaning there is no need of replacing components like oil and filters.

However, the initial investment required is still **costly** compared with an ICE. Several brands' options start at 20.000-30.000€, making EV still unavailable for the middle-low class and limiting the market's total demand. Nonetheless, we forecast that factors such as the entrance of more competitors, development of new technologies, decrease in production costs, and increase in economies of scale

[22] Reducing charging time as much as possible

will strongly influence the introduction of more affordable models in the next ten years. Tesla is also making efforts to **enter the mass markets**, introducing its latest vehicle, Model 3. As a result, as the **demand for cheaper models increases**, Tesla's average price will unavoidably **decrease**.

Competition and Market players

When talking about the major player in the EV market, one can follow several approaches. We can divide the purely EV manufacturers from those that traditionally manufacture ICE vehicles, but recently entered the EV market. We can also separate the premium/luxury manufactures from the mass manufacturers. Tesla is characterised as an intersection between premium and purely EV manufacture. As Sandy Munro, a prestigious automotive engineer stated: Tesla competition at the moment is "***None. […] But when they come, they'll be Chinese***". In fact, the major competitors for Tesla, totally dedicated to EV's are emerging from China (NIO, Xpeng, BYD). Nevertheless, **American names** are also popping up in the market, as Rivian and Lucid. Rivian is 20% owned by Amazon, and in 2019, Ford Motors Co invested $500 million in a partnership for developing EVs. Lucid only started delivering its first models in October 2021 but has already a market capitalization of $62 billion. Its cars promise to be as technological advance as Tesla, which might become a significant threat for Tesla.

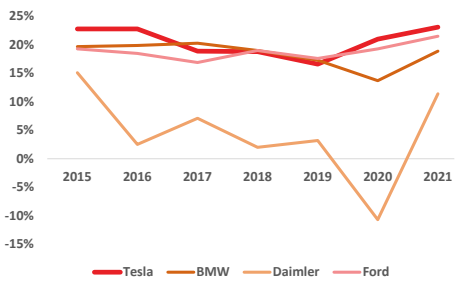
"None. There are no competitors to Tesla. But when they come, they'll be Chinese"
Sandy Munro

Source: Insider

On the premium side of the market, there are three **big players**: Daimler, BMW, Audi[23]. All these manufactures have already entered the EV market with premium models.

However, Tesla's competitors should not be restricted to these criteria, since several non-premium brands are building strong positions in the EV emerging market. For example, in 2021, Volkswagen group held a market share of 13%[24], the second largest after Tesla. General Motors, with 8,5%, also presents itself as a big mover in the market, with more affordable models.

Exhibit 21 - Gross Margin Tesla and some comparable companies



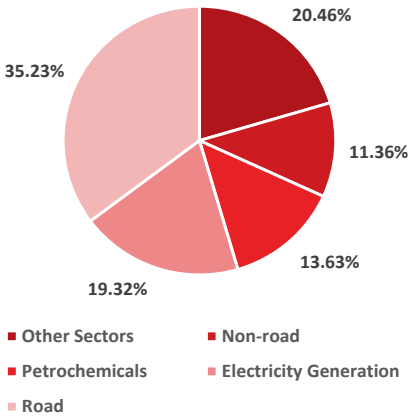
Source: Bloomberg

Tesla has been long seen as the pioneer in the EV world. Still, its **leadership position is threatened daily**, with traditional ICE manufacturers entering the market with more affordable prices. Tesla might keep several competitive advantages, however, in our opinion, big competition will arise from brands as Mercedes and BMW, historically known as luxury and status brands, with loyal customers, turning more difficult their shift to other brands. The new merging

[23] Excluding super-premium brands as Porsche, Ferrari, Lamborghini.
[24] Statista, "Global plug-in electric vehicle market share in the first half of 2021, by main producer", Accessed September 4, 2021, https://www.statista.com/statistics/541390/global-sales-of-plug-in-electric-vehicle-manufacturers/

competition will indeed **question Tesla high margins**. With more and more competitors, prices might need to decrease.

Exhibit 22 - Top oil consuming sectors worldwide



Source: Statista

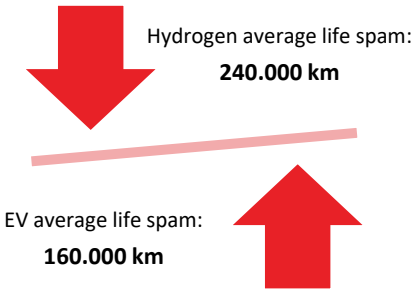
Industry Future

The world has evolved extremely fast over the last century as we discovered **oil**. It entirely changed the lifestyle in the whole world. However, this is **not sustainable**, and we must focus on green substitutes to preserve our current lifestile.

Two technologies are emerging as the future of power: **hydrogen and batteries**. Green hydrogen is a hydrogen fuel coming from the electrolysis of water with low-carbon electricity, for instance, electricity produced from renewable energy. It contributes to a greener future as it **emits zero CO_2** in the production process. On the other hand, batteries are produced mainly with lithium, a natural resource, still in the early exploration stage compared to petroleum, which is reaching its natural limits. As the hydrogen case, batteries, when charged with renewable energy, reduce the overall production of CO_2. The truth is that no technology is strictly better than the other.

EVs take too long to charge compared to fossil fuels and hydrogen. This might be a problem for all EVs, but it is being slowly solved. This year, Eni and XEV partnered to build a swap battery system where cars may change their battery to a fully charged one, and the process takes only a few minutes. More, Tesla has built a supercharger that takes 15 minutes to recharge 320 km. Nevertheless, both of these solutions must be applied on a big scale and be widely accessible.

Exhibit 23 - Technology average life spam



Source: My EV

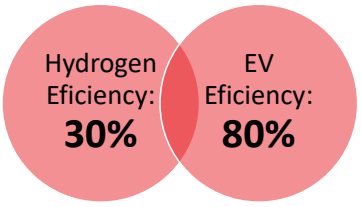
On the other hand, hydrogen-powered vehicles have **longer autonomy** because they are more power-dense than batteries are so far. Once again, the problem is being studied, but it is an obstacle until being solved.

Moreover, hydrogen-powered vehicles tend to **last longer**. A battery has an average life span of, on average, 10 to 20 years or 160.000 km, while a fuel cell (a key component of hydrogen-powered cars) lasts, on average, 5.000 hours in utilisation or 240.000 km.

Additionally, producing hydrogen with renewable energy sources leaves **zero residuals** or greenhouse gas emissions behind when the vehicle is no longer useful. When we talk about batteries, they are very **pollutant to dismantle**, and it is still not clear how companies will deal with large scale end-of-life batteries. Nevertheless, it is important to note that some companies are already converting old car batteries into **home batteries** for storing solar energy.

Furthermore, hydrogen is **riskier to transport** and store when compared to common batteries, turning the process much more **expensive**. It needs to be compressed at 700 times the atmospheric pressure and being at -253ºC, resulting in a higher risk of explosion.

Exhibit 24 - Engine overall efficiency: Hydrogen vs. EV



Source: Volkswagen

Besides, hydrogen is **less efficient** than EV batteries. While EVs can convert almost 80% of the energy storage into moving the vehicle, hydrogen cannot even reach half of this number[25]. Moreover, batteries quickly get too **large and heavy** while hydrogen does not. For this reason, this solution is being mainly considered for aeroplanes and long-distance boats. We believe hydrogen-powered cars are a solid **substitute for EV cars**. Although it is not as developed as EV, this technology may jeopardise the **company's future**.

The truth is that the energy source is a crucial point, but we have to look at the car industry in an enlarged way. Several scenarios might impact the way the **industry is perceived today**. One scenario is the replacement of vehicles for smaller individual vehicles to avoid the **parking problem** in the cities while reducing **CO_2 emissions**. In fact, there are already some automotive brands specialising in it, such as Citroen, Smart, or Renault, or some brands created just for this purpose, such as Daihatsu or XEV. Tesla's purpose, mission, and goals do not fit here for now. On the other hand, we believe the demand for a greener world will increase pressure for **shared mobility** solutions, just like the increasing importance of shared bicycles in cities nowadays. To be a part of this, Tesla should actively **partner** with the companies providing this type of vehicle. Instead, shared mobility could mean sharing private cars by giving a ride to people wanting to go to nearby places. Once again, it already exists on a small scale, and it is done through an app that joins drivers with people needing a ride. In this case, private cars continue to exist, but in a lower number. Nevertheless, it would imply fewer cars on the street, severely **negatively impacting Tesla**, relying on economies of scale and larger production efficiencies.

Energy generation and storage Sector

Exhibit 25 - Market value of energy generation and storage by 2030

Source: Statista

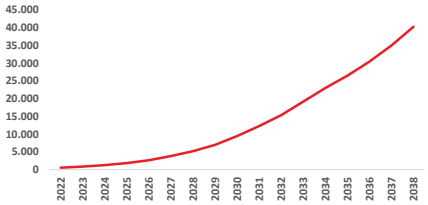
Energy storage was developed to serve the need of using energy when it could not be produced. According to the study "*History, Evolution, and Future Status of Energy Storage*",[26] batteries are the most common way to store energy in today's world, as it is one of the most **efficient** technologies discovered so far, despite being far from optimal. Furthermore, it is estimated that the U.S. industry loses $80

[25] Volkswagen, "Battery or fuel cell, that is the question", Accessed December 12, 2021, https://www.volkswagenag.com/en/news/stories/2020/03/battery-or-fuel-cell--that-is-the-question.html
[26] Whittingham, M. S. 2012. *History, Evolution, and Future*. New York: State University of New York

billion yearly due to short **power interruptions**, which could be avoided with batteries. Currently, Tesla has three products of energy storage (Tesla Powerwall, Telsa Powerpack, and Tesla Megapack) for both firms and households.

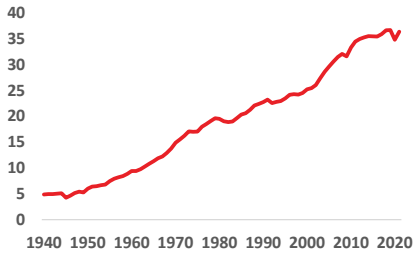
On the other hand, energy generation through the sun started three thousand years ago, but only one century after the **first solar cell** was planned and created. Tesla entered the energy generation market in 2016, after the acquisition of SolarCity. Currently, the company sell three products in the solar generation area (Solar panels, Tesla Solar Roof, and Tesla Solar inverter). This acquisition was very controversial and led the CEO to court. **SolarCity** was owned by Musk's cousins (Musk also had some participation in the company), and at the time of the deal, the company was having some financial distress issues. Even though the acquisition has been approved by the majority of Tesla shareholders, Elon was accused of putting personal priorities in front of the company's interests.

Exhibit 26 - Tesla MW Deployment



Source: Analyst Estimations

Exhibit 27 - Annual CO_2 emissions worldwide from 1940 to 2020 (in billion metric tons)



Source: Statista

Market

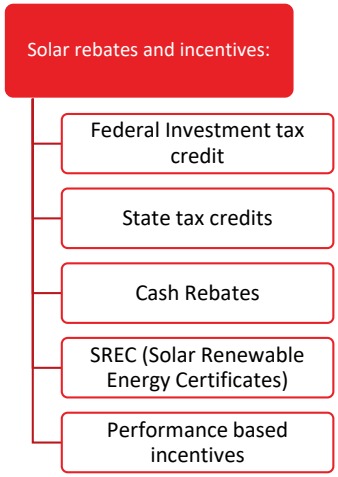
The market for renewable energy is **growing** due to **environmental awareness**, the growing population, and lifestyle improvements. As a result, many experts are **doubling predictions for energy demand** from 2020 to 2027[27], reaching an expected market value of more than one trillion U.S. dollars in 2027.

Companies are **investing in solar panels**, solar roofs, or energy storage products in order to decrease the electricity bill or simply because they want to move faster with the energy transition. For example, Google is already only using renewable energy since 2017 and continues to expand its sun and wind plants. Google performed the biggest deal in the world regarding renewable energy when it bought a $2 billion energy portfolio in September 2019[28]. It owns now enough plants to produce around **5.5 GWh** of energy per year. Additionally, both Apple and Amazon are now making more energy than some energy companies, and they are strongly buying solar and wind plants worldwide. Now, each of them has the capacity (including both in place and at development) to produce more than **8 GWh** of green energy per year. This is equivalent to avoiding more than 15 million metric tons of CO_2 per year (0.4% of the U.S. CO_2 emissions during 2020[29]), equivalent to taking 7 million cars off the road[30]. Besides, as energy is such a critical piece to

[27] Statista, "Renewable energy market size worldwide in 2020, with a forecast for 2027", Accessed September 2, 2021, https://www.statista.com/statistics/1094309/renewable-energy-market-size-global/
[28] The Guardian, "Google signs up to $2bn wind and solar investment", Accessed September 20, 2021 https://www.theguardian.com/technology/2019/sep/20/google-says-its-energy-deals-will-lead-to-2bn-wind-and-solar-investment
[29] Statista, "Carbon dioxide emissions in 2010 and 2020, by select country", Accessed December 9, 2021, https://www.statista.com/statistics/270499/co2-emissions-in-selected-countries/
[30] United States Environmental Protection Agency, "Greenhouse Gas Equivalencies Calculator", Accessed October 2, 2021, https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator

companies, many are **investing in batteries**, as a backup plan in case of energy failure. In fact, Tesla already has some business **agreements** with companies, like Amazon and Hertz, in the energy generation and storage areas.

Exhibit 28 - Solar Rebates and incentives



Source: EnergySage

Government Incentives / Regulations

In order to incentivise the **energy transition**, the U.S. government[31] are promoting several regulations. For example, **Solar Renewable Energy Certificates** (SRCEs) are received by companies based in the U.S. if they are able to show that a renewable source created a part of the energy used. Companies earn one SRCE for every 1 MWh of renewable energy produced.

On the other hand, **governments** also conceive **incentives** when discussing energy storage. For example, in the U.S., taxes are reduced, and investment tax credits are designed for companies using energy storage systems (Exhibit 28).

Total cost and Benefits

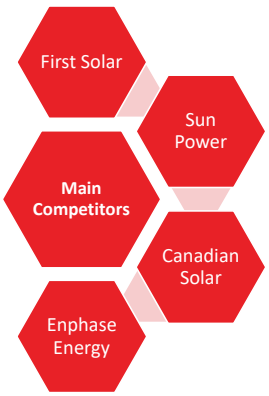
The year 2021 has been an interesting year for **energy prices**. Gas stock usually increases in the summer and decreases during the winter, as it is intensely used to heat houses all over the world. However, the production has been small this year, and reserves were **low** even before the winter started. On the other hand, CO_2 prices are **rising**. Its value tripled if we look at pre-pandemic levels. This is happening because of more substantial climate policy ambitions and higher financial investment in the market[32].

It is important to remember that **CO_2 prices are incorporated in energy prices**. For instance, the energy produced through coal produces twice the CO_2 compared with power generated using gas. Additionally, China is increasing its demand in the world market, which made gas prices almost triple this year. With gas prices so high, all the other energy sources follow the same direction, since they are perfectly substitutable products, and there is not enough energy to stop using gas. As a result, we are facing what many already call an **energy crisis**. Some energy-intensive firms, such as glass, steel, or fertiliser producers, are limiting their production, constraining international supply chains[33].

The effects of the energy crisis on Tesla are not clear: On the one hand, Tesla can **benefit** from the problem, as the higher the energy price coming from non-renewable sources of energy, the cheaper Tesla's energy generation and storage

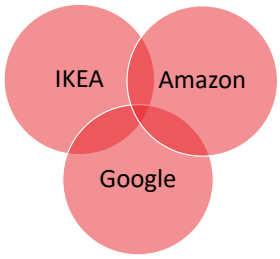
[31] Enelx, "Why is now the best time to think about an energy storage system?", Accessed September 21, 2021, https://corporate.enelx.com/en/stories/2020/12/energy-storage-incentives
[32] CNBC, "Why is now the best time to think about an energy storage system?" Accessed September 25, 2021, https://www.cnbc.com/2021/05/18/why-europes-carbon-market-is-experiencing-a-boom-like-never-before.html
[33] Reuters, "Soaring gas prices ripple through heavy industry, supply chains.", Accessed September 22, 2021, https://www.reuters.com/business/energy/soaring-gas-prices-ripple-through-heavy-industry-supply-chains-2021-09-22/

Exhibit 29 - Tesla energy main competitors



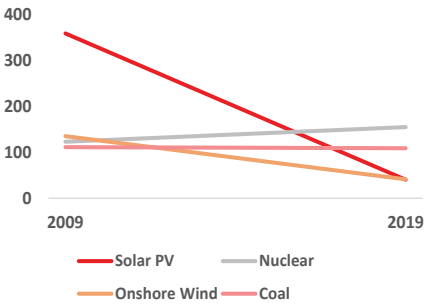
Source: Analyst Analysis

Exhibit 30 - Tesla energy potential competitors



Source: Analyst Analysis

Exhibit 31 - Price of energy per source (€/MWh)



Source: Our world in data

products are, as the investment payback period becomes lower. On the other hand, energy disruptions might delay raw material supply, **jeopardise** Tesla production capacity, and disable the company to answer the higher demand.

Competition

Industries consume 36% of the total energy consumption in the U.S.[34], making efforts to become self-sustainable. More and **more companies** are producing energy generation and storage products. The world's largest ones are NextEra Energy, Toshiba, Siemens, Panasonic, ABB, Electricite de France, Engie, E.ON, Iberdrola, or Exelon Corp.

Tesla is already one of the largest companies in the energy storage market, although it is not so developed in the energy systems generation area. Tesla's main competitors in this market are First Solar, Sun Power, Canadian Solar, or Enphase Energy due to business **model similarities** and **geographical proximity**. In our opinion, Tesla will not be able to significantly increase its penetration rate, since all these companies are already well-established players on the market. Nevertheless, we recognize that the business can rise as the market grows.

In another perspective, as previously explained, some companies are investing in solar panels, solar roofs, and energy storage products, but some companies go beyond that. Some believe it is worth having their own **energy storage subsidiaries**. This is the case with Google[35]. Besides its enormous energy production, the company invests in batteries to not depend on the sun or wind. In fact, although using different technologies, **Google's products** can substitute both, Tesla Powerpack and Tesla Megapack. On the other hand, we have the case with IKEA. The Swedish company produces and installs solar panels and energy batteries, which is an **obstacle** for Tesla to enter the European Market.

We consider these large firms another threat to Tesla's progress in this industry. They have a strong brand and a stable financial position, allowing them to grow faster, stronger and more robustly, which will shrink Telsa's market share.

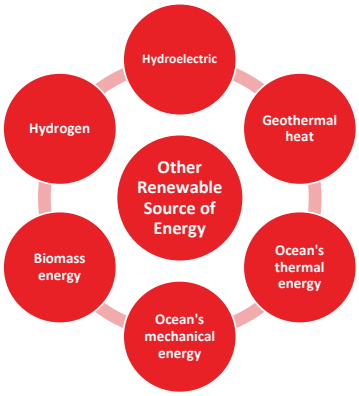
Industry future

There is a strong consensus that energy in the **future** will be **renewable**. Also, we believe it will be complemented with batteries and other **energy storage** products to decrease constant energy dependence[36]. In fact, besides the environmental

[34] EIA, "Energy Explained", Accessed November 25, 2021, https://www.eia.gov/energyexplained/use-of-energy/industry.php
[35] Futurism, "Google's Parent Company Will Soon Compete With Tesla for Energy Storage Solutions", Accessed October 2, 2021, https://futurism.com/googles-parent-company-will-soon-compete-with-tesla-for-energy-storage-solutions
[36] Renewable energy must be consumed in the exact moment of production, when there is no batteries.

benefits, the costs of renewable energy are dropping steeply. According to a study by Max Roser[37], solar panel costs reduced around 90% from 2009 to 2019, and onshore wind fans decreased 70% during the same period. It is predicted that the trend will continue. Nowadays, producing renewable energy through solar panels and wind fans is **cheaper** than almost any other alternative[38], only discussing the average cost or **the Levelized Cost Of Energy** (LCOE).

Exhibit 32 - Other Renewable Sources of Energy



Source: International Energy Agency

Moreover, a significant barrier to the spread of renewable energies is its **initial investment**, which can take several years to be paid back. Nevertheless, it is estimated that solar and wind energy allows for 60% of savings compared to the current energy wholesale forward curves. This can be specifically important when talking about **energy-intensive firms**, which are becoming relevant customers in this market, as it constitutes a competitive advantage.

All in all, we are seeing that solar and wind energy revealed many advantages compared to fossil fuels. However, there are at least seven other sources of **renewable energy.** They are hydroelectric, geothermal heat, the ocean's thermal and mechanical energy, biomass energy, and hydrogen. All these technologies will be available in the near future, and no one is better than all the others. Also, the energy demand is so significant that production must not be limited to only one technology. Renewable energy sources and the **neutralisation of CO_2** emissions are the future, and Tesla must adapt to respond to future needs.

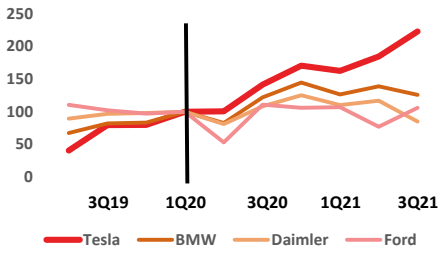
Besides the well-known lithium-ion battery, there are already **different technologies** in the market for energy storage. Hydrogen is also a form of energy storage, from lithium-sulfur to solid-state[39]. Additionally, new batteries are being discovered based on iron and salt. These new technologies can cost **half** of the commonly used lithium-ion technology and store energy for extended periods. This new technology has strong potential as it is as safe as previous technology and is more efficient and cheaper.

Unlike the automotive industry, in the energy generation and storage industries, the significant changes expected are in terms of **technology**. As a result, Tesla must keep **investing in R&D** to maintain its relevance in the market while strong competitors arrive.

[37] Our World in data, "Why did renewables become so cheap so fast?", Accessed December 1, 2021, https://ourworldindata.org/cheap-renewables-growth
[38] IRENA, "Renewable power generation cost 2020", Accessed June 30, 2021 https://www.irena.org/publications/2021/Jun/Renewable-Power-Costs-in-2020
[39] Energy Education, "Energy storage", Accessed September 22, 2021 https://energyeducation.ca/encyclopedia/Energy_storage

Covid-19 Impacts

Exhibit 33 - Covid-19 impact on automotive industry sales



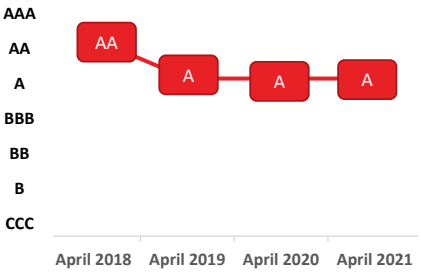
Source: Bloomberg

The Covid-19 pandemic caught companies off guard and brought them many challenges. Almost all industries' **market value** decreased except for technologies. For the automotive industry, sales fell around 20%[40] . Nevertheless, Tesla has bypassed the pandemic **without decreasing sales** (Exhibit 33). Nowadays, industries' success depends substantially on the capacity of online sales. However, it is hard to implement this sales channel in both industries Tesla operates. With all these **obstacles** and forced by the lockdown, the company was forced to **suspend part of its operations**, especially in the first half of 2021. Furthermore, with the production suspension of some suppliers and transportations disruptions, Tesla saw **additional expenses** on raw material shipping, the microchips crisis also intensified. Additionally, the construction and the ramp-up of some facilities were also **delayed**, particularly in the Gigafactories of Shanghai, Berlin, and Texas.

Despite this, Tesla implemented **cost-reduction strategies** across all its businesses, including employee layoffs, monetary reward reductions, suspension of non-crucial operating expenses, and opportunistic deals renegotiations. As a result, 2020 was the first year the company presented **positive results.** Overall, the company has constantly taken sound solutions to overcome covid-19 adversities and has been successful.

ESG Analysis

Exhibit 34 - MSCI ESG rating evolution



Source: MSCI

ESG is becoming an essential factor in investment decisions. Many investors are now worried about how the company impacts society and relates with stakeholders, besides its profits[41]. However, it is not always straightforward how the ESG rating affects a company's valuation.

The sustainability of the **Environment** is a significant concern for Tesla. During the last twelve years of existence, Tesla enabled its customers to avoid a total of 5 million metric tons of CO_2e[42]. The company constantly showed concerns with scope 1, 2, and 3 emissions[43], and as a result, Tesla cautiously chose the factory's location taking the environment into account. Factories are built to **maximise energy efficiency**, with the majority of their roofs covered by **solar panels**,

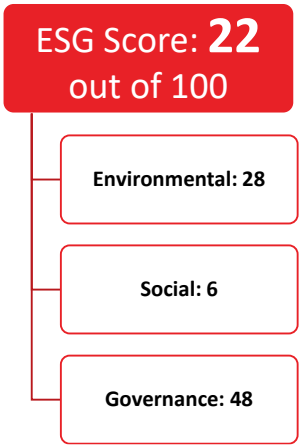
[40] Statista, "Tesla Report 2020", Accessed July 28, 2021, https://www.statista.com/study/60897/tesla-report/
[41] ESG investing: Focus on the ESG factors to identify company's expected growth and prospect.
[42] Tesla, "Impact Report", Accessed October 1, 2021, https://www.tesla.com/pt_pt/impact-report/2020
[43] Scope 1 emissions: emissions done directly through Tesla's assets. Scope 2 emissions: Tesla's indirect emissions generated by the company's energy sources. Scope 3 emissions: other emissions present in the whole value chain of the company, including clients emissions

ensuring sustainable energy is used. The company also has a **recycling batteries program**, and its vertical integration also **decreases its carbon footprint**. Therefore, there seems to be a consensus that Tesla has a good Environmental score.

The **Social** part reflects Telsa's impact on Society. In this case, both Bloomberg and MSCI give Tesla a low score due to past incidents, including exploding batteries and crashes driven by autopilot technology.

When we talk about **Governance**, both Bloomberg and MSCI characterise Tesla as having good corporate governance behaviour, precisely when we talk about the independence of directors, the board age distribution, and its compensation practices with investors. Nevertheless, according to MSCI, the company is negatively evaluated in its labour management. All employee relations, engagement efforts, protection, and labour intensity need to be improved. Actually, the company received a fine in October 2021 after being charged with racial abuse and discrimination[44].

Exhibit 35 - ESG Score



Source: S&P Global

Considering everything, Tesla has a good individual ranking (score A according to MSCI[45], decreasing from a double A in 2018). Nevertheless, the company scores very low when its peers are considered. **Tesla's S&P DJI ESG Score** was 22 out of 100[46], one of the industry's worst, positively influenced by Environmental and Governance factors and negatively influenced by its Social Factors. For Sustainalytics[47], on the other hand, the company places at a median level both in the industry and across all other industries.

Even though the majority of shareholders are present to capture Tesla's growth factor, many investors are now incorporating ESG ratings as a factor in their portfolio. However, Tesla ESG overall factor is unclear; while the company present a solid Environmental aspect, it still needs many improvements to equal the Governance and Social ones.

Risk Analysis

Tesla's stock is exposed to several risks, which should be incorporated when evaluating the company. These are risks related to unpredictable environmental

[44] NPR, "Tesla must pay $137 m to a Black employee who sued for racial discrimination" Accessed October 5, 2021, https://www.npr.org/2021/10/05/1043336212/tesla-racial-discrimination-lawsuit?t=1633552267188&t=1633636914388
[45] MSCI, "ESG Ratings Corporate Search Tool", Accessed October 3, 2021, https://www.msci.com/our-solutions/esg-investing/esg-ratings/esg-ratings-corporate-search-tool/issuer/tesla-inc/IID000000002594878
[46] Seeking Alpha, "Tesla ESG Rating", Accessed October 2, 2021 https://seekingalpha.com/article/4431315-teslas-standing-in-s-and-p-500-esg-index
[47] Sustainalytics, "Company ESG Risk Ratings", Accessed October 3, 2021, https://www.sustainalytics.com/esg-rating/tesla-inc/1035322998

causes, market and consumers preferences changes, government decisions, and others.

New Technologies: No EV in the future

Even though electric cars are the most advanced technology for the future, it is essential to consider that another technology more efficient might appear, making electric cars obsolete. Regulations, taxes, and changes in demand might lead to the dominance of other forms of energy such as hydrogen or others that is yet to appear.

Loss of attractivity

Assuming Tesla's Technology will be the future, there might be supply disruptions; unpredictable and unfavourable social, economic, political, and labour conditions; delays in factory development; loss of public credibility; the success and the timing of Roadster launch; new competitors, which causes loss of attractiveness to Tesla. All these factors may lead to a lower market share and higher costs (as they enormously benefit from economies of scale), making the company less competitive.

CEO changes

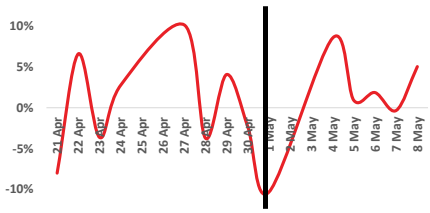
Exhibit 36 - CEO Evolution

Source: Tesla

The company is highly dependent on the CEO's assistance and performance. Many of Tesla's customers and fans are indeed admirers of Elon Musk. He is sometimes seen as an entertainer, and people like to hear him. Additionally, he does not work full-time at Tesla. He is also CEO and CTO of Space Exploration Technologies Corp., founded to develop and produce space vehicles. Finally, we believe if Elon Musk steps down as the Company's CEO, the stock price will be severely negatively affected, as many see the company's value linked to the CEO. The critical view is that Tesla has no apparent plan B if Elon Musk decides to exit the company.

CEO on Twitter

Exhibit 37 - Elon musk says Tesla is overvalued. Variation = -10,3%

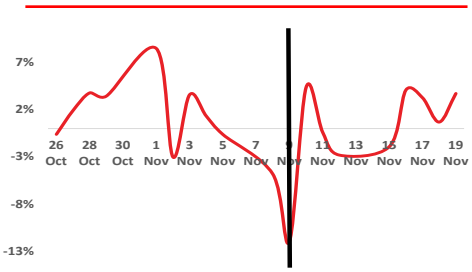


Source: Analyst Estimates

Elon Musk's strong statements on social media had strongly influenced Tesla's stock price. The CEO was often accused of having power for market manipulation, especially in Tesla's stock price and in the cryptocurrency market, as Elon Musk tweets cause large and, sometimes, unpredictable market movements, which becomes a significant risk, mainly due to speculation and fake news. Four impactful Musk tweets were analysed (Exhibit 37 to 40). Depending on the tweet tone, the shocks might be temporary or permanent and positive or negative. The average volatility on these days was 11,5%, either positive or negative. It is also true that Tesla stock also has high volatility even without the tweets. Nevertheless,

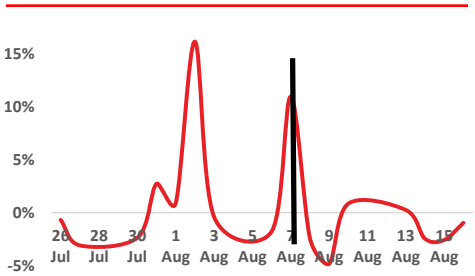
it is an additional source of risk that does not reflect higher returns and could be avoided.

Exhibit 38 - Elon musk putted a decision for a pull to decide whether to sell 10% of his stock. Variation = -12,0%



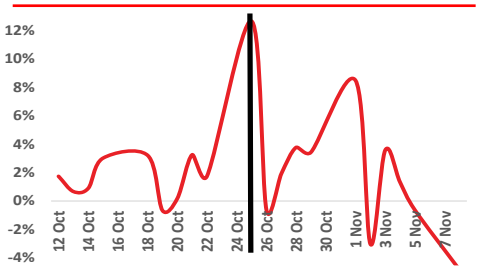
Source: Analyst Estimates

Exhibit 39 - Elon musk says he will take Tesla private. Variation = 11,0%



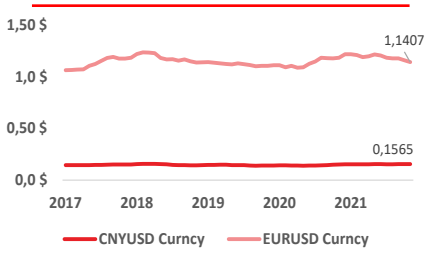
Source: Analyst Estimates

Exhibit 40 - Elon musk says Tesla is very much a production ramp problem, not a demand problem. Variation = 12,7%



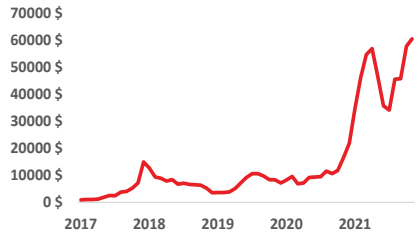
Source: Analyst Estimates

Exhibit 41 - Exchange Rate Evolution



Source: Bloomberg

Exhibit 42 - Bitcoin performance evolution



Source: Bloomberg

Exchange rate risk

It is common for a company to be exposed to exchange rate fluctuations as an international company. The company's make transactions in different currencies, besides the U.S dollar, such as the Euro, the Chinese Yuan, the British Pound, and the Canadian dollar. Nevertheless, it reports the results in U.S. dollars, meaning that a currency depreciation may worsen their results.

Bitcoin fluctuations

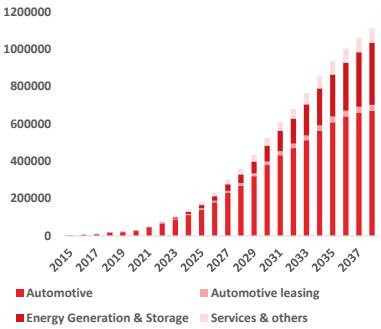
As the company has around $1,5 billion invested in bitcoin, it is highly exposed to market fluctuations. This risk becomes even higher when the company ponders to accept bitcoin as a means of payment, which we believe will only bring more uncertainty without any relevant positive impact on the company. Nonetheless, bitcoin is seen as an investment, not a currency, as such, we believe its product's demand will not increase because of the payment method.

These are vital risks to value the company and have been included in our forecasts. They were also considered when analysing the final target price.

Exhibit 43 - Tesla automotive Market share evolution

Source: Bloomberg

Exhibit 44 - Tesla sales evolution (Millions of $)



Source: Analyst Estimates

Exhibit 45 - Short term and Long-term growth by segments

Sector	Short-term growth (2022 - 2025)	Long-term Growth (2035 - 2038)
Automotive	35%	5%
Automotive leasing	37%	5%
Energy Generation & Storage	57%	14%
Services & others	42%	3%

Source: Analyst Estimates

Forecasts & Key Value drivers

Revenues

Automotive sales include vehicles sales, with or without resale value guarantee[48] or a buyback option, and the sale of automotive regulatory credits (ARC)[49]. The evolution of the world EV market value, Tesla production in units, and average selling price were projected to forecast automotive revenues. Several market studies point to an EV market increase of 24,3% CAGR between 2021 and 2028, going from $246,70 billion in 2020 to $1318,22 billion in 2028[50]. These two benchmarks were considered. During the 17 forecasted years, the market is expected to grow at 20,1% CAGR steadily.

During the 2Q21 Results Release, the company stated it expects 50% annual growth of vehicles deliveries over a multi-year horizon. Nevertheless, we believe these will not be reached due to the previously stated risks. Therefore, it was estimated a cumulative average growth rate of 31,9% over the next five years (17,2% over 17 years). The demand is projected to increase due to higher environmental sensibilization, political policies, and increasing diesel prices. In the long run, the demand will still increase but slower (CAGR of deliveries between 2022-2029 of 28,4% versus CAGR 2030-2037 of 8,7%) as the market is reaching steadiness. In 2020 Tesla delivered 499.557 vehicles. In the first three quarters of 2021, the company widely surpassed this number with 627.572[51]. In the fourth quarter, deliveries are expected close to 46.257, representing an overall one-year growth of 79%. In 2022, the annual growth is expected to be lower, 50%, due to the production constraints, backlog and scalability difficulties.

Tesla's market share has been growing since the beginning of the company's existence (12% in 2019, 14% in 2021), and it is believed it will keep increasing during the following six years due to the slow entrance of competitors into the market, quality superiority and brand recognition (21% in 2027). However, with the increasing number of premium competitors and the EV's democratization, the

[48] Sales with resale value guarantee, define a specific value for car' resale after a determined period, when the car is acquired through any of the firm's loan financing plans. This will allow for the creation of a resale market of Tesla's models.

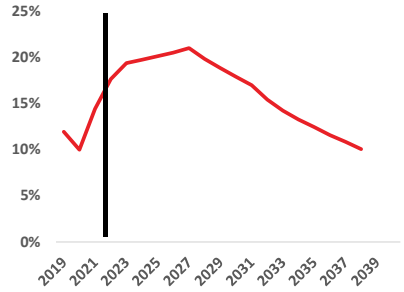
[49] ARC are tradable credits received by Tesla as a result of its activity. As Tesla produces low amounts of CO_2 in its operations, it sells them to other organizations which need them to comply with emission standards and other regulatory requirements, as previously seen.

[50] Globe News Wire, "Global Electric Vehicle Market Size [2021-2028] | is Anticipated to Grow USD 1,318.22 Billion at a CAGR of 24.3%", Accessed at December 15, 2021, https://www.globenewswire.com/news-release/2021/10/21/2318059/0/en/Global-Electric-Vehicle-Market-Size-2021-2028-is-Anticipated-to-Grow-USD-1-318-22-Billion-at-a-CAGR-of-24-3.html

[51] Vehicles deliveries in 2021: Q1: 44.283; Q2: 47.292; Q3: 47.197

market dominance will slowly decrease (18% in 2030 and 11% in 2037). In addition, the average selling price is predicted to decrease, approximately 2% per year and stabilise in the long-term ($46.336 in 2020; $39.828 in 2030; $38.645 in 2038) due to an increase of Model 3 sales, in deterioration of the most expensive Model S.

Exhibit 46 - Tesla automotive Market share evolution



Source: Bloomberg

The sale of ARC is expected to first grow at a higher rate (5% per year until 2024) due to the increasing CO_2 price as governments increase restrictions and offsetting goals. The number of ARC the company receives each year is also expected to decrease[52] to incentivise less CO_2 emissions. After 2030 the growth rate is expected to decrease (3% per year) as companies become more efficient and produce less CO_2[53].

The **automotive leasing** segment accounts for leasing programs available for customers. For now, it is only available in the U.S., Canada, and certain European countries. The expectation of the program expansion to other regions is offset by the decreasing trend of car leasing in the company for the last three years. As a result, the segment is expected to keep a 5% share of revenues for the forecasted period.

The **Energy and Generation Storage** segment deployed in 2020 about 339 MW, representing an increase of 63% compared with the previous year (205 MW in 2019). A deployment growth of 45% (2022-2032) is predicted in the following years, reflecting the strong beliefs in the segment viability. The trend is forecast to have a more vigorous growth rate during the first years and slowly decreases. The average MW price in 2020 was $9,7; in 2021 is predicted to be $8,3; and in 2022 about $8,5. The prices are expected to increase due to the energy crisis and energy transition, as more households and businesses are moving to green alternatives in the short term. However, with the increase of competition after 2025, the average price will grow lower. Our belief is based on the extraordinary pace at which big companies outside this industry are moving in, such as IKEA[54]. This is an attractive industry for big companies and businesses as they are highly dependent on energy, representing a considerable cost.

Services and others include sales of used cars, merchandising, vehicle insurances, and non-warranty after-sales vehicle services. With nothing pointing

[52] According to a new regulation draft called Fit for 55, which establiches CO^2 emission goals to 2055.
[53] Insider, "One of Tesla's biggest emissions credit buyers doesn't need them anymore, threatening a key profit source for Elon Musk", Accessed August 26, 2021, https://www.businessinsider.com/tesla-emissions-credits-sales-profit-stellantis-fiat-chrysler-2021-5
[54] Reuters, "IKEA starts selling renewable energy to households in Sweden", Accessed September 20, 2021, www.reuters.com/business/sustainable-business/ikea-starts-selling-renewable-energy-households-sweden-2021-08-17/

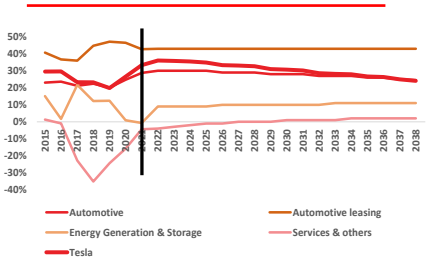
otherwise, the segment was predicted to remain between 10-12% of the automotive revenues.

Overall, Tesla revenues will grow on average 16,9% for the next 17 years. It has been proven that Tesla has a growing demand; however, it will be strongly impacted in the long run by the new market players. On the other hand, the Energy Generation and Storage segment will finally ramp up and meet all the demands. Automotive sales will continue to be the most significant slice of the total sales, representing approximately 57% in 2038, while the energy segment 31%.

Cost of revenues

In the cost of revenues, Tesla includes all the variable costs related to the production process of each business unit. The margin for each segment was estimated and benchmarked against the industry.

Exhibit 47 - Tesla Margin evolution overall and per segment



Source: Analyst Estimates

The CEO stated in the 2Q21 Results conference that Tesla is expecting higher margins in the **automotive segment** as the massive production will increase economies of scale, and as the higher sales in Europe and the United States, the most expensive markets, will contribute to it. In fact, during the 3Q21, the company registered the highest margin in the automotive segment of around 30%[55] due to the company's vertical integration strategy. However, the margin is expected to decrease in the long run to 25% and approach the luxury car industry average of 20% due to increased competition and entrance in markets with lower selling prices[56].

Second, the **automotive leasing** segment has shown constant margins over the last five years. Without any relevant announcement that could impact it, a flat margin is expected (43% for the forecasted period). It is the segment with higher margins, 46% in 2020.

The **Energy and Generation Storage** business unit has registered an average of 10% over the last five years but recently decreased due to investments in higher production capacity and ramp-up. Therefore, in the long-term is expected that the margins will increase up to the 10% range, influenced by the price increase in the industry[57], driven by the increasing demand.

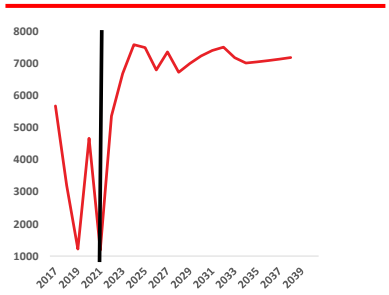
Finally, **Services and others**. Although it has not been profitable over the last years, it is an important segment to build customer trust. Despite its consistent

[55] Refer to Chapter *Strategy*.
[56] This includes China, Africa and India. In India, for instance, the average price of an ICE car is now $12.000.
[57] CNBC, "Solar prices jumped in the second quarter, reversing recent trends, on material costs and supply chain issues", Accessed Setpember 30, 2021, https://www.cnbc.com/2021/09/14/solar-prices-jump-as-supply-chain-issues-and-raw-material-costs-weigh.html

losses, it is predicted to reach a break-even point in 2027, due to company efficiencies.

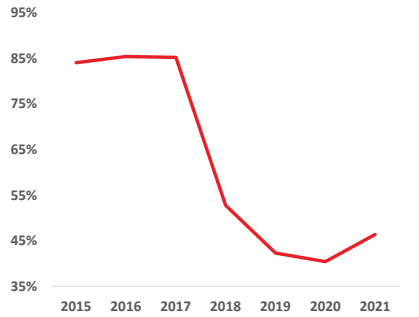
Overall, the company margins are firmly based on the company capability of economies of scale. Nevertheless, this path looks more challenging to follow due to the arrival of competitors. The company gross margin is 26% in 2025, and later it shrinks to 19% (2038), on average with the industry, another indication of overvaluation.

Exhibit 48 - Capex Evolution (Millions of dollars)



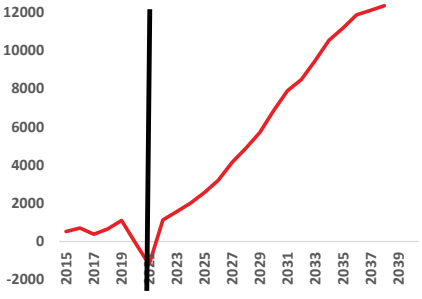
Source: Company Data and Analyst Estimates

Exhibit 49 - PPE evolution as a % of sales



Source: Company Data

Exhibit 50 - NWC Evolution (Millions of dollars)



Source: Company Data and Analyst Estimates

Other key figures

The automotive industry is capital-intensive due to the high investment need in factories and complex machinery compared with SG&A expenses. In fact, it is the second industry where more capital expenditure is needed in the U.S., after Oil & Gas[58]. In the 2Q21 Report, the company recognises how difficult it is to predict their CAPEX needs, given the growing business phase they are facing: new plants are being built in several continents, new models are being developed, constant investments in new technologies to keep the company always technologically advanced. Additionally, the company needs to increase the production capacity, as proven by the backlog already mentioned in the report.

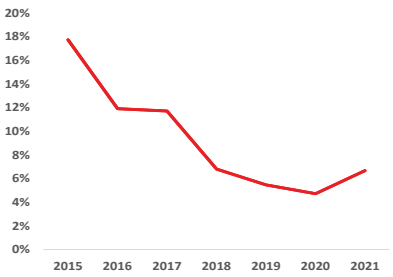
The company reports intentions of investing $4,5 billion in 2021 up to $6 billion in 2023. The CAPEX was forecasted as a percentage of the PPE, keeping a level of investment in absolute terms higher than depreciation. An average of 20,7% of CAPEX as a percentage of PPE, over the forecasted period, and 23,6% of depreciation as a percentage of PPE.

The net working capital has been negative since 2020 (-$64 million and -$1105 million in 2019), meaning the company has been financed by its suppliers. The average payable period (89 days in 2020) is higher than the average collection period (22 days in 2020), which means the company collects earlier money from the customers than it has to pay to their suppliers, giving them some freedom to manage the cashflows better. We forecast the average payable, collection, and holding period to be similar to the current values, as we believe no significant business changes will affect these figures.

In order to be in the front of technology trends, Tesla invests strongly in their Research & Development department. In fact, on Tesla AI day, during August 2021, the company launched Tesla Bot, also known as Optimus. It incorporated sla's AI from automation, its autopilot technology and was built to replace

[58] America Automakers, "Capital investment", Accessed September 29, 2021, https://www.americanautomakers.org/capital-investment

Exhibit 51 - R&D evolution as a % of sales



Source: Company Data

humans in repetitive tasks. This robot is an example of how much and how broad the company's R&D is. In 2020, the R&D was very significant in the company's financial statements, approximately 5% of revenues and 6% of the costs. In addition, the value invested has grown in the last five years (from $718 million in 2015 to $1491 million in 2020) and is predicted to keep the same behaviour in the future.

Valuation

Multiples

The multiple valuations were computed with the Price/Earnings (P/E) and Enterprise Value/EBITDA ratios from automotive peers. Even though the P/E ratio is the most common in valuations, the company only breakeven in 2020, as such, the EV/EBITDA multiple better reflect the financial situation of the company. The group of peers[59] was selected based on the similarity with the Tesla business model, as purely EV companies, market premium companies, and similar market share in the EV market. The same procedure was used to choose solar energy systems peers. As a result, the share price for the P/E multiple was $512, and for the EV/EBITDA was $313, resulting in a shareholder return of -45% and -66%, resulting in a SELL recommendation.

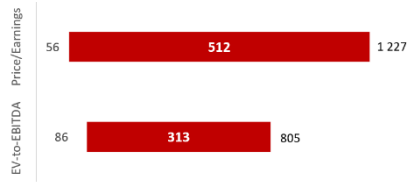
Exhibit 52 - Multiples Summary Valuation

Share price Multiples (Peers)	YE 2022
EV/EBITDA Multiple	21
* EBITDA	15689
= Resulting Operating EV	326343
+ Non Operated Invested Capital	1418
= Resulting Total EV	327761
+ Net Financial Assets	-13227
= Resulting Equity Value	314534
Share Price (EV/EBITDA Multiple impli	313
» P/E Multiple	49
= Market Capitalization (Equity Value)	513797
Share Price (P/E Multiple implicit)	512

Source: Analyst Estimates

A pitfall of this model was that no company perfectly matches Tesla business model: the purely EV companies, as NIO, are relatively small compared with Tesla. The more prominent companies, as BMW and Daimler, have been in the business for long years, are mature and stable, not reflecting the high risk of being relatively new, in a high growth stage as Tesla. The companies with higher market shareafter Tesla, like Ford, do not directly serve the same market segment, the premium. As mentioned before, for now, Tesla does not have a direct competitor, resulting in a poor selection of peers.

Exhibit 53 – Football field



Source: Analyst Estimates

Discounted Cash Flow Model

The DCF model is a better-suited method to value Tesla as we are evaluating a firm individually and accounting for its unique business model, not depending on the peers. Moreover, DCF actively accounts for the tax shield, which might become relevant when analysing the first years. Additionally, we assumed Tesla targets its debt, change it accordingly with the enterprise value during the forecasted years, one of the model assumptions.

[59] Tesla's Peers: Ford, BMW, Mercedes, Visteon, Aptiv, Cerence, NIO, Nikola, Workhorse, Fisker, Xpeng, First Solar, SunPower, Canadian Solar, Enphase Energy.

Discount Rates

In order to compute the weighted average cost of capital ($WACC$), the **cost of debt** (r_d), **tax rate** (t), **cost of equity** (r_e), and **target debt to equity ratio** (D/E) were estimated.

To evaluate the cost of debt,[60] it was considered a Tesla corporate bond with ten years maturity (CB10Y), which deliveries a YTM of 4,7%. The *annualized probability of default* and *loss given default* values were based on Moody's study on US corporate default[61]. Tesla's Moody's rating is Ba3, resulting in a probability of default of 16,7% and a loss given default of 34,2%. The resulting cost of debt obtained was 3,68%.

The current corporate tax rate in the United States is 21% and was assumed constant for the whole forecasted period.

The capital asset pricing model (CAPM) was used to estimate the cost of equity. Since Tesla is based in the United States and declares its annual report in dollars, it was used the U.S. 10-year Treasury Bond (1,63%), as a risk-free proxy (rf). Since the U.S. government backs this asset, it is considered a comparable risk-free investment due to the low risk of default and its high liquidity. For the levered equity beta (βe), it was used monthly data as it disregards short-term or daily fluctuations that do not capture changes in the firm's market value. Two betas were calculated: through peers and a solo regression using Tesla. In the first scenario, it was calculated two betas, one for the automotive segment and one for the energy generation segment, to preserve each industry's unique characteristics and allow an adequate selection of peers[62]. An unlevered average industry beta (βu) with the peers was obtained, and relevered[63] with the adequate Tesla expected capital structure which will remain constant. To calculate the peers beta, each company was regressed with the correspondent market; for example, Daimler was regressed with DAX 30. However, the resulting raw beta (automotive segment: 1,566 and solar segment: 1,535) were arguably low when compared with Tesla risk profile, reflecting a difficult peer's selection as previously mentioned. As such, a regression on Tesla's past data was performed, delivering a 1,86 levered beta. This beta reflects not only the growing phase the company is experiencing, but it also captures the high past volatility, which is not expected to reduce given all the

Exhibit 54 - DCF Summary Valuation

TESLA, INC. (XNAS:TSLA)	
Equity Beta	1,8584
Market Capitalization ($ mn)	930873
Net Financial Debt ($ mn)	-18214
EV-to-EBITDA	175,6
Price-Earnings	316,71
Rf (US10YT)	1,63%
Market return	7,23%
MRP	5,60%
Corporate tax rate US	21%
Re	12,03%
Rd	3,68%
Ru	12,20%
Beta debt	0,37
D/EV	1,58%
Tesla WACC	**11,89%**
Cost of debt components	
Corporate Bond Yield to Maturity (10Y)	4,7%
Probability of Default	16,7%
Loss Given Default	34,2%

Source: Analyst Estimates

[60] $r_d = \text{CB10Y} - [(1 + prob.\text{def})^{\frac{1}{10}} - 1] * [1 - \text{loss given default}]$

[61] Moodys, "Annual Defaul Study", Accessed December 13, 2021, https://www.moodys.com/researchdocumentcontentpage.aspx?docid=PBC_1258722

[62] It was used the same peers group as in the relative valuation.

[63] For that we started by calculating the $\beta d = \frac{rd-fr}{MRP}$. Then we calculated the $unlevered\ \beta e = \beta d * \frac{D}{D+E} + raw\ \beta e * \frac{E}{D+E}$, which showed us the company's volatility without leverage.

factors mentioned so far in the report and the prominent market reaction surrounding the company.

The market risk premium used was set at 5,6% based on Statista prediction for the US Equity Market. This number was confronted with the academic literature consensus of 5,5%[64], and it was considered more accurately given the current market situation lived by the pandemic.

The overall WACC obtained was 11,89%, reflecting a growth company in a new and unpredictable market with high volatility.

Enterprise and Terminal Value

Exhibit 55 – Key values

TESLA, INC. (XNAS:TSLA)	YE2022
WACC	12%
Nº of Shares Outstanding (in Millions)	1004
(Implicit) Growth Rate	2%
EV/EBITDA Multiple	21

Source: Analyst Estimates

During the first years, Tesla ROIC and RONIC were strongly volatile; however, it was possible to identify a decreasing trend. These ratios are expected from a young company leading an emerging, new and unpredictable market, such as the EV market.

The FCF was explicitly forecasted for 17 years until the company growth stabilizes in 2037-2038, with a perpetual growth rate (g) of 2%. The terminal value was explicitly forecasted for 2035, and only after applied the terminal value formula. The terminal growth rate of 2% results from a reinvestment rate of 36% and a RONIC of 5%, being the last below the WACC of 12%, meaning the new projects invested will destroy value for the shareholders. Nevertheless, the ROIC is 65%, meaning the current projects will continue to be profitable. Additionally, the growth rate is above the assumed long-term inflation of 2%, meaning the company will have a positive real growth rate.

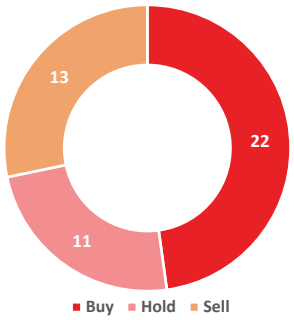
Final Remarks

Based on the DCF model, and with a forecasts period of 17 years, an Enterprise Value of $576.887 million was estimated and the appropriate discount factor of 11,89%. Non-Core Invested Capital (Digital Assets – Bitcoin owned by the company and Goodwill) was considered at book value since it is a good proxy for their market value, and the same procedure was used for the financing items. The resulting values were deducted from the enterprise value in order to obtain the equity value, deducted of minority interests as of December 2022 ($563.661 million). Given the 1.004 million shares outstanding, Tesla's target share price is $561, representing a one-year negative return on December 31, 2022 of -39% when compared with the current share price (December 16, 2021), considering

[64] Tim Keller, Marc Goedhart; David Wessels. 1990. Measuring and Managing the Value of Companies. New Jersey: McKinsey & Company

non-dividends gains, since it is the standard company policy. The resulting return leads to a SELL recommendation.

Exhibit 56 - Bloomberg Analyst Coverage



Source: Bloomberg

Consensus

According to Bloomberg, on December 10, 2021, 48% of the analysts agree Tesla is a buy, 24% hold, and 28% sell and the percentage of "buys" has been increasing since February 2020. Their price target range goes from 300$/share to 1580$/share. This report's price target stands in the lower half of this range.

Sensitivity analysis

It was performed a sensitivity analysis to the model main variables in order to test the model robustness: the long-term growth rate and the unlevered beta. Given the high weight of the terminal value on the overall valuation, the growth rate (g) main drivers were breakdown and tested: Return on New Invested Capital (RONIC) and Reinvestment Rate (RR). Each variable was upgraded and downgraded 5%, 25% and 50%, respectively, incorporating different scenarios of the company investment decisions and profitability. Under the analysis, the price target range from $543 and $593, not changing the previous SELL recommendation.

Additionally, we performed an analysis of the βu, since WACC is extremely sensitive to changes in this variable. It was used as a reference for the βu, our second-best deduction, the βu from the peers we obtained when calculating the WACC. This βu was 0.5 below the base case, which originated a WACC of approximately 9% and a resulting share price of $824, which is 47% above the base price target. Besides, it was also estimated the βu of the lower bound of the peers (0,38) and the βu of the upper bound of the peers (2,53). Both the βu, WACC and price target obtained were significantly different from the initial estimation, reflecting the importance of the βu when calculating the WACC. The WACC obtained with the lower βu was 4,38%, and with the higher βu was 15,43%.

For both the peers upper bound and the peers average case our SELL recommendation maintains.

Exhibit 57 - Sensitivity analysis

Growth Rate	-50%	-25%	-5%	0%	5%	25%	50%
	Ronic						
2%	2,5%	3,8%	4,8%	5,0%	5,3%	6,3%	7,6%
43%	1,09%	1,64%	2,08%	2,19%	2,30%	2,73%	3,28%
40%	1,00%	1,50%	1,91%	2,01%	2,11%	2,51%	3,01%
38%	0,96%	1,44%	1,82%	1,91%	2,01%	2,39%	2,87%
RR 36%	0,91%	1,37%	1,73%	1,82%	1,91%	2,28%	2,73%
34%	0,87%	1,30%	1,65%	1,73%	1,82%	2,16%	2,60%
33%	0,82%	1,23%	1,56%	1,64%	1,72%	2,05%	2,46%
29%	0,73%	1,09%	1,39%	1,46%	1,53%	1,82%	2,19%

Price Target	Ronic						
	2,5%	3,8%	4,8%	5,0%	5,3%	6,3%	7,6%
43%	549	558	566	568	571	580	593
40%	547	555	563	565	567	575	586
38%	547	554	561	563	565	572	583
RR 36%	546	553	560	561	563	570	580
34%	545	552	558	560	561	568	577
33%	544	551	557	558	559	566	574
29%	543	549	554	555	556	561	568

Source: Analyst Estimates

Exhibit 58 - βu analysis

Description	βu	WACC	PT	ΔPT
Lower bound Peers	0,38	4,39%	$2806	400%
Peers average	1,40	9,29%	$824	47%
Base β (Tesla regression)	1,89	11,89%	$561	0%
Upper bound Peers	2,53	15,43%	$370	-34%

Source: Analyst Estimates

Exhibit 59 - Scenario Analysis Optimistic Scenario

Scenario analysis

Tesla's performance is intrinsically correlated with automotive industry performance, as it weighed almost 95% of its revenues in 2020. Moreover, as ARC have less and less weight on the company's income, we believe it is not a determinant factor for the long-term performance. Additionally, we believe

automotive margin, EV market growth, and Tesla number of deliveries are the key determinants for the company's future performance. Therefore, two additional scenarios were developed: optimistic and pessimist scenarios. In the optimistic scenarios, we considered the company will achieve 50% deliveries growth, as announced in the last quarter presentation by the company, during 2022, 2023 and 2024. After this period, the deliveries were projected 2,5 percentual points higher relative to the base case. The assumption behind this scenario is the belief that the two factories being built will be ready at the beginning of 2022, allowing for better management of the backlog and ramp-up issues. Additionally, the two new models, Roadster and Cybertruck, which are indefinitely delayed and have a considerable order waitlist (Cybertruck in May 2021 had one million pre-orders according to the company), will be launched in the middle of 2022. Additionally, margins are expected to increase 2,5 percentual points compared to the base case due to earlier economies of scale of the new factories.

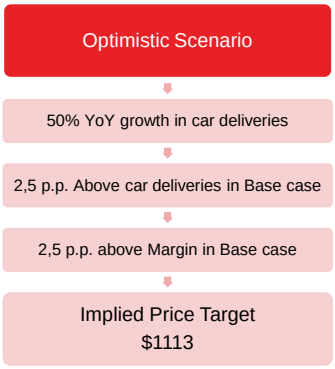


Exhibit 60 - Scenario Analysis Pessimistic Scenario

Source: Analyst Estimates

Under this scenario, the target price is $1113, reflected in a BUY recommendation, and the strong sensitivity of the share price to the automotive capacity production.

In the pessimistic scenario, a more conservative view was adopted, and both the deliveries and margins were downgraded 2,5 percentage points, reflecting a belief of Tesla not being able to overcome the backlog issues that have been presented for several months. Additionally, the gross margin is expected to fall to the industry levels as consumers' preferences shift to the cheaper models, and the Tesla brand is downgraded to a mass brand (with a gross margin of the automotive sector of 22,5% in 2038).

Under this scenario, the target price forecasted is $342, not causing any change to the current recommendation.

Appendix

Financial Statements

Reformulated Income Statement

Reformulated Income Statement	2021	2022F	2023F	2024F	2025F	2026F	2027F	2028F	2029F	2030F	2031F	2032F	2033F	2034F	2035F	2036F	2037F	2038F
Core Business																		
Automotive sales	43.046	63.874	87.636	111.648	140.884	179.487	229.833	269.050	319.632	379.722	432.314	470.790	512.690	563.959	609.076	639.530	658.716	671.890
Automotive leasing	1.444	3.194	4.382	5.582	7.044	8.974	11.492	13.453	15.982	18.986	21.616	23.539	25.635	28.198	30.454	31.976	32.936	30.235
Energy generation and storage	2.820	4.609	7.563	11.976	17.191	24.677	35.425	47.345	63.276	84.569	108.840	134.690	166.679	198.014	225.439	256.662	292.210	332.681
Services and other	3.913	6.387	8.764	11.165	15.497	19.744	25.282	29.596	35.159	41.769	47.555	51.787	61.523	67.675	73.089	76.744	79.046	77.267
Total revenues	51.223	78.064	108.344	140.370	180.617	232.882	302.031	359.443	434.049	525.047	610.324	680.806	766.526	857.847	938.058	1.004.912	1.062.908	1.112.074
YoY growth	62%	52%	39%	30%	29%	29%	30%	19%	21%	21%	16%	12%	13%	12%	9%	7%	6%	5%
Automotive sales	-30.660	-44.712	-61.345	-78.153	-98.619	-127.436	-163.181	-191.026	-230.135	-273.400	-311.266	-343.677	-374.264	-411.690	-450.716	-473.252	-494.037	-507.277
Automotive leasing	-827	-1.820	-2.498	-3.182	-4.015	-5.115	-6.550	-7.668	-9.110	-10.822	-12.321	-13.418	-14.612	-16.073	-17.359	-18.227	-18.773	-17.234
Energy generation and storage	-2.841	-4.192	-6.880	-10.893	-15.637	-22.210	-31.882	-42.610	-56.949	-76.112	-97.956	-121.221	-148.344	-176.233	-200.641	-228.430	-260.067	-296.086
Services and other	-4.085	-6.643	-9.026	-11.388	-15.652	-19.941	-25.282	-29.596	-35.159	-41.352	-47.079	-51.269	-60.908	-66.322	-71.627	-75.209	-77.465	-75.722
Total cost of revenues	-38.413	-57.367	-79.749	-103.616	-133.923	-174.702	-226.895	-270.900	-331.353	-401.686	-468.622	-529.584	-598.127	-670.317	-740.343	-795.117	-850.342	-896.319
Core gross profit	**12.810**	**20.697**	**28.596**	**36.754**	**46.693**	**58.180**	**75.135**	**88.544**	**102.697**	**123.361**	**141.702**	**151.222**	**168.399**	**187.529**	**197.715**	**209.795**	**212.565**	**215.754**
	25,01%	26,51%	26,39%	26,18%	25,85%	24,98%	24,88%	24,63%	23,66%	23,50%	23,22%	22,21%	21,97%	21,86%	21,08%	20,88%	20,00%	19,40%
Research and development	-2.488	-2613	-2717	-2826	-2939	-3057	-3148	-3243	-3340	-3440	-3544	-3614	-3687	-3760	-3798	-3836	-3874	-3913
% of Reveneus	5%	5%	4%	4%	4%	4%	3%	3%	3%	3%	3%	2%	2%	2%	1%	1%	1%	1%
Selling, general and administrative	-3.930	-4166	-4374	-4549	-4731	-4873	-4953	-5052	-5153	-5256	-5361	-5469	-5578	-5690	-5724	-5756	-5785	-5814
% of Reveneus	8%	6%	5%	4%	4%	3%	2%	2%	2%	2%	2%	2%	2%	2%	1%	1%	1%	1%
Core EBIT	**6.391**	**13.918**	**21.504**	**29.379**	**39.023**	**50.251**	**67.034**	**80.249**	**94.203**	**114.664**	**132.797**	**142.139**	**159.134**	**178.079**	**188.193**	**200.204**	**202.906**	**206.027**
Statutory taxes	-1342	-2919	-4510	-6161	-8183	-10538	-14057	-16829	-19755	-24046	-27848	-29807	-33371	-37344	-39465	-41984	-42550	-43205
Tax rate	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%
Tax adjustments	221	-493	-500	-500	-500	-500	-500	-500	-500	-500	-500	-500	-500	-500	-500	-500	-500	-500
Core Result	**5.270**	**10.506**	**16.494**	**22.718**	**30.340**	**39.213**	**52.476**	**62.920**	**73.948**	**90.119**	**104.449**	**111.832**	**125.263**	**140.235**	**148.228**	**157.720**	**159.855**	**162.322**
Non Core Business																		
Interest income	63	138	191	248	319	411	533	423	511	618	718	801	902	505	552	591	626	655
Excess cash from last year	15.974	23.419	32.503	42.111	54.185	69.865	90.609	71.889	86.810	105.009	122.065	136.161	153.305	85.785	93.806	100.491	106.291	111.207
% of excess cash	0,4%	0,6%	0,6%	0,6%	0,6%	0,6%	0,6%	0,6%	0,6%	0,6%	0,6%	0,6%	0,6%	0,6%	0,6%	0,6%	0,6%	0,6%
Restructuring and other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other (expense) income, net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Revenues	-0,2%	-0,2%	-0,2%	-0,2%	-0,2%	-0,2%	-0,2%	-0,2%	-0,2%	-0,2%	-0,2%	-0,2%	-0,2%	-0,2%	-0,2%	-0,2%	-0,2%	-0,2%
Non Core EBIT	**63**	**138**	**191**	**248**	**319**	**411**	**533**	**423**	**511**	**618**	**718**	**801**	**902**	**505**	**552**	**591**	**626**	**655**
Statutory taxes	-13	-29	-40	-52	-67	-86	-112	-89	-107	-130	-151	-168	-189	-106	-116	-124	-131	-137
Tax adjustments	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260
Change in net unrealized gain	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Reclassification adjustment for net gains on derivatives into net loss	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Foreign currency translation adjustment	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61
Less: Comprehensive income (loss) attributable to noncontrolling interests and redeer	0	-76	-76	-76	-76	-76	-76	-76	-76	-76	-76	-76	-76	-76	-76	-76	-76	-76
NON CORE RESULT	**371**	**354**	**396**	**441**	**497**	**570**	**666**	**579**	**649**	**733**	**813**	**878**	**958**	**644**	**681**	**712**	**739**	**762**
Financial																		
Interest expense	-388	-434	-477	-521	-564	-604	-642	-426	-446	-460	-471	-478	-484	-482	-482	-482	-482	-482
Interests (% Debt Previous Year)	5%	5%	5%	5%	5%	5%	5%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Financial Result Before Taxes	**-388**	**-434**	**-477**	**-521**	**-564**	**-604**	**-642**	**-426**	**-446**	**-460**	**-471**	**-478**	**-484**	**-482**	**-482**	**-482**	**-482**	**-482**
Statutory taxes	82	91	100	109	118	127	135	89	93	96	99	100	101	101	101	101	101	101
FINANCIAL RESULTS	**-307**	**-343**	**-377**	**-412**	**-445**	**-478**	**-508**	**-337**	**-352**	**-364**	**-372**	**-378**	**-382**	**-381**	**-381**	**-381**	**-381**	**-381**
Total Comprehensive income attributable to common stakeholders	5334	10517	16514	22747	30391	39305	52635	63162	74245	90488	104889	112332	125839	140498	148529	158052	160214	162704

Cash flow Map

Cash Flow Map	2021	2022F	2023F	2024F	2025F	2026F	2027F	2028F	2029F	2030F	2031F	2032F	2033F	2034F	2035F	2036F	2037F	2038F
Core EBIT	6.391	13.918	21.504	29.379	39.023	50.251	67.034	80.249	94.203	114.664	132.797	142.139	159.134	178.079	188.193	200.204	202.906	206.027
- Notional taxes on Core EBIT	-1342	-2919	-4510	-6161	-8183	-10538	-14057	-16829	-19755	-24046	-27848	-29807	-33371	-37344	-39465	-41984	-42550	-43205
+ Tax Adjustments	221	-493	-500	-500	-500	-500	-500	-500	-500	-500	-500	-500	-500	-500	-500	-500	-500	-500
= (Core) NOPLAT	5.270	10.506	16.494	22.718	30.340	39.213	52.476	62.920	73.948	90.119	104.449	111.832	125.263	140.235	148.228	157.720	159.855	162.322
+ Depreciation & Amortizations	-3365	1771	2294	2887	3472	4004	4579	5105	5653	6218	6797	6797	6797	6797	6797	6797	6797	6797
= Gross Core Free Cash Flow	1.905	12.277	18.788	25.604	33.812	43.217	57.056	68.025	79.601	96.337	111.246	118.629	132.060	147.032	155.025	164.517	166.652	169.119
- CAPEX	-1.186	-5.362	-6.684	-7.584	-7.494	-6.800	-7.359	-6.728	-7.003	-7.233	-7.406	-7.509	-7.181	-7.017	-7.051	-7.090	-7.135	-7.188
- Change in NWC	1135	-2334	-434	-449	-550	-645	-939	-747	-813	-1156	-1034	-582	-978	-1082	-631	-699	-235	-239
- Change in other core assets and liabilities	2.677	-660	903	836	1.736	1.601	-263	-2.708	-1.929	-2.128	-6.154	-4.745	-11.000	-8.896	-23.276	-32.847	-45.918	-55.884
- Change in operating cash	821	-3.147	-1.514	-1.601	-2.012	-2.613	-3.457	-2.871	-3.730	-4.550	-4.264	-3.524	-4.286	-4.566	-4.011	-3.343	-2.900	-2.458
+ Core Comprehensive Income Adjustments	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
= Unlevered Core FCF to the Firm	5.352	774	11.059	16.806	25.492	34.760	45.037	54.972	66.125	81.270	92.388	102.268	108.615	125.472	120.056	120.538	110.465	103.350
Non-core EBIT	63	138	191	248	319	411	533	423	511	618	718	801	902	505	552	591	626	655
- Notional taxes on Non-Core EBIT	-13	-29	-40	-52	-67	-86	-112	-89	-107	-130	-151	-168	-189	-106	-116	-124	-131	-137
+ Tax Adjustments	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260
= (Non-Core) NOPLAT	310	369	412	456	512	585	682	595	664	749	828	894	973	659	697	728	755	778
+ Non-Core Comprehensive Income Adjustm	61	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16
= Unlevered Non-Core FCF to the Firm	371	354	396	441	497	570	666	579	649	733	813	878	958	644	681	712	739	762
=Unlevered FCF to the Firm	5.723	1.128	11.455	17.247	25.989	35.330	45.704	55.552	66.774	82.003	93.201	103.146	109.573	126.115	120.737	121.250	111.204	104.112
+ Tax Shields	82	91	100	109	118	127	135	89	93	96	99	100	101	101	101	101	101	101
= Levered FCF	5.804	1.219	11.556	17.356	26.107	35.456	45.838	55.641	66.867	82.100	93.300	103.247	109.674	126.216	120.838	121.351	111.305	104.213
Interest	-388	-434	-477	-521	-564	-604	-642	-426	-446	-460	-471	-478	-484	-482	-482	-482	-482	-482
Change in Excess Cash	1833	-7445	-9084	-9608	-12074	-15680	-20745	18721	-14921	-18200	-17055	-14096	-17144	67521	-8021	-6685	-5800	-4917
Change in Debt	-4189	1405	906	922	895	855	794	732	643	480	362	249	178	-67	0	0	0	0
Change in Non-Controlling interest in subsid	-850	633	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CF Financial Debt	-3.594	-5.840	-8.656	-9.206	-11.743	-15.429	-20.592	19.026	-14.724	-18.179	-17.165	-14.326	-17.450	66.972	-8.503	-7.167	-6.281	-5.398
Equity CF	-792	4621	-2900	-8150	-14364	-20027	-25246	-74667	-52143	-63920	-76135	-88921	-92224	-193188	-112336	-114184	-105024	-98814

Reformulated Balance Sheet

Reformulated Balance Sheet	2021	2022F	2023F	2024F	2025F	2026F	2027F	2028F	2029F	2030F	2031F	2032F	2033F	2034F	2035F	2036F	2037F	2038F
Core Business																		
Operating Cash	756	3903	5417	7019	9031	11644	15102	17972	21702	26252	30516	34040	38326	42892	46903	50246	53145	55604
% Of Revenues (Assumption)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Accounts receivable net	2156	3903	5417	7018	9030	11644	15101	17971	21701	26251	30515	34039	38324	42890	46901	50243	53143	55601
Average Collection Period	15	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Inventory	5699	9537	13257	17225	22263	29042	37718	45034	55083	66775	77903	88037	99431	111432	123073	132178	141359	149002
Average Holding Period	54	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61
Accounts payable	-9054	-12305	-17106	-22225	-28726	-37473	-48668	-58106	-71073	-86159	-100517	-113593	-128295	-143779	-158799	-170548	-182394	-192256
Average Payable Period	86	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78
NWC	*-1199*	*1139*	*1569*	*2018*	*2568*	*3213*	*4151*	*4898*	*5711*	*6867*	*7900*	*8482*	*9461*	*10543*	*11174*	*11873*	*12108*	*12347*
Property plant and equipment net	17298	20889	25280	29977	33999	36794	39574	41197	42547	43562	44171	44884	45268	45488	45741	46035	46373	46764
See page "PP&E"																		
Prepaid expenses and other current assets	2.059	2674	3768	4895	6327	6988	9076	10836	9941	12051	14059	15888	17944	13406	14807	15902	17007	17926
% of Total Costs	5%	5%	5%	5%	5%	4%	4%	4%	3%	3%	3%	3%	3%	2%	2%	2%	2%	2%
Operating lease vehicles net	4.584	5985	7814	10203	13322	17394	22612	29396	38215	49679	64583	82021	104166	130208	162760	203450	254313	317891
YoY Growth	48%	31%	31%	31%	31%	31%	30%	30%	30%	30%	30%	27%	27%	25%	25%	25%	25%	25%
Solar energy systems net	5766	5607	5769	5721	5660	5607	5452	5610	5549	5490	5438	5288	5442	5382	5326	5221	5077	5224
YoY Growth	-3,6%	-2,8%	-2,8%	-2,8%	-2,8%	-2,8%	-2,8%	-2,8%	-3,0%	-3,0%	-3,0%	-3,0%	-3,0%	-3,0%	-3,0%	-4,0%	-4,0%	-4,0%
Operating lease right-of-use assets	2158	2990	2281	2402	2718	2990	4141	3160	3327	3765	4141	5737	4378	4609	5215	5737	7947	6064
YoY Growth	39%	39%	39%	39%	39%	39%	39%	39%	39%	39%	39%	39%	39%	39%	39%	39%	39%	39%
Intangible assets net	363	367	370	374	378	382	386	390	394	398	402	406	410	414	419	423	427	432
% of revenues	0,7%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Accrued liabilities and other	-7.597	-10200	-10834	-12633	-14449	-16302	-18122	-17972	-17362	-21002	-24413	-27232	-30661	-34314	-37522	-40196	-42516	-44483
% of Revenues	15%	13%	10%	9%	8%	7%	6%	5%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Deferred revenue	-2.057	-2342	-3250	-4211	-5419	-6986	-9061	-10783	-13021	-15751	-18310	-20424	-22996	-25735	-28142	-30147	-31887	-33362
% of Revenues	4%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Customer deposits	-886	-1561	-2167	-2807	-3612	-4658	-6041	-7189	-8681	-10501	-12206	-13616	-15331	-17157	-18761	-20098	-21258	-22241
% of Revenues	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Deferred revenue net of current portion	-1.517	-2342	-3250	-4211	-5419	-6986	-9061	-10783	-13021	-15751	-18310	-20424	-22996	-25735	-28142	-30147	-31887	-33362
% of Revenues	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Other non-current assets	2.116	5464	7356	9530	10837	13973	18122	21567	26043	31503	36619	34040	38326	42892	46903	50246	53145	55604
% of Revenues	4%	7%	7%	7%	6%	6%	6%	6%	6%	6%	6%	5%	5%	5%	5%	5%	5%	5%
Other long-term liabilities	-4.472	-5464	-7584	-9826	-12643	-16302	-21142	-25161	-30383	-36753	-42723	-47656	-53657	-60049	-65664	-70344	-74404	-77845
% Revenues	9%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Core invested capital:	**17529**	**27261**	**32696**	**38608**	**43455**	**47908**	**55347**	**63295**	**71118**	**79966**	**92027**	**101590**	**118239**	**133002**	**161174**	**198356**	**247747**	**306719**
Non Core Business																		
Digital assets, net	1.260	1.260	1.260	1.260	1.260	1.260	1.260	1.260	1.260	1.260	1.260	1.260	1.260	1.260	1.260	1.260	1.260	1.260
		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Goodwill	158	158	158	158	158	158	158	158	158	158	158	158	158	158	158	158	158	158
Non Core Invested Capital:	**1.418**	**1.418**	**1.418**	**1.418**	**1.418**	**1.418**	**1.418**	**1.418**	**1.418**	**1.418**	**1.418**	**1.418**	**1.418**	**1.418**	**1.418**	**1.418**	**1.418**	**1.418**
Total Invested Capital	**18947**	**28679**	**34114**	**40025**	**44873**	**49326**	**56765**	**64713**	**72536**	**81384**	**93445**	**103008**	**119657**	**134420**	**162592**	**199774**	**249165**	**308137**
Financial																		
Excess Cash	15974	23419	32503	42111	54185	69865	90609	71889	86810	105009	122065	136161	153305	85785	93806	100491	106291	111207
% Revenues	31%	30%	30%	30%	30%	30%	30%	20%	20%	20%	20%	20%	20%	10%	10%	10%	10%	10%
Current portion of debt and finance leases (current debt)	-1716	-1917	-2107	-2302	-2490	-2670	-2837	-2991	-3126	-3227	-3303	-3356	-3393	-3379	-3379	-3379	-3379	-3379
% of current debt on total debt	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%
Debt and finance leases net of current portion (long term debt)	-6438	-7192	-7907	-8635	-9341	-10016	-10644	-11222	-11729	-12108	-12394	-12590	-12731	-12678	-12678	-12678	-12678	-12678
% of lonf term debt on total debt	79%	79%	79%	79%	79%	79%	79%	79%	79%	79%	79%	79%	79%	79%	79%	79%	79%	79%
Total Debt	-8154	-9108	-10014	-10936	-11831	-12686	-13481	-14213	-14855	-15335	-15697	-15946	-16124	-16057	-16057	-16057	-16057	-16057
D/EV (Market Values)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Redeemable noncontrolling interests in subsidiaries	0	-451	-451	-451	-451	-451	-451	-451	-451	-451	-451	-451	-451	-451	-451	-451	-451	-451
Convertible senior notes (Note 12)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Noncontrolling interests in subsidiaries	0	-633	-633	-633	-633	-633	-633	-633	-633	-633	-633	-633	-633	-633	-633	-633	-633	-633
Net Financial Assets	**7820**	**13227**	**21405**	**30091**	**41270**	**56094**	**76044**	**56592**	**70870**	**88590**	**105284**	**119131**	**136097**	**68644**	**76665**	**83350**	**89150**	**94066**
Total stockholders' equity	**26767**	**41905**	**55519**	**70116**	**86143**	**105420**	**132810**	**121305**	**143406**	**169974**	**198728**	**222139**	**255754**	**203064**	**239257**	**283124**	**338314**	**402204**

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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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