The development of the world electric vehicles fleet in years 2010-2017

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Abstract. The article characterises the development of the world fleet of electric vehicles in years 2010-2017. It presents global forecasts of the fleet of passenger HEVs, PHEVs and BEVs. Changes in production volumes and number of registered types of vehicles are presented in a breakdown into respective countries. The overall number of HEVs produced thus far is estimated at approx. 12.5 million. There are roughly 38 thousand HEVs registered in Poland. Of 3.2 million electric plug-in vehicles and BEVs used in the world in 2017. Yet, electric plug-in vehicles (BEVs and PHEVs) globally accounted for just 0.3% of the worldwide fleet of passenger cars in 2017. Despite the considerable boost in the sales of electrically-powered vehicles in recent years, especially in the plug-in category, with increase from 6500 cars in 2010 to 553 thousand vehicles in 2015 and approx. 750 thousand in 2016 and over 1.1 million vehicles in 2017, including BEVs – from 6000 in 2010 to roughly 760 thousand in 2017, the sales levels still do not come to the volumes expected at the beginning of the 2000s.

1. Introduction

The size of the worldwide vehicle fleet estimated in 2017 to total 1.3 billion vehicles (of which 95% accounted for passenger cars), combined with its pace of growth (the fleet came to 250 million vehicles in 1970, 500 million in 1986 and a billion in 2010) [1], [2], [3] raises the issue of exhaustibility of liquid fuels consumed by the automotive industry on one side and on the other – the problem of greenhouse gases and other pollutants generated by internal-combustion engines.

The observed progress in the development of combustion engines, despite substantial financial spending, cannot respond to those challenges. For this reason, the continued works on improving the construction of internal combustion engines are accompanied by efforts to develop alternative sources of drive, also by combining them with traditional ICEs.

One of the prospective directions of development in the automotive industry over the forthcoming decades is electrification. A great deal of programme and legal initiatives were undertaken in this area in the first and second decade of the 21st century, both by public administrations in most developed countries and by various international organisations, which resulted in concrete actions of automobile producers and their business milieus [4], [5], [6].

Initiatives nowadays in the area of electrification in motor transport (vehicles with electric drive that dominated in the initial period of development of the automotive industry were overtaken completely by vehicles equipped with internal combustion engines) focus on three different technical solutions.

The first solution both in terms of time sequence and the scale of development involves hybrid electric vehicles (HEV) equipped with classic internal combustion engines and supporting electric engines powered with electric energy generated by batteries charged during car driving.
The second solution relates to plug-in hybrid electric vehicles (PHEV) that apply an internal-combustion engine with an electric engine, in which the electric energy may be generated also by batteries charged by external sources.

The third solution (considered by many experts as the only true electric vehicles) comprises vehicles that use only electric power from batteries charged with energy from external sources (Battery Electric Vehicle – BEV). Because of the external power source those cars are also categorised as plug-in vehicles.

2. Hybrid cars

The precursor in the field of HEV was Toyota which launched the production of 300 hybrid Toyota Prius cars by the end of 1997. In the subsequent years its production expanded to several thousand vehicles annually, sold only in Japan. In 2001 together with the increase in the number of produced hybrid electric cars to tens of thousands per year, the company started to sell them in North America and Europe.

The first millions of hybrid vehicles had been produced by Toyota (together with the affiliated Lexus brand) within over just 10 years (1997 – 2007), the next million in the ensuing two years (till August 2009).

By the end of 2013 the cumulated production of Toyota and Lexus hybrid cars exceeded 6 million vehicles [7], surpassing 10 million in 2017 to eventually total 11.5 million cars at the end of the year [8]. Among 33 models offered in almost 100 countries the most popular are Toyota Prius, sold in a number of over 6.5 million in different versions, Lexus sold in more than a million, Camry Hybrid, Auris Hybrid, Yaris Hybrid and Highlander Hybrid [9], [10].

In 1997 Honda Insight was introduced into the market and in 2002 a hybrid electric Honda Civic. In total up to year 2017 Honda produced over 1.5 million HEVs.

The overall number of HEVs produced thus far is estimated at approx. 12.5 million, of which to year 2017 more than 6 million cars were sold in Japan, approx. 3 million in the US and over 1.3 million in Europe. More than 90% of produced HEVs are hybrid petrol electric vehicles [11]. The above proportions are confirmed by data from several countries reporting to Eurostat according to which among 700.000 HEVs registered in those countries only 72 thousand were hybrid electric vehicles equipped with diesel engines.

The largest HEV fleet in Europe is located in France (300.000 vehicles), the UK and Germany (200.000 vehicles each) and the Netherlands (approx. 150 thousand vehicles).

The worldwide HEV fleet accounting for 1% of the world fleet of passenger cars, with the continually growing production coming to approx. 2 million vehicles annually, is going to grow but still at a pace that does not guarantee the accomplishment of levels assumed by most projections and forecasts.

In 2016 the largest share in the market of newly registered passenger cars HEVs enjoyed in Japan (38%), Norway (36.9%), the Netherlands (3.7%), France and Sweden (2.3% each).

In Poland hybrid vehicles such as HEV recorded in annual reports of the Main Statistical Office since 2015 account for more than 90% of electric vehicles reported in such publications. Few had been recorded at the beginning of 2000s (from 48 vehicles sold in 2004 to approx. 300 newly registered vehicles in 2009) [12], [13]. The overall number of registered hybrid vehicles in Poland by year 2010 is estimated at approx. 1000 vehicles. Year 2013 turned as a break-through when 1864 hybrid electric vehicles were sold and registered in Poland. In the next years the following was recorded: over 2500 hybrid vehicles in 2014, 5539 in 2015, 9849 in 2016 and over 17 thousand hybrid vehicles in 2017 [14], [15]. At the end of 2017 roughly an overall of 38 thousand HEVs had been registered in Poland. While there are 26 models of various hybrid vehicles of 12 brands available on the Polish market, the market is practically dominated by Toyota (69% of sales) and its affiliated company Lexus (27% of sales).

Table 1. Sales of hybrid-electric passenger cars in years 2010- 2017, in thousands

| Description   | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 (2) | 2017 (2) |
|---------------|------|------|------|------|------|------|----------|----------|
|               |      |      |      |      |      |      |          |          |

2
3. Hybrid plug-in cars

A relatively small share of plug-in hybrid electric vehicles is noted also in other countries. The sale of plug-in hybrid vehicles started in 2011 with just 10 thousand PHEVs sold worldwide (Table 2). The sales of PHEV had been growing gradually to total 61 thousand in 2012, 82 thousand in 2013, 134 thousand in 2014 and approx. 400 thousand in 2017, however this does not change the fact that it accounted for just 0.05% of the total number of passenger cars produced in the world.

In Europe where the sales of PHEV approximated 150 thousand in 2017, hybrid vehicles enjoyed the greatest popularity in Germany (c.a. 30 thousand vehicles) and in the UK (slightly over 30 thousand cars). Globally the greatest number of PHEVs had been sold in 2017 in China (111 thousand vehicles) and in the Netherlands (100 thousand). Significant numbers of PHEV were also noted in the UK (55 thousand), Germany (c.a. 32 thousand) and Norway (approx. 35 thousand).

### Table 3: Plug-in hybrid electric vehicles sales in selected countries and regions

| Country      | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|--------------|------|------|------|------|------|------|------|
| Germany      | 9    | 13   | 22   | 25   | 21   | 23   | 34   |
| UK           | 22   | 23   | 25   | 29   | 37   | 45   | 11   |
| France       | 9    | 13   | 28   | 47   | 41   | 41   | 50   |
| Italy        | 4    | 5    | 7    | 15   | 21   | 25   | 37   |
| Spain        | 7    | 10   | 10   | 10   | 12   | 19   | 31   |
| Belgium      | 4    | 7    | 5    | 6    | 8    | 8    | 9    |
| The Netherlands | 16 | 15   | 23   | 24   | 14   | 14   | 11   |
| Sweden       | 4    | 3    | 3    | 5    | 7    | 9    | 14   |
| Austria      | 1    | 1    | 2    | 3    | 2    | 2    | 3    |
| Denmark      | 0    | 0    | 0    | 1    | 1    | 2    | 7    |
| Poland       | 0    | 0    | 0    | 1    | 2    | 5    | 10   |
| **UE/28**    | 80   | 132  | 137  | 166  | 166  | 191  | 279  |
| Switzerland | ●    | ●    | ●    | 7    | 6    | 6    | 7    |
| Norway      | ●    | ●    | ●    | 10   | 10   | 11   | 17   |
| **Europe**  | ●    | ●    | ●    | 183  | 182  | 208  | 303  |
| USA (3)     | 274  | 269  | 401  | 459  | 452  | 384  | 347  |
| Japan (4)   | 392  | 316  | 678  | 679  | 1000 | 1100 (5) | 1000 (6) |
| **World**   | 746  | 717  | 1200 | 1336 | 1635 | 1692 | 1650 |

Source: Own summary based on:
1. European Vehicle Market Statistics, Pocketbook 2015, ICCT [16]
2. European Automobile Manufacturers Associations, Press Releases of 1.02.2018 p.2, www.acea.be/uploads/pressreleases-files2018.02.01_AVF_q4_2017_finalpdf [17]
3. Sales of hybrid vehicles in US, Department of Transportation, Bureau of Transportation Statistics [15] and Cobb J.: December 2017 Dashboard www.hybridcars.com [18]
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5. Road Transport equipment stock of vehicle, passenger cars, by type of motor energy, http://ec.Europe.eu.eurostat/web/transport/data/database?p_id.roads_egs_carpda_worldpad [11]
6. Own estimates: the sale of Toyota HEVs in Japan comes to 650-680 thousand vehicles annually with the past several years.
### Table 2. Newly registered plug-in hybrid passenger cars (PHEV) in years 2011 – 2015, in thousands

| Description | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|-------------|------|------|------|------|------|------|------|
| France      | 0.1  | 0.6  | 0.8  | 2.0  | 5.7  | 7.7  | 11.9 |
| Germany     | 0.3  | 1.2  | 1.6  | 4.4  | 11.1 | 13.3 | 29.3 |
| Italy       | -    | 0.1  | 0.2  | 0.4  | 0.7  | 1.3  | 2.6  |
| The Netherlands | 0    | 4.3  | 20.1 | 12.4 | 41.2 | 20.7 | 1.2  |
| Belgium     | 0.3  | 1.0  | 1.0  | 1.0  | 2.0  | 6.6  | 11.3 |
| Spain       | 0    | 0.1  | 0.1  | 0.4  | 0.9  | 1.5  | 3.4  |
| Austria     | -    | -    | 1.0  | 1.0  | 1.0  | 1.2  | 1.7  |
| Sweden      | 0    | 0.7  | 1.1  | 3.4  | 5.6  | 10.5 | 15.4 |
| UK          | 0    | 1.0  | 1.0  | 7.9  | 19.2 | 27.4 | 31.2 |
| EU28        | 0.6  | 9.0  | 15.1 | 35.7 | 86.9 | 89.5 | 115.4|
| Norway      | -    | 0.3  | 0.3  | 1.7  | 7.8  | 20.7 | 25.2 |
| Switzerland | -    | -    | 1.0  | 1.0  | 2.3  | 2.8  | 3.4  |
| Europe      | 0.6  | 9.3  | 16.4 | 35.7 | 96.7 | 113.0| 144.0|
| Canada      | 0.3  | 1.4  | 1.5  | 2.2  | 2.6  | 6.3  | 8.7  |
| China       | 0.3  | 0.3  | 0.7  | 24.3 | 60.7 | 79.0 | 111.0|
| India       | -    | 0.2  | 0.5  | 1.0  | -    | -    | -    |
| Japan       | 0    | 11   | 14.1 | 16.2 | 14.2 | 9.4  | 31.5 |
| South Korea | -    | -    | -    | -    | 0.5  | 0.2  | -    |
| USA         | 8.0  | 38.6 | 49.0 | 55.4 | 42.8 | 72.9 | 89.9 |
| Other countries | 0.1 | 1.0  | 1.0  | 3.8  | 10.35| 18.6 | -    |
| **In total**| **9.0** | **60.7** | **91.6** | **133.7** | **221.7** | **286.7** | **385.1** |

Source: Own summary based on:
European Vehicle Market Statistics pocketbook, 2017, ICCT [16]
Global EV Outlook 2017, OECD/JEA 2017 [21]
European Automobile Manufacturers Associations, Press Releases of 1.02.2018 p.2, www.acea.be/uploads/pressreleases-files2018.02.01_AVF_q4_2017_finalpdf [17]
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### Table 3. Registered fleet of plug-in hybrid passenger cars (PHEV) in years 2011 – 2016, in thousands

| Description | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|-------------|------|------|------|------|------|------|
| Austria     | 0.0  | 0.0  | 1.0  | 1.5  | 2.0  | -    |
| France      | 0.1  | 0.7  | 1.5  | 3.6  | 9.1  | 17.0 |
| Germany     | 0.3  | 1.4  | 3.0  | 7.4  | 18.5 | 31.8 |
| Italy       | 0.0  | 0.1  | 0.4  | 0.8  | 1.5  | -    |
| The Netherlands | 0.3 | 4.3  | 24.5 | 36.9 | 78.2 | 98.9 |
| Portugal    | 0.0  | 0.0  | 0.0  | 0.2  | 0.7  | -    |
| Belgium     | 0.3  | 1.3  | 2.3  | 3.3  | 5.3  | -    |
| Spain       | 0.0  | 0.1  | 0.2  | 0.6  | 1.5  | -    |
| UK          | 0.0  | 1.0  | 2.0  | 10.2 | 27.5 | 54.9 |
Over 40% of the worldwide fleet of PHEVs comprised three models: Volt/Ampera sold in over 160 thousand till December 2017, Mitsubishi Outlander sold in almost 150 thousand till December 2017 and Toyota Prius Plug-In Hybrid sold in approx. 130 thousand.

Available data regarding years 2016 – 2017 prove that a relatively moderate pace of development is noted in this segment of the automotive industry and even that is being limited – e.g. in the Netherlands the sales of PHEVs in 2016 dropped by almost 50% (from 41 thousand to 21 thousand and in 2017 to 1.200 vehicles). A spectacular though less rapid - than as assumed at the turn of the first and second decade of the 21st century – development was recorded by BEVs.

### 4. Fully electric cars

In 2010 there had been just 16 thousand BEVs registered worldwide (Table no. 5), of which 6 thousand were registered that year (Table no. 4). The registration of newly purchased electric passenger cars began to grow rapidly from that moment to come to 39 thousand in 2011, 58 thousand in 2012, 112 thousand in 2013, 191 thousand in 2014, 325 thousand in 2015, 466 thousand in 2016 and 759 thousand in 2017. The increased sales had been generated mostly by China with a production of more than 60% of BEVs manufactured globally. The world fleet of such vehicles was respectively 16 thousand vehicles in 2010, 55 thousand in 2011, 113 thousand in 2012, 227 thousand in 2013, 420 thousand in 2014, 740 thousand in 2015 and over 1.2 million in 2016, of which 255 thousand in Europe (including approx. 160 thousand vehicles in the EU). The largest fleet of BEV passenger cars was noted in China (over 480 thousand vehicles), the US (86 thousand vehicles), Norway (100 thousand vehicles), France (67 thousand vehicles) and Germany (approx. 41 thousand vehicles). Poland with its fleet of several hundred BEVs has been outpaced significantly by countries such as Italy or Portugal.

Despite an over 70-fold increase of the world fleet of BEVs in years 2016-2017 electric passenger cars still account for just 0.1% of the total number of passenger cars registered in the world.

Major global producers of electric vehicles (in brackets the production of electric vehicles in the global production of a given motor company in 2016) include: China-based BYD – 102.500 vehicles (7%), Renault-Nissan – 86.200 vehicles (1%), Tesla – 76.2 thousand vehicles (100%), VW Group – 62.5 thousand (1%), BMW Group – 62.1 thousand (3%), BAIC – 46.2 thousand vehicles (2%), Kotos – 37.4 thousand (15%), Geely Group – 32.7 thousand (3%), General Motors – 32.7 thousand (0.1%) [12], [25].

It is worth noting that more than 60% of the over 750 thousand electric passenger cars produced globally in 2017 had been produced in Chinese factories. Among the traditional automobile companies,
the greatest share on the BEV market is enjoyed by Nissan-Renault with its flagship Nissan Leaf, the production of which increased from 40 cars in 2010 to 47 thousand in 2017. An overall of 300 thousand cars of that model were produced in years 2010-2017 [26]. Ranking second on BEV market among automobile companies with a long-standing history in the industry is BMW Group which produced over 31 thousand electric BMW i3 and more than 20 thousand electric BMW 330e in 2017.

Table 4. Newly registered electric passenger cars (BEV) in years 2010-2017, in thousands

| Description          | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|----------------------|------|------|------|------|------|------|------|------|
| France               | 0.2  | 2.6  | 5.7  | 8.8  | 10.6 | 17.3 | 21.7 | 24.9 |
| Germany              | 0.1  | 1.4  | 2.2  | 5.3  | 8.4  | 12.1 | 11.3 | 25.0 |
| Italy                | -    | 0.1  | 0.5  | 0.8  | 1.0  | 1.4  | 2.0  | 1.4  |
| The Netherlands      | 0.1  | 0.8  | 0.8  | 2.2  | 2.6  | 2.5  | 3.7  | 9.9  |
| Belgium              | -    | -    | -    | -    | 1.0  | 1.0  | 2.0  | 2.7  |
| Spain                | -    | 0.6  | 0.5  | 0.9  | 1.0  | 1.4  | 2.0  | 3.9  |
| UK                   | 0.3  | 1.2  | 1.7  | 2.7  | 6.8  | 10.1 | 10.5 | 13.6 |
| Sweden               | -    | 0.2  | 0.3  | 0.4  | 1.2  | 2.9  | 2.9  | 4.2  |
| Austria              | -    | 0.6  | 0.6  | -    | 1.0  | 2.0  | 3.8  | 5.4  |
| Dania                | -    | -    | -    | 1.0  | 2.0  | 4.0  | 1.3  | 0.7  |
| Poland               | -    | 0    | 0    | 0    | 0.1  | 0.2  | 0.1  | 0.4  |
| EU28                 | 0.5  | 7.9  | 12.4 | 22.1 | 35.2 | 54.2 | 63.5 | 97.5 |
| Norway               | 0.4  | 1.8  | 4.2  | 8.2  | 18.1 | 27.8 | 29.5 | 44.9 |
| Switzerland (1)      | -    | -    | 1.0  | 1.0  | 1.0  | 3.3  | 3.3  | 4.8  |
| Europe (1)           | 0.9  | 9.9  | 17.4 | 31.0 | 54.2 | 85.3 | 96.3 | 147.2 |
| Canada               | -    | 0.2  | 0.6  | 1.6  | 2.8  | 4.4  | 5.2  | 14.9 |
| China                | 1.0  | 4.7  | 9.6  | 14.6 | 48.9 | 146.7| 257.0| 468.0|
| India                | 0.3  | 0.4  | 1.4  | 0.2  | 0.4  | 1.0  | 0.4  | 0.4  |
| Japan                | 2.4  | 12.6 | 13.5 | 14.8 | 16.1 | 10.5 | 15.5 | 24.5 |
| South Korea          | 0    | 0.3  | 0.5  | 0.6  | 1.3  | 2.9  | 5.1  | 0    |
| USA                  | 1.2  | 9.7  | 14.6 | 47.7 | 63.4 | 71.0 | 86.7 | 104.5 |
| Other countries      | 0.2  | 2.4  | 2.6  | 5.0  | 9.0  | 16.1 | 16.7 | 0.0  |
| In total             | 6.4  | 38.5 | 57.8 | 112.1 |190.8| 325.4| 466.4| 759.1 |

(1) Vehicles a haut efficacete energetique, Tendence du marche 2017, Suisse energie [26]
Source: Own summary based on: Global EV Outlook 2017, OECD/IEA 2017 p.18 [21] and European Vehicle Market Statistics, Pocketbook 2016, ICCT [16] and Vehicles a haut efficacete energetique, Tendence du marche 2017, Suisse energie [27]

One of the major producers of electric vehicles is Tesla Inc., a motor company established in 2003 by Elon Musk to launch and develop the production of electric vehicles. The company made its debut in 2008 with Tesla Roadster, sold in a number of 1200 by June 2010. In 2012 the company started its production of Tesla Model S with a range of 300 km and sports performance. The car became the first electric sedan of Premium class produced on a mass scale to get credits worldwide. Over a period of 5 years more than 300 thousand cars were sold (accounting for 80% of the total sales by Tesla). In 2017 Tesla sold over 100 thousand vehicles, including 54 thousand of S model and more than 46 thousand of X model. The next launched for production is Tesla Model 3 which arouses enthusiasm among potential buyers not only owing to its declared range of 350 km but also due to its reasonable price of USD 35K. The first deliveries were supposed to kick off at the end of 2017. Within 6 weeks from the new model’s presentation on 31 March 2016 almost 400 thousand clients placed orders for the car.
Table 5. Registered fleet of passenger BEVs in years 2010-2016, in thousands

| Description       | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|-------------------|------|------|------|------|------|------|------|
| France            | 0.3  | 2.9  | 8.6  | 17.3 | 27.9 | 45.2 | 66.9 |
| Germany           | 0.2  | 1.6  | 3.9  | 9.2  | 17.5 | 29.6 | 40.9 |
| Italy             | 0.6  | 0.7  | 1.3  | 2.1  | 3.2  | 4.6  |     |
| The Netherlands   | 0.3  | 1.1  | 1.9  | 4.2  | 6.8  | 9.4  | 13.1 |
| Portugal          | 0    | 0.2  | 0.3  | 0.4  | 0.6  | 1.3  |     |
| Spain             | 0    | 0.6  | 1.1  | 2.0  | 3.0  | 4.5  |     |
| Sweden            | 0    | 0.2  | 0.4  | 0.9  | 2.1  | 5.0  | 8.0  |
| UK                | 1.6  | 2.9  | 4.6  | 7.2  | 14.0 | 21.0 | 31.5 |
| EU28              | 1.9  | 9.3  | 21.2 | 44.3 | 74.2 | 121.8| 161.3|
| Norway            | 3.3  | 5.3  | 9.5  | 19.7 | 41.8 | 72.0 | 98.9 |
| Switzerland       |     |     |     |     |     |     | 8.0  |
| Europe            | 2.7  | 12.1 | 28.1 | 59.0 | 107.0| 182.4| 251.4|
| Canada            | 0    | 0.2  | 0.9  | 2.5  | 5.3  | 9.7  | 14.9 |
| China             | 1.5  | 6.3  | 15.9 | 30.6 | 79.5 | 226.2| 483.2|
| India             | 0.9  | 1.3  | 2.8  | 2.9  | 3.3  | 4.3  | 4.8  |
| Japan             | 3.5  | 16.1 | 29.6 | 44.3 | 60.5 | 70.9 | 86.4 |
| South Korea       | 0    | 0.3  | 0.8  | 1.4  | 2.8  | 5.7  | 10.8 |
| USA               | 3.8  | 13.5 | 28.2 | 75.9 | 139.3| 210.3| 297.0|
| Other countries   | 0.8  | 3.1  | 5.8  | 10.6 | 19.4 | 36.2 | 52.4 |
| In total          | 16.4 | 55.1 | 112.9| 226.8| 420.3| 745.6| 1208.9|

Source: Own summary based on: Global EV Outlook 2017, OECD/IEA 2017 p.49 [21] and European Vehicle Market Statistics, Pocketbook 2017, ICCT [16]

5. Summary
The total cumulated sales equal to more or less the number of registered plug-in passenger electric cars, comprising BEVs and PHEVs, is estimated at approx. 3.2 million in years 2010-2017, with a fleet of 0.4 million vehicles in 2013, 710 thousand in 2014 and 1.2 million in 2015 and c.a. 2 million in 2016. Among 3.2 million PHEVs used worldwide in 2017 over 1.2 million functioned in China, approx. 750 thousand in the US, 850 thousand in Europe, of which approx. 650 thousand in the EU.

In overall plug-in electric vehicles (BEV and PHEV) in 2017 accounted for just 0.3% of the world fleet of passenger cars.

Despite a boost in the sale of electric vehicles in recent years, especially as regards plug-in vehicles - an increase from 6.5 thousand in 2010 to 533 thousand in 2015 and approx. 750 thousand in 2016 and over 1.1 million vehicles in 2017, including increased sale of PHEVs from several hundred in 2010 to roughly 400 thousand in 2017 and BEVs from 6000 in 2010 to c.a. 760 thousand in 2017, those volumes fall behind the forecasts made at the beginning of the 2000s.

The review presented in 2009 within the framework of the EU project EAGAR [21] (European Assessment of Global Publicity Founded Automotive Research) proved for instance that more than one million of PHEVs were expected to be used in the US in 2015, whereas in fact only 200 thousand of such vehicles had been registered, according to forecasts 500 thousand PHEVs were to be used in 2018 in Canada, yet just 15 thousand had been registered in 2016. Then again it was assumed that BEVs used in South Korea would account for 10% of the overall number of registered cars in 2020, however only 11 thousand electric vehicles were registered in 2016 in that country.

Even if the present pace of growth of the electric vehicles market, in particular plug-in vehicles continues, the above projections have proved too optimistic. Adjustments in the predicted tempo of
electric mobility do not change the fact that electric vehicles have already become a real element of the automotive market both in respective countries and globally.

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