AlixPartners

INSIGHT AUTOMOTIVE

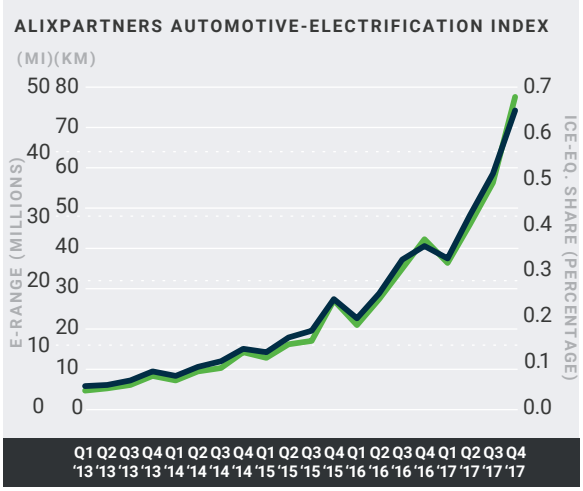
JULY 2018

An inflection point in electric vehicles

The worldwide automotive industry decisively committed to electrification in 2017, as manufacturers expanded to all the major markets with a burgeoning number of models.

Cars with electrified powertrains have become firmly established in the core global automotive markets. With both vehicle sales and market share soaring in 2017, manufacturers are now vigorously expanding their offerings. Consumers in all industrialized countries are showing rising interest in both battery-powered vehicles and plug-in hybrids, as are most car manufacturers. The aggregate range of electric vehicles sold more than doubled, from 37 million kilometers in the first quarter of 2017 to 78 million kilometers in the fourth quarter. Likewise, the degree of electrification of the overall fleet sold doubled during the year (figure 1).

FIGURE 1: BOTH TOTAL E-RANGE AND ICE-EQUIVALENT SHARE UP BY 82% IN 2017



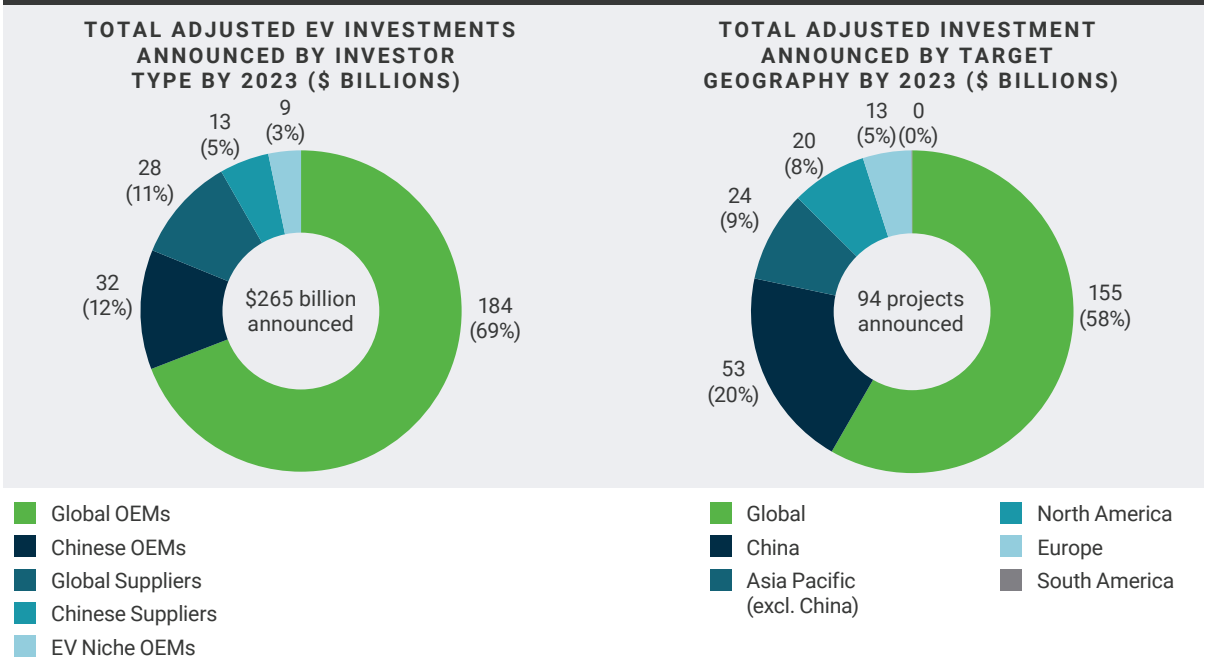
E-range: Electric miles sold

ICE-eq. share: Number full ICE equivalent[1] sold as percentage of total number of vehicles sold

Source: IHS Markit, EV-volumes.com, AlixPartners research

1. Electric range/311 miles (500km) defining the equivalent full ICE vehicle share

FIGURE 2: BY 2023, GLOBAL OEMS WILL BE HALF OF E-INVESTMENTS



More than $100 billion of global investment linked to VW and Renault-Nissan-Mitsubishi – both companies stating that China is a core EV Growth Market

Source: Press research, company reports, AlixPartners analysis
Note: Global investments include announcements that are not region specific (e.g. launch of product lines); supplier investments have been increased by 35% to account for estimated supplier involvement in EV

This article presents some findings from the quarterly AlixPartners Automotive Electrification Index. The AlixPartners e-index, first published in advance of the September 2017 International Motor Show, measures the progress of electrification in the global automotive industry. It determines both total electric range of electric vehicles sold and share of electric cars sold on country-by-country and carmaker-by-carmaker bases.

SIGNIFICANT INVESTMENT IN THE NEXT FIVE YEARS

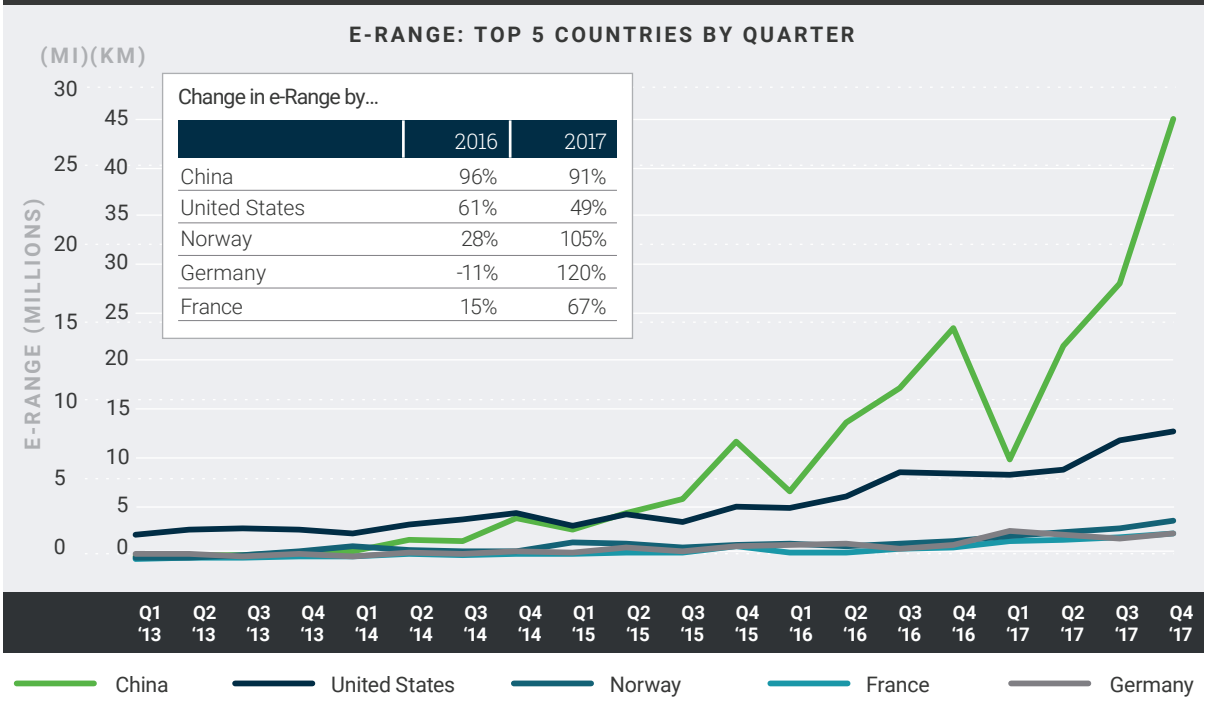
Confirming their commitment to electrification, carmakers and their suppliers have announced plans for billions of dollars in investment by 2023: in fact, in the amount of $265 billion—a figure that excludes investment in charging stations and other forms of infrastructure (figure 2). Global carmakers account for the lion's share of the amount: $184 billion, with Volkswagen alone aiming to spend $42 billion. Suppliers account for $38 billion. By country, the largest recipient of investment will be China, with an expected spend of more than $50 billion.

In the past, government incentives and regulations drove most of the adoption of e-cars, and that's still true in such countries as China and Norway. However, the expected investments are also being driven by the desire to capture markets with only modest state support. Government help is still needed in e-infrastructure because sales are slower in areas with lagging charging investments, but a rising number of car buyers now consider e-car ownership an attractive option.

CHINA FAR IN FRONT, WITH GERMANY JOINING THE TREND

China continues to lead in sales rankings (figure 3). Its electric range sold increased by 91% in 2017, reaching 44 million kilometers in the last quarter of 2017. And China by itself already accounts for well over half of the e-kilometers sold worldwide. That's on top of a 96% gain during the previous year. By comparison, the US recorded only moderate growth: a 61% increase in 2016 and 49% in 2017. With 13 million e-kilometers sold in the fourth quarter of 2017, the US is a strong global number two market.

FIGURE 3: CHINA PULLS AWAY; GERMANY CATCHES UP



Change in e-Range by...

	2016	2017
China	96%	91%
United States	61%	49%
Norway	28%	105%
Germany	-11%	120%
France	15%	67%

Source: IHS Markit, EV-volumes.com, automaker responses, AlixPartners research

FIGURE 4: TOP 20 COUNTRIES COVER 98% OF GLOBAL E-RANGE

E-RANGE BY COUNTRY: Q4 2017

Rank Q4 '17	Rank Q4 '15	Country	e-Range (miles, millions)	e-Range (km, millions)	Number EV sold
1	1	China	27.38	44.06	264,803
2	2	United States	7.99	12.86	58,390
3	3	Norway	2.43	3.92	19,474
4	5	Germany	1.69	2.71	17,527
5	6	France	1.62	2.61	12,203
6	9	Japan	1.55	2.49	16,361
7	7	United Kingdom	0.88	1.41	12,190
8	12	Canada	0.70	1.13	5,759
9	4	Netherlands	0.66	1.07	3,077
10	17	South Korea	0.54	0.86	4,995
11	11	Switzerland	0.43	0.69	2,567
12	10	Sweden	0.40	0.65	6,821
13	14	Spain	0.40	0.64	3,171
14	15	Austria	0.28	0.45	1,904
15	16	Belgium	0.24	0.39	3,841
16	20	Portugal	0.14	0.23	1,608
17	19	Italy	0.13	0.21	1,456
18	18	Australia	0.07	0.12	646
19	46	Malaysia	0.07	0.12	2,981
20	27	India	0.07	0.12	1,090

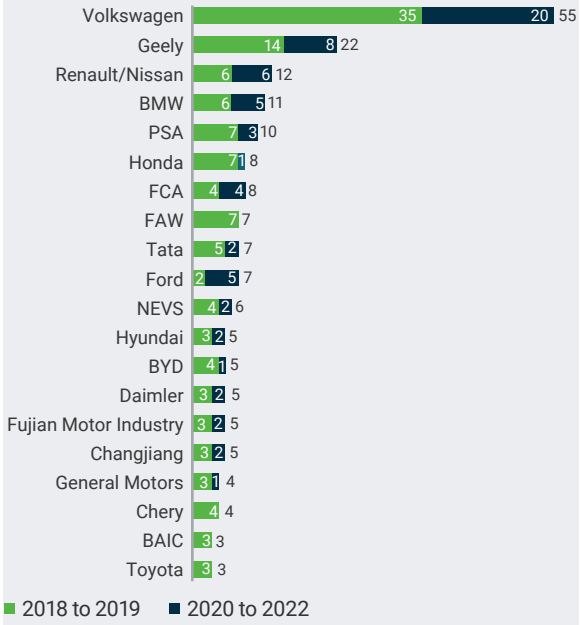
Source: IHS Markit, EV-volumes.com, automaker responses, AlixPartners research

At some distance behind the front-runners comes Norway, with almost 4 million e-kilometers. However, sales were to almost 6 million inhabitants, putting the country far ahead in terms of market penetration. By absolute numbers, though, Norway remains outpaced by the major markets of Germany, France, Japan, the United Kingdom, and South Korea. Germany did manage to reverse its decline of e-kilometers sold in 2016 with a 120% increase in 2017. That represented the strongest percentage growth in any Western core market, but with 127% increase, both Japan and South Korea also gained considerable momentum in 2017 (figure 4).

BROADER RANGE OF CAR MODELS ENTICING CUSTOMERS

Among other factors, AlixPartners attributes the e-boom to carmakers' launches of models in new vehicle classes, thereby expanding to customer groups as e-vehicles become popular (figure 5). A greater number of new e-models were launched in 2017 than ever before: 84, which was almost as many as in the previous three years combined. That acceleration is expected to continue: 271 new e-models are planned from 2018 to 2022, with more new ones likely to be added along the way. European carmakers—together with their Chinese joint ventures—are expected to launch 101 models. And Volkswagen alone has announced 55 new models—more than all European models combined for the past four years.

FIGURE 5: TOP 20 OEMS BY NUMBER OF LAUNCHES – VOLKSWAGEN THE MAJOR DRIVER



Others: 2018 to 2019: 54 launches; 2020 to 2022: 25 launches
Source: AlixPartners research
Status: 6 April 2018

TESLA'S HEAD START DIMINISHING

European manufacturers are obviously pushing to narrow the gap between themselves and their competitors in China, which has 12 manufacturers in the top 20 (figure 6). With 13 million kilometers of e-range sold, United States–based Tesla still took first place in the fourth quarter of 2017, but China's BAIC and BYD are closing the gap, with 8.8 million and 7.4 million kilometers, respectively. Tesla, moreover, seems to be profiting less than other manufacturers from the global e-car momentum. Its e-range grew by only 34 and 42% in 2016 and 2017, respectively, whereas the total market in industrialized countries grew by 54 and 82%, respectively. As for BAIC, its e-range sales rose by 216% in 2016 and 130% in 2017.

The rankings shift markedly when manufacturers bring new models to market for a broad range of buyers (figure 7), as General Motors shows. GM had a 104% sales increase in 2016, but in 2017 it shot to the head of the growth pack with a whopping 500%. In cooperation with SAIC, GM brought to the Chinese market the Baojun E100 city car, which has clearly been a hit.

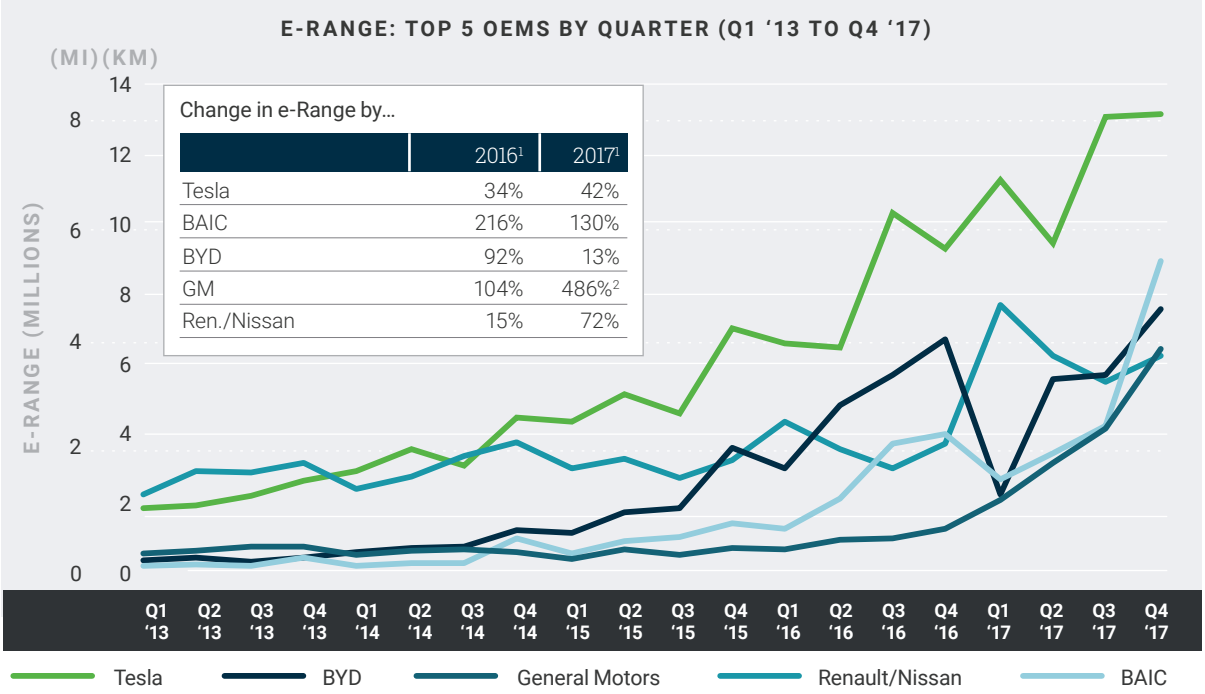
FIGURE 6: BAIC AND BYD CATCHING UP AND REDUCING GAP TO TESLA

E-RANGE BY AUTOMAKER: Q4 2017

Rank Q4 '17	Rank Q4 '15	OEM	e-Range (miles, millions)	e-Range (km, millions)	Number EV sold
1	1	Tesla	8.10	13.03	28,904
2	8	BAIC	5.46	8.79	50,766
3	2	BYD	4.59	7.39	43,297
4	14	General Motors	3.88	6.25	27,012
5	3	Renault/Nissan	3.76	6.05	22,021
6	4	Geely	2.03	3.27	24,985
7	7	BMW	1.86	3.00	33,729
8	12	Chery	1.81	2.92	16,184
9	5	Zotye	1.70	2.73	17,525
10	6	Volkswagen	1.55	2.49	20,459
11	11	Hyundai	1.55	2.49	14,818
12	17	Changan	1.45	2.34	12,855
13	9	Jianghuai	1.40	2.25	12,393
14	16	Jiangling	1.02	1.64	12,549
15	13	Zhidou	0.94	1.51	9,868
16	24	Dongfeng	0.93	1.49	8,152
17	22	Toyota	0.84	1.35	12,912
18	31	Hawtai	0.83	1.34	8,492
19	33	Lifan	0.75	1.21	5,756
20	19	SAIC	0.61	0.98	17,628

Source: IHS Markit, EV-volumes.com, automaker responses, AlixPartners research

FIGURE 7: WITHIN TOP OEMS, GM RECORDED THE STRONGEST GRWOTH IN 2017



Source: IHS Markit, EV-volumes.com, automaker responses, AlixPartners research
1. Change Q4 previous year to Q4 particular year
2. 2017 introduction city car Baojun E100 (GM cooperation with SAIC)

DYNAMIC GROWTH IN DEGREE OF ELECTRIFICATION

Besides e-range sold, AlixPartners looks at degree of electrification of the total fleet sold by country and by manufacturer. The index uses a formula that relates number of electric vehicles sold to total vehicles sold, weighted by a 500 kilometer range—the standard used in the industry for combustion engine cars. E-cars with ranges of less than 500 kilometers without the support of a combustion engine are weighted less than electric cars that meet that industry standard. Largely in line with the electric range sold, the degree of electrification among sold cars increased in individual regions and countries of the world in 2017 (figure 8), rising by 60% in North America, 75% in Europe, 90% in China, and 135% in both Japan and South Korea.

By absolute electrification, however, countries in northern and western Europe remain the leaders. Northern and western European countries enjoy relatively high purchasing power and large government subsidies. Front-runner Norway sold the equivalent of a 15%-electrified fleet in the fourth quarter of 2017, followed by Iceland at 4.4%, the Netherlands at 2%, Switzerland at 1.5%, and Sweden at 1.1%. China only just passed a 1% equivalent electrified fleet, but the size of the Chinese market means theirs is a globally significant number. After all, more than half of the 447,000 e-cars sold in the fourth quarter of 2017 worldwide went to China.

By manufacturer's degree of electrification, the established carmakers are well behind their Chinese competitors and Tesla. Among the top 20 there are only two established carmakers: BMW at number 19 and Renault–Nissan at 20. Chinese manufacturers have made significant progress in the electrification of their vehicle fleets in the past year. The established manufacturers are doing their utmost to exploit the e-boom (1) by producing a wide variety of new models, (2) by making massive investments—especially in research and development, and (3) by taking advantage of their traditional vehicle-manufacturing strength. There is much work left to do, and the worldwide automotive industry remains an exciting place!

ABOUT THE ALIXPARTNERS AUTOMOTIVE ELECTRIFICATION INDEX

Each quarter, the AlixPartners Automotive Electrification Index measures the progress of electrification in the global automotive industry by calculating electric ranges of vehicles sold, which is expressed as number of electric vehicles sold multiplied by the vehicles' electric ranges—without combustion engine support. A separate analysis determines degree of electrification of vehicle fleet sold, according to the following formula: number of electric vehicles sold multiplied by electric ranges (without combustion engine support) divided by 500 kilometers and divided by total number of cars sold. The weighting on a 500 kilometer range corresponds to the industry standard for combustion engine range.

Those calculations are for battery-powered electric vehicles, fuel cell electric vehicles, and plug-in hybrid electric vehicles. Hybrid electric vehicles with no plug-in option are excluded. The analysis draws exclusively on publicly available data—mainly from IHS Markit and EV Volumes, which publish global sales figures for light vehicles and electric vehicles. Electric ranges for vehicles used in the calculations are based on data from EV Volumes and from information published by the carmakers themselves.

FIGURE 8: FOR THE FIRST TIME CHINA CROSSING THE 1% THRESHOLD

ICE-EQ. SHARE BY COUNTRY: Q4 2017

Rank Q4 '17	Rank Q4 '15	Country	ICE-eq. share (%)[1]	Number EV sold[1]
1	1	Norway	15.0	1,474
2	5	Iceland	4.4	869
3	4	Netherlands	2.0	3,077
4	6	Switzerland	1.5	2,567
5	7	Sweden	1.1	6,821
6	12	China	1.0	264,803
7	9	Austria	1.0	1,904
8	17	Ireland	0.9	82
9	8	France	0.8	12,203
10	13	Portugal	0.7	1,608
11	15	Belgium	0.6	3,841
12	11	Germany	0.6	17,527
13	14	United States	0.6	58,390
14	24	Luxembourg	0.6	253
15	18	Finland	0.6	964
16	10	United Kingdom	0.5	12,190
17	16	Canada	0.5	5,759
18	67	Singapore	0.5	311
19	21	Japan	0.4	16,361
20	26	New Zealand	0.4	337
21	29	South Korea	0.4	4,995
22	53	Hungary	0.4	414
23	20	Spain	0.4	3,171
24	3	Denmark	0.3	341
25	25	Slovenia	0.3	193

Source: IHS Markit, EV-volumes.com, automaker responses, AlixPartners research
1. Q4 2017

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ABOUT US

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