



Chinese NEV phalanx cracked - Western carmakers are sensing their chance

Most of us know the Golden Rule of the "Great Nation": make your own laws and regulations and urge others, smaller ones, to comply with them. That's exactly what the Chinese government have learned from the US by using its own rulebook for the green car market: subsidize and grow the mainland electric and hybrid vehicle makers at all costs. Rule Number 1 constitutes the Chinese definition of NEV "New Energy Vehicles", which, from an academic point of view, should include HEVs hybrid electrical vehicles, PHEVs plug-in hybrid electrical vehicles, BEVs battery electrical vehicles and FVCs fuel-cell vehicles. But in reality, Beijing NEV policy definition favors local produced (designed and sourced) battery and only PLUG-IN hybrid passenger vehicles, to be eligible for ample state subsidies. Luckily there is already a mature green energy car world outside the Middle Kingdom. Hybrid cars have been driving on the streets for a long time already. Since 1997, Toyota alone has sold 3,7 million Prius mid-size sedan and hatchback world-wide and among its whole hybrid car lines totally 9 million hybrid cars. The latest million-unit milestone was achieved in just nine months.

A large number of foreign OEM have realized the Chinese Trojan NEV horse of forced joint development and consequently technology sharing has to be avoided.

Some [far off, self-proclaimed Chinese NEV experts](#) have recently distributed mainland EV propaganda that "96% of the market belongs to domestic brands" and "nearly 700.000 NEVs would be on the street end of 2016" so finally "China would beat by numbers the US+Canada+Mexico+Europe altogether." Well these young folks should consult professional sources to learn that as per April 2016, Japan is the cumulative market leader with more than 5 million hybrids sold, followed by the United States with cumulative sales of over 4 million units since 1999.

abc Automotive Business Consulting has been monitoring and evaluating the development of Chinese EV-maker for quite a long time - we drove in August 2006 the very first BYD F3e in Shenzhen. As independent technology advisory using only industry recognized local and global data bases (IHS, CAAM and CPCA), we may have gained different insights in recent ten years, having recently driven all major NEV models. So no more "Yellow Fever" and rumour dissemination dear colleagues, let's stick to the facts.

Western Hybrid carmaker are catching up

The recently dominance of Chinese OEM in the NEV New Energy passenger vehicle segment is history – Western carmakers have successfully broken into the once almost 100% by C-OEM controlled market and have gained a remarkable market share of 15,7% by end July 2016 already. Despite heavy and unilateral promotion of Chinese brands (*Comrades, buy China!*) 23.835 new battery, hybrid and plug-in hybrid cars in China wearing a foreign badge and the number is rapidly growing. Toyota, Volvo and Tesla have reported increasing sales, even the Chinese CAAM China Association of Automotive Manufacturers database confirms this fact.

China being a late entrant in the global NEV market, so the development patters looks similar like any other early markets. The market is still in the overdrive since it took off in 2013 with annual sales have almost tripled every year. The proportion of sold electric cars has slightly increased from 53% to 58% in the first seven months. China’s NEV car fleet has grown up to about 380.000 electric and plug-in hybrid passenger cars since 2013 (not included busses and commercial vehicles).

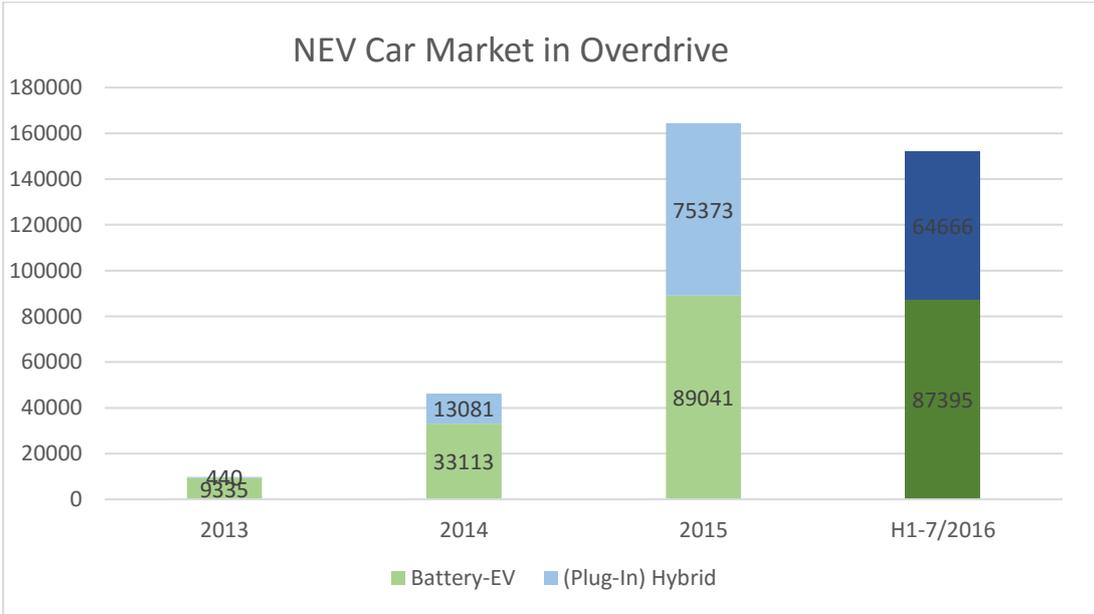


Fig. 1: NEV car market in China has tripled every year

2016 Beijing favors electric cars

However, Beijing’s target of selling one million New Energy vehicles until end of 2015 has by far not been achieved, even with generous Green Mobility subsidies. For instance, a Chinese battery powered electric car with a driving range over 250km gets a Beijing/State subsidy of 55.000 RMB plus a Shanghai subsidy of 30.000 RMB and a free license plate in Shanghai

(last auction average price paid was 87.200 RMB). So from a C-OEM list price the buyer can deduct 172.200 RMB (\approx 23.000 EUR/26.000 USD).

Owing to the dedicated communication channel between Beijing and BYD in Shenzhen, the government encouraged the NEV maker to manufacture and sell the new all-electric QIN 300EV. Beijing is providing the needed financial supporting framework to make sure this model will be a huge commercial success, as the new NEV 2016 financial support framework clearly favors electric cars with a large driving range over plug-in hybrid cars.

	Driving range	State subsidy	Shanghai subsidy	Beijing subsidy	Σ 上海
EV	R \geq 250km	55.000 RMB	30.000 RMB	55.000 RMB	85.000 RMB
	150km \geq R < 250km	45.000 RMB	30.000 RMB	45.000 RMB	75.000 RMB
	100km \geq R < 150km	25.000 RMB	10.000 RMB	25.000 RMB	35.000 RMB
Hybrid	R \geq 50km	30.000 RMB	10.000 RMB		40.000 RMB

Fig. 2: NEV 2016 subsidy scheme

	Driving range	State subsidy	Shanghai subsidy	Beijing subsidy	Σ 上海
EV	R \geq 250km	54.000 RMB	40.000 RMB	54.000 RMB	94.000 RMB
	150km \geq R < 250km	45.000 RMB	40.000 RMB	45.000 RMB	85.000 RMB
	80km \geq R < 150km	31.500 RMB	40.000 RMB	31.500 RMB	71.500 RMB
Hybrid	R \geq 50km	31.500 RMB	30.000 RMB		61.500 RMB

Fig. 3: NEV 2015 subsidy scheme

Beijing's message to Chinese consumer this year is clear: Buy only Electric cars with a long driving range – buy BYD e5 long-range 220km electric sedan which comes with a 65Ah LFP batter pack and an electric motor with max 160KW (rated power 80KW) or, even better, choose the brand new BYD electric QIN 300EV.

E-Cars launched two to four years ago such as the supermini three door hatchback SAIC Roewe e50 (launch date: Nov. 2012, driving range 120km) which have received once a hefty subsidy of about 100.000 RMB in 2013, will only be honored by a lean 35.000 RMB promotion in 2016. With a current price tag of 153.900 RMB (2015: 138.900 RMB) it's no wonder that only 447 units were sold in first seven months of 2016 as e.g. BAIC EV 160 is much better deal (subsidy: 85.000 RMB).



Fig. 4: EV Range & Subsidy: Winners & Loser

Now Beijing has set an even more ambitious target. It is currently building a national-wide charging network to fulfill the power-demand of five (!) million electric vehicles by 2020. 5 million electric cars in 2020 means the market shall triple in size every year, which may be possible if you look at the above historic data.

However, from a practical point of view I just try to envision how and where all the charging stations for the plug-in hybrids and electric cars in metropolitan areas like Shanghai shall be deployed. Maybe we will experience an exchange of gown racks in front of most apartment windows against electric ropes hanging down the all the parking lots during night.

The real picture in Chinese Green car market

Let us have now a closer look at the NEV market and review the sales ranking of car models and OEM with cutoff date July 2016. BYD is as expected the shining star. With 53,371 battery and plug-in hybrid passenger cars sold in the first seven months it gained a market share of about 35%. Here the state and province funding demonstrates its huge distorting effect on competition.

The company has three electric and one PHEV car in the mid-size family car segment (C2) were totally 52,500 cars in have been sold since January. In this segment, the strong Western competitor is the Toyota Corolla Levin hybrid, which even ranks 2nd after in sales after the SUV Tang 唐.

In the Compact car C1 small family limousine segment, the Shanghai Roewe e550 is the Nr. 1 choice in the metropolitan area. If you are opting for Uber's People car option in this city, often this PHEV car makes your ride enjoyable, as no cheap interior or thin plastic/metal parts processed. The later however you can experience in the EV series from JAC (iEV5, iEV6). Booth pure electric car have at first sight a nice exterior but have you ever tried to drive them as Western guy with an average body height of 178cm (and desperately tried to adjust the drivers seat)?

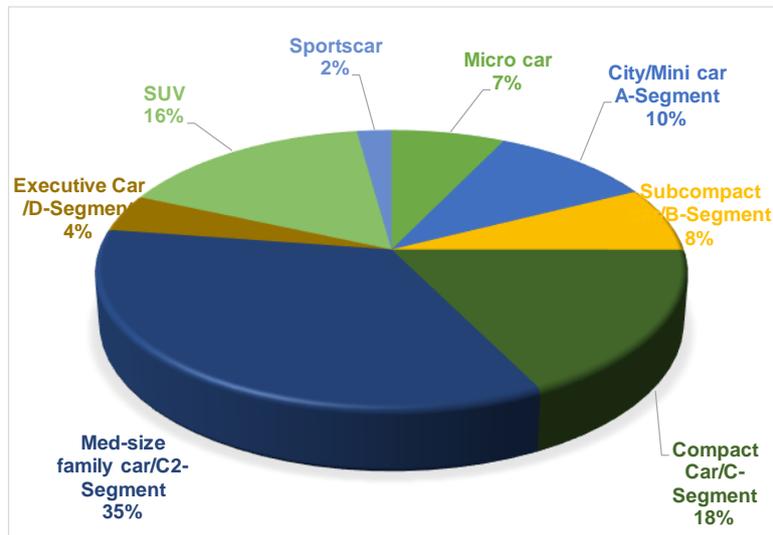


Fig. 5: NEV market share per car segment, 1-7/2016

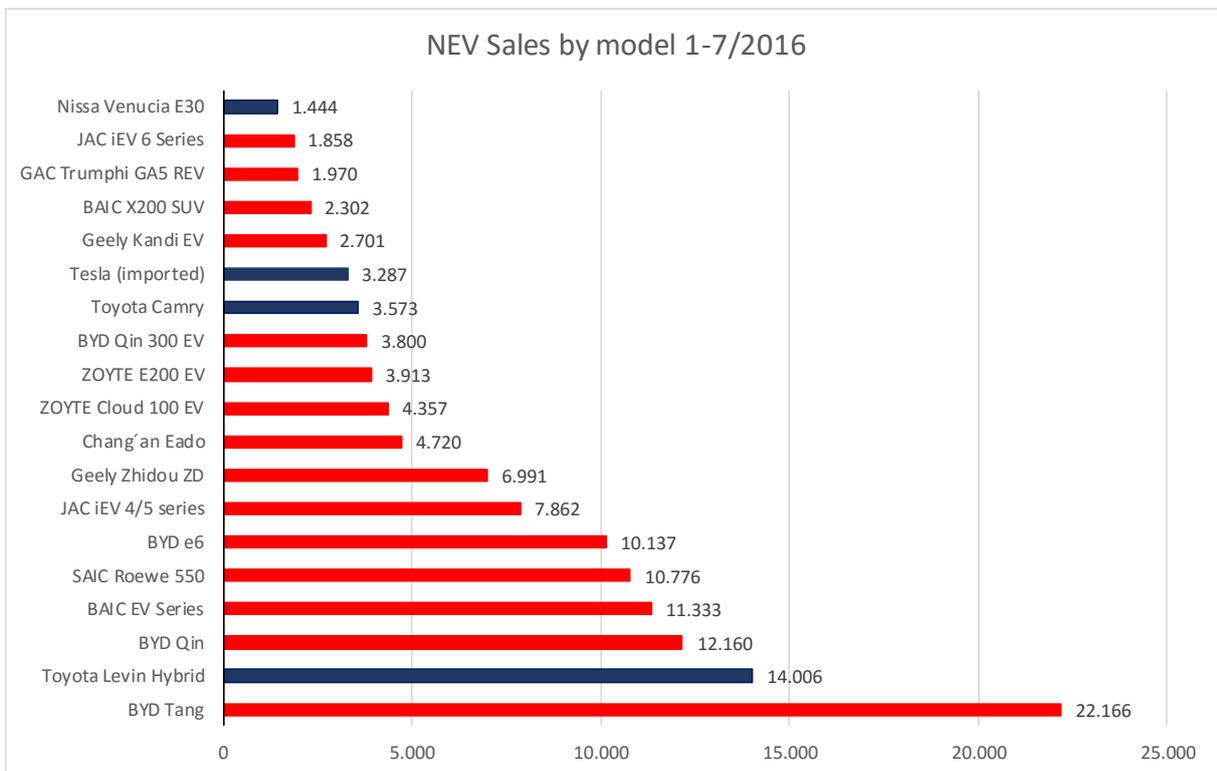


Fig. 6: NEV car model sales ranking, 1-7/2016

BYD's top model is the hybrid SUV Tang 唐 (505hp/820Nm). The Power-SUV has gained much popularity among Chinese customer, as it offers a wide range of purchase incentives, such as: no driving range limitations, free license plate & huge subsidies, stylish SUV design, complete safety and middle-class comfort features and, with its power a decent sports car performance (0-100 km/h: 4,9s). Until BYD will set up a new Tang production line in Shenzhen, the monthly capacity is limited to about 3000

units. A recent dealer visit in Shanghai revealed, that the 6 months waiting period of Nov. 2015 has been cut down from to only one month.

In the same period this year, BYD has sold 19.000 pure electric cars of e5, e6 including the recently electrified Qin 秦 300EV. Its 48kWh battery powers a 218hp and 310nm electric engine to reach 150 km/h top speed and needs 8s for 0-100km/h. BYD claims a driving range of about 300km/h and receives a hefty red subsidy of about 172.200 RMB (\approx 23.000 EUR/26.000 USD). No wonder why BYD net profit soared 384 percent year on year to 348 million USD (311 mio EUR) in H1/2016 on "robust" NEV sales (revenue is 1.6 times greater than the same period a year earlier).

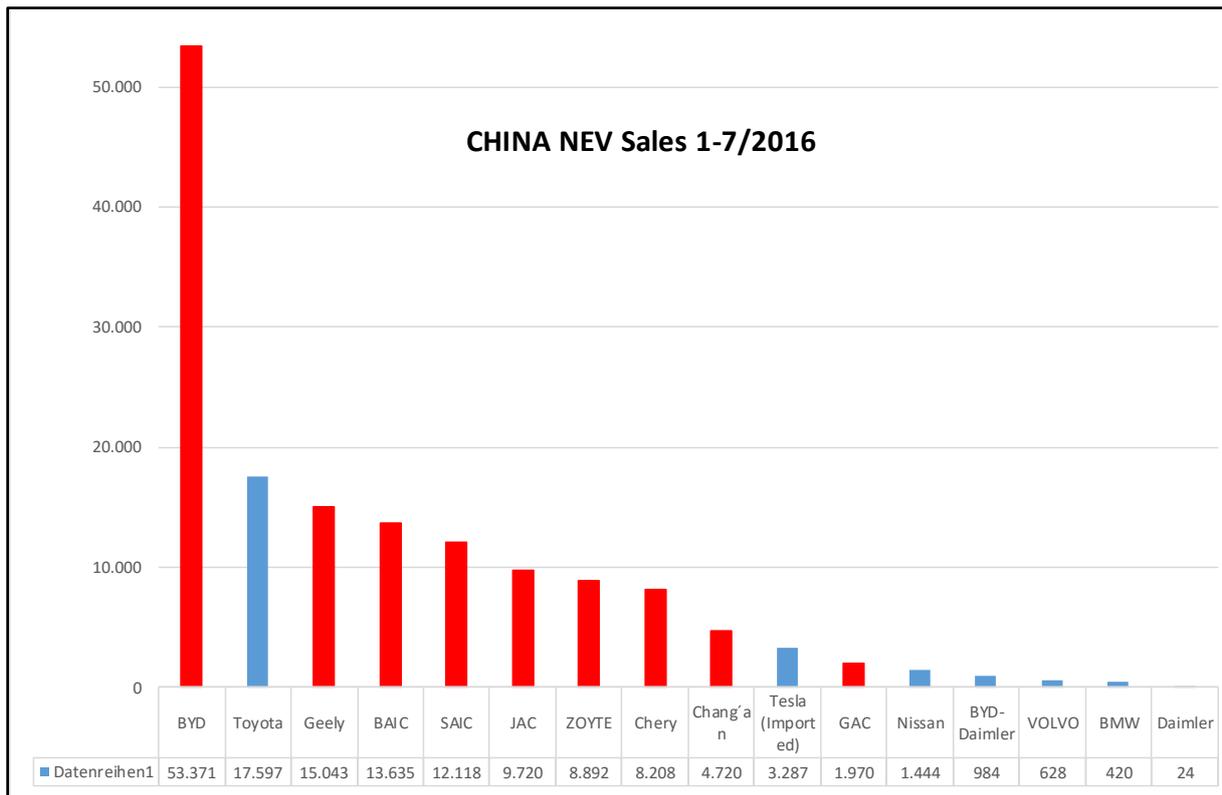


Fig. 7: NEV OEM Sales ranking 1-7/2016

But both BYD engineers and management have been a great fan of Japanese carmaker Toyota, when the company launched their 1st mass market compact car BYD F3 eight years ago. The F3 which was remarkably similar to a 2006 Toyota Corolla, and, in fact was a blunt inside-outside copy of it, attracting low-budget & low-quality minded Chinese customers by a 50% discount compared to the Japanese role model.

Toyota's smart hybrid move

Toyota has not gotten down on bended knee in front of the Chinese government. In fact, the Asian green car leader is assembling since 2011 the

mid-size D segment Camry hybrid car on imported CBU basis at its Guangzhou Nansha I plant. For Chinese people in the South China, the Emperor in Beijing are far more away and they have no objections to honor superior Japanese hybrid technology. Even the proximity to BYD in Shenzhen does not have a much negative impact on Toyota Guangzhou sales.

And from the Nansha plant Nr. 1 comes a new NEV Eastern rising star in China, encouraging their US and European peers to follow. It is the Toyota Corolla Levin Hybrid (MC-C platform, program 635A). The Toyota Corolla Levin Hybrid is a mid-size limousine (C2-segment) based on the real E170 Toyota Corolla, and design-wise close to the US-Corolla.

Produced by Toyota in partnership with GAC (Guangzhou Auto Corporation), it was launched in April 2015 at the Shanghai motor show and went on sales in November 2015.

The drivetrain is not a racing horse but enough power for an economic mid-size family car and is equipped with a most efficient and fuel-saving hybrid system. It is based on the 1.8 liter 4 cylinder VVT-I L4 MPI Atkinson 8ZR-FXE gasoline engine with 99hp and 142Nm, mated with an electric motor with 72hp and 207Nm, to achieve in tandem about 171hp and 350Nm. As transmission, the Toyota 'e-CVT' automatic system is used, offering three drive modes: EV mode, ECO mode, and PWR mode. As realistic fuel consumption, the average Toyota Corolla Levin Hybrid needs only 4.2l for 100km without a plug-in mode. The mid-size limousine is not a heavy-weight with its 1375 kg, even with its Nickel-metal hydride battery pack.



Fig. 7: Toyota Levin Hybrid

After eight months on sale, the Toyota Corolla Levin hybrid limousine is stealing the show from the much subsidized Chinese NEV makers, as it

ranks 2nd after the BYD Tang hybrid SUV. Together with Toyota Camry Hybrid, an entry business class car with a 156hp 2.5l petrol engine and a 140hp electric motor, mated to an 'e-CVT' and the Toyota Prius, the Japanese carmaker managed to sell 17.597 hybrid cars in till July 2016.

Japanese OEM are smart Asian entrepreneurs as they found a workaround not sharing the hybrid technology with its JV partner GAC group.

At the 2015 Auto Shanghai car introduction, the management announced the decision to implement a locally designed, sourced and produced hybrid system. It was the first time, that Toyota has researched, developed and produced hybrid powertrain components (battery, inverter and transaxle) outside of Japan. The components were developed through the efforts of over 260 Chinese engineers at Toyota Motor Engineering & Manufacturing (China) Co., Ltd., Toyota's R&D center for cutting-edge component technologies, based in Changshu.

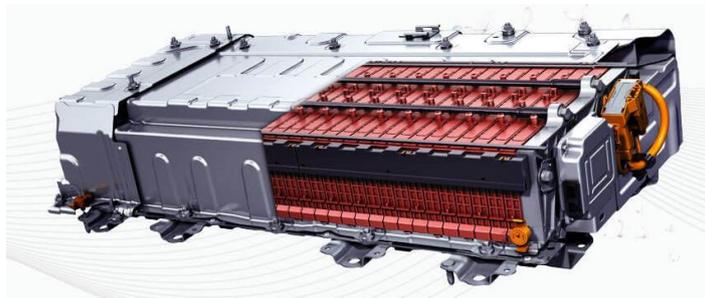


Fig. 8: Toyota Levin NiMH battery pack

Toyota Motor Corp is currently strengthening its production base for nickel-metal-hydride (NiMH) batteries for hybrid vehicles (HEVs) in China.

Corun Peve Automotive Battery (CPAB) Co Ltd, which is based in Changshu, China, will start production of NiMH battery cells end of 2016. CPAB is affiliated with Primearth EV Energy (PEVE) Co. Ltd., which is financed by Toyota and Panasonic Corp to develop and produce automotive batteries.

Until the SOP, Toyota is exporting battery materials from China to Japan, manufactures the cells in Japan and sent them back to China to make battery packs. The localization of battery cells will further lower production costs.

Western NEV OEM dominance in the rise

The NEV car segment where the Western OEM dominance is currently 84% and further growing is the luxury segment with Volvo, BMW and Daimler as the key players. The US carmaker GM will launch new hybrid models later this year such as the Chevrolet Malibu XL hybrid, Buick Lacrosse Hybrid and Cadillac CT6 plug-in Hybrid, so Western carmakers will

dominate this segment for sure until end of this year. As Beijing has significantly reduced PHEV subsidy from 61.500 RMB to 40.000 RMB in Shanghai and will further reduce it next year, chances for Western OEM NEV's with superior manufacturing quality and technology leadership are increasing to battle Chinese EV makers in the upper middle class and luxury segment (D2, E).

Nationalist comrades, watch your back: the Germans are rolling out next year a bunch of nice electric and hybrid cars – the Chinese NEV dominance on the mainland is over.