

# **Škoda's Marketing Strategy of Penetration the Czech Market with Electric Cars**

Bc. Daria Iushkina

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Master's thesis  
2017

 **Tomas Bata University in Zlín**  
Faculty of Management and Economics

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Tomas Bata University in Zlín  
Faculty of Management and Economics  
Department of Management and Marketing  
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## MASTER'S THESIS ASSIGNMENT

(PROJECT, ARTWORK, ARTISTIC PERFORMANCE)

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#### I. Theoretical part

- Compile the theoretical information with literature research about marketing strategy.

#### II. Practical part

- Analyze readiness and marketing strategies of Skoda Auto for launching of electric cars.
- Prepare the electric cars' launching timeline for Skoda, including necessary marketing actions.
- Submit the project to risk and cost analysis.

### Conclusion

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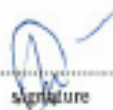
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## ABSTRAKT

V současné době je situace na mezinárodním trhu mezi producenty automobilů nezávislé producenty spíše konkurenční a to je povzbuzuje najít nové způsoby a nástroje, aby přilákali zákazníky. Většina automobilek zvolila strategii šetrnou k životnímu prostředí, založenou na světové ekologické situaci. Více než to, že nedávný skandál s emisemi u Volkswagenu donutil téměř všichni hráče trhu věnovat velkou pozornost otázce životního prostředí. Navíc úspěch Tesly dokázal, že je zde vysoká možnost masového zavedení elektromobilů na trh. Společnosti jako BMW, Volkswagen, Renault Group atd. investovali miliardy do rozvoje hybridů či elektromobilů (EV).

Potenciální jedničkou na českém trhu je Škoda Auto se svými novými koncepty elektromobilů a hybridních automobilů. Společnost se těší velké oblibě po celém světě díky svým vysokým standardům kvality a modernímu designu. Cílem projektu je identifikovat správný způsob rozvoje společnosti v oblasti trhu s EV v České republice.

**Klíčová slova:** Český trh, marketingová strategie, elektromobil, Škoda Auto, automobilky, globální konkurence

## ABSTRACT

Nowadays there is rather competitive situation on the international market among Auto producers, which encourages them to find new ways and tools to attract customers. Most of the Automakers chose environment-friendly strategy, based on the ecological situation worldwide. More than that, recent Volkswagen's emission scandal forced almost all players to pay significant attention to the environment question. Furthermore, Tesla's success proved that there is high possibility to introduce electric cars on the mass market. Such corporations as BMW, Volkswagen Group, Renault Group etc. invest billions in development of hybrids or electric vehicles (EV).

One of the potential leader for Czech Market is Škoda Auto with their new concepts of electric and hybrid cars. The company enjoys great popularity around the world due to its high quality standards and modern design. The aim of the project is to identify the correct way of company's development to occupy the part of EV' market in the Czech Republic.

**Keywords:** Czech market, marketing strategy, electric vehicle, electric car, Škoda Auto, Automakers, global competition

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I hereby declare that the print version of my Master's thesis and the electronic version of my thesis deposited in the IS/STAG system are identical.

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## INTRODUCTION

Over the last few decades car manufacturing companies have been operating in an increasingly competitive environment. Each of the leading players try to introduce new technology and be an innovator in the race. Car producers invests plenty of money for research and development. It became increasingly important to be the first in the field. Customers become more selective, consequently it is rather important to produce the best product in segment “price-quality”.

It is not a secret, that leading positions in the car production sector in Europe are possessed by German companies, as Mercedes Benz, Volkswagen Group, BMW. Traditional German quality together with fare prices for the models enjoy great popularity among Auto owners. It is known, that Škoda Auto became a part of Volkswagen Group in 90s, and as a result, nowadays it consolidates best traditions of Czech culture and great features of German quality. The common strategy of development brings only the positive changes in global and local sales. Introduction of new models and facelifts attracts even more consumers; therefore, company is willing to invest in absolutely innovative projects. One of them is manufacturing of electric vehicles, based on the market potential and experience of competitors.

For example, BMW started successful sales of models “i”, Volkswagen manufactures electric vehicle on Golf’s platform, and Fiat prepares famous 500 in electric version. It is obvious, that people are interested in this technology after outstanding performance of Tesla’s EVs. In spite of the fact, that Alan Mask was oriented on luxury auditory, he was one of the first, who proved that electric vehicle project can be profitable.

Moreover, European authorities prepared the green-orientated strategy for all participants of Euro Union, consequently, it also influenced Automakers to review their visions in terms of the environment. Obviously, it influenced them to find new innovative solution in order to not lose the positions. One of them is investment in development of hybrids and electric cars. It is also necessary to underline, that countries try to develop the chain of electric chargers around the Europe. This infrastructure will provide more chances for EVs to become a part of Auto market.

## **OBJECTIVES AND METHODS OF MASTER THESIS PROCESSING**

To understand the most important problems, there were used different tools and methods. Firstly, it was important to prepare the overview of the current situation on the auto market and compare competitive advantages of the leaders. Moving further, we also considered the historical aspects and development of the electric vehicles, that helped to underline the most significant innovations in the field. Modern marketing tools were used in order to prepare preferable way of development for Škoda Auto. In the end of the master thesis there are some advices in terms of designing of the new concept.

Objectives of this diploma work were:

- Compile the theoretical information with literature research about Electric Vehicles.
- Analyze readiness and marketing strategies of Skoda Auto for launching of electric cars.
- Prepare the electric cars' launching timeline for Skoda, including necessary marketing actions.
- Submit the project to risk and cost analysis.

Methods used:

- Qualitative Research
- Quantitative Research

## **I. THEORY**

# 1 ŠKODA AUTO

The company Škoda Auto a.s., headquartered in Mladá Boleslav, is an industrial heavy-weight in the Czech Republic and one of the world's oldest car makers. Its origins go back to 1895, when Václav Laurin and Václav Klement set up a firm introducing the way for more than a century of Czech car production. Škoda Auto currently employs more than 25,400 people. The Škoda brand has been part of the Volkswagen Group for more than 25 years. During this time, Škoda Auto deliveries have increased substantially and its product portfolio has expanded significantly: the company produces not only standard sedans but also cars of SUV class. The Company's principal business activities are the development, production and sale of Škoda cars, components, genuine parts and accessories, and the provision of servicing. Besides producing of high quality vehicles, Škoda provides the variety of other services to maintain the customers. The sole shareholder of Škoda Auto a.s. is Volkswagen Finance Luxemburg S.A., established in Luxembourg, Luxembourg. Volkswagen Finance Luxemburg S.A. is a subsidiary of Volkswagen AG. Škoda Auto runs production plants in the Czech Republic. Škoda-branded cars are also manufactured in such countries as China, Russia, India, Slovakia, Ukraine and Kazakhstan.

## 1.1 The history

Nowadays, Škoda is considered to be the third oldest car producer in the world, with its history started in 1895. During the last century, the Czech brand has gone through long path of changes and developments, producing a significant list of award-winning cars in just about every category. Interesting fact is that the development of the brand started as Laurin and Klement producing bicycles, Škoda has designed and engineered pretty much everything from traditional sports cars, limousines and 4x4s to the more unusual firetrucks, mobile libraries, tractors and hearses.

Moving to the beginning of the Škoda's history, it is crucial to underline that Vaclav Laurin and Vaclav Klement always had a passion for technology. They were constantly searching for innovations which has always been as the inspiration for such a successful car manufacturer. With the production of innovative vehicles, Laurin and Klement were pioneers of their time. The story of the two founders started when they did not get the expected bicycle and, consequently, decided to open their own factory to repair bicycles in 1895. Initially, they quickly moved from bicycles' reparation to the production line of certain bicycle model.

As the result, at the end of the 19th century, Laurin&Klement was the first local company which offered a 2-year warrantee on their products. When founders achieved the huge success and popularity, L&K merged with Škoda in the year 1925. With great motivation, they were the most significant characters who laid the success stone for Škoda brand. Currently, the Škoda brand has a number of sponsorships, including cycling racing. This being at the root of the company is the most popular races of all the other races.

It is necessary to emphasize, that production of bicycle has been the strongest pillar in the success of the Škoda brand for many years. As the result, Škoda still continues manufacturing bicycles. In the year 2013, the noted brand launched eleventh collection of 10 bicycles for both children and adults. No doubts that Vaclav Laurin and Vaclav Klement created one of the most successful brands in the world. Nevertheless, it was also the hard work that needed to be done in order to achieve success on the global level.

Laurin and Klement tried to visit as much as possible workshops in order to find new ideas and stay in touch with other inventors. After one of the conferences in Germany they brought back home the portable engine for bicycles. It could be attached to regular bicycle and let driver to move the vehicle with no force. It encouraged Laurin and Klement to extend the production line. Already in the year 1899, the Laurin and Klement Co. began producing motorcycles, which were soon successful and gained several racing victories. After initial experiments at the turn of the century, the production of motorcycles was gradually replaced by Automobiles from 1905 onwards.

Like many other products, the first Laurin and Klement Automobile, the Voiturette A, gained a huge success, later becoming the archetype of the Czech Automobile maker. Later on, it formed a stable position for the company in the developing international Automobile market, so that the Company could start operating on a wide scale. The volume of the production increased and soon exceeded the potential of a private enterprise, and in 1907 the founders of the company initiated conversion to a joint-stock company. The international role for Škoda 's became highly important. The number of production facilities was increased Rapidly and already after 1914, Škoda participated in the production for the armed forces.

This time it was strong country's economic development, consequently, a joint venture with a strong industrial partner became essential in the 1920s. Government contributed to strengthen and modernize the Company, which was at that time producing numerous types of passenger cars, trucks, buses, airplane engines and agricultural machinery. In 1925, fusion

with the Pilsen Škoda Co. was accomplished, marking the end of the Laurin and Klement trademark. In early 1930s, the Automotive business was again organized as a separate joint-stock company within the Škoda Group. After the crisis, the company achieved a breakthrough with the Type Škoda Popular.

“In 1939 came World War 2. Czechoslovakia was occupied by the Germans and the period until 1945 was a disruptive one for Škoda. The civilian car production programme was very limited and the majority of manufacturing was to support the German war effort. After the war, as part of large-scale nationalization in Czechoslovakia, the company became a national enterprise and took over all passenger car production.

Škoda also manufactured the Škoda 440 which, in 1959, evolved into the first Octavia, named because it was the eighth model to be produced after the end of World War 2.” [24]

Post socialist period was rather hard for the economy of Czechoslovak, nevertheless, based on the traditional production processes and past success, the country’s economy managed to maintain a relatively good standard for several decades, despite the changes brought about by planned economy and unduly Rapid growth. This strategy only became doubtful in the end of the 1960s due to development of new technology in the western world. The permanent stagnation of the economy started after the 70s, also affecting the Mlada Boleslav Automobile manufacturer in spite of the company's leading position in the East Europe market. In spite of the difficulties, the new model range Škoda Favorit helped the Company to grow again after start of the production in 1987.

Unsustainable economic situation together with the political changes of 1989 (when the Berlin Wall was brought down) brought new market conditions. The government of the Czech Republic and the management of Škoda began to search for a strong foreign partner in order to secure the company's long term international competitiveness. It was also crucial to maintain stable workforce, so as the enterprise provided with huge number of work places. In December 1990, Volkswagen was chosen and a joint venture began the year 1991. Škoda became the fourth brand in the Volkswagen group, alongside Volkswagen, Audi and Seat.

Volkswagen bought an initial 31 percent stake in the company for DM 620 million, which would increase to a 70 percent shareholding by 1995, at a total cost to Volkswagen of DM 1.4 billion. As a result, Škoda reported annual revenues in 1991 of CZK 15 billion (about \$390 million).

For better cooperation, Volkswagen simultaneously acquired co-ownership rights of the distinctive Škoda winged arrow logo, which had been the property of the Škoda Plzen engineering company since the end of World War II. “The Czech government paid Škoda Plzen more than CZK 250 million (\$8 million) for the right to have Volkswagen use the trademark on cars. (The logo was updated with new colors in 1993. The name 'Škoda Auto' was printed in white around a black circle, said to symbolize the company's long heritage. The green of the winged arrow within symbolized contemporary concern for environmental issues.)

Volkswagen immediately took measures to streamline Škoda's production process.” [37] New policy was invented to retool from the central planning mentality of Škoda's workers to Western standards of efficiency and quality. It significantly helped to improve Škoda's productivity in the next year by following the Volkswagen acquisition, although profits took a bit longer to achieve. By the end of 1992, the company was making 860 cars a day, versus 560 at the beginning of the year, according to the Financial Times. Škoda managed to turn a profit (\$42.8 million) in 1992. Revenues, meanwhile, had risen dramatically to \$1.1 billion.

Volkswagen invested about \$240 million in Škoda's Czech plants in its first two years of cooperation. It was planned to invest about \$5 billion for the decade in order to double capacity to 460,000 cars a year by the mid-1990s. Škoda hired about 17,000 workers at this time; due to the expansion, it was increased to 20,000 workers during the decade. People were paid an average monthly salary of \$260 each in 1993, what was competitive salary for that time. Not surprisingly, Automotive suppliers moved to the Czech Republic, chasing Volkswagen's business.

At the time, more than half of all Škoda's cars were sold in the European Community, particularly the eastern provinces, where there was a problem with undersold similar Volkswagen models by 20 percent. Another important platform for Škoda was the United Kingdom, which imported about 10,000 of the vehicles a year. Škoda Automobile UK was established to simplify the import of the cars for this region in 1993.

One of the most monumental challenges was the overcoming the poor reputation of Škoda and other Eastern Bloc products. Many customers didn't trust them at all. One Škoda official estimated there were 100,000 Škodas on British roads in the early 1990s, each one a testament to inferiority. Significantly that a marketing study quoted by the Financial Times found their owners loved the cars despite the jokes. Another problem was to get non-owners to try

the cars. Volkswagen's association with the company gave its new claims of quality credibility and standards. Škoda spent about £11 million on advertising in 1993 and 1994 to persuade potential U.K. customers to give the brand a chance, because together with rather low price, it provides successful Germany quality.

In spite of positive results, there were also negative points in the history of Czech brand. For instance, Volkswagen scaled back its original investment plans in mid-1993 after sustaining huge losses at its Seat division in Spain. A modified agreement signed six months later committed Volkswagen to investing DM 3.75 billion in Škoda through 1998, with the aim of boosting production to 300,000 cars a year by 2000. Because of this, Škoda lost CZK 4.26 billion in 1993 on revenues of CZK 35 billion.

“Ten thousand workers staged brief work stoppages to protest plans to lay off 800 employees in late 1994. The Financial Times reported growing hostility towards foreign investments in the Czech Republic, such as that of Air France in Czechoslovak Airlines.” [18]

Moving further, it is important to mention, that in November 1994, Škoda replaced the profitable Favorit with its new Felicia model. A million of them expected to be produced by April 1996. Some Felicias were assembled at Volkswagen's Polish plant, and, beginning in late 1996, under license in Belarus and Smolensk. Ventures in India, Egypt, and China were also being considered for this purpose.

One more important change was regarding Škoda reviving of the Octavia name for a new mid-size model that debuted in the fall of 1996. Priced from \$15,200 in Germany, the Octavia was Volkswagen's brave answer to low-priced Asian marques. Interestingly, the vehicle was Škoda's first car with an Automatic transmission.

With the launch of the Octavia, according to Automotive Components Analysis, it was underlined with the first time that Škoda ever had two models in production at the same time. After analytical research, Volkswagen had decided to build a new, thoroughly modern DM 500 million factory next to the existing one in Mlada Boleslav to accommodate the Octavia's assembly line. It was rather efficient in comparison with rival Japan's most productive facilities. Czech President Vaclav Havel remarked on its abundance of natural lighting, including glass walls at opposite ends, saying, 'it would be wonderful if all production halls looked like this. It is a beautiful plant, truly modern, truly appealing.' Due to the lower cost of labor in central Europe, the new facility was not completely Automated. Furthermore, Škoda also had another, smaller plant in Vrchlabi.



In order to achieve maximum economies of scale Volkswagen chose commonality of platforms between its four divisions. However, as many of the car components were made in high-cost Germany, they seemed to have the potential of diluting the wage savings available via Seat and Škoda. The Financial Times reported that the Octavia shared a significant fraction of its parts with versions of the Audi A3 and the VW Golf then in development. Many of these parts arrived at the Škoda factory already assembled in subunits, such as the front-end module, which included the bumper, lights, and radiator.

It is important to emphasize, that worldwide sales grew about 25 percent in 1996 with the most remarkable increases in central Europe. In neighboring Slovakia, sales rose 90 percent to 23,035 units; they leapt 102 percent to 15,840 in Poland. Obviously, the Czech Republic itself remained a vibrant market, with 87,400 cars sold in 1996, up 21 percent.

Annual sales were CZK 106 billion in 1998. A launch of redesigned Felicia was in February, and new generation of the Octavia came soon after. A significant month was March of 1999, when a four-wheel drive model appeared. In April of the same year, Škoda opened its new Design Center, which accommodated 160 employees. More than that, already in May company's new coal-fired power station SKO-ENERGO s.r.o. at Mladá Boleslav began operations.

In terms of investments, Škoda spent £12 million to promote the Octavia in the United Kingdom. Although it achieved some of the best owner loyalty rates in the business and had been under Volkswagen ownership for almost 10 years, Škoda still had a challenge getting prospects to become competitive there.

Škoda established a factory in India in January 2000. The company introduced its new Fabia hatchback already in April 2000. Its new post-VW quality standards led some observers to compare the Škoda Octavia with a potential competitor for premium marques, for example, Ford Motor Company's Volvo unit. Volkswagen finally prepared an important agreement to buy the remaining 30 percent of Škoda in May 2000, paying DM 650 million.

The image of Škoda in Western Europe was completely changed after partnership with VW Group, in stark comparison with the reputation of the cars throughout the 1980s—often described as "the laughing stock" of the Automotive world. Due to Auto production development worldwide, attractive new models were marketed by competitive companies, whereas Škoda's image was initially slow to improve. Rather interesting campaign was conducted in the UK, where a major attention was achieved with the ironic slogan "It is a Škoda, honest".

It was started in 2000 when the Fabia was launched. Advertisement on British television, as a new employee on the production line is fitting Škoda badges on the car bonnets was appeared in 2003. According to the commercial, when some attractive looking cars come along the employee stands back, not fitting the badge, since they look so good they cannot be Škodas. This market campaign worked by confronting Škoda's image problem head-on—a tactic which marketing professionals regarded as high risk. Nevertheless, by 2005 Škoda was selling over 30,000 cars a year in the UK, a market shares of over 1%. For the first time in its UK history, a waiting list developed for deliveries by Škoda. UK owners have consistently ranked the brand at or near the top of customer satisfaction surveys since the late 1990s.

Important changes for Škoda Auto came over in 2010. It was regarding both products and management. On 1 September 2010, Prof. Dr. h.c. Winfried Vahland assumed responsibility for the management of the company, becoming the CEO of Škoda Auto. Under Vahland's leadership, Škoda opened forth plans to double the company's annual sales to at least 1.5 million by 2018 (later known as the "Growth Strategy"). Moving further, at the 2010 Paris Motor Show in September 2010, the company unveiled the Octavia Green E Line. This e-car concept was the forerunner to the e-car test fleet that Škoda released in 2012. The final 1st-generation Octavia (Tour) was produced at the Mladá Boleslav plant in November 2010. The worldwide production of this model exceeded 1.4 million units since its release in 1996. Finally, in 2010 for the first time in history, China overtook German sales to become Škoda's largest individual market.

Škoda Auto celebrated its 20-year partnership with the Volkswagen Group in April of 2011. More than 75,000 visitors attended an open-house event in Mladá Boleslav. Before that, the company provided detailed report on its 2018 Growth Strategy: at least one new or completely revised model should be released every half of year. With the release of the new strategy, the company redesigned its logo, which was presented at the 2011 Geneva Motor Show. Škoda's main attraction at the event was the design concept called VisionD; a concept to the future 3rd generation Octavia was shown as well. Škoda presented the MissionL design study at the IAA in Frankfurt am Main in September, which was to become the basis of the company's forthcoming compact model the European Rapid. In the same year, the company started production of the new Rapid model in Pune, India (October 2011), and launched the Citigo at Volkswagen's Bratislava plant (November 2011).

2012 year was rather important as wee. For example, during that time Škoda was preparing the introduction of two volume models. Firstly, it was the European version of the Rapid

premiered at the Paris Motor Show which was a successor to the 1st-generation Octavia in terms of its price bracket. The second volume model was the 3rd-generation Octavia, which premiered in December 2012. At the same time, the local production of the Yeti was launched at the Nizhny Novgorod GAZ factory, Russia. Škoda also introduced an emission-free fleet of Octavia Green E Line e-cars on Czech roads for external partners. Internal tests on the fleet in 2011 proved that the e-fleet had driven more than 250,000 km. During the same year, Škoda celebrated several milestones, including fourteen million Škoda cars being produced since 1905 (January), three million Fabias (May), 500,000 Superbs at the Kvasiny plant (June) and 5 years of Škoda operations in China.

2013 in history of Škoda was important due to massive rejuvenation of the model range: they launched the third-generation Octavia Combi and Octavia RS (both liftback and estate) as well as facelifted Superb and Superb Combi. They were accompanied by brand new members of the Rapid family as the Rapid Spaceback, the first Škoda hatchback car in the compact segment, and the Chinese version of the Rapid. Also the Yeti faced significant changes: two design variants of Škoda's compact SUV are now available: city-like Yeti and rugged Yeti Outdoor. Moreover, there was special solution for Chinese market - Yeti with extended wheelbase.

Huge scandal arisen in 2015 when Volkswagen admitted that it had installed pollution-cheating software in many of its cars to fool regulators that its cars met emissions standards when in fact they polluted at much higher-levels than government standards. After the incident, almost 1.2 million Škoda cars worldwide were fitted with this emissions-cheating device. Volkswagen recalled and covered refitting costs for all of the cars affected by the Volkswagen emissions testing scandal. In spite of the negative influence after the VW scandal, Škoda was in 2015 voted as the most dependable car brand in the UK.

At the same year, new Škoda chairman Bernhard Maier stated that the Volkswagen Group "is working on a modular, new electric platform and we are in the team", and that "there is no alternative to electrification." The target of Škoda is to produce an electric car with a range of over 300 miles (480 km), 15-minute charging time and a cost below a comparative combustion-engine vehicle. New Škoda corporate "Strategy 2025", which replaces the previous "Strategy 2018", aims to start production of a fully electric vehicle in 2020 or 2021, after a plug-in hybrid Superb in 2019.

Regarding the latest news, as of August 2016, Škoda was being sold in 102 countries with planned expansions to South Korea, Singapore and Iran within a year. The decision whether to expand into the North American market is planned to be made in the middle of 2017. Furthermore, Škoda Auto started to manufacture a large, seven-seat SUV Škoda Kodiaq in 2016, intended to be a true off-roader, it was introduced at the Paris Motor Show in October 2016 and sales started in the beginning of 2017.

## 1.2 Technical development

Significantly, that in 2016, Škoda Auto invested CZK 10.0 billion in technical development. Revenue from external orders in 2016 came to CZK 1.3 billion. The development of new models was in the hands of 1,648 employees at the Company's headquarters and 38 colleagues abroad.

In the spring, the VISION S concept car was unveiled in Geneva. This show car, 4,700 mm long, 1,914 mm wide and 1,698 mm high, garnered a great deal of media attention. One of the vehicle's focal points on the outside was its uniquely shaped 21-inch wheels. It is powered by a combination of combustion and electric drive, known as PHEV (plug-in hybrid electric vehicle). There are three rows of seats to accommodate six people. Mobile phone integration into the car's systems connects all passengers to the outside world via the internet. All passengers have their own screen, which they can use to communicate with each other.

The message of the Vision S show underlined following ideas: Škoda has a new SUV design, Škoda is developing electric drive, Škoda is online, Škoda remains family-oriented.

Nowadays, Škoda provides an extensive model portfolio varying from the small Citigo to the flagship Superb. A new series was added during 2016 year, when Škoda presented absolutely new category, SUV Kodiaq at the Paris Motor Show. The self-assured, powerful and dynamic SUV combines main qualities of the Škoda brand: an significant amount of space, strong futuristic design, many practical features and excellent pricing solution. The best-selling for many years Škoda Octavia celebrated its 20th birthday in 2016. It is important to underline, that five million Octavias have been sold to date, more than any other Škoda model. Furthermore, almost each model was presented with new facelift or in new generation in 2016.

Škoda cars are leaders when it comes to functionality and innovation. Emotions are also integral to the new design DNA. The cars' successfulness is borne out by the results of independent tests. The Škoda Octavia, Superb, Rapid, Rapid SPACEBACK and Yeti chalked up 12 first places on the highly demanding German market in 2016. We are developing new cars to stand us in good stead in the tough competitive landscape. We have plans to introduce even more exciting exteriors and interiors and to modernise the way the controls are arranged on the dashboard. Innovations and newgeneration "Simply Clever" solutions are also in the pipeline. We are digitising our development operations to increase the efficiency of technological developments.

In terms of environment, Škoda Auto traditionally carries out its plans with keen consideration for sustainable development and sensitivity towards nature. Development work has been launched on the gradual electrification of Škoda cars with technology for PHEVs (plugin hybrid electric vehicles) and BEVs (battery electric vehicles). Electrified vehicles will be tailored separately to the European and Chinese markets as each has its own individual needs.

Now that the development of the brand new model, the Škoda Kodiaq, has been successfully brought to completion, Technical Development will focus on implementing the SUV strategy. Another new SUV will be the successor to the Škoda Yeti, due to start series production in 2017. The new-generation Škoda Yeti will be longer, wider and squatter than the current model in order to achieve finely rendered proportions and a dynamic look. Passengers will enjoy plenty of space both in the front and on the back seats, and the luggage compartment will be able to hold more cargo. Compared to the present model, comfort and safety features will be expanded, and the vehicle will come with new-generation engines. Innovations of existing models will also abound in 2017. China-specific versions of the Škoda Kodiaq and the newgeneration Škoda Yeti will be produced. In the present year, 2017, Technical Development will aim to extend online services, expanding from its single Škoda Kodiaq offering to embrace a further six Škoda models. Earnest development work will also be devoted to completely new generations of vehicles. In the creation of new products, Technical Development reflects customers' latest demands and keeps tabs on trends evolving on the markets to which Škoda vehicles are exported. Significant innovation potential has been identified in the gradual electrification of Škoda cars with the deployment of technology for PHEVs (plug-in hybrid electric vehicles) and BEVs (battery electric vehicles). In 2017, the Škoda Motorsport factory team will focus its efforts on competing in WRC2 rallies offering the

best promotional opportunities and in the Czech Championship. The Škoda Fabia R5 will benefit from further improvements and is now also put up for sale to customers. Besides participating in the above competitions, Škoda Motorsport will offer support to customer teams and will continue to develop the customer scheme.

### 1.3 Environment question

Nowadays every modern company is faced with the technological, social and environmental challenges of a fast-moving world. Škoda is not an exception. The essence of success lies in the principle of sustainability, which at Škoda Auto relies on creating shared values inside of the Company and with the world around it. The Company creates shared values under its recent strategy and builds “Green Future” environmental preferences and by establishing and adhering to principles of ethical and transparent conduct. Sustainability management at the Company is also controlled by executive management.

That is why environmental protection policy is an integral part of all Škoda Auto activities. Such activities as vehicle development, production and recycling are influenced by environmental responsibility of the company. As during previous years, all key parameters that have an environmental impact are important and they are systematically monitored and evaluated, moreover, action is constantly being taken in response to the results.

Within the specification of its integrated management system, Škoda Auto’s environmental management system and its energy management system has been certified as compliant with ISO 14001 and ISO 50001 respectively.

The environmental forum regularly evaluates and approves energy-saving measures. At the Mladá Boleslav plant, for example, action has been taken to add frequency inverters to the indoor ventilation system’s fan drives, enabling the Company to optimize their operation, make substantial electricity savings, and reduce the current and voltage spikes when starting up the drives.

At the Vrchlabí plant, an evaporator has been installed to treat oily water. This equipment can be used to treat oily process water, minimizing the amount of liquid waste requiring disposal. Once processed in this way, the water meets requirements for entry into the municipal wastewater treatment plant. The installation of the evaporator will also significantly reduce the movements of the vehicles used to transport liquid waste away from the plant.

The new-generation Škoda Superb was decided to produce at the Kvasiny plant. Taking this under the consideration, the Company invested heavily in new production technology for the welding shop, assembly facilities and logistical areas. All these modernizations made the new plant more efficient.

A top air protection priority is reduction of the main pollutants released into the atmosphere when cars are made are volatile organic compounds (VOCs). In last couple years, the Company optimized measures to reduce VOC emissions from car body painting, which saw these emissions drop by more than 82 tons per year. In addition, the quantity of VOCs emitted per m<sup>2</sup> of painted area fell down to 40% of the 45 g/m<sup>2</sup> statutory limit. One more engineering solution is that the heat recuperated from the thermal abatement of VOC emissions is used to warm up equipment in the paint shops.

The Company's priorities are directed to the safe handling of compounds that, if leaked, could contaminate the soil or groundwater. It seems to be standard procedure to observe safety rules, such as multiple barrier protection. Less hazardous compounds are the preferred option if it is technologically possible. Based on the environment-friendly principles, technological procedures and processes are selected to minimize water consumption, with the goal to pull down specific water consumption per vehicle produced. Recycled water is accounted for more than 36% of overall consumption in production purposes.

The respect to the waste hierarchy has a dominant position in waste management together with principle of a prevention policy. In 2015, waste management at the Mladá Boleslav plant was the crucial issue to solve. The basic requirement was to reduce the proportion of waste for disposal. In 2016, the Company noted this as a result in a significant increase in the share of recoverable waste, with a corresponding contraction in waste for disposal.

On the one hand, energy consumption per car produced stagnated in 2015. Nevertheless, the that the winter was warmer in 2016 means that there was a little positive change in this indicator. Since 2012, Škoda Auto has pursued its "Green Future" strategy, which is the part of the Škoda Growth Strategy. Under the strategy it fulfils its commitments and steadfastly improves sustainability, primarily by making sparing use of resources throughout the Company. More than that, many resources were invested in cleaning equipment.

## 2 ELECTRIC VEHICLES

### 2.1 Specific features of EV

Nowadays there is extremely fast development of science and technologies around the world. During last 20 years there have been discovered plenty of things: exploration of cosmos, huge jump in conformation of Einstein's theory in physics, new approaches in medicine, evolution of electronic devices etc. People are interested in simplifying of the life, more than that, environment question becomes rather important. It is prestigious to follow the trend of saving sources and reduction pollution, consequently, in terms of Automotive industry, the future is for low consumption cars, and the best pretenders for this position are electro mobiles.

Almost all modern car production companies invest in elaboration of electric cars, nobody wants to stay behind the competitors. It costs much money to develop electric vehicle, mostly because there is huge difference between engineering concepts of gasoline-powered and electric vehicles.

First and main difference is that electric cars consume electricity, at least partially. In comparison to conventional vehicles that use a gasoline or diesel-powered engine, electric vehicles use an electric motor powered by electricity from batteries or a fuel cell. On the other hand, it is important to mention, that not all electric vehicles work the same way. "Plug-in hybrids offer both a gasoline or diesel engine and an electric motor: the motor is powered by a battery that can be recharged by plugging in. Other electric vehicles forgo liquid fuels entirely, operating exclusively on electricity ("battery electric" vehicles). Still others power an electric motor by converting hydrogen gas into electricity ("hydrogen fuel cell" vehicles)." [45] It is proven, that electric cars produce no tailpipe emissions, reduce human's dependency on oil, and are cheaper to operate.

During the driving of electric car, the first significant things which is coming up is smoothness and silence of the vehicle, there is no sound pollution from the engine.

In terms of consumption, electric cars use far less energy than gasoline-powered cars, generally cost about a third as much as a gas-powered car to run. The cost of charging the battery depends on the price paid per kWh of electricity – which varies with location. Most of the mileage-related cost of an electric vehicle can be contributed to electricity costs of charging the battery pack, and its potential replacement with age, because an electric vehicle has only



around five moving parts in its motor, compared to a gasoline car that has hundreds in its internal combustion engine. In order to calculate the cost per kilometer of an electric vehicle it is crucial to assign a monetary value to the wear incurred on the battery with use, the capacity of a battery decreases. However, even an 'end of life' battery which has insufficient capacity has market value as it can be re-purposed, recycled or even used as a spare. Nonetheless, there are several possibilities to calculate spending during the exploitation of the electric vehicle.

University of California at Davis' Plug-in Hybrid & Electric Vehicle Research Center recently released a great tool for finding out how much you could save by switching from a gasoline vehicle to an electric vehicle.

It is possible just to enter addresses into the "EV Explorer" (<http://gis.its.ucdavis.edu/evexplorer/#!/>) and the tool will simulate the fuel costs for up to 4 vehicles. "The vehicles can be changed to include the current daily driver and there is the option to enter the local price for gasoline and electricity. Another useful feature is the ability to test the increase in range and fuel savings when charging at your destination. This might be a good way for existing electric vehicle's owners to explain the benefits of workplace charging to businesses considering offering a place for employees to plug in." [27] Furthermore, there are other considerations of benefits, like home charging availability, but this tool can be a quick way to see how much money different electric cars could save. Some specialists say, that switching to an electric car can save much money per year in fueling costs, compared to even the most fuel-efficient conventional cars. Generally, it is not expensive to maintain the electric car, mainly because it requires no oil changes and emissions checks, but due to different production way, the electric car sometimes is much more expensive, than fuel one.

Regarding air pollution and greenhouse gas emissions, electric cars and trucks are often cleaner than even the most efficient conventional vehicles. "Exactly how clean depends on the type of vehicle and the source of the electricity. When battery electric vehicles are powered by the cleanest electricity grids, greenhouse gas emissions from EVs are comparable to a car getting over 100 miles per gallon. When charged exclusively with renewable electricity like solar or wind, charging and operating an EV can be nearly emission free." [45] Consequently, it is environment-friendly concept, which also attract many customers.

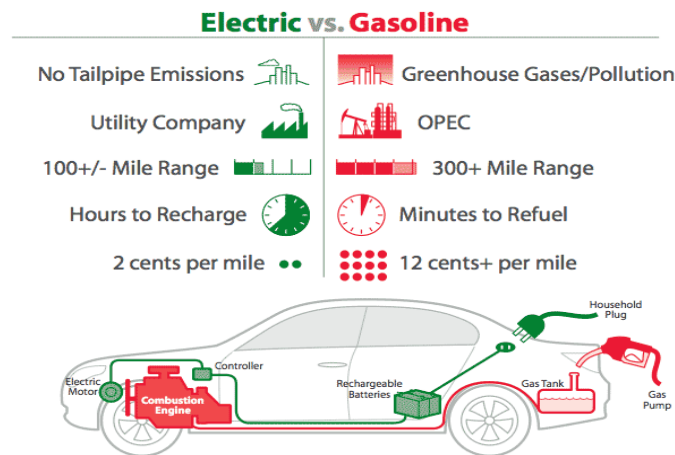
In spite of many benefits, there are also some minuses of using EVs. First of all, the price of the new car is quite high. Base prices range from \$21,750 for the Smart Electric Drive to

more than \$125,000 for our high-performance Tesla Model S test car. However, the full range of prices will be considered in chapter 2 during analysis of main competitors.

Secondly, another problem appears when we think about of EV. “Several pure electrics may not meet people’s driving needs between charges if they drive more than 70 miles per day and do not have access to workplace or public charging. Pure EV range varies from about 60 to 100 miles, although some versions of the expensive Tesla Model S can go a lot farther by about 240 miles. In particular, driving in cold weather will shorten the range noticeably, especially when the heater is used. The headlights, wipers, and defroster can likewise exact a toll. Gasoline-fueled cars will typically go 350 to 400 miles between fill-ups and take 5 minutes to fill. Driving an EV requires more planning. But, plug-in hybrids have a combined gasoline and electric range of 400 to 550 miles. Plug-in hybrids solve the range problem, but they still need a place to plug in. Unless they are relying entirely on workplace charging, electric vehicle owners generally need to have ready access to an outlet (or 240-volt battery charger) and parking spot for overnight charging.” [12] In most areas, this means that access is limited to single family or townhomes rather than apartments or condos, although in some countries, there are many local initiatives which have begun to foster charging and parking solutions for multi-family housing.

It takes between 4.5 and 6 hours to fully charge a pure-electric vehicle for a typical 240-volt charger. The time might be different due to the car, battery size, and the speed of the charger. Obviously, no EV driver wants to experience a completely depleted battery. Nonetheless, electric cars achieve the biggest benefits when they’re charged overnight at home when electric rates may decrease. As another benefit, most electric-car drivers say they find it much more convenient to just plug in at home than to have to stop at gas stations. However, most vehicles also support much faster charging, where a suitable power supply is available. Taking all of the problems under the consideration, for long distance travel there has been the installation of “Fast Charging” (as Supercharger from Tesla) stations with high-speed charging capability from three-phase industrial outlets so that consumers could recharge the battery of their electric vehicle to 80 percent in about 30 minutes. Although charging at these stations is still relatively time consuming compared to refueling, in practice it often meshes well with a normal driving pattern, where driving is usually done for a few hours before stopping and resting and drinking or eating; this gives the car a chance to be charged. More than that, charging can also be done using a street, garage or shop charging station. The

electricity on the grid is in turn generated from a variety of sources; such as coal, hydroelectricity, nuclear and others. Such Power sources as photovoltaic solar cell panels, micro hydro or wind may also be used and are promoted because of concerns regarding global warming. On the Figure 2 we can see main differences between gasoline-powered and electric vehicles.



**Figure 1.** Difference between gasoline-powered and electric cars (Cost efficiency of electric vehicles and extended range electric vehicles for various user groups, 2017)

## 2.2 Environment and electric cars

Problems affecting the global environment are on everyone's mind these days, and the world's leading Automakers are no apart of the issue. One product of such thinking has been the development of environment-friendly vehicles. The ultimate ecology-conscious Automobile is that powered only by electricity, causing neither atmospheric nor noise pollution.

For all scenarios analyzed, the use phase is responsible for the majority of the GWP impact, either directly through fuel combustion or indirectly during electricity production. “When powered by average European electricity, EVs are found to reduce GWP by 20% to 24% under the base case assumption of a 150,000 km vehicle lifetime.” [22]

Nevertheless, there is opinion, that producing the electricity used to charge electro cars generates global warming emissions. The amount of these emissions, however, varies significantly based on the mix of energy sources used to power a region's electricity grid.

“For example, coal-fired power plants produce nearly twice the global warming emissions of natural gas-fired power plants, while renewable sources like wind and solar power produce virtually no emissions at all.” [14]

The UCS report, *State of Charge: Electric Vehicles' Global Warming Emissions and Fuel-Cost Savings Across the United States*, compares the global warming emissions from EVs with those from gasoline-powered vehicles and finds that:

- Nationwide, EVs charged from the electricity grid produce lower global warming emissions than the average compact gasoline-powered vehicle (with a fuel economy of 27 miles per gallon)—even when the electricity is produced primarily from coal in regions with the “dirtiest” electricity grids.
- In regions with the “cleanest” electricity grids, EVs produce lower global warming emissions than even the most fuel-efficient hybrids.
- EVs charged entirely from renewable sources like wind and solar power produce virtually no global warming emissions.

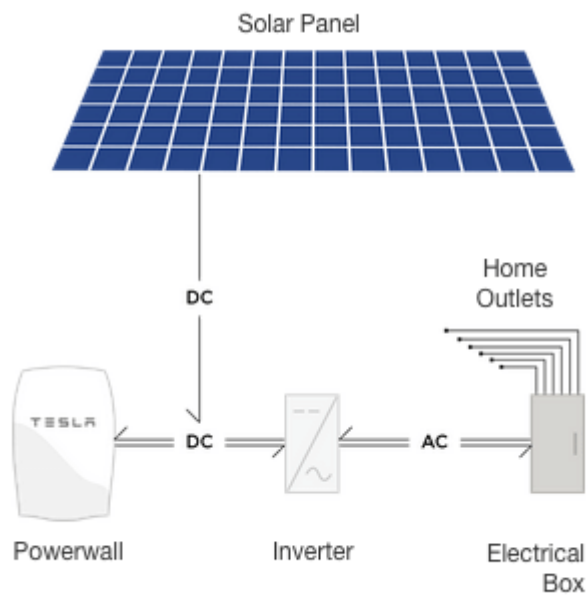
Basically, there are two types of emissions that impact on the environment: greenhouse gas emissions and air pollutant emissions.

Greenhouse gas emissions, such as carbon dioxide (CO<sub>2</sub>), which can trap additional heat from the sun in the earth’s atmosphere, causing the ‘greenhouse effect’ and climate change. CO<sub>2</sub> is the main greenhouse gas produced by motor vehicles. Air pollutant emissions, such as hydrocarbons, oxides of nitrogen and particulate matter can lead to smog and adverse health impacts such as respiratory illness, cardiovascular disease and cancer.

When it is considered ecological-friendly equipment, it is also important to take into account costs for using this strategy. Regarding the price issue, the best example could be a concept presented by Alan Mask which is called Powerwall.

“Powerwall is a home battery that charges using electricity generated from solar panels, or when utility rates are low, and powers the house in the evening. Automated, compact and simple to install, Powerwall enables to maximize self-consumption of solar power generation.” [41]

The standard kit of the Powerwall system consists of solar panels, an inverter for converting electricity between direct current and alternating current, a meter for measuring battery charge, and in backup applications, a secondary circuit that powers key appliances. Usage of home battery influences the components of the pack (Figure 3).



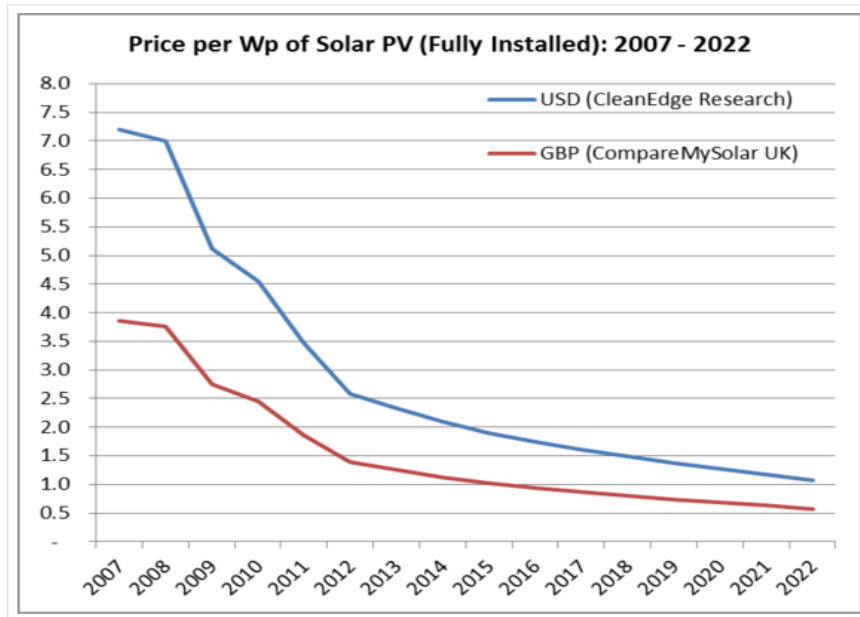
**Figure 2.** The Tesla Powerwall

So as energy from solar panel is free, it minimizes further costs of charging electro cars (Figure 4).



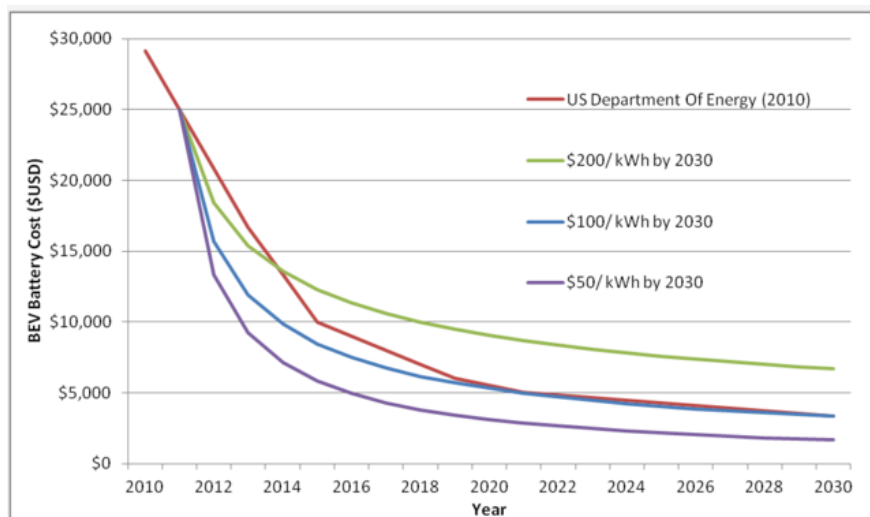
**Figure 3.** Charging of electro car by means of Solar Power

Furthermore, according to the recent research, the prices of solar panels have been dropped down (Figure 5).



**Figure 4.** Price of Solar panels

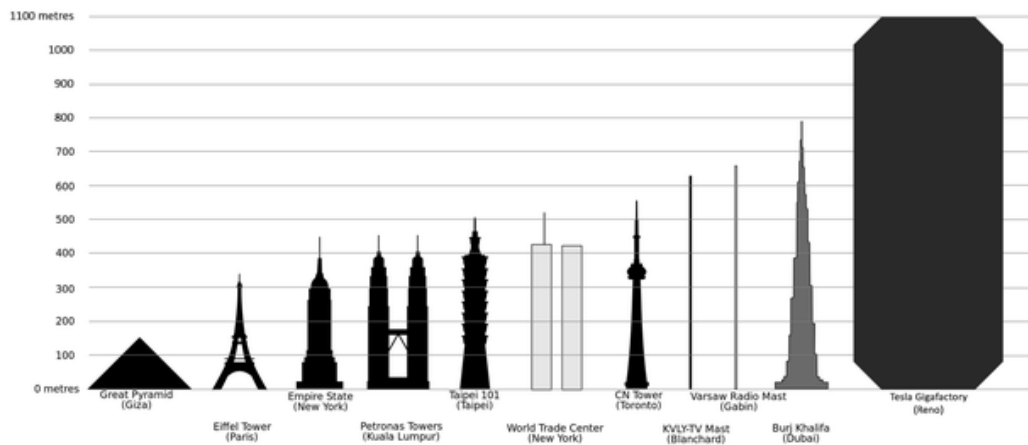
In the future specialists anticipate the dramatic decrease of the prices per Wp of solar PV installed for customizing. It is also essential to compare prices for 33 kWh car battery to figure out how much money users spend for charging. (Figure 6). It is seen that all prices decrease, what makes electro cars even more convenient.



**Figure 5.** prices of 33 kWh car battery

It is crucial to underline, that Alan Mask has been built the Tesla Gigafactory, which is a lithium-ion battery factory. The production will be primarily for Tesla Motors. The factory became operational in the first quarter of 2016. It will be the world's second-largest building

by usable space, smaller than only the Boeing Everett Factory, and the world's largest building by physical area (Figure 7). It seems that Tesla Motors is directed for wide-spread production of batteries.



**Figure 6.** How big is Tesla Gigafactory

It is obvious, that nowadays it is more profitable to have electro car. More than that, in spite of some opinions, it is definitely environment friendly vehicle. Many specialists suppose that future is for electro mobiles, especially after Volkswagen scandal with emissions.

### 2.3 History of electric vehicles

As it was mentioned before, that electric vehicles are not an invention of modern times, it has a long and storied history. Introduced more than 100 years ago, electric cars are seeing a rise in popularity today for many for the same reasons they were first popular.

The first countries, where electric vehicles appeared were France and England in the end of 19th century. It didn't achieve great popularity until Americans began to devote attention to this type of transport. Many innovations followed and interest in motor vehicles increased greatly in the late 1890s and early 1900s. as a result, the first commercial application was established as a fleet of New York City taxis in 1897.

In the beginning, some of the electric vehicles appeared as electrified horseless carriages and surreys. Furthermore, some inventors could introduce something even more interesting. For example, in 1902 Wood's Phaeton presented the machine with a range of 18 miles, a top speed of 14 mph and cost \$2,000.

Already in the earliest 1900 America was prosperous and the motor vehicle, available in steam, electric, or gasoline versions, was becoming more popular. The years 1899 and 1900

were the high point of electric vehicles in America, as they outsold all other types of cars. That time electric cars had more advantages compare to their competitors. For instance, they did not have the vibration, smell, and noise associated with gasoline cars. The most difficult part of driving of gasoline cars was changing of gears, while electric vehicles did not require gear changes. On the other hand, steam-powered cars also had no gear shifting, but they suffered from long start-up times of up to 45 minutes on cold mornings. The steam cars had less range before needing water than an electric's range on a single charge. The only good roads of the period were in town, causing most travel to be local commuting, a perfect situation for electric vehicles, since their range was limited. Due to many factors, the electric vehicle was the preferred choice of many (especially women), mostly because it did not require the manual effort to start, as with the hand crank on gasoline vehicles, and there was no wrestling with a gear shifter.

Significantly, that early electric vehicles were ornate, massive carriages designed for the upper class with fancy interiors and expensive materials, with averaged \$3,000 by 1910, while basic electric cars cost under \$1,000. Electric vehicles enjoyed great popularity into the 1920s with production peaking in 1912.

In spite of range of advantages, there was a decline in consumption due to various reasons:

- First of all, there was a development roads' system between cities in the USA by the 1920s. It brought the need longer-range vehicles. Consequently, some of the car owners preferred gasoline-based cars;
- It became affordable for the average consumer to use gasoline due to dramatic decrease in prices after the discovery of Texas crude oil;
- The invention of the electric starter by Charles Kettering in 1912 eliminated the need for the hand crank;
- Henry Ford developed mass production of internal combustion engine vehicles what made these vehicles widely available and affordable. The price range was from the \$500 to \$1,000. By contrast, the price of the less efficiently produced electric vehicles continued to rise. In 1912, an electric roadster sold for \$1,750, while a gasoline car sold for \$650.

Consequently, electric vehicles had disappeared already by 1935. The years following until the 1960s were dead years for electric vehicle development and for use as personal transportation. Nevertheless, many attempts to produce practical electric vehicles occurred from



1960s. The main reason of this change was a need for alternative fueled vehicles to reduce the problems of exhaust emissions from internal combustion engines and to reduce the dependency on imported foreign crude oil. The problem became wildly important during 60-70th of 20th century.

For instance, in the early 1960s, the Boyertown Auto Body Works jointly formed the Bat-tronic Truck Company with Smith Delivery Vehicles, Ltd., of England and the Exide Division of the Electric Battery Company. "The first Battronic electric truck was delivered to the Potomac Edison Company in 1964. This truck was capable of speeds of 25 mph, a range of 62 miles and a payload of 2,500 pounds. Battronic worked with General Electric from 1973 to 1983 to produce 175 utility vans for use in the utility industry and to demonstrate the capabilities of battery powered vehicles. Furthermore, battronic developed and produced about 20 passenger buses in the mid-1970s." [25]

There were to leaders in electric car production during this time. Firstly, Sebring-Vanguard which produced over 2,000 "CitiCars." These cars had a top speed of 44 mph, a normal cruise speed of 38 mph and a range of 50 to 60 miles. The other leading company was Elcar Corporation which produced the "Elcar". The Elcar had a top speed of 45 mph, a range of 60 miles and cost between \$4,000 and \$4,500.

In 1975 the United States Postal Service purchased 350 electric delivery jeeps from the American Motor Company to be used in a test program. These jeeps had a top speed of 50 mph and a range of 40 miles at a speed of 40 mph. Heating and defrosting were accomplished with a gas heater and the recharge time was 10 hours.

Development of electric vehicles was supported by several legislative and regulatory actions. Primary among these is the 1990 Clean Air Act Amendment, the 1992 Energy Policy Act, and regulations issued by the California Air Resources Board (CARB). In addition to more stringent air emissions requirements and regulations requiring reductions in gasoline use, several states even have issued Zero Emission Vehicle requirements.

There was established the Partnership for a New Generation of Vehicles (PNGV) which provided the opportunity to develop electric vehicles. It was involved by the "Big Three" Automobile manufacturers, and the Department of Energy, as well as a number of vehicle conversion companies. It helped to reach super highway speeds with ranges of 50 to 150 miles between recharging. An early 1990s vehicle was the Ford Ecostar utility van with an alternating current motor and sodium sulfur batteries. The top speed was 70 mph and it had

a range of 80 to 100 miles. While about 100 Ecostars were produced, it was considered an R&D vehicle and never offered commercially.

“General Motors had designed and developed an electric car from the ground up instead of modifying an existing vehicle. This vehicle, called the EV1, is a 2-passenger sports car powered by a liquid-cooled alternating current motor and lead-acid batteries. The EV1 had a top speed of 80 mph, had a range of 80 miles, and could accelerate from 0 to 50 mph in less than 7 seconds.” [26]

During 1998 became available other 3 famous electric vehicles: the Toyota RAV4 sport utility, the Honda EV Plus sedan, and the Chrysler EPIC minivan. All three models were equipped with advanced nickel metal hydride battery packs.

It is also important to underline, that Nissan produces 200 of the Altra EV from 1998-2002. Nevertheless, with a booming economy, a growing middle class and low gas prices in the late 1990s, many consumers didn't worry about fuel-efficient vehicles. Even though there wasn't much public attention to electric vehicles at this time, behind the scenes, scientists and engineers - supported by the Energy Department - were working to improve electric vehicle technology, including batteries.

The true rebirth of the electric vehicle didn't appear until around the start of the 21st century. It didn't happen even due to the fact that all the starts and stops of the electric vehicle industry in the second half of the 20th century helped show the world the promise of the technology.

The most crucial event that supported positive changes in production of electric vehicles was the announcement in 2006 that a small Silicon Valley startup, Tesla Motors, would start producing a luxury electric sports car that could go more than 200 miles on a single charge. Already in 2010, Tesla received a \$465 million loan from the Department of Energy's Loan Programs Office (the loan was repaid by Tesla a full nine years early) to establish a manufacturing facility in California. In the short time from that period, Tesla enjoyed great popularity and won wide acclaim for its cars. It became the largest Auto industry employer in California.

“Tesla's announcement and subsequent success spurred many big Automakers to accelerate work on their own electric vehicles. In late 2010, the Chevy Volt and the Nissan LEAF were released in the U.S. market. The first commercially available plug-in hybrid, the Volt has a gasoline engine that supplements its electric drive once the battery is depleted, allowing consumers to drive on electric for most trips and gasoline to extend the vehicle's range. In

comparison, the LEAF is an all-electric vehicle (often called a battery-electric vehicle, an electric vehicle or just an EV for short), meaning it is only powered by an electric motor.” [25]

Due to market reorientation, over the next couple of years, other big companies began manufacturing electric vehicles. Nonetheless, consumers weren't satisfied with one of the biggest problems of the electric vehicle – lack of charging stations around. That was the main reason to investigate and invest in this field for Green-orientated authorities. For instance, through the Recovery Act, the Energy Department invested more than \$115 million to help build a nation-wide charging infrastructure, installing more than 18,000 residential, commercial and public chargers across the USA. More than that, some Automakers and other private businesses also installed their own chargers at important locations in the U.S., bringing today's total of public electric vehicle chargers to more than 8,000 different locations with more than 20,000 charging outlets. Furthermore, many chargers appeared in Europe as well, especially, in north countries, such as Norway, Denmark, Sweden and Finland.

At the same time, new battery technology - supported by the Energy Department's Vehicle Technologies Office - began hitting the market, helping to improve a plug-in electric vehicle's range. In addition to the battery technology in nearly all of the first generation hybrids, the Department's research also helped develop the lithium-ion battery technology used in the Volt. More recently, the Department's investment in battery research and development has helped cut electric vehicle battery costs by 50 percent, while simultaneously improving the vehicle batteries' performance. This in turn has helped making more affordable cars for regular consumers by decreasing the costs of electric vehicles.

Consumers now have more choices than ever before when it comes to buying an electric vehicle. Nowadays, there are plenty of plug-in electric and hybrid models available in a variety of sizes - from the two-passenger Smart ED to the midsized Ford C-Max Energi to the BMW i3 luxury SUV. As gasoline prices continue to rise and the prices on electric vehicles continue to drop, electric vehicles are gaining in worldwide popularity.

### 3 MARKETING TOOLS

There are plenty of marketing tools which can be used before project starts. It is necessary to choose correct development plan for successful introduction of the new product. There are several strategies should be used. One of the most important tools is analysis of competitors (see part Analysis).

#### 3.1 PESTEL analysis

There are two main segments should be considered when we talk about market entry: external and internal one. A PESTEL analysis is a framework or tool used by marketers to analyses and monitor the macro-environmental (external marketing environment) factors that have an impact on an organization. The result of which is used to identify threats and weaknesses which is used in a SWOT analysis. PESTEL stands for: political, economic, social, technological, environmental and legal environment. All of them are external factors.

Political situation can be also not very sustainable in the country, consequently, correct analysis takes important place in the hierarchy. This can include – government policy, political stability or instability in overseas markets, foreign trade policy, tax policy, labor law, environmental law, trade restrictions and so on. Organizations need to be able to respond to the current and anticipated future legislation, and adjust their marketing policy accordingly.

Economic factors have a significant impact on how an organization does business and also how profitable they are. Factors include – economic growth, interest rates, exchange rates, inflation, disposable income of consumers and businesses and so on. These factors can be further broken down into macro-economic and micro-economic factors. Macro-economic factors deal with the management of demand in any given economy. Governments use interest rate control, taxation policy and government expenditure as their main mechanisms they use for this. Micro-economic factors are all about the way people spend their incomes. This has a large impact on B2C organizations in particular.

Socio-cultural factors, are the areas that involve the shared belief and attitudes of the population. These factors include – population growth, age distribution, health consciousness, career attitudes and so on. These factors are of particular interest as they have a direct effect on how marketers understand customers and what drives them.

Technological development is supposed to be integral part of every country's analysis, because correct investments in the field might bring high benefits. Technological factors affect

marketing and the management thereof in three distinct ways: new ways of producing goods and services, new ways of distributing goods and services, new ways of communicating with target markets.

Environment factors have only come to the forefront in the last fifteen years. They have become important due to the increasing scarcity of raw materials, pollution targets, doing business as an ethical and sustainable company, carbon footprint targets set by governments. These are just some of the issues marketers are facing within this factor. More and more consumers are demanding that the products they buy are sourced ethically, and if possible from a sustainable source.

One more important field is legal environment. It is necessary to learn about legal system in the country to overcome further difficulties with adaptation. Legal factors include health and safety, equal opportunities, advertising standards, consumer rights and laws, product labeling and product safety.

Regarding internal factors, it is crucial to underline, that it can influence choice of foreign entry modes. When the company has decided which markets to enter it must then decide how to enter them. A number of such factors as speed, costs and long-term objectives influence the choice of foreign market entry mode.

### **3.2 Marketing Mix**

The marketing mix refers to the set of actions, or tactics, that a company uses to promote its brand or product in the market. The 4Ps make up a typical marketing mix - Price, Product, Promotion and Place. However, nowadays, the marketing mix increasingly includes several other Ps like Packaging, Positioning, People and even Politics as vital mix elements.

**Price:** refers to the value that is put for a product. It depends on costs of production, segment targeted, ability of the market to pay, supply - demand and a host of other direct and indirect factors. There can be several types of pricing strategies, each tied in with an overall business plan. Pricing can also be used a demarcation, to differentiate and enhance the image of a product.

**Product:** refers to the item actually being sold. The product must deliver a minimum level of performance; otherwise even the best work on the other elements of the marketing mix won't do any good.

Place: refers to the point of sale. In every industry, catching the eye of the consumer and making it easy for her to buy it is the main aim of a good distribution or 'place' strategy. Retailers pay a premium for the right location. In fact, the mantra of a successful retail business is 'location, location, location'.

Promotion: this refers to all the activities undertaken to make the product or service known to the user and trade. This can include advertising, word of mouth, press reports, incentives, commissions and awards to the trade. It can also include consumer schemes, direct marketing, contests and prizes.

All the elements of the marketing mix influence each other. They make up the business plan for a company and handled right, can give it great success. But handled wrong and the business could take years to recover. The marketing mix needs a lot of understanding, market research and consultation with several people, from users to trade to manufacturing and several others.

### **3.3 Integrated Marketing Communications (IMC)**

It is essential for organizations to promote their brands well among the end-users not only to outshine competitors but also survive in the long run. Brand promotion increases awareness of products and services and eventually increases their sales, yielding high profits and revenue for the organization.

First of all, it is necessary to understand what brand communication means. Brand communication is an initiative taken by organizations to make their products and services popular among the end-users. Brand communication goes a long way in promoting products and services among target consumers. The process involves identifying individuals who are best suited to the purchase of products or services (also called target consumers) and promoting the brand among them through any one of the following means advertisement, sales promotion, public relationship, direct marketing, personal selling, social media etc.

Integrated marketing communication refers to integrating all the methods of brand promotion to promote a particular product or service among target customers. In integrated marketing communication, all aspects of marketing communication work together for increased sales and maximum cost effectiveness.

There are various components of Integrated Marketing Communication:

1. The Foundation. As the name suggests, foundation stage involves detailed analysis of both the product as well as target market. It is essential for marketers to understand the brand, its offerings and end-users. It is needed to know the needs, attitudes and expectations of the target customers. Keep a close watch on competitor's activities.
2. The Corporate Culture. The features of products and services ought to be in line with the work culture of the organization. Every organization has a vision and it's important for the marketers to keep in mind the same before designing products and services.
3. Brand Focus. Brand Focus represents the corporate identity of the brand.
4. Consumer Experience. Marketers need to focus on consumer experience which refers to what the customers feel about the product. A consumer is likely to pick up a product which has good packaging and looks attractive. Products need to meet and exceed customer expectations.
5. Communication Tools. Communication tools include various modes of promoting a particular brand such as advertising, direct selling, promoting through social media such as Facebook, Twitter, Instagram etc.
6. Promotional Tools. Brands are promoted through various promotional tools such as trade promotions, personal selling etc. Organizations need to strengthen their relationship with customers and external clients.
7. Integration Tools. Organizations need to keep a regular track on customer feedbacks and reviews. It is important to have specific software like customer relationship management (CRM) which helps in measuring the effectiveness of various integrated marketing communications tools.

Integrated marketing communication enables all aspects of marketing mix to work together in harmony to promote a particular product or service effectively among end-users.

### **3.4 Porter's 5 Forces**

Porter's Five Forces model, named after Michael E. Porter, identifies and analyzes five competitive forces that shape every industry, and helps determine an industry's weaknesses and strengths. These forces are:

1. Competition in the industry. The importance of this force is the number of competitors and their ability to threaten a company. The larger the number of competitors, along

with the number of equivalent products and services they offer, dictates the power of a company. Suppliers and buyers seek out a company's competition if they are unable to receive a suitable deal.

2. Potential of new entrants into the industry. A company's power is also affected by the force of new entrants into its market. The less money and time it costs for a competitor to enter a company's market and be an effective competitor, the more a company's position may be significantly weakened.

3. Power of suppliers. This force addresses how easily suppliers can drive up the price of goods and services. It is affected by the number of suppliers of key aspects of a good or service, how unique these aspects are and how much it would cost a company to switch from one supplier to another. The fewer number of suppliers, and the more a company depends upon a supplier, the more power a supplier holds.

4. Power of customers. This specifically deals with the ability customers have to drive prices down. It is affected by how many buyers, or customers, a company has, how significant each customer is and how much it would cost a customer to switch from one company to another. The smaller and more powerful a client base, the more power it holds.

5. Threat of substitute products. Competitor substitutions that can be used in place of a company's products or services pose a threat. For example, if customers rely on a company to provide a tool or service that can be substituted with another tool or service or by performing the task manually, and this substitution is fairly easy and of low cost, a company's power can be weakened.

Porter's Five Forces is a model of analysis that helps to explain why different industries are able to sustain different levels of profitability. The model is widely used, worldwide, to analyze the industry structure of a company as well as its corporate strategy. Porter identified five undeniable forces that play a part in shaping every market and industry in the world. The forces are frequently used to measure competition intensity, attractiveness and profitability of an industry or market.

### **3.5 SWOT analysis**

SWOT analysis is an acronym for strengths, weaknesses, opportunities, and threats and is a structured planning method that evaluates those four elements of an organization, project or



business venture. A SWOT analysis can be carried out for a company, product, place, industry, or person. It involves specifying the objective of the business venture or project and identifying the internal and external factors that are favorable and unfavorable to achieve that objective.

Strengths: characteristics of the business or project that give it an advantage over others;

Weaknesses: characteristics of the business that place the business or project at a disadvantage relative to others;

Opportunities: elements in the environment that the business or project could exploit to its advantage;

Threats: elements in the environment that could cause trouble for the business or project.

Identification of SWOTs is important because they can inform later steps in planning to achieve the objective. First, decision-makers should consider whether the objective is attainable, given the SWOTs. If the objective is not attainable, they must select a different objective and repeat the process.

Users of SWOT analysis must ask and answer questions that generate meaningful information for each category (strengths, weaknesses, opportunities, and threats) to make the analysis useful and find their competitive advantage.

### **3.6 Marketing Dominance strategy**

Typically, there are four types of market dominance strategies that a marketer will consider: There are market leader, market challenger, market follower, and market nicher.

The market leader is dominant in its industry. It has substantial market share and extensive distribution arrangements. It is typically the industry leader in developing innovative new products and business methods. Of the four dominance strategies, it has the most flexibility in crafting strategy. However, it is in a very visible position and can be the target of competitive threats and government anti-combines actions. The main options available to market leaders are:

1. Expand the total market by finding new users or new uses of the product;
2. Expand the total market by encouraging more usage on each use occasion;

3. Protecting market share by developing new product ideas, improving customer service;
4. improving distribution effectiveness;
5. Expanding market share by targeting one or more competitors.

A market challenger is an organization a strong, but not dominant position that is following an aggressive strategy of trying to gain market share. It typically targets the industry leader. The main principles involved are:

1. Assess the strength of the target competitor;
2. Understand the (amount of support) that the target can muster;
3. Choose only one target at a time;
4. Find a weakness in the target's position;
5. Consider how long it will take for the target to realign their resources so as to reinforce this weak spot.

Launch the attack on as narrow a front as possible. Whereas a defender must defend all their borders, an attacker has the advantage of being able to concentrate their forces at one place. Launch the attack quickly, and then consolidate. Some of the options open to a market challenger are:

1. Discounting or price cutting;
2. Product line extensions;
3. New product introduction;
4. Increase product quality;
5. Improve service;
6. Find new distribution channels;
7. Improve and intensify promotional activity.

A market follower is an organization in a strong, but not dominant position that is content to stay at that position. The rationale is that by developing strategies parallel to those of the market leader, they will gain a good share of the market while being exposed to very little risk. This is a "play it safe" strategy. The advantages of this strategy are:

1. No expensive R&D failures;
2. Being able to capitalize on the promotional activities of the market leader;
3. Low risk of competitive attack;
4. Save money avoiding a head-on battle with the market leader.

In this niche strategy the firm concentrates on a select few target segments. This is also called a focus strategy. The objective is focusing marketing efforts on one or two narrow market segments and tailoring the marketing mix, the organization can better meet the needs of that target market. The firm typically looks to gain a competitive advantage through effectiveness rather than efficiency. The most successful nichers tend to have the following characteristics:

1. They tend to be in high value added industries and are able to obtain high margins;
2. They tend to be highly focused on a specific market segment.

### **3.7 Market Penetration Strategy**

Market penetration refers to the successful selling of a product or service in a specific market, and it is measured by the amount of sales volume of an existing good or service compared to the total target market for that product or service. It helps establish the businesses current station and which direction it needs to expand in to achieve market growth. Successful outcomes stem from careful monitoring by key staff and leaders. Timing is key to a successful market growth; this can be dependent on the overall market welfare, the business's competitors and current events. Questions, brainstorming and discussions can help distinguish whether it is the best time for market growth.

There are six main strategies in terms of market penetration: price adjustments, increased promotion, development more distribution channels, product improvements, market development and penetration pricing.

One of the common market penetration strategies is to lower the products' prices. Businesses aim to generate more sales volume by increasing the number of products purchased by putting on lower prices for consumers comparing to the alternative goods. Companies may alternatively pursue strategies of higher prices depending on the demand elasticity of the product, in hopes that it will generate an increased sales volume and result higher market penetration.

Businesses can also increase their market penetration by offering promotions to customers. A promotion is a strategy often linked with pricing, used to raise awareness of the brand and generate profit to maximize their market share.

A distribution channel is the connection between businesses and intermediaries before a good or service is purchased by the consumers. Distribution can also contribute to sales volumes for businesses. It can increase consumer awareness, change the strategies of competitors and alter the consumer's perception of the product and the brand, and another method to increase market penetration.

Product management is crucial to a high market penetration in the targeted market and by improving the quality of products, businesses are able to attract and out-quality the competitors' products to match customers' requirements and eventually lead to more sales made. Product improvements can be utilized to create new interests in a declining product, for example by changing the design on the packaging or material/ingredients.

Market development aims at non-buying shoppers in targeted markets and new customers in order to maximize the potential market. Before developing a new market, companies should consider all the risks associated with the decision including the profitability of it. If a company is confident about their products and believes its strengths and is enticing to the new consumers, then market development is a suitable strategy for the business.

Penetration pricing is a marketing technique which used to gain market share by selling a new product for a price that is significantly lower than its competitors. The company begins to raise the price of the product once it has achieved a large customer base and market share. Penetration pricing is frequently used by network provider and cable or satellite services companies. Many of the providers will initially offer an unbeatable price to attract customers into switching to their service and after the discount period has ended, the price increases dramatically and some customers will be forced to stay with the provider because of contract issues.

### **3.8 STP marketing**

STP marketing is a three-step approach to building a targeted marketing plan. The "S" stands for segmenting, the "T" for targeting and the "P" for positioning. Going through this process allows a business owner and marketing consultants or employees to formulate a marketing strategy that ties company, brand and product benefits to specific customer market segments.

## **Summary**

In the first part of our theoretical work we have compiled information about Skoda Auto and its positioning on the market. After that, we have analyzed the specific features and characteristics of electric cars from its first introduction. Finally, we considered the most important tools for marketing analysis, which will be further used in practical part of the master thesis.

## **II. ANALYSIS**

## 4 ANALYSIS OF SKODA AUTO

### 4.1 Strategies analysis

Every successful company has a strategy which should be revised and updated. The strategy helps to build the sustainable position on the market and also represents the goals and future prospective should be achieved. The current Škoda Growth Strategy covers the period from 2010 to 2018, whereas the new strategy plan has been already shown. It covers the period till 2025 (as well as Volkswagen Group's timeframe). The strategy for the future of the Škoda brand grapples with a period that will mostly deal with monumental change in personal mobility. New technical capabilities and increasing digitization in the transport sector will redefine customers' individual driving experience in the coming future. The main attention is directed to such objects as e-mobility, connectivity, Autonomous driving, infotainment and attainment of the greenest possible values.

The most significant goal for car industry in general is satisfying longing for safe, environmentally friendly, comfortable and independent mobility. Škoda Auto is focused on helping to shape this car-centric future. Under its Strategy 2025, Škoda Auto will respond to tomorrow's road transport challenges and, in addition, will chart a course for the Škoda brand. The initial targets of the medium-term strategy are the expansion of the product range "to embrace further SUV models and the introduction of intelligent connectivity systems. New Škoda SUVs will be launched on the market in 2016/2017. E-mobility will be keeping Škoda Auto busy as it pursues its CO<sub>2</sub>emission abatement targets. Other important technological areas are connectivity and the attendant innovative infotainment. Škoda will also focus on simplifying vehicle operation for comfortable driving, guided by the brand's "Simply Clever" philosophy, vehicle controls – human/machine interface." [36]

Another important pillar of Strategy 2025 is branding. Now when Škoda cars have achieved technological and qualitative excellence in the international arena, the plan is for emotional design to shine through in the brand's perception all the more in the future in order to identify and attract new customer groups.

The main idea is a strong emphasis which is placed on the further development and emotionalisation of the Škoda brand. For example, the new Škoda Superb sent out a clear signal in this respect. The third generation of this model, launched as both a sedan and Combi in mid-2015, heralds a new era of design, technology, comfort and unrivalled roominess for

Škoda. By harnessing innovative MQB technology, the brand's flagship has entered new territory in safety, connectivity and environmental protection. The Škoda Superb's qualities underscore the brand's eagerness to offer cars beyond compare in those areas and segments where it maintains a presence. The new Superb is available in a special sporty version, the SportLine, which was given its world première at the IAA motor show in Frankfurt am Main.

One more interesting marketing approach is considered on the example of new Škoda Kodiaq. The strategy represents reconnection of the lifestyle, which is directed to nature and family. Huge advertisement campaign was conducted in Alaska (Kodiak is the city there. People were asked to replace the last letter of the city on every sign table from "K" to "Q" in order to support the campaign).

Besides this high-end product, other product-related events have also borne out the emotionalization and step-up in the quality of the range of models. What is more, every claim was considered and analyzed to achieve greater customization. The new Škoda Superb, premiered in 2015, marked the start of a clear shift towards higher-quality products and outstanding design. The year 2016 was characterised by the brand new Škoda Kodiaq, the first large SUV emblazoned with the Škoda badge and the first of our cars to offer all-round connectivity. This vehicle integrates the new design language with connectivity and online services unknown in any previous Škoda model as they are state-of-the-art milestones in technology, comfort and roominess. Škoda Auto is also introducing new safety, connectivity and environmental protection standards with this model. The Škoda Kodiaq is the first in a range of Škoda models that are to be marketed in the next few years. All of the Škoda Kodiaq's new connectivity and safety features will gradually be incorporated into other cars in the Škoda brand portfolio. In late 2016, the Company overhauled the design of – and the technology available for – the Škoda Octavia, which is the brand's beating heart. Our progressive approach is reflected in the new "four-eyed face", cutting-edge online services and driver-assist systems, and new "Simply Clever" features, which will embolden the brand's position and its key model on the world's most demanding markets.

The new competitive range of products from Škoda Auto and their elevation to higher echelons of technology and quality shows the high performance of the company on the international arena. For last several years sales were increased and are expected to be higher in the future. To see how new strategy touched the whole scope of segments, we can consider that by the end of 2015, more than 1,700 dealers and service partners had switched to Škoda's new modern corporate design. Following the successful start-up of the new-generation



Škoda Superb's production, the Company turned its attention to upgrading and expanding the Kvasiny plant. On this factory are currently produced Škoda Superb, Škoda Superb Combi and Škoda Yeti. As figures show, the Company's efforts have translated into improved sales. From year to year, deliveries to customers were improved globally. Sales of the new-generation Škoda Fabia, Škoda Superb and Škoda Octavia in particular flourished. Škoda Auto will also be cultivating its "Simply Clever" philosophy. One area in which this approach will be put into effect is in the introduction of new elements that will not only ease our customers' lives, but will also make using and driving the car itself more intuitive, simpler and funnier.

## **4.2 Analysis of product portfolio**

### **4.2.1 Citigo**

Škoda Citigo is budget-price city car, available in either a three- or a five-door body style. This urban car is powered by a petrol engine, except in its Citigo G-TEC incarnation, which uses petrol or natural gas. Key rivals for the Citigo are the Kia Picanto, Hyundai i10, Citroen C1, Peugeot 108, Toyota Aygo and Renault Twingo. Regarding the benefits, it's easy to drive the Citigo smoothly in stop-start traffic because its brake and clutch pedals provide plenty of feedback. Furthermore, there are no problems to park it, due to its small size, large windows and light steering. The standard manual gearbox has a slick shift action. Every model in the Škoda range has received a 5 star Euro NCAP safety rating. The Citigo's front, head and side airbags for both driver and passenger are designed to keep users safe around town. Its Electronic Stabilization Control helps to keep the car under control during evasive maneuvers and in difficult driving conditions. This attractive compact city car, rejuvenated throughout its interior in 2015, was purchased by 40,152 customers in 2015, down 5.5% on the previous year. In the coming year, further new product measures will gradually be implemented.

### **4.2.2 Fabia**

The third-generation Škoda Fabia hatchback hit the European markets in late 2014, with the new-look Škoda Fabia Combi joining it in January 2015. There is completely new, thrilling design of the car by its high-tech, roominess and capabilities. The sales netted by the Škoda Fabia and Škoda Fabia Combi have been accompanied by numerous highly prized Automotive-industry accolades, including the "Red Dot Award" for outstanding product design. The

Fabia Estate continues the journey into the development of Škoda's design language. Crystalline shapes and sharp lines fuse to form an Estate that's larger and broader. This design ensures efficiency and head-turning dynamism on the road. It is important to mention exterior, which is well balanced, also tight proportions what gives the Fabia a powerful road-stance. The grille and headlights appear optically stronger and with the powerfully contoured bonnet. Compare the previous generation, the loading floor is wider - coming in at 960mm. The passenger area is also wider and longer, and although the car is slightly lower, there's more headroom for the driver and front seat passengers. It's reasonably priced, cheap to run, comfortable and practical, but gets an added dash of upmarket appeal due to new Škoda family styling and extra technology, including standard DAB radio and Bluetooth. Main competitors for Fabia are Opel Corsa, Maruti Swift, Fiat Palio and Nissan Micra. Škoda Fabia, with its meticulous design and balanced proportions, is an attractive proposition delivering both dynamism and a lusty, emotional character. The new Fabia, which, alongside many other accolades, can pride itself on the title of the safest car in its class, enjoyed a very warm reception following its introduction on to the individual markets. In 2015, it enjoyed double-digit year-on-year growth (+19.8%) with a total of 192,358 deliveries. In 2016, the Škoda Motorsport factory team focused its efforts on competing in WRC2 rallies offering the best promotional opportunities, the Asia-Pacific Championship and the Czech Championship. This is the first full season for the Škoda Fabia R5, which should continue to be offered for sale to private teams. In 2016, 203,308 Škoda Fabia's were made worldwide (2015: 195,349), a 4.1% year on year jump.

### 4.2.3 Rapid

Since 2012, the Škoda Rapid has neatly filled the gap between the Škoda Fabia and the Škoda Octavia. The liftback Škoda Rapid and, since 2013, the Škoda Rapid Spaceback have established themselves as customer favorites, emerging as the second most powerful model – after the Škoda Octavia – in the Škoda portfolio. The 500,000th Škoda Rapid rolled off the line in mid-2015. In July 2015, Škoda expanded this model range to include the striking Škoda Rapid SpacebackScoutLine. Concerning specific features, in 2015, the Škoda Rapid and Škoda Rapid Spaceback offered advanced connectivity, new safety and driver-assist systems, and new engines. Chiseled curves and molded body lines blend in effortlessly with black design elements. The interiors of the Škoda Rapid have been thoughtfully put together to give the balance between space and comfort. With two engine and three transmission variants along with a multi-function steering wheel, and many other clever features, the new

Škoda Rapid can make driving experience rather comfortable. The Škoda Rapid is available in a choice of diesel and petrol engines with a five-speed manual and a six-speed Tiptronic Automatic or the class-leading seven-speed DSG Automatic gearbox. Main competitors are Honda City, Ford Fiesta Classic, Nissan Sunny, Hyundai Verna, Toyota Etios, Volkswagen Vento.

The Škoda Rapid and the Škoda Rapid Spaceback fuse the practicality of Škoda cars with a fresh and appealing design. The Rapid was rolled out globally in 2012, followed by the Rapid Spaceback a year later. In 2015, major product innovations and enhancements were made to both models, focusing primarily on infotainment, safety and driver assists. In all, 194,321 Škoda Rapid Spacebacks were delivered to customers, making them the second bestselling range – behind the Škoda Octavia – once again in 2015. Compared to the previous year, there was a 14.6% rise in production of the Škoda Rapid in 2016. In total, 216,773 Škoda Rapid s and Škoda Rapid SPACEBACKs were made (2015: 189,187).

#### 4.2.4 Octavia

The Škoda Octavia is Škoda's top-selling model and the brand's beating heart. The third-generation Škoda Octavia, launched in 2013, is in a class of its own as one of the Automotive market's standout cars. Since autumn 2015, the Škoda Octavia RS 230 has been making waves with its attractive design, sporty interior, advanced technology and formidable performance. This sporty family car, the fastest mass-produced Octavia of all time, is the first ever Škoda to feature a front differential with an electro-hydraulically controlled lock (VAQ), making for extremely dynamic cornering. Since September 2015, all-wheel drive combined with a six-speed dual-clutch transmission has been available for the Škoda Octavia RS powered by a 2.0 TDI (135 kW). The petrol is a 2.0 TSI with 220PS which makes this Octavia the most powerful ever built. In new Octavia there are plenty of technologies included, for example, SmartLink, which provides information about how the driver can connect your smart phone with in-built infotainment via MirrorLink™, Apple CarPlay and Android Auto.

This model, the central pillar of the Škoda Growth Strategy, broke the record for the number of vehicles delivered in a single year when it reported a total of 432,335 deliveries in 2015 (+11.1%). The third-generation Škoda Octavia, marketed since 2013, sets the standard in its class and continues to enjoy one success after another. The Škoda Octavia's wide range of designs and outstanding qualities make it especially successful among customers in Western

Europe, where year-on-year deliveries increased by 4.6%. The Škoda Octavia also has a recent track record with its sporty incarnation, the Octavia RS, and its green offering, the G-TEC.

There's a particular sentence in the press pack of the Škoda Octavia that's worth repeating: "Škoda's success and development has been driven by one key model: the Octavia". Meanwhile, a four-figure sum has been added to the car's price point. Škoda is betting that its standard-bearer can prosper within this slightly richer market niche. Strategic competitors are Kia Ceed, Ford Focus and Opel Astra. Creative proposition includes following values: human (down to earth in character, the Octavia is an everyday hero that relates to people's real lives through gentle humor and realistic family scenarios), Simplifying and Surprising. It is also important to emphasize, that Octavia has been awarded and recognized as one of the finest cars in its segment. In 2016, the Škoda Octavia once again remained Škoda Auto's most important model. Worldwide production of this model was reported at 445,415 units, tantamount to 4.6% year on year growth (2015: 425,640 units). The Škoda Octavia accounted for the lion's share of the total annual production of Škoda cars, coming in at 38.7%.

#### **4.2.5 Roomster**

The Škoda Auto plant in Kvasiny ceased production of this model in spring 2015, having made more than 370,000 of the compact ŠKODA MPVs in the space of nine years. As the name suggests, the ŠKODA Roomster's hallmarks – and the key to its success among customers – were its spacious luggage compartment and interior modularity. It's made up of four 1.2-litre petrol engines with between 69PS, plus three diesel engines with between 75PS and 105PS. The car is not particularly speedy, but the Roomster is more about economy than pace – all of the engines are reasonably frugal with the Greenline models able to return more than 65mpg according to the official figures. The controls are well-weighted and precise, which makes for a likeable and relaxed driving experience, helped further by the large glass area, giving good visibility. The Škoda Roomster is a well thought out and practical family car. Rival models are typically van-based and lack the solid, car-like cabin and well-judged suspension set up of the Roomster.

#### **4.2.6 Yeti**

The Škoda Yeti is one of the world's most popular compact SUVs. Available with front- or all-wheel drive, the Škoda Yeti is a versatile beast. It comes in two versions: the Škoda

Yeti is suited to the urban landscape, while the more intrepid Škoda Yeti Outdoor feels just as much at home in an off-road setting. The Škoda Auto plant in Kvasiny turned out its 500,000th Škoda Yeti in October 2015. In mid-2015, this model series was innovated to encompass new engines and a wider range of infotainment and connectivity.

According to producers, Yeti strikes the perfect balance between on road performance, style, and family orientated practicality. Made for outdoor adventure, but equally at home in the city. It is compact and functional SUV. Yeti enthusiasts may remember the launch of the Škoda Yeti when it won Top Gear's Family Car of the year award 2009. Since, it has been named the most satisfying car to own by UK drivers in the annual Auto Express Driver Power customer satisfaction survey 2012, 2013 and 2015. Main competitors are Hyundai Tucson, Kia Sportage and Nissan Qshqai.

In 2015, this first-generation model was coming to the end of its life cycle. Overall, 99,547 Škoda Yetis were delivered to customers, tantamount to a 3.2% year-on-year decline. In 2016, the Škoda YETI experienced a 6.2% year on year increase in production to 95,426 units.

#### **4.2.7 Superb**

The Škoda Superb has always blazed a trail in its class. In 2015, the 750,000th Superb since 2001 was made. The third generation of this model, unveiled in 2015, saw the Škoda brand enter a new era. The new Superb sedan saw the light of day in summer 2015, with the Škoda Superb Combi hot on its heels in September. In both of these versions, the completely redeveloped top-of-the-range model has revolutionized Škoda's design language, attaining new heights in creature comforts and technology. The new Škoda Superb impressively interweaves space, function and emotion. The embracing of the Volkswagen Group's advanced MQB technology paves the way for a new dimension in comfort and safety. What's more, the car offers industry-leading connectivity. Škoda Auto ushered in the Škoda Superb Green-Line at the IAA motor show in Frankfurt am Main, where it also premiered the Škoda Superb SportLine. The Superb is the high-level model in the Škoda range and remains true to its creator's value for money principles by providing the size and feel of a luxury saloon for the same cost of a family hatchback.

The interior is filled with high quality materials which provide an upmarket feel that wouldn't be amiss in any German executive car costing upwards of £50,000. All of the plastics have a soft-touch, while many of the buttons and switches are carried over from the latest

Volkswagen Passat, which means they work with a reassuring clunk. The Superb also gets a huge and usefully practical boot.

To understand the reasons of the car's popularity, it is possible to consider feedbacks from importers, dealers, customers and media. For example, most of importers highlighted that there was "huge reach of target group before start of TV launch campaign via Czech Channels". Furthermore, "perfect BTL concept" led to "great traffic on model page". From dealers' point of view, in spite of some minuses, marketing process was conducted very well. In some countries it was even rather huge traffic at launch event, there was also "high quality dialogue with potential customers". Perception of the model was also very positive: design, features (assistance systems), driving comfort, production quality, wheels program. During the presentation, customers compare the new Superb to the premium cars (eg. BMW), dealers consider the activities as one of the biggest launch events ever for Škoda. In some countries it was positively mentioned about huge range of colors. Very positive perception of the model from customers: design, features (assistance systems), driving comfort, production quality, wheels program. Most of the customers emphasized, that they liked much space inside and huge variety of equipment and options; people were surprised to see premium-class concept from Škoda ("sporty and elegant car for a top pricing", "an Audi for a Škoda price"). Take everything into account, there was positive press and media reactions almost in every country ("Superb, Škoda is now raising the level"). Journalists appreciated modern design and space ("The Czech offers a lot space in the rear as in a luxury car" (DE)). It was likewise mentioned, that the model "can compete with brands as VW and even Audi". Some magazines made own competitions among cars and Superb Limo even won against Ford Mondeo, Mazda 6, VW Passat and Volvo V70.

Most of the negative feedbacks from dealers were connected to long delivery time, pricing, problems with diesel crisis and product restriction problems (buildability). More than that, some people claimed that Passat and Mondeo have more competitive price. In terms of the features, there was mentioned, that seat of rear bench is short, virtual pedal doesn't work well, 2.0 TDI 150 HP engine is too slow in the beginning, side mirrors are small. Most of the people complained about long delivery time. There was slight criticism over DSG transmissions, regarding price ("for a Superb you should spend less"), guarantee ("short guaranty on VW level"). Finnish publications mentioned, that car was noisy on Finnish roads.

The introduction of the third-generation flagship in March 2015 was a high point in Škoda's largest model offensive, which had first been successfully mobilized back in 2010. The new

model was gradually unveiled on the various global markets in 2015, making its way on to the Chinese market in the autumn. In 2015, 80,176 Škoda Superbs were delivered globally, 32,563 of which were new-generation cars. The Škoda SUPERB experienced a substantial surge in demand in its segment. In 2016, the number of Škoda SUPERBs built rose by 76.3% to 148,880.

#### **4.2.8 Kodiaq**

In 2016, the Company is set to unveil a completely new model in the SUV category. Kodiaq provided for Škoda a chance to reach a new customer category. The vehicle, which is also to be made available as a seven-seater, is built to a design that forges ahead with the latest Škoda vehicle components and reinforces the car's emotional side. The new SUV, Kodiaq, offers the brand's signature spaciousness while also providing a high level of safety and superior creature comforts. It has incorporated modern new lighting technology, driver assists and multimedia systems. Engine options range from a 121bhp 1.4 petrol all the way up to a punchy 188bhp 2.0-litre diesel, and there's also a choice between front and four-wheel drive and manual and Automatic (DSG) gearboxes. The strategy of the Automobile is directed on reconnection to family, nature and hobbies. For deeper understanding we can consider main issues of the marketing campaign. HUMAN: A global understanding of the problems facing today's family and an approach that substantiates brand empathy and creates emotional engagement. SIMPLIFYING: Delivering products and services that make drivers' and passengers' lives easier. SURPRISING: Cutting through the sea of sameness and going against the stream by offering a recognizable truth told in an emotional and engaging way. Core competitors of the model are Kia Sorento, Hyundai Santa Fe, Nissan X-Trail, Ford Kuga and Mazda CX-5. Škoda Kodiaq turning out 1,259 units in anticipation of the model's sales launch in early 2017.

### **4.3 Analysis of financial sustainability**

2015 year saw the brand counting more deliveries than ever before, achieving a record 1,055,501 Škoda brand vehicles being delivered worldwide. The 1.8% annual rise meant that this was the second year in a row in which the number of vehicle deliveries in a single calendar year had overcome through the one-million barrier. Western and Central Europe reported growth in 2015, a result rooted in the expanding Automotive market combined with thriving progress in the model offensive. More than that, the company delivered 1.1 million

vehicles to customers worldwide in 2016, beating 2015 by 6.7%. Nevertheless, in spite of positive dynamic, there were some problems in Eastern Europe during 2015, overshadowed by the tangled political and economic situation in Russia, where deliveries fell short of the previous year. The situation became better in 2016. In 2016, 1,126,477 Škoda brand vehicles were delivered to customers worldwide, up 6.7% year on year, making this the third year in a row in which it had broken through the million-delivery mark. The Company's sales climbed to 799,938 vehicles. Sales revenue rose by 10.5% year on year to CZK 348.0 billion. In the reporting period, vehicle sales accounted for 84.0% of the Company's total sales revenue. The top-selling models were the Škoda Octavia, the Škoda Fabia, and the Škoda Superb, which saw sales rocket. The genuine parts and accessories business constituted 5.6% of total sales revenue (2015: 5.9%). The remaining 10.4% was made up of receipts from the supply of components to VOLKSWAGEN Group companies and other revenues.

At 814 thousand vehicles in 2016, Škoda's sales were slightly up compared to the prior-year level. Significantly, that cars from the new Fabia and the Octavia family models were in especially high demand. The difference between figures for deliveries and unit sales is mainly due to the fact that the vehicle-producing joint ventures in China are not counted as Škoda brand companies. The number of Škoda brand vehicles produced worldwide increased year-on-year to 1.2 (1.0) million units across seven series. The 19 millionth vehicle manufactured by Škoda since its formation rolled off the production line at the company's base in Mladá Boleslav in the last year.

The Škoda brand's sales revenues increased by 9.8% in the year 2016 achieved €13.7 billion. Positive volume- and mix-related effects together with the optimization of product costs increased operating profit by 30.9% to €1.2 billion. Operating return on sales rose from 7.3% to 8.7% in 2015 and 2016 respectively.

In Central Europe, the Škoda brand has kept to its own growth trajectory. The Company had an extreme rise in overall deliveries. In Poland and the Czech Republic, a record number of Škodas were delivered, once again confirming the brand's status as the market's number one there. Another places where customers took receipt of record numbers of vehicles were Slovakia, Slovenia and Hungary.

In 2016 in absolute terms, the cost of sales increased by 10.1% year on year to CZK 295.2 billion. The increase was largely the result of material costs (raw material costs, consumables and goods purchasing). Compared to the previous year, gross profit increased by 12.9% to



CZK 52.8 billion. Distribution costs remained at virtually the same level as in the previous year, amounting to CZK 13.5 billion (+1.7%). In 2016, administrative costs were 7.8% higher year on year at CZK 7.8 billion. The Company's operating profit for the reporting period amounted to CZK 30.9 billion. Profit before tax came to CZK 30.8 billion. Profit after tax amounted to CZK 25.2 billion. The profit before income tax-to-revenues ratio was 8.9%. In 2016, cash flow from operating activities climbed by 27.3% year on year to CZK 50.4 billion. There was an 18.0% year on year increase in net liquidity to CZK 70.9 billion as at 31 December 2016.

As at 31 December 2016, the Company's balance sheet totalled CZK 228.2 billion, a 12.6% increase, equal to CZK 25.6 billion, on the previous year-end balance. The value of non-current assets was down slightly when juxtaposed with the comparative period. The rise on the asset side of the balance sheet can therefore be attributed in particular to an increase in current assets. This development mainly reflected the upbeat trend in net liquidity and the higher value of current financial assets. As at the balance sheet date, current assets stood at CZK 123.3 billion, up 29.9% on the figure reported as at 31 December 2015. Equity increased during 2016 by CZK 20.1 billion to a total of CZK 137.6 billion, and this drove up the equity and liability side of the balance sheet. In 2016, capital expenditures (net of development costs) amounted to CZK 14.7 billion, the largest proportion of which was channelled into product investment related to the launch of new models and engines. The Company spent CZK 10.0 billion on new product research and development in 2016 (2015: CZK 10.3 billion). The Company acquired 1% share in the company SAIC Volkswagen Automotive Company Limited with effect from 29 March 2016.

Regarding the difficult situation in 2015, Škoda deliveries to customers in Eastern Europe plunged as the car markets – especially in Russia, Ukraine and Kazakhstan – went down. Deliveries decreased 26.4% year on year to 87,727 vehicles. The decline was particularly sensitive on the Russian market, reporting a 34.8% year-on-year slump to 55,012 customer deliveries. This result saw Russia, Škoda's third largest market just a year earlier in 2014, relegated to fifth in the chart of Škoda Auto's biggest market's platform. The adverse situation in Russia spilled over into Kazakhstan, squeezing the sales result here as vehicle deliveries crashed by 57.6% to 2,352. Despite this negativity, 2015 was still the third most successful year in the Company's history. Furthermore, 2016 showed even better result, compare to 2015 with increasing of deliveries by 6,7%.

While the markets in and around Russia took a turn for the worse in 2015, developments elsewhere in Eastern Europe were way more successful. In Romania, for example, Škoda registered double-digit growth in 2015 in comparison with 2014, maintaining its position as the country's second-strongest importer by delivering 8,988 vehicles. Škoda made good headway in customer deliveries in the Baltic countries, too, reporting increase in delivering for last 3 years.

There was significant increase in production of all the current models in 2016, overall, it grew up for 11%. Highest number belongs to the production of Superb model. Due to introduction of new generation of the car and high demand to the new Superb, the production was increased by 76% for one year. Correct marketing campaign and modern design helped company to gain great popularity among customers and become competitive participant on the market of business cars. (Table 1)

**Table 1.** Production of cars in units (Annual Report Škoda Auto)

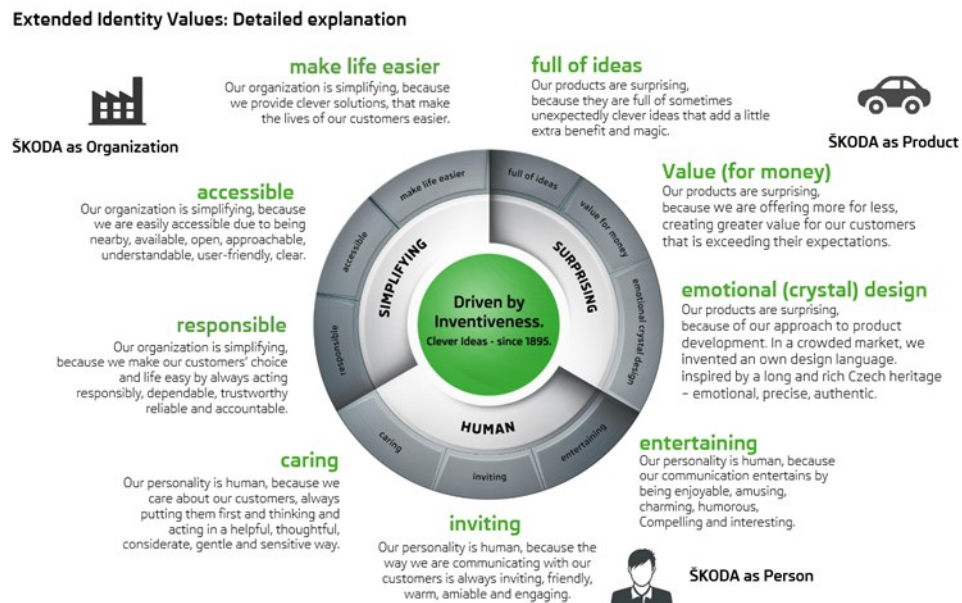
Units	2016	2015	%
Octavia	445,415	425,629	5
Rapid	216,603	189,187	14
Fabia	203,308	195,349	4
Superb	148,880	84,550	76
Yeti	95,417	89,890	6
Citigo	41,247	41,280	0
Kodiaq	1,167	–	
Roomster	–	11,166	
	<b>1,152,037</b>	<b>1,037,051</b>	11

As it is seen from the table 2, all of the figures were rather higher in 2016 compare to 2015. It shows the right approach of the company together with sustainable position on the market. Customers respect Škoda's cars for the balance between price and quality. Furthermore, long history maintains trustful relationship which is appreciated by partners and dealers.

**Table 2.** Deliveries (Annual Report Škoda Auto)

	2016	2015	%
Deliveries (thousand units)	1,126	1,056	+6.7
Vehicle sales	814	800	+1.7
Production	1,152	1,037	+11.1
Sales revenue (€ million)	13,705	12,486	+9.8
Operating result	1,197	915	+30.9
as % of sales revenue	8.7	7.3	

Škoda as organization has specific branding and marketing approach which is illustrated in the Figure 1.



**Figure 7.** Extended identity values (Škoda Annual report)

In 2017, Škoda Auto will focus on successfully driving forward its growth, expanding its market shares and increasing deliveries in key markets. In 2017, the Škoda brand will continue to innovate its product portfolio at full stretch. This year, the Škoda Kodiaq, the brand's baby, will gradually be unveiled on the global markets, while the Škoda Octavia, Škoda Rapid and Škoda Citygo are all lining up for a facelift. The introduction of the new generation Škoda Yeti will be a highlight in the second half of the year. The plan behind the expanded and modernised portfolio of sports utility vehicles is for Škoda to gain a firmer footing in one of the fastest-growing segments. Škoda Strategy 2025 heralds a new era for Škoda Auto, in which, together with the Volkswagen Group, it is set to become the world's leading provider of sustainable mobility.

## 5 ANALYSIS OF ELECTRIC VEHICLES

### 5.1 Types of EVs

For many consumers, electric vehicles (EVs) are considered the new participant on the block, and may even seem futuristic to some. In fact, these “cars of the future” have actually been around for more than a century. They were the most popular mode of motorized transportation in the early 1900s until powerful internal combustion engines fueled by gas and diesel rendered them obsolete.

Today, electric cars are once again emerging as a viable alternative to fuel burning vehicles for a number of reasons: diminishing oil reserves, pollution from Automobile emissions, and government regulations aimed at protecting the environment.

There are four main types of electric vehicles, classed by the degree that electricity is used as their energy source: hybrid electric vehicles (HEVs), plug-in hybrid electric vehicles (PHEVs), battery electric vehicles (BEVs) and fuel-cell electric vehicles.

HEVs are powered by both petrol and electricity. The electric energy is generated by the car’s own braking system to recharge the battery. This is called ‘regenerative braking’, a process where the electric motor helps to slow the vehicle and uses some of the energy normally converted to heat by the brakes. HEVs start off using the electric motor, then the petrol engine cuts in as load or speed rises. The two motors are controlled by an internal computer which ensures the best economy for the driving conditions. The Honda Civic Hybrid and Toyota Camry Hybrid are both examples of HEVs. Since these vehicles’ batteries are smaller than those of an entirely electric vehicle, charging time is less. These vehicles can be recharged every 3-7 hours at 240 volts but cannot use 400-volt Rapid charging points.

Plug-in hybrid electric vehicles are also known as Extended-Range Electric Vehicles (EREVs), this type of EV is powered by both petrol and electricity. PHEVs can recharge the battery through both regenerative braking and ‘plugging-in’ to an external electrical charging outlet. In EREVs the petrol engine extends the range of the car by also recharging the battery as it gets low. These EVs vary greatly depending on choice of primary energy source, for example, Toyota Prius favors petrol while the Mitsubishi Outlander PHEV favors electricity. It is important to mention, that extended-range hybrids do not offer the same fuel economy as BEVs, they do offer significantly improved fuel economy over vehicles equipped with just an electric motor.

BEVs are fully electric vehicles, meaning they are only powered by electricity and do not have a petrol engine, fuel tank or exhaust pipe. BEVs are also known as ‘plug-in’ EVs as they use an external electrical charging outlet to charge the battery. BEVs can also recharge their batteries through regenerative braking. There are plenty of models already available, for example, Tesla, the BMW i3 and the Nissan Leaf which produces zero CO<sub>2</sub> exhaust emissions.

BEVs are powered by electricity from an external source (usually the public power grid) and stored in onboard batteries that turn the vehicle’s wheels using one or more electric motors. Regenerative braking also helps to recharge the batteries when BEVs are being driven. The initial purchase price of BEVs is significantly higher than similar gas-powered vehicles, even with government incentives (if offered in your province). However, many experts believe that, as with hybrid electric vehicles, increased consumer demand will result in lowered cost in the near future. These vehicles offer consumers not only the opportunity to cut down their CO<sub>2</sub> emissions but also to save greatly on fuel and maintenance costs. Although the benefits are clear, there are also practical considerations for consumers thinking about purchasing a BEV:

- “Current BEVs usually have a potential range between 140 and 180km, compared with 500 km or more between fill-ups for most conventional cars. However, for most consumers, that range is well within their current commute range, making BEVs a viable – and more fuel efficient – option as a commuter car.” [40]
- BEV batteries can typically be re-charged overnight in a regular household (120V) outlet, or even faster using a 240V outlet (similar to the type of outlet domestic clothes dryers use). The cost of installing a 240V outlet is estimated to be between 200 and 400 Euro. Many EV owners also purchase a charging station for their home, which ranges in price from 600 to 1200 Euro.
- 400-volt Rapid charging stations are now available in many strategic locations. A vehicle equipped with a CHAdeMO or COMBO connector can be 80% charged in under 30 minutes.
- More and more recharging stations are being built to accommodate BEVs, although the network does not yet provide complete coverage across Europe and America.

The fuel-cell is another type of electric vehicle expected to be widespread on the market in the next few years. Since February 12, 2015, the fuel-cell Tucson is now for sale in the

Vancouver area, making Hyundai the first OEM to market a fuel-cell vehicle. Toyota is slated to follow suit in September 2015 with its Mirai. Instead of storing and releasing energy like a battery, fuel-cell electric vehicles create electricity from hydrogen and oxygen. Because of these vehicles' efficiency and water-only emissions, some experts consider these cars to be the best electric vehicles, even though they are still in development phases. However, fuel-cell technology is not yet problem free. Extracting hydrogen from a water molecule is an energy-intensive process that generates greenhouse gas emissions if renewable energies are not used. The transportation and infrastructure required to bring this fuel to stations must also be taken into account, though for now there are few hydrogen fuel stations.

## 5.2 Competitors analysis

Automakers are encouraged by new fuel-economy standards, along with zero emission vehicle, to produce new type of cars, which is electric one. According to the research, most of them will probably be plug-in hybrids. Decreasing of costs in battery technology anticipates decline of prices and, as a result, wider adoption. And as it was mentioned before, growth of public charging options are planned to make charging of the vehicle more accessible.

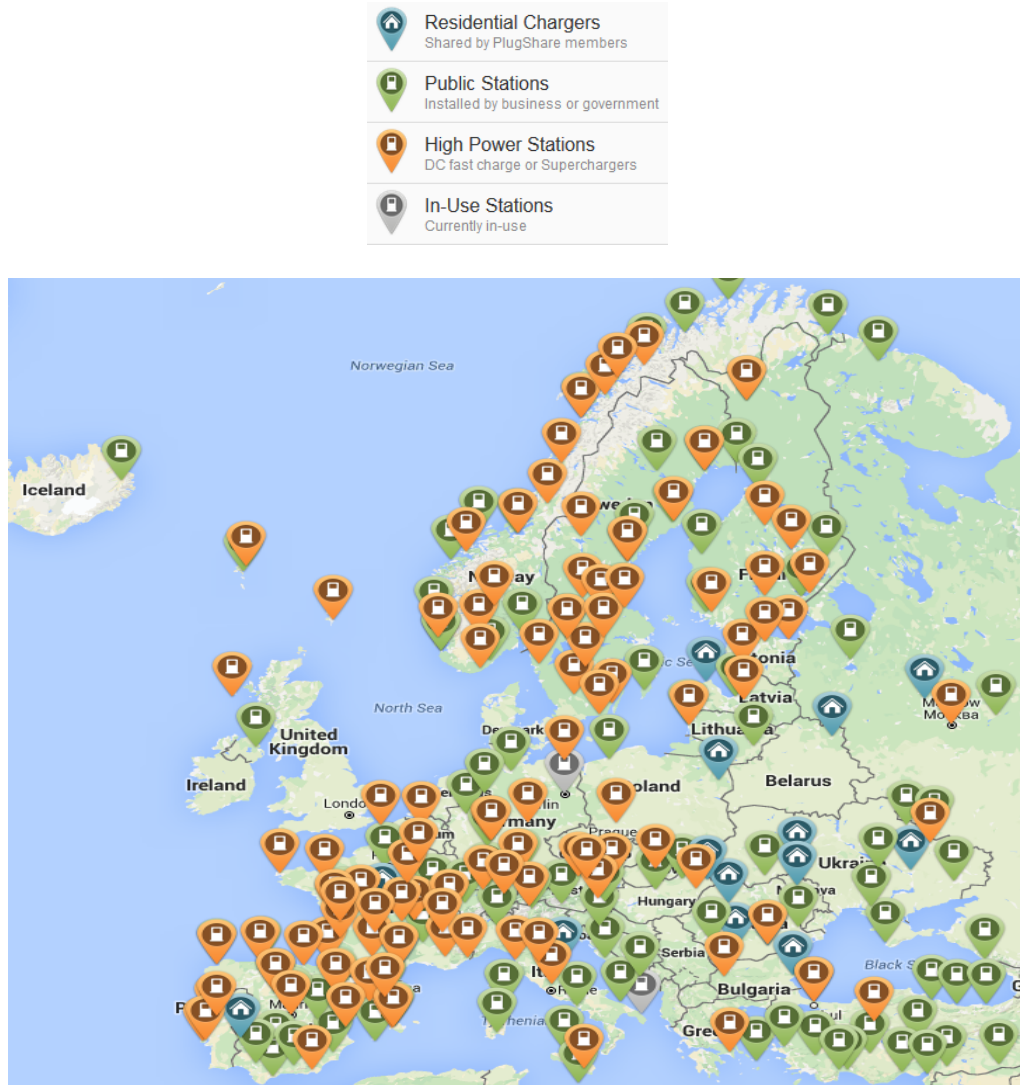
Some people believe that the low penetration of EVs in the Auto market will give more players introduce these cars, consequently, it should lead to a greater acceptance of this category, creating a larger market for all players and competition should not be a concern in the near future.

Some specialists assume, that EVs will eventually be replaced from being novel second cars. It will probably become to being more primary-use cars in a household, and a wider variety of types of electric cars (from SUVs to sports cars) provides expansion of EV's appeal.

Electric Automobiles are becoming increasingly popular due to high-tech novelty. As we can see, several models from the most famous brands have now been sold for years. Nevertheless, most consumers have limited access to the market of electric vehicles and may have many questions regarding whether an electric car might fit into their lifestyle.

One of the most frequent reason for regular people to not buy electric vehicles is due to the limitations imposed by the need to charge it rather often. Despite the fact, that electric vehicles can go farther on a single charge than when they were first introduced, considering a long-distance trip is unlikely to be easy adventure.

To overcome this problem, some manufactures started to establish a wide chain of chargers. It is very important to underline that for last several years this amount have been significantly increased in the USA as well as in the whole Europe (Figure 8).



**Figure 8.** Chargers in Europe (Google maps)

On the Figure it is seen that in Europe there are plenty of stations, especially, on the North. It is profitable and prospective to invest in this industry, people become more and more interested in using electric vehicles. To follow the flow, many modern companies started their own projects of development electric cars. Even though there are many players on the market, the innovator in the field is used to be Tesla Motors. In order to understand the current situation on the market, it is necessary to analyze all competitors.

“Ford Motors announced earlier in December that it will invest an additional \$4.5 billion in electric vehicles by 2020. General Motors’ battery powered Chevrolet Bolt, which will have

a range of 200 miles between charges, is expected to be launched in 2016. Given the focus on clean vehicles and long term targets of zero emission, an increasing number of Automakers are now investing heavily on electric vehicles.” [26]

As this continues, along with manufacturing and technological advances, perhaps electrical cars will become a major force in the Automobile industry in the coming years (Table 3).

**Table 3.** Top electric vehicles (Future of Electric Vehicles is Bright, 2016)

CAR	RANGE (MILES)	HORSEPOWER	SPEED	COST*
Ford Focus Electric 	76	143	84 mph (top speed)	\$27,170
BMW i3 	81	170	0-70 mph in 7 seconds	\$42,400
Chevrolet Spark EV 	82	140	0-60 mph in 7.2 seconds	\$29,995
Volkswagen e-Golf 	83	115	0-62 mph in 10 seconds	\$28,995
Nissan Leaf 	84	107	0-60 mph in 9.9 seconds	\$29,010
Fiat 500e 	87	111	85 mph (top speed)	\$31,800
Mercedes B-clas electric drive 	87	177	0-60 mph in > 8 seconds	\$41,450
Kia Soul EV 	93	109	0-60 mph in 11.5 seconds	\$31,950
Tesla Model X 	250	762	0-60 mph in 3.2 seconds	\$132,000
Tesla Model S 85D 	265	373	0-60 mph in 4.2 seconds	\$67,500

### 5.2.1 Tesla Motors

To start the analysis of competitors from the leader of industry is the best way to compare the participants of the market. Founded by Elon Musk, Tesla is the company which is worldwide known for innovation in the different industries, including Automotive sector.

Tesla has a competitive edge in this market given its supercharger network and direct selling model. Further, most new players are planning to enter the non-luxury segment, where Tesla’s Model 3 is yet to be launched. The Model 3 has received significant media attention as the next model in Tesla’s impressive lineup and as a disrupter in the electric car industry.



Tesla's supercharger network which hosts more than 3738 superchargers around the world providing convenient charging options to its car users, definitely provides it a competitive edge, given that no other player has been able to replicate this kind of network so far. While other car makers are working on fast charging alternatives, competing with Tesla on the charging network might be hard for other Auto makers, given its first mover's advantage. Tesla is the only Automaker exclusively developing electric cars on a significant scale and this gives it an edge over other Automakers that also need to focus on their traditional models. Furthermore, this allows Tesla to have a direct selling model which reduces overhead costs. Providing of convenient application for Tesla cars owners gives significant advantage for the company. Including the after sales service requirements of traditional cars, it is difficult for other Automakers to adapt a direct selling model.

“Tesla vehicles use an onboard charger to convert alternating current (AC) from a wall charger to direct current (DC) that's stored in the battery. Superchargers consist of multiple chargers working in parallel to deliver up to 120 kW of power directly to the battery. As the battery nears to a full charge, the vehicle's onboard computer gradually reduces the current to the optimum level for topping off cells.

Supercharging takes advantage of Tesla's unique battery architecture. Each battery's connections, cell chemistry, and cooling system are engineered to move significant power out of the battery pack during hard accelerations and uphill driving.” [18]

Driving (discharging) and charging use the same systems to move energy out of and into the battery. Supercharging utilizes the car's discharge capacity to flow a similar amount of power back into the battery pack through dedicated high voltage cables. The car's onboard computer constantly monitors the battery during both driving and charging to ensure that it maintains peak performance.

Tesla is the only EV manufacturer capable of charging vehicles at up to 120 kW, which equates to about 270 kilometers of range in as little as 30 minutes.

Tesla was able to lower the cost of its electric vehicle with help of more efficient and technologically advanced manufacturing methods. Tesla's “Gigafactory” for example, will be able to build more lithium batteries in a year than the entire world can produce in a year, the company claimed. In cooperation with strategic battery manufacturing partners, company is planning to build a large-scale factory that will allow them to achieve economies of scale

and minimize costs through innovative manufacturing, reduction of logistics waste, optimization of co-located processes and reduced overhead. These cheaper alternatives and technological advancements may lead to increased demand for the electric car.

More than that, Tesla provides free-charging for those who bought Model S and Model X. it also attracts new customers and increases their loyalty.

Regarding the expansion plan, Tesla strategically tries to locate Superchargers along the most travelled highways as well as in the city centers. In addition to Superchargers, they have a Rapidly developing network of Destination Charging Partners with dedicated Tesla Wall Connectors at their households. These are primarily destinations where it is possible to stay for several hours at a time, such as ski resorts, restaurants, hotels and others. Tesla motors is expecting to build 2 times more stations during 2016.

First of all, it is important to consider all Tesla models: S, X and 3.

The Tesla Model S is a five-door, luxury electric car introduced in June 2012. The United States Environmental Protection Agency (EPA) official range for the 2012 Model S Performance model higher than any other electric car at the time, furthermore, it scored the best Automobile safety rating.

The Model S became the first electric car to top the monthly new car sales ranking in any country, twice leading in Norway, in September and again in December 2013; and also in Denmark in December 2015. Global Model S sales passed the 100,000 unit milestone in December 2015. Moving further, it was ranked as the world's bestselling plug-in electric vehicle in 2015, up from second best in 2014, more than that, it was also ranked as the top selling plug-in electric car in the U.S. in 2015. As of December 2015, the leading markets are the United States with a 60% share of global sales and Norway with 9.4%. Other leading country markets are China, the Netherlands, Canada, Denmark, Germany, and Switzerland. As of December 2015, the Model S ranks as the world's second bestselling plug-in car in history after the Nissan Leaf.

Regarding awards, The Tesla Model S won the 2013 World Green Car of the Year, 2013 Motor Trend Car of the Year, Automobile magazine's 2013 Car of the Year, Time Magazine Best 25 Inventions of the Year 2012 award and Consumer Reports' top-scoring car ever. In 2015, Car and Driver named the Model S the Car of the Century.

In 2016 Tesla has completely updated design of the car. A few new features appeared on the sedan's options list. For example, the Model X's HEPA air-filtration system, which is said to be significantly more effective than conventional air filters at removing pollution and allergens from the air, is now included in the \$3000 Premium Upgrades package, and two new interior trim choices—Figured Ash Wood and Dark Ash Wood—are also newly available. To go along with these changes, pricing for the 2017 Model S is up by \$1500 across the range.

The Tesla Model X is a full-sized all-electric crossover SUV that uses falcon wing doors for access to the second and third row seats. The prototype was unveiled at Tesla's design studios in Los Angeles on February 9, 2012. The Model X was developed from the platform of the Tesla Model S; both are being produced at the Tesla Factory in Fremont, California. First deliveries of the Model X began in September 2015. Since its introduction, about 2,700 units have been delivered by early April 2016. According to producers, Model X is the safest, fastest and most capable sport utility vehicle in history, it's ludicrously fast, accelerating from zero to 100 kilometers per hour in as quick as 3.4 seconds.

Model X is designed with safety as the first priority. The floor-mounted battery lowers the center of gravity so that the risk of rollover is about half that of any vehicle in its class. The battery structure strengthens Model X against side impact intrusions. And without a gasoline engine, the large front trunk acts as a giant impact-absorbing crumple zone. The car continually scans the surrounding roadway with camera, radar and sonar systems, providing the driver with real-time feedback to help avoid collisions. Even at highway speeds, Model X is designed to Automatically apply brakes in an emergency. A medical grade HEPA filter strips outside air of pollen, bacteria, viruses and pollution before circulating it into the cabin. There are three modes: circulate with outside air, re-circulate inside air and a bioweapon defense mode that creates positive pressure inside the cabin to protect occupants.

Model X is able to achieve 470 kilometers of range in part because it is the most aerodynamic SUV in production. At 0.24, Model X's drag coefficient is 20% lower than the next best SUV. In addition, an active spoiler deploys from the rear lift gate to optimize highway efficiency and stability.

The start of delivering of the model from Tesla will be in October 2017. Approximate price is around 35000 dollars before incentives. Regarding the features, it is important to empha-

size, that minimal range is 200 miles. The Model 3 has 16 cameras, 2 radars (laser and regular ones). If we calculate price for energy consumption, (including the information, that the price per 1 kw is 3 CZK in Czech Republic), we get only 180 CZK for 300 km of driving. It is confirmed, that total exploitation cost for using this electro vehicle is around 1/3 of using regular car. More than that, there is self-driving system which can bring the user to different locations. The system is based on mobile I microchip EYE Q4 (10 terabytes of data per second processing), which will be removed to Q5 in 2018 (10 times more effective than Q4). Car is certified by EPA and has life guaranty for batteries. Tesla expects to produce roughly 500000 (all models) cars in year 2018.

### 5.2.2 BMW i3

The BMW i3 is a five-door urban electric car. Historically, designers have had a hard time finding an attractive design for a small electric city car—as evidenced by the design of cars like the Spark EV and Scion iQ EV. Prior to the i3's release, perhaps the most successful small EV design was the electric version of the Fiat 500 (will be discussed later), especially when decked out in a striking color combination.

The i3 concept car was unveiled in 2011 at the International Motor Show Germany, whereas the production version was unveiled in July 2013. Mass production of the i3 began in September 2013 and retail deliveries started in November 2013 for Europe. Prices in Germany start from €34,950. The BMW i3's official range is 130 to 160 km.

In May 2016, BMW announced that the 2017 model year (MY) BMW i3 will come with an improved battery pack with 50% more capacity (33 kWh) than the previous model with a corresponding range increase expected to achieve 183 km, and 300 km. The Range Extender variant will also feature the same higher capacity battery as the all-electric model, with a corresponding all-electric range increase. Both variants with the improved battery are available in the UK, Germany and France starting in July 2016.

The i3 ranks as the world's third best-selling all-electric car in history in November 2015. As of April 2016, cumulative global i3 sales totaled over 47,000 units. The i3 ranked third among all-electric cars sold worldwide both in 2014 and 2015, and it was also the world's fifth top selling plug-in electric car in 2015. More than that, the BMW i3 won two World Car of the Year Awards selected as 2014 World Green Car of the Year and also as 2014 World Car Design of the Year. The i3 was also given the Product Design Gold Award, and,

in the first UK Car of the Year Awards, it won in two categories: UK Car of the Year 2014 and Best Supermini of 2014.

The car is orientated mostly for young people who have income higher than average and want show that they care about environment. Prices are rather high, nevertheless, BMW is prestigious brand with long history, customers can rely on quality, consequently, they are willing to pay more. Modern outfit attracts attention, i3 has enough space and rather comfortable inside. Smooth and silent driving is typical for many electric cars.

### **5.2.3 Chevrolet Spark EV**

The Spark EV is the all-electric version of Chevy's five-door urban mini-car. Initially, General Motors announced the production of the electric version of the third generation Chevrolet Spark in 2011, the model is simply called Chevrolet Spark EV. However, the availability was limited to select markets. Already in November of 2012 there was introduced the production version at Los Angeles Auto Show.

Spark EV is the first all-electric passenger car, which appeared from GM in the USA since 1999. The approach is within the framework of General Motors vehicle electrification strategy. The release of the vehicle was in 2013 for specific markets: California and Oregon. Then GM decided to extend the market size and in December 2014, U.S. sales totaled 1,684 units.

GM Korea decided to manufacture the car and sell it on the local market in October 2012. Retail sales began in South Korea already in the end of 2013. There were further plans to sell the Spark EV in Canada and Europe.

In terms of mechanical characteristics, the car was first powered by a 21.3 kWh nanophosphate lithium-ion battery pack supplied by A123 Systems. The Spark EV can be fast-charged to 80% of capacity in 20 minutes using an optional connector, and charging time increases to about seven hours using a dedicated 240-volt charging station or about 17 hours using a standard household 120-volt outlet.

The sales of the Spark EV have been growing from the first announcement. People are interested in new model from Chevrolet due to its relevant price and range of available accessories.

#### 5.2.4 Ford

Ford is investing an additional \$4.5 billion in electrified vehicle solutions by 2020, including the new Focus Electric with all-new DC fast-charge capability, which delivers 80 percent charge in an estimated 30 minutes and projected 100-mile range. The company is adding 13 new electrified vehicles to its product portfolio by 2020; more than 40 percent of Ford's nameplates globally will be electrified by the decade's end. Ford also redefining how future vehicles are created, moving from a features-based product development to a customer-experience-led process, applying insights from social scientists. This user experience design technique also plays an important role in developing the Ford Smart Mobility plan, which is designed to take the company to the next level in connectivity, mobility, Autonomous vehicles, the customer experience and data and analytics.

#### 5.2.5 Fiat 500e

The outlook of the new electric model is based on the famous Fiat 500. It uses a 24 kilowatt-hour liquid-cooled lithium-ion battery pack, providing an official EPA range of 135 km. The company pays a lot of attention to the exterior of the vehicle, based on the mentality, that Italy is the center of fashion industry. In fact, Fiat's director of product marketing, based the campaign on the following quote: "Let's be honest, ugliness is probably one of the worst forms of pollution," Davis said. "The Fiat 500e proves that you do not have to give up on good looks to deliver an electric car."

Since the 500e's release in 2013, a number of minor upgrades have been made to the center console. For 2016, Fiat added new color options, replaced the dash-mounted TomTom navigation system with Chrysler's native UConnect navigation and infotainment system. Critics aren't blown away by UConnect's graphics interface or functionality, but aesthetically, it's a step up from the awkwardness of the tacked-on TomTom system. The 500e's low weight advantage also helps with efficiency and driving range. A full charge via the car's 6.6-kW charger takes about four hours. Although it is possible to get a 240-volt home charging station rated at 30 amps to take full advantage of the 500e's charging capability, which adds about 20 to 25 miles of range in an hour of charging.

#### 5.2.6 Volkswagen E-Golf

The e-Golf utilizes a 134-hp 100-kWh electric motor powered by a 35.8-kWh lithium-ion battery. The EPA estimates around 200 km of range on a single charge; fuel economy is

rated at a combined 119 MPGe. An onboard charger is standard equipment. Novel packaging of the battery components avoids reducing passenger space; options include Automated emergency braking and parking assist. Volkswagen also upgraded the electric motor, netting an additional 19 horsepower and 15 lb-ft of torque for new totals of 134 horsepower and 214 lb-ft. Last year, the e-Golf SE started at \$29,815.

It seems like the e-Golf's exterior looks different, that's mostly because it is equipped with the new headlights, taillights, front fenders, and bumpers from the refreshed, Europe-market Golf. However, the regular, gasoline-powered Golf won't see those changes until the 2018 model year, a wait that gives the e-Golf's styling some new characteristics. As before, the front end features large C-shaped LED running lights and a thin blue accent stripe across the plastic plate that substitutes for the gas-powered car's grille.

### **5.2.7 Nissan Leaf**

As we can understand from the backronym "LEAF" that means leading environmentally-friendly affordable family car, Nissan is directed on environment-carrying strategy. The U.S. EPA officially called the 2016 model year Leaf with the 30 kWh battery is 172 km (107 miles) on a full battery charge, while the trim with the smaller 24 kWh battery is 135 km (84 miles), the same as the 2014/15 model year. Leaf battery packs can be charged from fully discharged to 80% capacity in about 30 minutes using DC fast charging. Since its inception, more than 250,000 Leafs have been sold worldwide through December 2016, making the Leaf the world's all-time best-selling highway-capable electric car in history. As of December 2016, the European market is led by Norway with over 19,400 new units registered, and the UK with 15,000 units by mid-September 2016. The Leaf was the world's best-selling plug-in electric car in 2013 and 2014.

### **5.2.8 Renault Zoe**

Renault Zoe is a five-door supermini electric car produced by the French manufacturer Renault. Earlier Zoes have a 22 kWh lithium-ion battery pack that delivers a range between 210 km and 240 km under the NEDC cycle. In September 2016, Renault announced the introduction of an optional 41 kWh lithium-ion battery, increasing the range to 400 km under the NEDC cycle. Renault had previously unveiled under the Zoe name a number of different concept cars. Initially in 2005 as the Zoe City Car and later as the Zoe Z.E. electric concept

was shown in two different versions in 2009 and 2010 under the Renault Z.E. name. A production ready version of the Zoe was shown at the 2012 Geneva Motor Show. Retail customer deliveries began in France in December 2012, followed in 2013 by several European countries. Since 2013 the Zoe is the all-time top selling all-electric car in the French market, with 27,155 units registered through June 2016. Zoe sales achieved the 50,000 unit milestone in June 2016. The Zoe has been the top selling all-electric car in this category in Europe for two years running, 2015 and 2016, and also topped European sales in the broader plug-in electric car segment in 2016.

Taking everything into account, we can conclude, that almost each market player tries to develop new environment-friendly strategy, based on the electric vehicles' production. Automakers invest plenty of money in research, as well as in development of new production lines. EVs are more expensive, compare to gasoline cars, but exploitation is much cheaper. Furthermore, after the scandal with CO, and huge losses of Volkswagen, it became crucial to reduce pollution. Even such companies as, Apple or Uber are working now on the development of EVs which don't require the driver to be in the car. obviously, for Škoda it will be great challenge to overcome competitors, nevertheless, rational strategy can lead to the success.



## 6 ELECTRIC CARS AND ŠKODA AUTO

### 6.1 Analysis of future prospect for EVs

Many specialists assume, that even with low oil prices, the future for electric vehicles is bright. Such factors as decreasing battery prices, manufacturing longer-range models, and building more charging stations are driving forward electric vehicle sales. All of mentioned are crucial reasons for oil industry to prepare a new strategy, because the Auto industry investing billions to meet strong pollution standards globally, many leading companies are looking forward to extend this new segment.

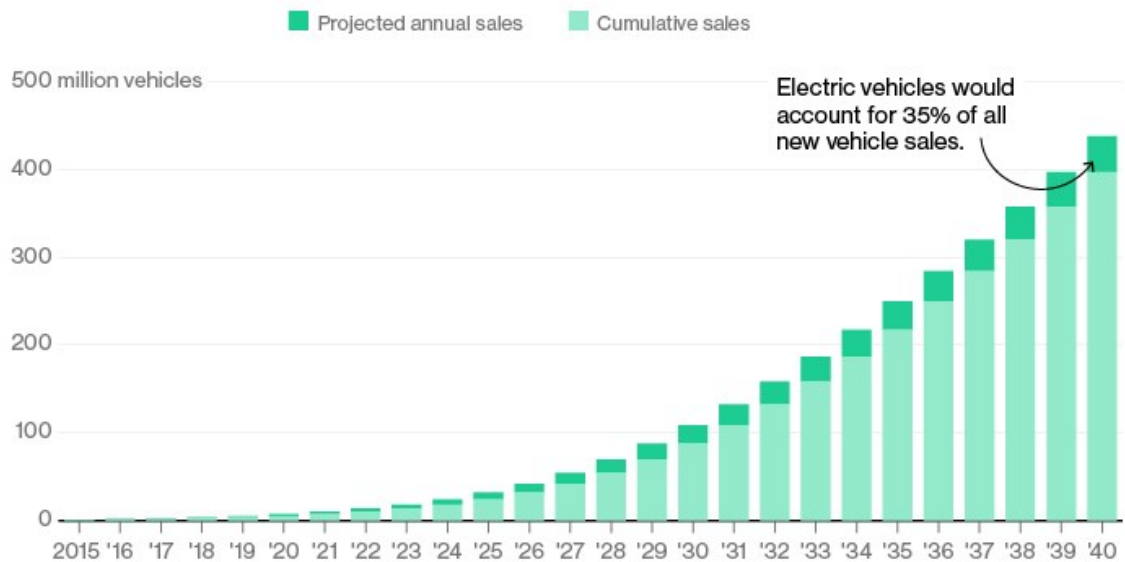
“The major oil companies greatly underestimate the impact electric vehicles will have on their market”, write independent energy advisors Salman Ghouri and Andreas de Vries. According to Ghouri and De Vries, “The trends currently underway in the Auto industry are likely to have a substantial impact on oil demand in the medium term, and even a devastating impact in the longer term”.

As it is known, at the beginning of the 20th century, coal and wood were the dominant sources of energy, together providing more than 90 percent of global energy consumption. Nevertheless, starting from 1910, Henry Ford made the Automotive Revolution. It caused increase of demand for liquid fuels, making crude oil’s contribution to global energy supply to more than double from year to year. Thus, by 1970 crude oil had taken top-spot in the global energy mix.

Transportation sector is growing significantly since world’s oil companies with plenty of organic growth opportunities were provided. Almost all energy outlooks judge the major oil companies, they appear to expect this status quo to continue. For instance, BP’s most recent Energy Outlook 2035 assumes that non-oil based transport will grow just 5 percent per annum for the next 20 years, and that essentially all this growth will be in the gas-powered transport segment. Similarly, The Outlook for Energy: A View to 2040 published by ExxonMobil assumes that by 2040 “plug in” electric vehicles and fuel cell vehicles will have no more than a 4 percent market share. Chevron, meanwhile, has indicated that it plans based on the assumption that the Auto industry will remain fundamentally the same for at least another 50 years.

From the research of Bloomberg New Energy Finance in the article "Here's How Electric Cars Will Cause the Next Oil Crisis", it is underlined that electric vehicle sales grew 60

percent worldwide in 2015. Furthermore, it was mentioned that electric vehicles will account for 35 percent of new car sales globally by 2040. More than that, by the same time, long-range electric cars will cost less than \$22,000 (in today's dollars), according to the projections. Thirty-five percent of new cars worldwide will have a plug system (Figure 9).



**Figure 9.** The rise of electric cars (Bloomberg)

In the next few years, such Automakers as Tesla, Chevrolet, Nissan are planning to start selling long-distance electric cars in the \$30,000 range. Other carmakers and tech companies are investing huge amounts of money for development of new models. As some specialists say, by 2020, some of these will cost less and perform better than their gasoline counterparts. The aim would be to match the success of Tesla's Model S, which now outsells its competitors in the large luxury class in the U.S.

Navigant Research (famous industry expert) also predicts strong EV growth in 2017. For example, new, longer range models will enter the market and more charging stations will be installed by the end of the year. Already through the first two months of 2017, EV sales are up 9 percent compared to the same time last year. As a result, the oil industry is dropping. Bloomberg predicts the EV "revolution" will displace 13 million barrels a day of crude by 2040 and 2 million barrels per day as early as 2023.

Taken everything into account, it is possible to emphasize several reasons why the future of electric vehicles is bright. Firstly, in spite of experts' forecasts, battery costs are dropping faster than it was predicted. More specialists, scientists, industry experts, and Automakers concluded that battery prices are headed below \$150 per kilowatt-hour in the coming ten

years. Some experts believe that from this time EVs enter the mass market. "EVs may be able to compete directly with petrol-driven cars on cost a lot sooner than most people think," wrote scientists Björn Nykvist and Måns Nilsson, authors of a recent scientific study published in Nature Climate Change on falling battery prices. Battery prices are "on a trajectory to make unsubsidized electric vehicles as affordable as their gasoline counterparts in the next six years," Bloomberg New Energy Finance projects. "That will be the start of a real mass-market liftoff for electric cars". By 2022, Bloomberg estimates electric cars will be cost competitive on a lifecycle basis (purchase plus fuel costs) with gasoline cars. Carmakers like General Motors and Tesla are investing in mainstream EV models because they expect battery prices to fall Rapidly.

Secondly, longer-range, affordable electric cars that will able to travel more than 300 kilometers on a charge, are appearing in showrooms. GM's Chevrolet Bolt, with this range and costing about 30,000 euro, has been described by Wired as "the electric car for the masses." It arrived last year, followed by Tesla's affordable Model 3 and the next generation, longer range Nissan LEAF. Even VW has announced about manufacturing of a hybrid car. Figures for plug-in hybrids has been increased as well. GM's next-generation Chevrolet Volt, a plug-in hybrid whose range has been boosted from 80 kilometers to 100 kilometers, is already in showrooms. Toyota plans to reintroduce its Prius Plug-in later this year, also with boosted all electric range.

Thirdly, more charging stations are planning to be worldwide. It is known, that lack of charging stations remains a barrier to achieve wider EV use. But utilities and others are moving to increase the number of charging stations at workplaces, apartment complexes, campuses, transit stations and other public gathering places. Companies such as Google, Coca-Cola and Walgreens are installing charging stations. Nissan offers buyers of its LEAF two years of free charging at hundreds of stations. BMW and VW are teaming up to build up plenty of charging stations as well. Furthermore, Tesla has built 655 Supercharger stations with 3,963 Superchargers in 2016.

Fourthly, car makers are investing billions of dollars to bring more electric vehicle models to market. The number of EV models has grown from two in 2010 to 25 in 2016. Over the next three years, industry expert Alan Baum forecasts, the number of models to double to over 50, with 16 new models in 2016. With sales leaders Tesla, GM, Nissan and BMW threatening to run away with the EV market, other companies are planning the production for the coming 5 years. Ford is investing \$4.5 billion in electric cars, and will be adding 13

electric cars and hybrids by 2020, when more than 40 percent of its lines will be electrified. Honda's Chief Executive Takahiro Hachigo recently announced that two-thirds of its line by 2020 will be electrified, including conventional hybrids, plug-in hybrids and fuel cell vehicles. The mighty German Auto industry is also recognizing the threat. Despite losses after the diesel scandal, VW will step up its EV investments and plans to roll out 20 electric cars and plug-in hybrids by 2020.

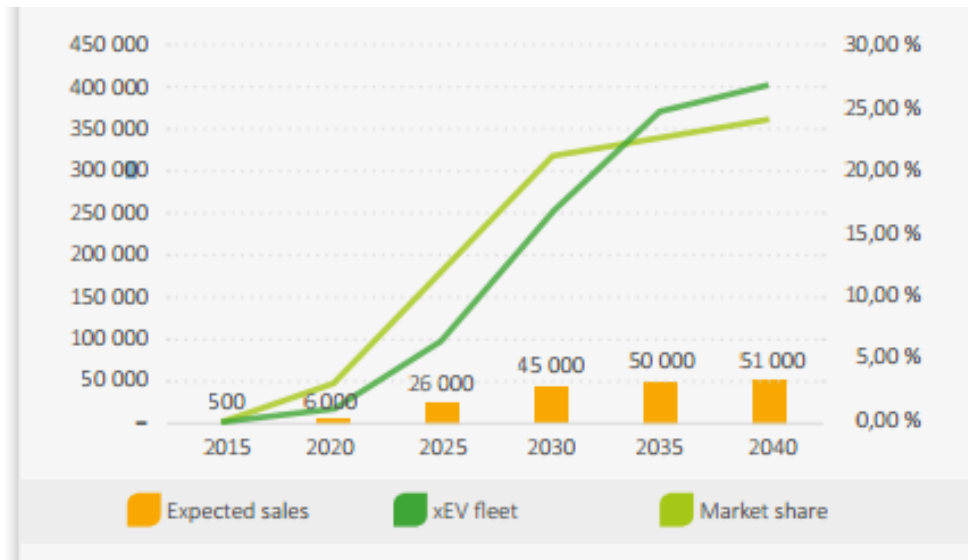
Finally, EVs have gained importance as the world looks for ways to reduce the carbon pollution and oil dependency that fuel dangerous climate change. A study by NRDC and the Electric Power Research Institute found that widespread electric vehicle use could cut carbon pollution by 550 million metric tons annually in 2050, equivalent to the emissions from 100 million passenger cars. It also would reduce other harmful pollution, such as ozone and particulate matter. As part of the historic Paris climate accord, 197 nations representing 97 percent of the world's emissions have committed to national plans to cut carbon pollution, including from motor vehicles which accounts for 17 percent of global CO<sub>2</sub> emissions. The three largest passenger car markets representing two-thirds of global sales all have strong fuel economy standards in place that will help drive up EV sales: the U.S. (54.5 mpg by 2025), European Union (56.9 mpg by 2021) and China (47.7 mpg by 2020). China has quickly become the world's largest market for EVs and the home to the world's number one EV manufacturer.

In the longer term the impact of the trends currently underway in the Auto industry could well be devastating for the crude oil industry. The sooner the industry realizes this, the bigger the chances it will find new opportunities for growth in the future that the Auto industry intends to create.

## **6.2 Czech market analysis in terms of redness for electric cars**

The first important question regarding the electric vehicles' manufacturing is how to build the infrastructure around the country. If we compare Czech Republic with other countries, it is seen that in Czech there is significant lack of charging stations for e-cars. Nevertheless, it is possible to charge the car at home, during the night, consequently, the most probable solution in this dilemma is production of urban electric vehicle.

E-mobility has become increasingly widespread because of pressure to reduce CO<sub>2</sub> emissions and to secure better air quality in cities. In the Czech Republic more and more customers are buying e-cars because of the broader portfolio of brands and models sold on the local market. The total costs of operation are in some cases comparable to those of cars with internal-combustion engines. Nevertheless, the significant emergence of e-mobility is expected after 2020, when the total costs of operation will be equal to those of standard vehicles mainly due to the European Union's CO<sub>2</sub> targets. Penetration should reach 3% together with a 6% share in annual sales in the country. Growth will be even more significant after 2025, when strict CO<sub>2</sub> targets come into force. The market share of electric vehicles should reach approximately 30% of newly registered cars (Figure 10).



**Figure 10.** Expected EV sales (Wake up call for oil companies: electric vehicles will deflate oil demand, 2016)

In January 2016, there were about 1,000 battery electric vehicles and more than 4,000 hybrids registered in the Czech Republic. The National Action Plan assumes that that total number of electric vehicles should be 250,000 in 2030. To reach this number, development of the country's recharging station infrastructure is needed.

To satisfy the increasing demand, Škoda Auto decided to cooperate with energy giant ČEZ. The plan supposes collaboration in development both electric cars and infrastructure. As a result, ČEZ will develop and build charging stations. The lack of charging stations has often been an critical block in the proliferation of electric cars. The two firms will work together to ensure the cars and stations are compatible and that the number of stations can meet the demand from the volume of cars produced. More than that, it provides the opportunity for

EVs' owners to travel long distance destinations. It is also possible to go to neighbor countries, as Germany and Austria, because they equipped much better in terms of charging stations for e-cars.

“Electromobility is a major opportunity,” ČEZ CEO Daniel Beneš told daily *Hospodářské noviny*. “Škoda Auto for us as a Czech company is a very important partner. Negotiations continue and are progressing” he added.

In spite of the fact, that electric cars have not yet been mass produced and in Czech Republic there are only few hundred electric vehicles, there were built already 70 charging stations here. Moreover, around 40 stations are planned along main highways. ČEZ has received EU funding for the project, as the EU is promoting electric cars to improve the environment. According to Beneš, it is the largest network of its kind in the CEE region.

As reported by researches, electric cars will consume the amount of energy that is put out by a nuclear power block by 2030 due to the fact that number of EVs is expected to increase. All of this makes it an important segment for ČEZ. Neither company wanted to disclose more details about the project.

Confirming to Škoda's board member Bohdan Wojnar recently told “*Hospodářské noviny*” that by 2025 electric cars could cover around 20 to 25 percent of Škoda car sales. Škoda in 2016 sold 183,000 cars in Central Europe, and sells up to 80,000 units annually in the Czech Republic, based on information from the annual report of the company.

As it was already mentioned, electric cars currently have a high price, which combined with poor battery life and a relative lack of charging stations makes the cars unattractive to potential buyers. Wojnar says that both battery life and price will be improved in the coming years. But customers still require sufficient charging stations, otherwise they will not consider purchasing electric cars.

The spread of electric cars can also be promoted by the public sector. The use of electric cars is being announced as a strategy of smog's reduction, which has been a problem across the Czech Republic last winter. Prime Minister Bohuslav Sobotka (ČSSD) recently said the government would seek EU funds for charging stations. The government also announced its intention to subsidize the purchase of electric cars for fleets: firms, government offices and municipalities.

Škoda Auto supposes to produce hybrid electric cars in mass scale by the middle of 2019, with the Superb for western markets and an Octavia and Kodiaq for China. Based on the VW I.D. concept platform a purely electric car will be on the market already in 2020. “We have decided the first plug-in vehicle will be on the market from 2019 onwards, and first battery electric vehicle will then follow quite shortly afterward,” Škoda CEO Bernhard Maier told Topgear magazine in September 2016. “We must focus on our SUV offensive, and then we have to focus on electrification.” He also assumes that technology will be improved in order to decline the price of electric vehicles (EVs), nonetheless, the infrastructure is also needed. “We need some technological jumps to cope with the biggest challenges we face for our EV. The first is range, the second is charging infrastructure, the third is weight and overall it is cost,” Maier told Topgear. “In all aspects we expect improvements, and with that it will be accessible for Škoda and its customers to go down the EV route.”

One more influential strategy should be developed in cooperation with hypermarkets and malls, because it will definitely increase the convenience for EV’s users to charge the car during the time, they spend for shopping. Even short-term charge might be essential for some drivers.

Students’ involvement can bring great input in the development of electric industry. Almost every Czech technical university participates in some e-mobility project. Since 2010 students of the Faculty of Electrical Engineering at the Czech Technical University in Prague have developed five prototypes of e-Formula Student monopost cars. The eForce FEE Prague Formula team participated in its first race in 2012 and is the only regular participant in e-Formula Student events from the Czech Republic. In 2014 students at the Technical University of Ostrava announced the completion of the SCX prototype, – an advanced student-designed car. It is a fully electric sports car with four synchronous motors generating a total of 295 horsepower. The SCX accelerates from 0 to 100 km/h in five seconds and has a range of roughly 180 km. A limited series of this car will be sold following homologation. The University of West Bohemia in Plzeň is another centre of electricvehicle development. In 2010 the university presented the HER, an electric hot rod developed in only 150 days. This car has a range of up to 150 km and maximum speed of 110 km/h. Three years later, the same team presented an electric chopper called Blue Elyctra with a 16kW electric motor providing the maximum speed of 130 km/h (with an installed limiter) and range of up to 150 km. In 2015 the team rolled out its brand new electric sports motorcycle called Électricité.

The goal of this project was to construct a prototype with reasonable parameters for a reasonable price.

The Czech government supports the development of all types of alternative-fuel filling stations and recharging stations. Czech companies are investing heavily in the development of public charging stations. At the end of 2015 there were around 200 public charging points around the country, though mainly in big cities. The largest operators of these are energy distributors such as ČEZ, RWE, PRE and E.ON (Figure 11).



**Figure 11.** Public charging stations. Current situation

### **6.3 Development process in Škoda Auto**

The development of new product in Škoda begins approximately 48 months before start of production (SOP). The timeline is separated and followed by different departments. The first step is elaboration of product's mission, usually it takes around 3 months. Based on the information, designers start to prepare first drafts of expected car. This milestone is called product premises, through the period it should be defined, how the future product should look. It is also necessary to characterize the type of future vehicle, based on the matrix. (Figure 12).









	 Notch	 Hatch	 MPV	 Estate	 SUV	 Car derived Van
A00		<b>Citigo</b>				
A0		<b>Fabia</b>	<b>Roomster</b>	<b>Fabia Combi</b>		<b>Praktik</b>
A	<b>Rapid</b>	<b>Rapid Spaceback</b>			<b>A0 Crossover</b>	
	<b>Octavia</b>			<b>Octavia Combi</b>	<b>Yeti</b>	
					<b>A+SUV</b>	
B	<b>Superb</b>			<b>Superb Combi</b>		

Figure 12. Matrix

As long as the previous step is done, exact product definition should be settled. It consists of preparation of catalogue list, including such basic characteristics as safety, control system, environment protection etc. Furthermore, during this period, marketing department needs to gather the information regarding competitors, including analysis of similar models on the market. After that project feasibility is coming, where it has to be decided if company produces the car or not. Decision of the concept and design is ranked next. In order to figure out if the customers satisfied with car, Škoda always prepare the real research for around 500 people: potential customers are able to see the new model and give some feedback which will be included in parameters of the new car. When the final vision is ready, it is necessary to “freeze” the model’s specifications. Integral part of the whole process is communication with direct suppliers, who should already know the outlook of the new design. From this point it is possible to start the preparation for the release. On the following step purchasing department starts to order all necessary pieces. All technical and production issues should be considered. Finally, in two months after SOP there should be the launch of the model.

For better integration of the information regarding launching of new model it is significant to use special application to simplify the processes and work with information online. In order to fulfil these goals, there was developed LaunchTRACK.

The LaunchTRACK online tool is an application to manage/steer/report launches of new Škoda models on individual local markets with direct online connection between departments of Škoda and market/importer launch management teams.

The application covers the following critical factors in Launch management on importer/market level:

Launch team – A cross-functional team with representatives from all important areas, i.e. sales planning, marketing, PR, sales operations, service, parts, training etc. It must be led by Market Launch Manager (person nominated from the existing structure).

Launch review – Pro-active use of LaunchTRACK to plan and later to update the status. Regular reviews (minimum once in two weeks) for risk handling, alignment within teams and improving the future launch planning process.

Feedback to Škoda Auto – In order to integrate efforts with markets, departments require Market Launch Plan update (usual frequency is on bi-weekly basis). For this purpose the LaunchTRACK application will become the tool, providing the key inputs and real share point of all launch related data/documents.

The application is supposed to be rather effective due to many factors:

- All information easily accessible – everything online;
- Used for steering the launch;
- Save the time (reports Automation);
- Automatic data pre-filling;
- Data display in visual form;
- Documents depository.
- Furthermore, launchTRACK Automatically generates:
  - Key Activity Overview;
  - Launch Scorecard Activities;
  - Readiness Report;
  - KPI report;
  - Gantt Overview Report;
  - Team Milestone Overview (Figure 13).

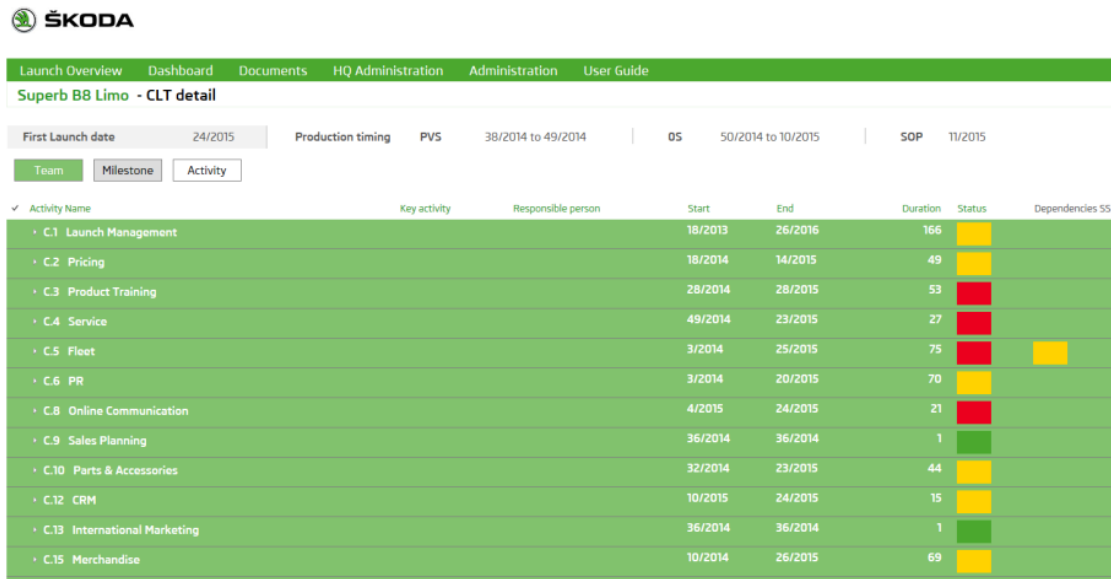


Figure 13. Information display

It is also important to emphasize the convenient Timeline, produced by the tool, which shows all key activities during the launching of the new model (Figure 14).

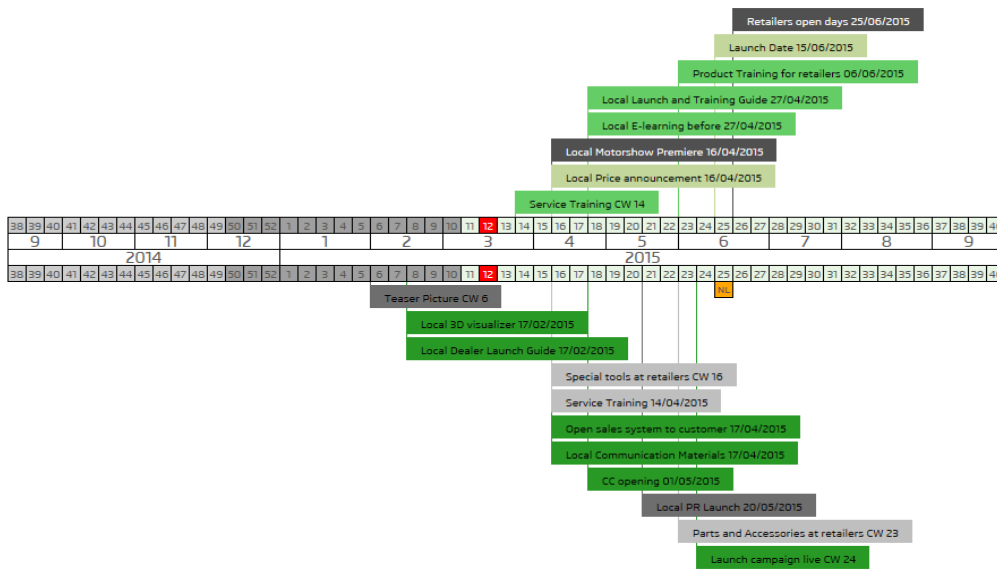


Figure 14. Timeline

The access to the LaunchTRACK can get only limited number of Škoda’s employees, consequently, the information on the portal is confidential. All information can be easily added or deleted, in addition, it is possible to define responsible person or prepare mail distribution to different recipients.

## 6.4 Risk analysis

Škoda Auto's global operations in Automotive markets pose numerous risks potentially adversely affecting its financial performance and business results. On the flip side, economic and legislative changes can yield opportunities, which the Company then strives to harness in a bid to strengthen and further improve its competitive position.

The most significant risks the Company faces are financial and sector-specific risks, risks arising from changes in general economic and political conditions and amendments to legislation, operational risks and other risks, such as those stemming from changes in quality and human resources risks.

When we consider possible risks, first of all, we should pay attention to those, which can't be managed directly by the company. All companies activities are heavily influenced by general global, EU and local economic conditions, such as the state of the economy and the related economic cycle, legislative changes, the political situation, terrorist activities and pandemics in the countries where the Company is active. Other significant risks that could affect the Company's business activities in global markets include divergent paces of economic growth in different countries or regions and a vulnerable banking system. Exports to countries carrying potential territorial and political risks are identified well in advance and minimized by using standard approved products available on the financial and insurance markets. The Company's partners here are Czech and international banking organizations, including EGAP (the state-controlled export guarantee and insurance company). The economic situation may also be adversely affected by additional technical development costs as a result of changes in legislation, such as stricter legislative requirements for vehicle safety, fuel consumption or emissions of harmful substances, as well as adjustments to standard vehicle specifications. With environmental protection laws, it should be borne in mind that EU legislation on exhaust gas emissions is likely to be tightened. When it touches the electric vehicles, it is hard to anticipate all difficulties regarding legal system and political attitude in general. For example, in Europe there are plenty of subsidized projects for development of electric cars, whereas in Russia the whole economy is based on the oil, consequently, it is against of country's interests to promote this sector.

In terms of demanding risks, growing and more aggressive competition in the Automotive sector is reflected in increasing sales support. The situation is further exacerbated by market

risks associated with changes in customer demand, since customers' purchasing patterns depend not only on actual conditions, such as real wages, but also on psychological factors. To mitigate these risks as far as possible, the Company continuously needs to analyze the competition and customer behavior. Customers are interested in electric vehicles, nevertheless, it is important to think of each particular detail of this project, so as this attitude might be changed due to different reasons. Regular support and maintenance together with sustainable position can help to overcome these difficulties.

Close and economically beneficial collaboration between carmakers and their suppliers poses procurement-related risks capable of disrupting production and potentially triggering major financial losses when there is a beginning of production of new models. These include late delivery, failure to deliver and quality defects, or – in extreme cases – a supplier's becoming insolvent and dropping out of the supply chain. Other risks stem from growing competition in the supply industry. To mitigate these risks, company has to source parts for electric vehicle assembly mainly from multiple suppliers so that it is able to respond flexibly to any negative developments. In addition, preventive measures should also be adopted within the risk management system to address supplier insolvencies. The financial stability of suppliers should be always reviewed. All these measures, both preventive and reactive, help to minimize risks in manufacturing of electric vehicles.

Financial risks and how they are managed should be among the most closely monitored aspects of risk management at Škoda Auto. From the perspective of materiality, the risk associated with exchange rate fluctuations against the Czech crown and their impact on cash flows, financing and the overall economic performance of the Company is of paramount importance. All actions of the company should meet the requirements of international accounting standards for hedge accounting. Other integral risk which should be controlled is the active management of the potential impacts on financing of the Company's activities, and liquidity management. The Company can also manage export risk by using standard trade finance instruments (e.g. letter of credit, stand-by letter of credit, bank guarantee, etc.). It is also important to monitor financial results from production of electric cars to anticipate the future actions which could be used in case of unpredictable situation.

Regarding research and development risks, it is important to emphasize, that new product carry the inherent risk that customers might not accept it. For this reason, the Company conducts extensive analyses and customer surveys to find out, what will be the reaction for new electric car from Škoda Auto. Trends are identified in time, and their relevance to customers

should be probed. The risk of the inability to launch new products according to the scheduled timeline, to the requisite quality and in line with target expenditures might be mitigated by ongoing project inspections and cross-checks with specifications, allowing necessary action to be taken in response to any deviations that are identified. If something goes not as it was planned, the first impression from the new EV on the market arena could be negative.

Escalating competitive pressures, the increasing complexity of production technologies and the large number of suppliers make quality assurance an important part of the manufacturing process. Despite the Company's effective and systematic approach to quality assurance, risks cannot be ruled out. The quality of the future electric car, processes and management system should be audited regularly by an independent accredited certification company. Department managers can also regularly report to Company management on testing and measurements. Furthermore, the quality management department should keep tracking of customer satisfaction and provide information on the latest market developments. Risk-minimization measures should instantly be deployed in response to negative deviations from expectations.

Against the backdrop of a dynamically evolving Automotive industry and ever keener competition, the Company needs to secure its future competitiveness in the form of a stable, skilled and flexible workforce on its production line and in its offices. This can only be achieved in the long run by an aptly composed strategy that covers the entire HR process, encompassing planning, recruitment, training and incentivization. At the same time, potential risks – such as the loss of skilled staff responsible for key corporate processes, risks deriving from legislative amendments, legal risks or risks associated with long-term demographic changes – must be correctly analyzed and averted.

When it comes to information systems and technologies, the Company should care about protection from risks involving data accessibility, confidentiality and integrity. Particular attention must be paid to unauthorized access to and misuse of data regarding the development of new electric vehicle. This area can be covered by various measures relating to employees, organization, applications, systems and data networks. Hence, Škoda Auto has established an information security management system (ISMS) to minimize information security risks and their impact on economic targets. More than that, employees are bound by Company guidelines on the handling of information and internal regulations on the safe use of information systems. Additionally, standard technical measures are in place to counter external and internal threats (anti-virus protection, firewalls, the allocation of access privileges, etc.).

All of mentioned risks should be taken under consideration when it is about production of absolutely new type of vehicle in models' line. It will help to gain better results for the company.

## **6.5 Marketing analysis and suggestions**

There are plenty of possibilities to force marketing development of the new product and identify the future prospect. Nevertheless, it is crucial to emphasize the most important tools. With this strategies it will be easier to consider all the possibilities for electric vehicle manufacturing in Škoda Auto.

### **6.5.1 Porter's 5 forces**

Porter five forces analysis is a framework that attempts to analyze the level of competition within an industry and business strategy development. It draws upon industrial organization economics to derive five forces that determine the competitive intensity and therefore attractiveness of an Industry. It includes threat of new entrants, threat of substitute products or services, bargaining power of customers, bargaining power of supplier and intensity of competitive rivalry.

Firstly, regarding to the substitution, it is crucial to underline that the company has plenty of different products which can be considered as substitutes. For example, some customers can prefer regular gasoline car, because it is cheaper, than electric one. Consequently, it is crucial to identify the right strategy to attract the customers. Here there should be provided the information regarding savings during the exploitation of the vehicle. It is also environment-friendly project, that also should be mentioned. Finally, the car should fit interests of young people, based on the strategies of other Automakers, because target auditory is usually technology-orientated group of people.

Secondly, in terms of new entrants, there is a high possibility, that other Automakers will continue development of EV, consequently, it is hard to overcome them. For Škoda Auto it is important to have some advantages to compete on the market. It might be futuristic design, unique technologies for better driving, slight difference in prices. It is highly important to monitor competitors and analyze all new features which were provided.

Thirdly, if we consider bargaining power of supplier, we can pretend on special terms of the contract. The main reason is that Škoda Auto enjoys great popularity around the world, consequently, many big suppliers would like to cooperate with Škoda. More than that, there will

be ordered huge amount of parts during the long-term period, what is also profitable for suppliers. Undoubtedly, there will be competition among suppliers to provide the equipment and finally there will be an opportunity to choose the most capable offer for the company. More than that, it is possible to create a financial benefit or special discount to save some money. Purchasing's primary role is to optimise costs. In 2016, Purchasing worked with Technical Development and the Volkswagen Group to implement concerted measures that were successful in optimising the material costs of the various Škoda models. In 2016, Škoda Auto's outlay on production material purchasing totalled CZK 177.9 billion, consistent with a year on year increase of CZK 4.2 billion. Much of this material continues to be sourced in the Czech Republic (48.8%), followed by Germany, which accounts for about a quarter (25.6%) of the production materials purchased. Non-production purchasing aggregated CZK 35.9 billion, equal to a 26.2% increase year on year.

Fourthly, it is important to analyze bargaining power of customers. As it was mentioned before, the market of electric cars develops rather fast, and based on the experience of competitors, there are many possibilities to influence people to buy a new electric car. Qualitative electric vehicle will definitely have high bargaining power. Škoda Auto is in Volkswagen Group, which is famous due to high qualitative standards.

Finally, we should consolidate all previous forces to create fifth step. For most industries the intensity of competitive rivalry is the major determinant of the competitiveness of the industry. It is necessary to analyze competitors during each manufacturing step, more than that, it is crucial to improve the product, based on the feedback of customers, suppliers and media. For example, facelift is a standard procedure for many Automakers (Figure 15).

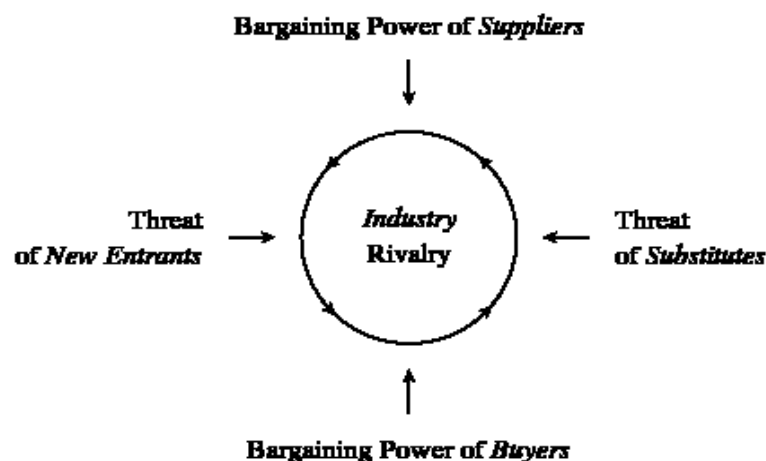


Figure 15. Porter five forces (PORTER, Michael, 1998)



### 6.5.2 ABC analysis

ABC analysis might be also helpful to identify the most profitable area, where should be significant investment in marketing. ABC analysis is an analysis of a range of items that have different levels of significance and should be handled differently. It is a form of Pareto analysis in which the items (such as activities, customers, documents, inventory items, sales territories) are grouped into three categories (A, B, and C) in order of their estimated importance. A items are very important, 'B' items are important, C items are marginally important. For example, the best customers who yield highest revenue are given the A rating, are usually serviced by the sales manager, and receive most attention. B and C customers warrant progressively less attention and are serviced accordingly. The biggest group is always C, because it includes a range of different areas with low profitability. Based on this strategy, we can single out the largest markets for Škoda Auto. (Table 4).

**Table 4.** Customer deliveries. Largest markets (Škoda Auto Annual report)

	Vehicles		Change (%)
	2016	2015	2016/2015
<b>Total ŠKODA brand</b>	<b>1,126,477</b>	<b>1,055,501</b>	<b>6.7%</b>
China	317,088	281,707	12.6%
Germany	165,196	158,747	4.1%
Czech Republic	88,016	85,005	3.5%
United Kingdom	80,325	74,879	7.3%
Poland	56,180	50,039	12.3%
Russia	55,386	55,012	0.7%
Turkey	28,893	22,233	30.0%
Spain*	23,241	22,068	5.3%
France	23,013	21,500	7.0%
Austria	20,563	20,503	0.3%
Italy	20,530	16,550	24.0%
Israel	20,402	17,753	14.9%
Belgium	18,925	18,001	5.1%
Slovakia	18,860	18,252	3.3%
Switzerland	18,579	19,012	(2.3%)

It is also important to analyze the historical figures, based on data from annual report from Škoda Auto. As it was considered in chapter 1 of the Master Thesis, Škoda Auto has significant increase of production, purchasing and sales during the last several years. It means, that company is sustainable and has positive position among all stakeholders. Western and Central Europe reported growth in the overall number of vehicles delivered to customers, a result rooted in the expanding Automotive market combined with thriving progress in the model offensive. In defiance of the unabating complexity of the political and economic situation in Russia, deliveries in Eastern Europe were higher than in the previous year. The European region, taken as a whole, saw deliveries climb by 5.4% year on year (Table 5).

**Table 5.** Customer delivery by region (Škoda Auto annual report)

	Vehicles		Change (%)	Share of passenger car market (%)**	
	2016	2015	2016/2015	2016	2015
Central Europe*	183,770	172,115	6.8%	19.0%	20.7%
Eastern Europe	90,446	87,727	3.1%	5.2%	4.6%
Western Europe	454,001	430,865	5.4%	3.3%	3.3%
Overseas/Asia	398,260	364,794	9.2%	0.6%	0.6%
<b>Total ŠKODA brand</b>	<b>1,126,477</b>	<b>1,055,501</b>	<b>6.7%</b>	<b>1.4%</b>	<b>1.4%</b>

\* including the Czech Republic  
 \*\* total markets

### 6.5.3 Business Canvas

One more important tool which can be used is business canvas for electric car in Škoda Auto. As it is visible from the Appendix 1, there are plenty of inputs and outputs in the company such as partners, activities, resource. It is also important to anticipate all possible costs regarding production and marketing to identify the price of the vehicle and communication tools with customers. Revenue stream is the dominant one, because it brings the profit for the whole company for further development. On the macrolevel there are several forces which drive the internal company’s processes. In our example it consists of key trends for customers, including such factors as urbanization and climate; such market forces as changing customer’s values in general; macroeconomic forces should be consider with issues like storage resources and relevantly high prices for fuel; the last, but not the least is industry forces, which are strongly correlated with political problems.

### 6.5.4 Marketing Mix

Product. For Skoda Auto a lot of emphasis is put on being utilitarian. It means that cars are equipped with wide array of small features that help in everyday usage. F.e. nets, hooks, and the trunk for carrying load or ice scraper on inside of fuel cap. It is possible to predict, that company will include basic features during development of electric vehicle.

Price. Skoda Auto positions itself an affordable car for everyday use. Price for Electric car should be competitive to gain the dominant position on the market.

Place. Skoda Auto has 2 production plants in Czech Republic: Mlada Boleslav and Kvasiny.

Promotion. Skoda actively invests in sponsorship of hockey events. This is a good strategy because it helps to differentiate from competitors who invest into football. More than that, investment in bicycle competition brings significant benefits for the company.

### 6.5.5 PESTEL analysis of Czech Market

**Political environment.** The Czech Republic has undergone major economic reforms and has privatized a majority of its sectors such as autoproduction, telecommunication, banking, and others. It is a stable economy registering growth over last years, making it a favorable destination for investment. The Czech economy was severely impacted by the global downturn, prompting the government to use fiscal consolidation to augment public finances and improve the business environment. Healthcare and pension reforms were introduced to ensure fiscal sustainability. South Moravia has small oil and gas deposits. The Czech Republic's political situation was marked as sustainable. Nevertheless, tension between the main political parties further led to the instability of the governing coalition.

**Economical Environment.** The Czech GDP is forecast to reach US \$279.8 billion by the end of 2017. The open investment climate and huge potential in sectors such as energy, automotive, retail, and construction is expected to drive the economy over the forecast period.

**Social Environment.** The Czech Republic is a politically stable environment and economically growing country with many incentives for a foreign investors. The investors are expected to have to mitigate cultural differences and established competition from other existing franchises. The US and Czech Republic Cultures Compared Czech culture differs from America in that they tend to be indirect and more formal. The Czech people are more unassuming and avoid confrontation to maintain the social expectation of politeness. In addition, the Czech people are more structured and tend to adhere to rules and regulations which may appear to an American as slow moving. In order for any investor to be successful in opening their franchise in the Czech Republic, they will have to be formal and patient.

**Technological Environment.** The Czech lands have a long and rich scientific tradition. The research based on cooperation between universities, Academy of Sciences and specialized research centers brings new inventions and impulses in this area. Important inventions include the modern contact lens, the separation of modern blood types, and the production of the Semtex plastic explosive. The Czech Republic is reducing its dependence on highly polluting low-grade brown coal as a source of energy.

**6.5.6 SWOT analysis of electric car**

**Table 6.** SWOT analysis (own source)

STRENGTHS	WEAKNESSES
Qualitative advantage Strong brand of Skoda Part of the VW Group Environment-friendly product Skoda offers best in class spaciousness Car can be equipped with various applications Futuristic design or popular design of Citygo, Fabia Has positive associations with German cars	Price might be too high Not enough trust to absolutely new product from customers High competitiveness Lack of electric chargers
OPPORTUNITIES	THREATS
New design can attract new customers, whereas base of Fabia or Citygo can look more reliable Can leverage its image of affordable and clever car Promotion of savings during life usage of the vehicle Can analyze competitor’s mistakes before entering new segment	High pressure from competition The competitors have better technology Lack of trust to new technologies

**6.5.7 STP marketing**

The segmenting step is essentially a brainstorming activity. The list of all the potential market segments company could target in a marketing campaign will help to build appropriate strategy. The auto market can be split among huge range of users.

Table 7. Segmenting (own source)

Variable	Appropriate segmentation
Age	18-25 years old (20%), 25-45 years old (70%), from 45 years (10%)
Gender	Mostly women (65%) due to small size of the car
Income	The income should be higher than average due to high cost
Education	Higher degree (80%)
Nationality	Czechs (80%), the rest (20%)
Occupation	The biggest segment will be taken by engineers (approximately 60%)
Lifestyle	Modern, high-tech orientated, active, positive, curious people

Regarding targeting, the best option is to promote the product through the Internet. TV campaigns and boards can also take place in advertisement plan.

Positioning mas is the last element of the STP process. For this to work, it is necessary to have two variables to illustrate the market overview. there is a gap in the Sporty-Economy part.

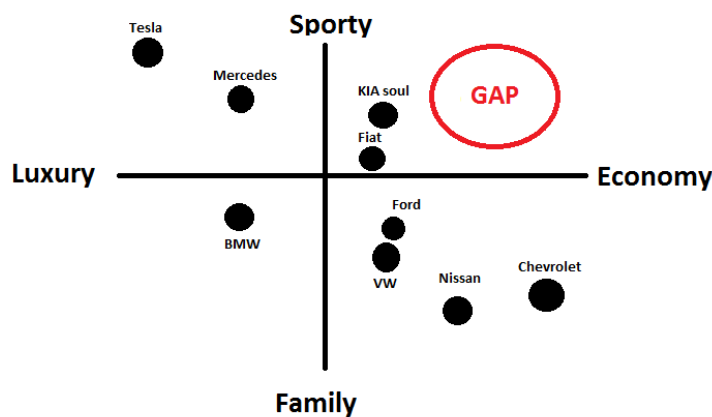


Figure 16. Positioning (own source)

6.5.8 Marketing dominance strategy

Due to rapid development of electric cars among competitors, Skoda Auto most probably will take the position of follower in the field. Furthermore, significant impact will be made

by VW, because after collaboration, some specialists underlined similar designs in Skoda, compare to VW automobiles. Strategies parallels can be developed based on the experience of leaders in the sector, what brings little risks for the project. Skoda Auto regularly rents competitive cars to figure out advantages and disadvantages of each type. Nevertheless, for Czech market new electric car might be a leader, due to the fact, that Czech people prefer to buy local products to support local economy.

### 6.5.9 Development of EV (5 years analysis)

**Table 8.** 5 years' prospect (own source)

<b>Years</b>	<b>Actions</b>
2016	R&D: deep analysis of the product, including marketing research, preferences of customers, potential future development of EV, competitive analysis
2017	Development of product's mission, based on the research, including the benefits of having electric car. Choosing the type of the car (will probably be based on Citygo or Fabia platform). Preparing design's drafts: engineers together with designers need to develop the most attractive and convenient layout. Product premises, including basic information of the future project
2018	Product definition: preparation of catalogue list, including such basic characteristics as safety, control system, environment protection etc. Here should also be considered the government and legal issues, which might arise during each production and maintenance
2019	Final decision on the concept and design. The step includes research among potential customers to determine the best design: random people should evaluate the car's attractiveness, based on the pictures and modelling, they don't know that it is Skoda's concept. "Freezing" of model's specifications, which is reserves all the features of the future vehicle. It is also important to prepare the phase of communication with suppliers, to evaluate final costs and logistics. Preparing of the marketing campaign is rather important issue and it is done by team of professionals
2020	Purchasing of all necessary pieces, considering all production issues, preparation for the release, SOP (start of production), launch of the model and presentation

### 6.5.10 Cost allocation

It is necessary to calculate approximate costs of production for the electric car. In the table below there are only the most important costs (final amount might be bigger).

**Table 9.** Cost allocation

<b>Action</b>	<b>Price (EUR)</b>
Developing new car edition	2500 (per car)
Electric battery	10000 (per car)
Introducing new accessories	100 000
Unexpected expenses	500 000
Emergency fund	1 000 000
Staff training	50 000
Creating new ATL campaign Billboards, print, radio, TV etc.	2 000 000
Creating new BTL campaign POS materials, Dealership etc	1 500 000
Creating new Digital campaign Pay pre click ads, Landing pages, graphics etc.	1 000 000
Creating new marketing positioning story (values, customer's personas etc.)	1 000
Sponsorship and Special events	2 000 000

### 6.5.11 Suggestions regarding market penetration

Taking everything into account, it is important to underline, that there will be rather huge competition among Automakers to be the leader in electric cars' manufacturing. In terms of advices for Škoda Auto, I suppose, there should be chosen following strategies.

Firstly, continue collaboration with energy companies for development of the infrastructure in Czech Republic. It will attract customers to unusual concept of electric vehicle. It is also important to cooperate with government, and other authorities in order to promote benefits

from usage of EVs. For instance, influence reduction of taxes to make the product more admirable. It is also possible to communicate with other related businesses. For example, in the USA all of the taxis are electric ones, the taxi companies have special contracts with electric cars producers and it supports the industry. Furthermore, in terms of ecology it is quite significant impact as well. The benefits for nature should be performed and proved. Moving further, it is likewise important to invest in research and development. Regular cars could be replaced by electric ones only when the price for both will be more or less equal, and it can be achieved only when batteries become cheaper.

Electric car is currently urban project. Probably, Škoda Auto should choose Citigo or Fabia platform to develop the electric vehicles. It will help to reduce costs of manufacturing and decrease the time before start of production. Both Citigo and Fabia are absolutely convenient for big cities, where there are problems with parking places. It will also be more comfortable for short distances from home to work, for instance. Special charging stations could be also established for Škoda's users, based on the example of Tesla. The electric version of Citigo or Fabia should be a little different from fuel-based "brothers", mainly because some of the customers would like to underline among others, that they take care of environment and are able to poses the electric car. Furthermore, the prices shouldn't be higher, than competitors' cars, otherwise, it might be not popular on the market.

According to the research and Skoda's positioning, the price of the electric car should be lower compare to competitors. To maintain this strategy together with high quality standards, the final price of new electric car from Skoda should be around 675,000 CZK (the average price of similar car is around 780,000 CZK).

Nevertheless, some experts have another opinion regarding this question. EV are rather expensive, and most of the people are not willing to pay for a car such a Citigo a money like for an Octavia. It can work in such countries as Norway, Sweden, where government supports the demand for electric cars. Consequently, in the Czech Republic the portion of potential customers is not that high. It would be more reasonable to produce bigger car, for example, based on the platform of popular Octavia.

In general, Škoda Auto has very good reputation among customers and partners. Company is well known by bigger car for a reasonable price, this should work as well in the future, and this is the current biggest customer advantage. New generations together with SUV Kodiaq attract new segment of consumers, cars look modern and attractive. It was proven



by annual numbers of sales, which were increased from year to year. For Czech market Škoda is the best option, when we consider price-quality conditions. More than that, citizens of Czech Republic would prefer to buy locally produced product instead of foreign one. Škoda is significant part of Czech history and people are fairly proud to be part of it. Undoubtedly, whenever it will be the choice for Czech customer to buy Škoda electric vehicle or any other one, Škoda's car will be preferred.

## CONCLUSION

This project was focused on the overview of the Czech Automotive market in order to identify the opportunity and barriers for Škoda Auto to introduce electric vehicle to the Czech Republic. The market research revealed that Czech Auto market has a potential to grow and it is dominated by several large players like Škoda and Volkswagen. According to Porter's five forces analysis, market is attractive and profitable, though with concentrated competition. Hence, during the introduction of a new product, company must apply its competitive strengths and conduct an intensive advertising program in order to attract customers and acquire a market share. Škoda Auto can take a niche on the market by offering electric cars on the platform of Citigo and Fabia from its portfolio which is comparatively new product for the Czech market. It is also possible to develop new futuristic design to attract young people.

Furthermore, cooperation with energetic company ČEZ provides more opportunities for Škoda, because ČEZ is planning to manufacture plenty of charging stations around the Czech Republic.

Moreover, there was also developed a marketing strategy in the project on how to penetrate the Czech market. The strategy includes analysis of competitors, also, the best tools were underlined.

It is also necessary to identify the correct price for new electric vehicle. The price shouldn't be higher than competitors' offers, otherwise the sales will not be significant. Long history together with high quality product, provided by Škoda Auto, provides positive impression from the new product.

Environment question plays vital role in the building of marketing strategy. Even government and other authorities are interested in development of environment-friendly car.

Taking everything into account, there are good chances for Škoda Auto to occupy the market niche among electric cars producers. Right strategy and correct analysis can provide more possibilities to improve new product even before start of production.

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## **LIST OF ABBREVIATIONS**

WTO World Trade Organization

NAFTA North American Free Trade Agreement

EU European Union

GDP Gross Domestic Product

GNI Gross National Income

R&D Research & Development

VAT Value Added Tax

ROE Return on Equity

ROI Return on Investments

ISO International Standards Organization

EGAP The State-Controlled Export Guarantee and Insurance Company

SOP Start of Production

EV Electric Vehicle

ISMS Information Security Management System

CZK Czech Crones

IMC Integrated Marketing Communications

CRM Customer Relationship Management

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# APPENDIX P I: BUSINESS MODEL CANVAS FOR EV IN ŠKODA

