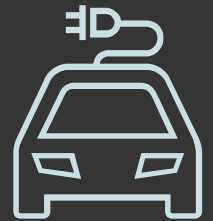


AlixPartners Automotive- Electrification Index

Full Year 2017



AlixPartners Automotive Electrification Index

e-Range

E-RANGE =

Sum of electric range of all electric vehicles (EV) sold

- By automaker, segment, region and country
- Note: e-Range does not include range from internal-combustion-engine (ICE) sources in plug-in hybrids – Only the battery range is included
- The e-Range attempts to rank the electrically driven range, and as such, does not include non-plug-in hybrids (HEVs) such as the standard Toyota Prius

AlixPartners Automotive Electrification Index

ICE-vehicle equivalent market share

Using e-Range data, we can calculate an **ICE-vehicle equivalent market share**

Total number of full-ICE-equivalent-range EVs sold

Total number of vehicles sold (EV and ICE)

- By automaker, segment, region and country
- Full-ICE-equivalent EVs are defined as the electric range of the vehicle sold divided by 311 miles (500 km)
- Note: to make the EV equivalent to an internal combustion engine vehicle (ICE), the 311-mile (500-km) range approximates an equivalent range between fill-ups for ICE vehicles. Dividing by this factor results in a more illuminating view of overall electrification, as it counts vehicles with high-electric ranges as full alternatives to ICE vehicles and discounts small range city cars or compliance vehicles
- Note: range of the ICE vehicles are not normalized to 311 miles (500 km) – each ICE unit sold is counted as a full vehicle

AlixPartners Automotive Electrification Index

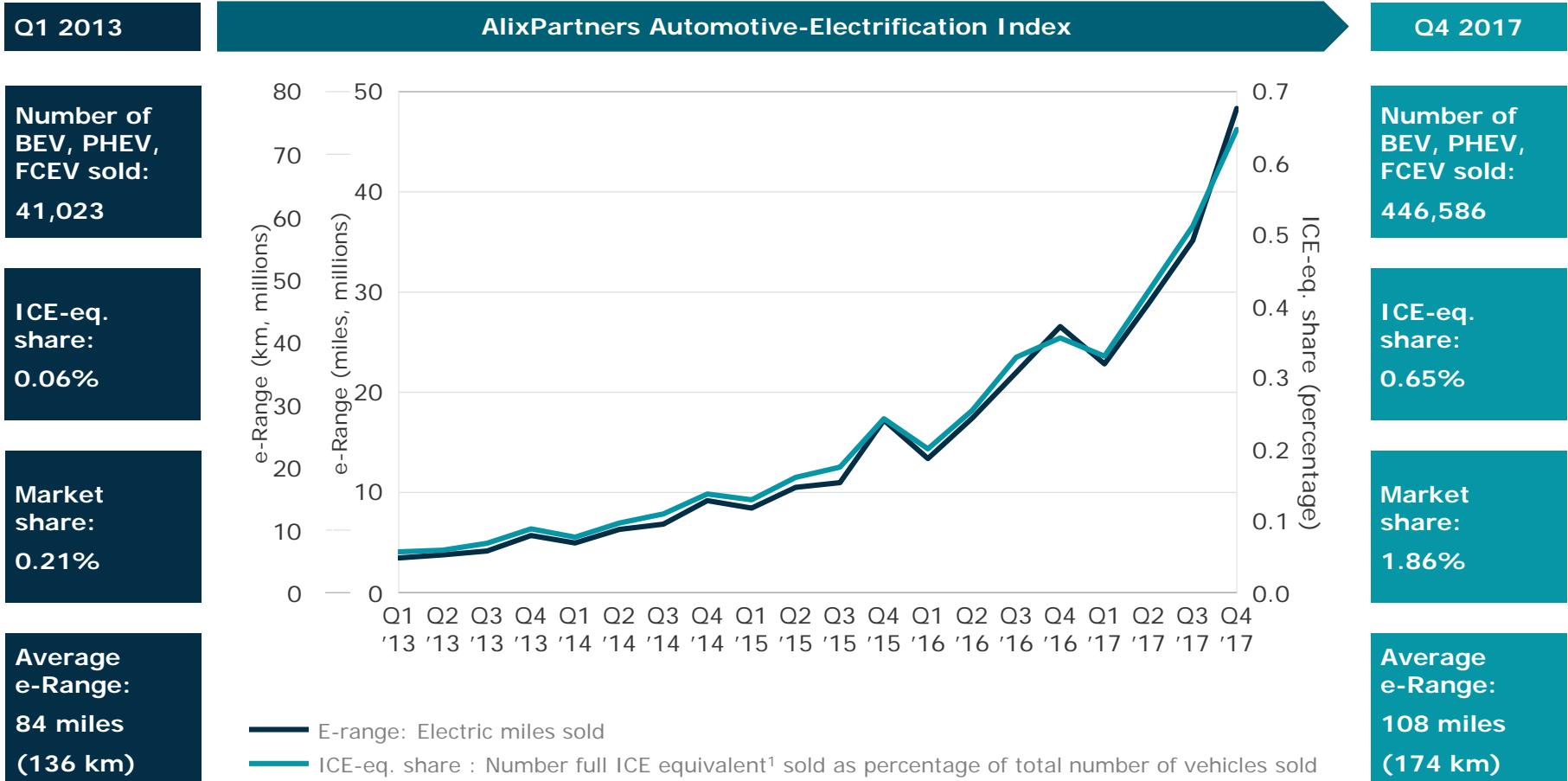
- **Goal:** 'e-Range' as a more meaningful measure than currently exists in the public domain for tracking the progress of electrification in the auto industry globally by region, country, segment and particularly by Automaker
- **Transparency:** Based on public available data and data validated directly by the Automakers
- **Sources:**
 - IHS Markit Ltd.: for total sales data (all vehicle types)
 - EV-volumes.com: for electric ranges for battery-electric vehicles (BEVs), plug-in hybrid vehicles (PHEVs), fuel-cell electric vehicles (FCEVs)
 - Automaker- and government-published websites: ditto the above
 - Discussions with Automakers to validate ranges, with several Automakers updating ranges beyond what was publicly available
- **Vehicle scope:** passenger cars and light trucks (GVW < 6 tons), which coincides with IHS Market's 'light vehicle' definition
- **Sales allocation by automaker:** based on IHS Markit's method for allocating vehicle sales to brands (including for joint ventures, upfitters, post-production customizations, etc.)

71 Countries in the Index

(where EV sales have taken place/are recordable to date)

AUSTRALIA	ESTONIA	MACEDONIA	SERBIA
AUSTRIA	FINLAND	MALAYSIA	SINGAPORE
BAHRAIN	FRANCE	MALTA	SLOVAKIA
BELGIUM	GERMANY	MEXICO	SLOVENIA
BERMUDAS	GREECE	MAROCCO	SOUTH AFRICA
BRAZIL	HONG KONG	NETHERLANDS	SOUTH KOREA
BULGARIA	HUNGARY	NEW ZEALAND	SPAIN
CANADA	ICELAND	NORWAY	SWEDEN
CHILE	INDIA	OMAN	SWITZERLAND
CHINA	INDONESIA	PANAMA	TAIWAN
COLOMBIA	IRELAND	PERU	THAILAND
COSTA RICA	ISRAEL	POLAND	TURKEY
CROATIA	ITALY	PORTUGAL	UKRAINE
CYPRUS	JAPAN	PUERTO RICO	UAE
CZECH REP.	JORDAN	QATAR	UK
DENMARK	LATVIA	ROMANIA	USA
ECUADOR	LITHUANIA	RUSSIA	URUGUAY
EGYPT	LUXEMBOURG	SAUDI ARABIA	

Both, total e-Range and ICE-equivalent share up by 82% in 2017; average electrical range per vehicle up by 30% only



¹ Electric range/311miles (500km) defining the equivalent full ICE vehicle share
Sources: IHS Markit, EV-volumes.com, AlixPartners research

e-Range by propulsion; PHEVs avg. 32% share of all EV sold; no clear trend pro/contra PHEVs

Q1 2013

AlixPartners Automotive-Electrification Index

Q4 2017

Number vehicles sold

BEV	30,430
PHEV	10,593
FCEV	-

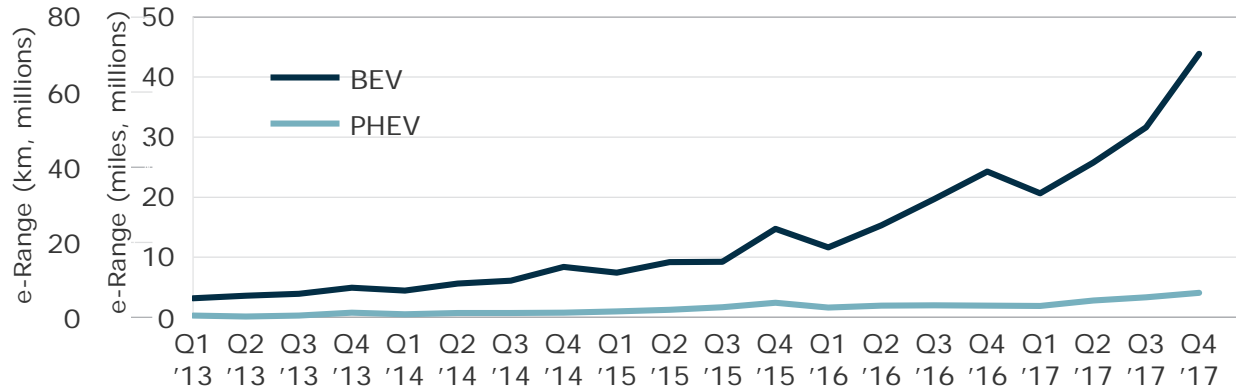
Market share:

BEV	0.16%
PHEV	0.05%

Average e-Range (miles):

BEV	105
PHEV	26

e-Range by propulsion



Number vehicles sold

BEV	320,344
PHEV	125,174
FCEV	1,068

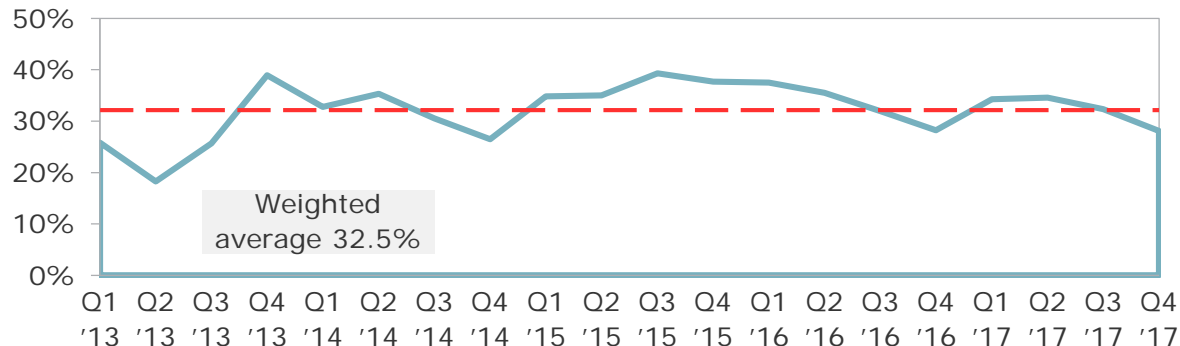
Market share:

BEV	1.33%
PHEV	0.52%

Average e-Range (miles):

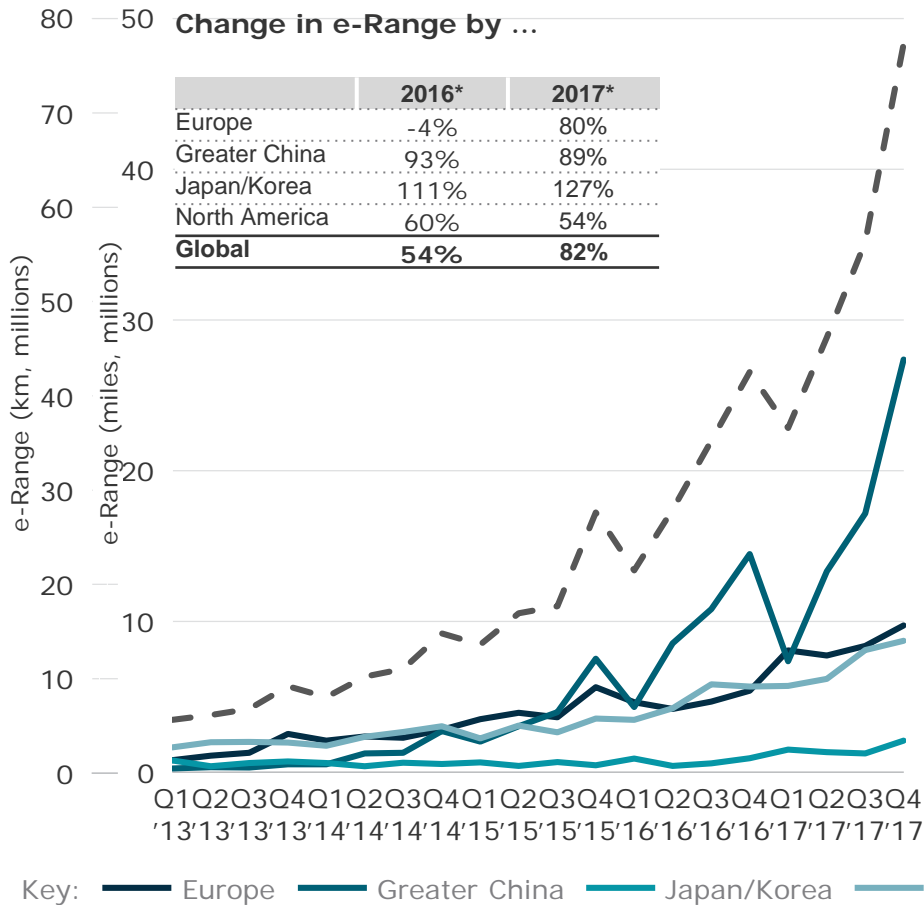
BEV	137
PHEV	33

Share of PHEVs within total number of electric vehicles sold

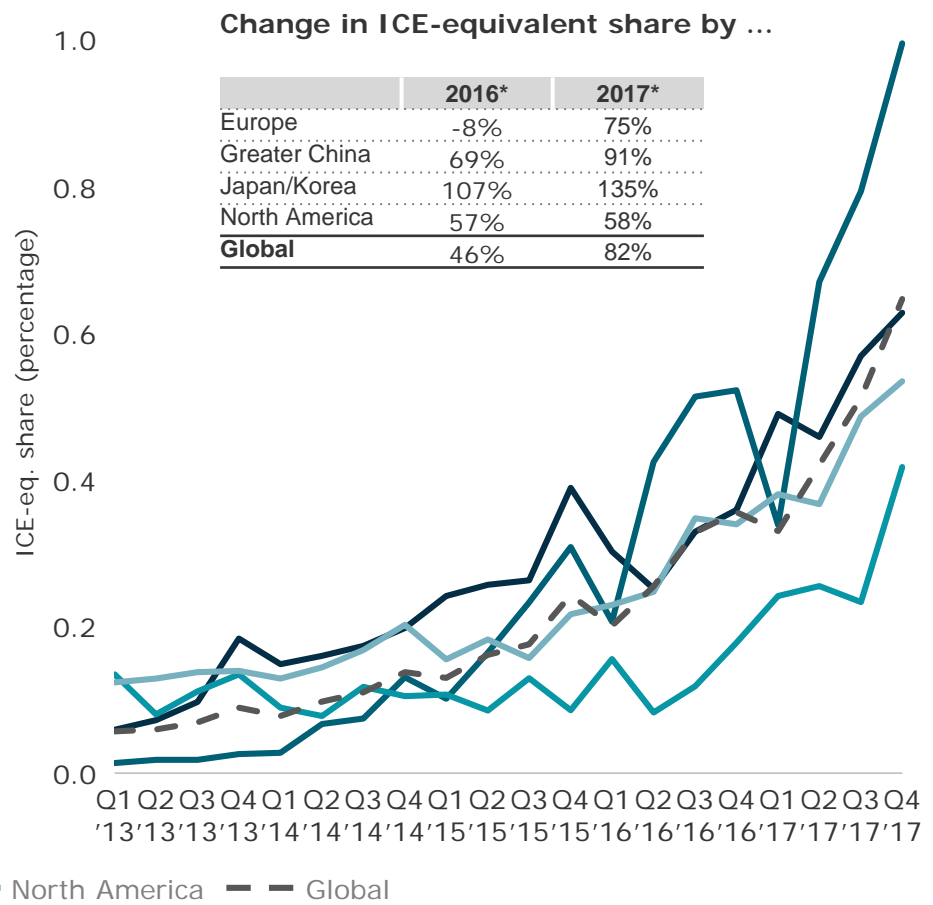


e-Range and ICE-equivalent share by region: Japan/Korea catching up in ICE-equivalent share

e-Range: regions by quarter (Q1 '13 to Q4 '17)



ICE-eq. share: regions by quarter (Q1 '13 to Q4 '17)



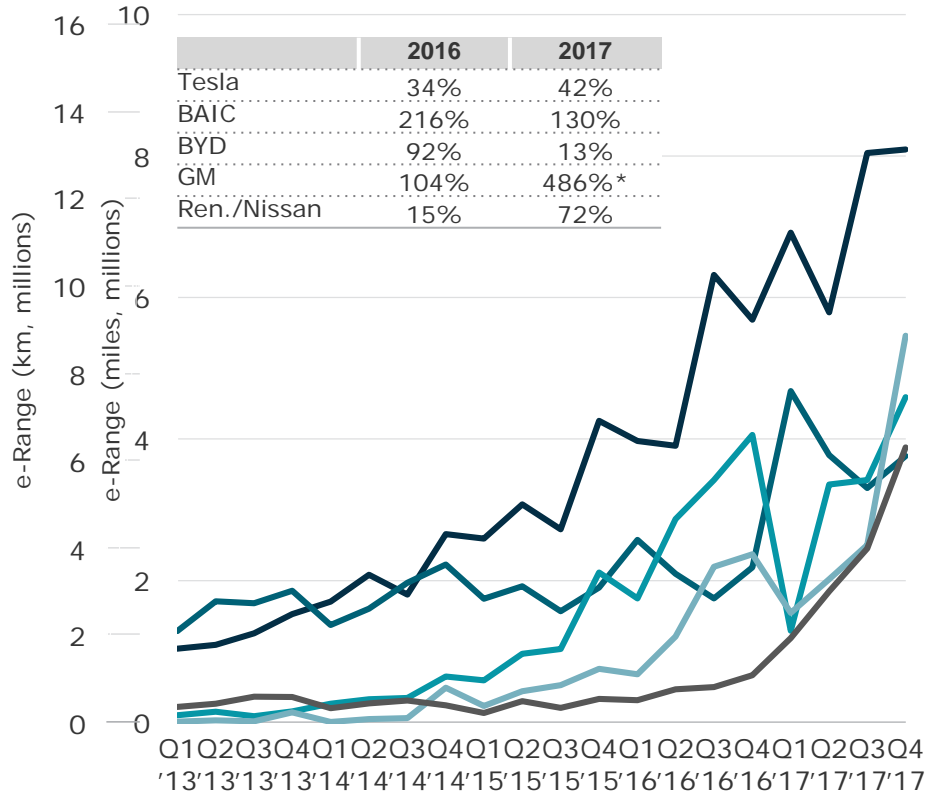
* Change Q4 previous year to Q4 particular year

Last 12 months GM grew most within Top OEMs, Germany changed negative trend and caught up

e-Range: Top 5 OEMs by quarter (Q1 '13 to Q4 '17)

Change in e-Range by ...

	2016	2017
Tesla	34%	42%
BAIC	216%	130%
BYD	92%	13%
GM	104%	486%*
Ren./Nissan	15%	72%



Key: — Tesla — BYD — General Motors
— Renault/Nissan — BAIC

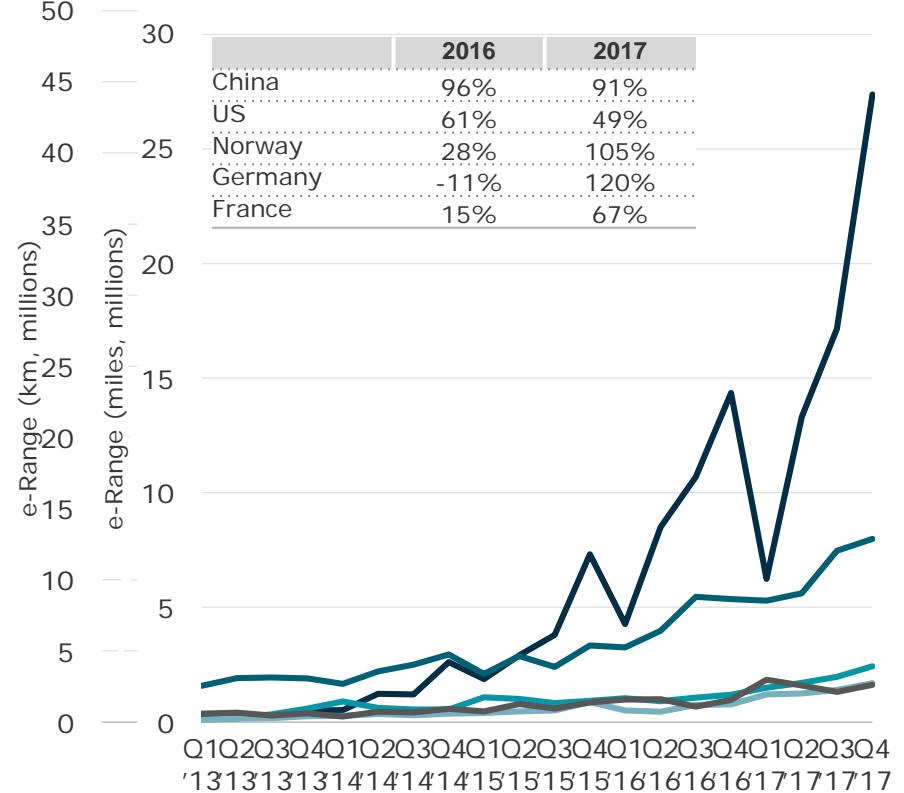
* Change Q4 previous year to Q4 particular year

** 2017 introduction city car Baojun E100 (GM cooperation with SAIC)

e-Range: Top 5 countries by quarter (Q1 '13 to Q4 '17)

Change in e-Range by ...

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



Key: — China — Norway — Germany
— United States — France

e-Range by country Q4 2017: Top 15 countries cover 98% of global e-Range, thereof China 57%

e-Range by country: Q4 2017

Rank Q4 '17	Rank Q4 '15	Country	e-Range (miles, millions)	e-Range (km, millions)	Number EV sold	Rank Q4 '17	Country	e-Range (miles, millions)	e-Range (km, millions)	Number EV sold
1	1	China	27.38	44.06	264,803	21	Denmark	0.06	0.10	341
2	2	United States	7.99	12.86	58,390	22	United Arab Emirates	0.05	0.09	195
3	3	Norway	2.43	3.92	19,474	23	Finland	0.05	0.08	964
4	5	Germany	1.69	2.71	17,527	24	New Zealand	0.05	0.08	337
5	6	France	1.62	2.61	12,203	25	Iceland	0.05	0.08	869
6	9	Japan	1.55	2.49	16,361	26	Hungary	0.05	0.07	414
7	7	United Kingdom	0.88	1.41	12,190	27	Singapore	0.04	0.07	311
8	12	Canada	0.70	1.13	5,759	28	Poland	0.04	0.06	293
9	4	Netherlands	0.66	1.07	3,077	29	Romania	0.02	0.04	186
10	17	South Korea	0.54	0.86	4,995	30	Luxembourg	0.02	0.04	253
11	11	Switzerland	0.43	0.69	2,567	31	Israel	0.02	0.04	135
12	10	Sweden	0.40	0.65	6,821	32	Slovenia	0.02	0.03	193
13	14	Spain	0.40	0.64	3,171	33	Czech Republic	0.02	0.03	157
14	15	Austria	0.28	0.45	1,904	34	Ukraine	0.02	0.03	115
15	16	Belgium	0.24	0.39	3,841	35	Mexico	0.02	0.02	128
16	20	Portugal	0.14	0.23	1,608	36	Slovakia	0.01	0.02	122
17	19	Italy	0.13	0.21	1,456	37	Ireland	0.01	0.02	82
18	18	Australia	0.07	0.12	646	38	Jordan	0.01	0.02	45
19	46	Malaysia	0.07	0.12	2,981	39	Turkey	0.01	0.01	42
20	27	India	0.07	0.12	1,090	40	Taiwan	0.01	0.01	30

e-Range by country Q4 2017: Top 15 countries cover 98% of global e-Range, thereof China 57%

e-Range by country: Q4 2017

Rank Q4 '17	Country	e-Range (miles, millions)	e-Range (km, millions)	Number EV sold
41	Colombia	0.01	0.01	73
42	Russia	0.01	0.01	45
43	Malta	0.00	0.01	24
44	Greece	0.00	0.01	39
45	Latvia	0.00	0.00	26
46	Uruguay	0.00	0.00	37
47	South Africa	0.00	0.00	22
48	Lithuania	0.00	0.00	19
49	Brazil	0.00	0.00	15
50	Serbia	0.00	0.00	15
51	Cyprus	0.00	0.00	28
52	Chile	0.00	0.00	12
53	Hong Kong	0.00	0.00	16
54	Indonesia	0.00	0.00	14
55	Estonia	0.00	0.00	6
56	Bulgaria	0.00	0.00	15
57	Thailand	0.00	0.00	19
58	Croatia	0.00	0.00	7
59	Ecuador	0.00	0.00	14
60	Oman	0.00	0.00	24

Rank Q4 '17	Country	e-Range (miles, millions)	e-Range (km, millions)	Number EV sold
61	Costa Rica	0.00	0.00	4
62	Morocco	0.00	0.00	2
63	Saudi Arabia	0.00	0.00	12
64	Bahrain	0.00	0.00	7
65	Macedonia	0.00	0.00	5
66	Panama	0.00	0.00	2
67	Qatar	0.00	0.00	3
68	Peru	0.00	0.00	4
69	Egypt	0.00	0.00	1
70	Bermuda	-	-	0
71	Puerto Rico	-	-	0
	Global	48.32	77.76	446,586

ICE-equivalent share by country Q4 2017: 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 (%)	Number EV sold	Rank Q4 '17	Country	ICE-eq. share (%)	Number EV sold	Rank Q4 '17	Country	ICE-eq. share (%)	Number EV sold
1	1	Norway	15.0	1,474	26	Romania	0.3	186	51	Ecuador	0.0	14
2	5	Iceland	4.4	869	27	UAE	0.3	195	52	South Africa	0.0	22
3	4	Netherlands	2.0	3,077	28	Latvia	0.2	26	53	Bahrain	0.0	7
4	6	Switzerland	1.5	2,567	29	Ukraine	0.2	115	54	Mexico	0.0	128
5	7	Sweden	1.1	6,821	30	Israel	0.2	135	55	Chile	0.0	12
6	12	China	1.0	264,803	31	Malaysia	0.2	2,981	56	Russia	0.0	45
7	9	Austria	1.0	1,904	32	Slovakia	0.1	122	57	Morocco	0.0	2
8	17	Ireland	0.9	82	33	Lithuania	0.1	19	58	Qatar	0.0	3
9	8	France	0.8	12,203	34	Czech Republic	0.1	157	59	Thailand	0.0	19
10	13	Portugal	0.7	1,608	35	Italy	0.1	1,456	60	Brazil	0.0	15
11	15	Belgium	0.6	3,841	36	Australia	0.1	646	61	Saudi Arabia	0.0	12
12	11	Germany	0.6	17,527	37	Poland	0.1	293	62	Peru	0.0	4
13	14	USA	0.6	58,390	38	Serbia	0.1	15	63	Indonesia	0.0	14
14	24	Luxembourg	0.6	253	39	Uruguay	0.1	37	64	Egypt	0.0	1
15	18	Finland	0.6	964	40	Greece	0.1	39	65	Costa Rica	0.0	4
16	10	UK	0.5	12,190	41	Estonia	0.0	6	66	Cyprus	0.0	28
17	16	Canada	0.5	5,759	42	Colombia	0.0	73	67	Jordan	0.0	45
18	67	Singapore	0.5	311	43	Macedonia	0.0	5	68	Malta	0.0	24
19	21	Japan	0.4	16,361	44	Hong Kong	0.0	16	69	Panama	0.0	2
20	26	New Zealand	0.4	337	45	Croatia	0.0	7	70	Bermuda	-	0
21	29	South Korea	0.4	4,995	46	Bulgaria	0.0	15	71	Puerto Rico	-	0
22	53	Hungary	0.4	414	47	India	0.0	1,090				
23	20	Spain	0.4	3,171	48	Taiwan	0.0	30				
24	3	Denmark	0.3	341	49	Turkey	0.0	42				
25	25	Slovenia	0.3	193	50	Oman	0.0	24				
										Global	0.6	446,586

e-Range by automaker Q4 2017: 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	Rank Q4 '17	OEM	e-Range (miles, millions)	e-Range (km, millions)	Number EV sold	
1	1	Tesla	8.10	13.03	28,904	21	Daimler	0.60	0.97	11,055	
2	8	BAIC	5.46	8.79	50,766	22	Hainan Automobile	0.54	0.87	3,698	
3	2	BYD	4.59	7.39	43,297	23	Great Wall	0.40	0.64	3,185	
4	14	General Motors	3.88	6.25	27,012	24	Sichuan Yema	0.27	0.44	1,741	
5	3	Renault/Nissan	3.76	6.05	22,021	25	Mitsubishi	0.24	0.39	6,838	
6	4	Geely	2.03	3.27	24,985	26	Fujian Motor Industry	0.21	0.34	2,258	
7	7	BMW	1.86	3.00	33,729	27	Guangzhou Auto	0.21	0.33	3,077	
8	12	Chery	1.81	2.92	16,184	28	PSA	0.19	0.30	1,937	
9	5	Zotye	1.70	2.73	17,525	29	FCA	0.16	0.26	3,468	
10	6	Volkswagen	1.55	2.49	20,459	30	Ford	0.15	0.24	4,834	
11	11	Hyundai	1.55	2.49	14,818	31	Honda	0.13	0.22	1,961	
12	17	Changan	1.45	2.34	12,855	32	Mahindra & Mahindra	0.07	0.12	940	
13	9	Jianghuai	1.40	2.25	12,393	33	Yulon	0.05	0.08	608	
14	16	Jiangling	1.02	1.64	12,549	34	Soueast	0.00	0.00	137	
15	13	Zhidou	0.94	1.51	9,868	35	FAW	0.00	0.00	170	
16	24	Dongfeng	0.93	1.49	8,152	36	TATA	0.00	0.00	150	
17	22	Toyota	0.84	1.35	12,912	37	Other	-	-	224	
18	31	Hawtai	0.83	1.34	8,492	Global			48.32	77.76	446,586
19	33	Lifan	0.75	1.21	5,756						
20	19	SAIC	0.61	0.98	17,628						

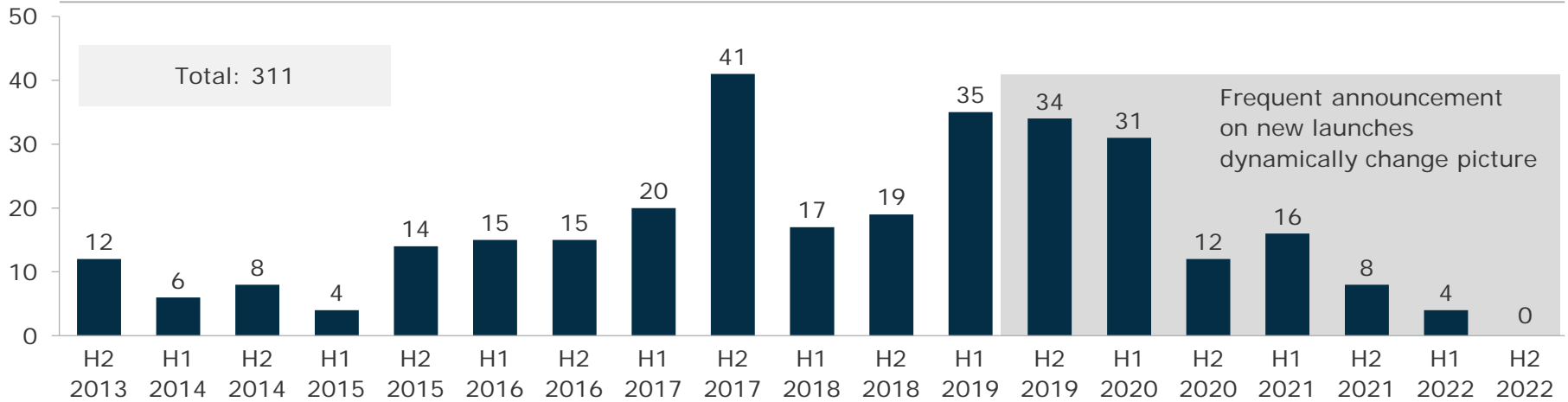
ICE-equivalent share of OEMs: only 2 traditional OEMs in top 20, rest are Tesla and Chinese OEMs

ICE-eq. share by automaker: Q4 2017

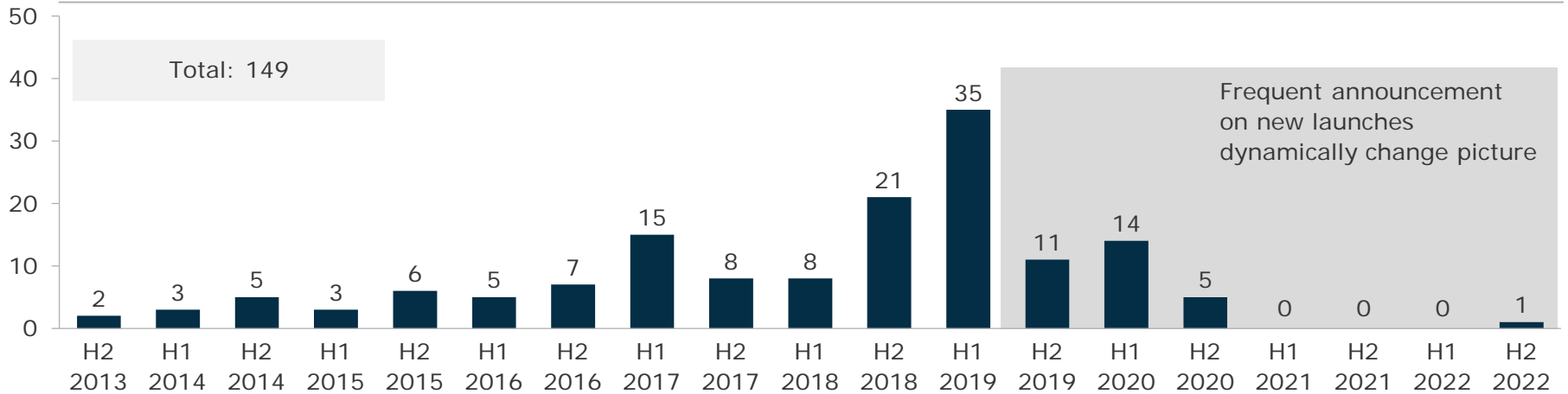
Rank Q4 '17	Rank Q4 '15	OEM	ICE-eq. share (%)	Number EV sold	Average range (miles)
1	1	Tesla	90.14	28,904	280
2	2	Zhidou	30.63	9,868	95
3	30	Fujian Motor Industry	16.74	2,258	93
4	3	BYD	11.12	43,297	106
5	37	Sichuan Yema	6.81	1,741	155
6	6	BAIC	6.55	50,766	108
7	33	Hawtai	5.58	8,492	98
8	32	Hainan Automobile	4.98	3,698	146
9	34	Lifan	4.91	5,756	131
10	4	Zotye	4.21	17,525	97
11	7	Chery	3.45	16,184	112
12	9	Jianghuai	1.80	12,393	113
13	12	Jiangling	1.58	12,549	81
14	15	Changan	1.30	12,855	113
15	41	Yulon	1.24	608	81
16	5	Geely	1.12	24,985	81
17	21	Dongfeng	1.07	8,152	114
18	11	SAIC	0.99	17,628	34
19	10	BMW	0.94	33,729	55
20	13	Renault/Nissan	0.53	22,021	171
21		General Motors	0.52	27,012	144
22		Guangzhou Auto	0.51	3,077	67
23		Great Wall	0.35	3,185	124
24		Mitsubishi	0.32	6,838	35
25		Daimler	0.28	11,055	55
26		Hyundai	0.27	14,818	104
27		Volkswagen	0.19	20,459	76
28		Mahindra & Mahindra	0.16	940	78
29		Toyota	0.11	12,912	65
30		PSA	0.09	1,937	96
31		FCA	0.05	3,468	46
32		Honda	0.03	1,961	69
33		Ford	0.03	4,834	31
34		Soueast	0.01	137	7
35		FAW	0.00	170	1
36		Tata	0.00	150	0
37		Other	-	155	-
Global			0.65	446,586	108

Global NEV launches 2013-2022 – strong 2019, only H1 2019 PHEV launches dominate over EV

EV launches



PHEV launches



Top 25 OEMs by launches (2013-2022) make 76% of all launches – Volkswagen the major driver

Rank		H2 2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Total
1	Volkswagen	1	5	3	0	6	12	23	11	7	2	70
2	Geely	0	2	4	0	5	7	7	8	0	0	33
3	BMW	1	2	1	3	6	0	6	2	1	2	24
4	Renault/Nissan	2	1	1	0	1	2	4	2	4	0	17
5	Hyundai	1	2	1	3	4	3	0	2	0	0	16
6	BAIC	1	1	1	2	7	2	1	0	0	0	15
7	BYD	1	1	5	1	1	2	2	1	0	0	14
8	Daimler	0	2	2	2	3	1	2	1	1	0	14
9	PSA	2	0	0	1	1	1	6	3	0	0	14
10	Dongfeng	0	0	1	2	7	1	2	0	0	0	13
11	FAW	0	0	0	1	3	2	5	0	0	0	11
12	General Motors	1	0	1	3	2	0	3	0	1	0	11
13	Honda	0	0	0	1	2	2	5	1	0	0	11
14	Changan	1	0	1	2	3	1	2	0	0	0	10
15	Chery	0	1	0	2	3	2	2	0	0	0	10
16	FCA	1	0	0	1	0	0	4	4	0	0	10
17	SAIC	0	1	0	2	4	0	1	1	0	0	9
18	Tata	0	0	0	0	1	3	2	2	0	0	8
19	Ford	0	0	0	0	0	0	2	5	0	0	7
20	NEVS	0	1	0	0	0	1	3	2	0	0	7
21	Toyota	0	1	0	1	2	2	1	0	0	0	7
22	Fujian Motor Industry	0	0	0	0	1	3	0	1	1	0	6
23	Lifan	0	0	0	4	1	0	1	0	0	0	6
24	GAC	0	0	1	0	4	1	0	0	0	0	6
25	Changjiang	0	0	0	0	0	1	2	2	0	0	5
	Others	3	3	5	12	17	16	29	14	9	1	109
	Total	15	23	27	43	84	65	115	62	24	5	463