CHINA ANNOUNCED 2019 SUBSIDIES FOR NEW ENERGY VEHICLES

ICCT **POLICY UPDATES** SUMMARIZE REGULATORY AND OTHER DEVELOPMENTS RELATED TO CLEAN TRANSPORTATION WORLDWIDE.

On March 26, 2019, China's Ministry of Finance, Ministry of Industry and Information Technology (MIIT), Ministry of Science and Technology, and National Development and Reform Commission jointly released A Notice of Further Adjusting Fiscal Subsidies for Promoting New Energy Vehicles (hereafter "the Notice").[1] A new energy vehicle (NEV) is a battery electric, plug-in hybrid, or fuel cell vehicle, and the Notice provides a detailed formula to determine the subsidy due to consumers who buy a new battery electric or plug-in hybrid vehicle in 2019. (Unlike prior adjustments, the Notice does not apply to fuel cell vehicles or new energy buses—those are left for future policy amendments.)

This is the 2019 annual adjustment to China's decade-long central subsidy program for NEVs, which was introduced initially as the Ten Cities, Thousand Vehicles project in 2009. The historical evolution of this program is illustrated in Figure 1. The most recent major adjustment was detailed in ICCT's policy update published in May 2017.[2]
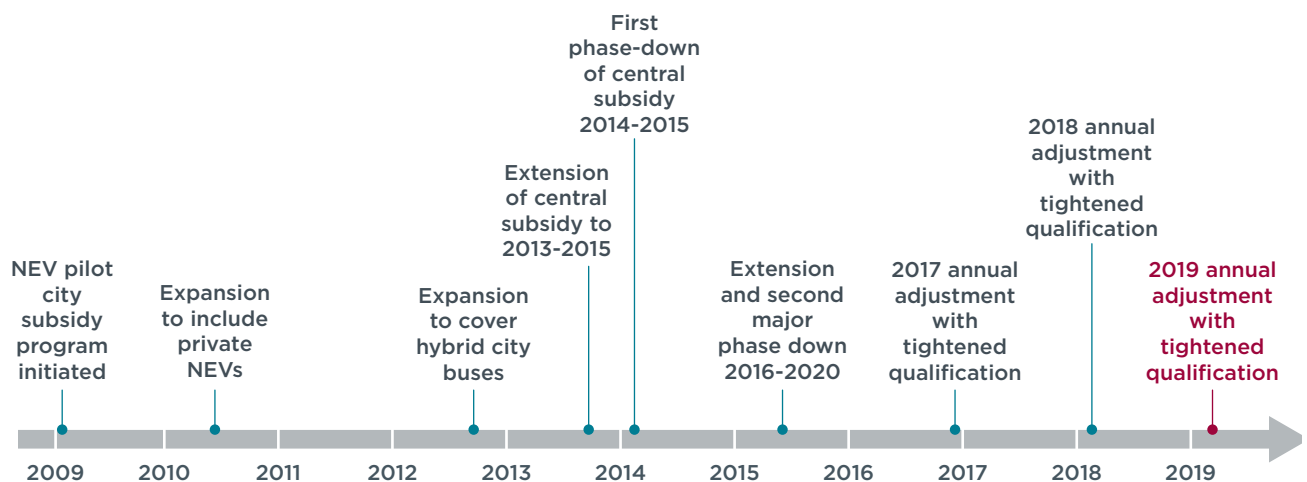

Figure 1. Timeline of China's central subsidy program for new energy vehicles

1   Ministry of Finance, "A Notice of Further Adjusting Fiscal Subsidies for Promoting New Energy Vehicles" [关于进一步完善新能源汽车推广应用财政补贴政策的通知](2019), http://jjs.mof.gov.cn/zhengwuxinxi/zhengcefagui/201903/t20190326_3204190.html
2   Hongyang Cui, Zifei Yang, and Hui He, *Adjustment to subsidies for new energy vehicles in China,* (ICCT: Washington, D.C., 2017), https://www.theicct.org/publications/adjustment-subsidies-new-energy-vehicles-china

Generally, the Notice echoes the NEV subsidy phase-down schedule announced in the previous policy update. What's new is that the Notice outlines tightened requirements to qualify for the subsidy, and provides a revised formula to determine the subsidy's size. Further, it includes guidance regarding the paired incentive from local governments, and a few provisions to enhance the overall effectiveness of the program.

The Notice will fully take effect in the middle of the year, on June 25, after a three-month transition period from the time of its release. Therefore, for the purposes of this policy update, the current policy is still the 2018 policy and the 2019 policy is the new policy. The last section of this policy update describes a special provision regarding how the current and new policies connect during the transition period.

REVISED SUBSIDIES AND COMPARISON WITH CURRENT LEVELS

The overall design of the policy outlined in the Notice is similar to the last version. To qualify for the subsidy, vehicles must meet minimum technical and performance requirements, and the size of the subsidy is indexed to a variety of vehicle specifications and utility parameters. This subsection first describes the qualification criteria for the 2019 subsidy (Table 1), and then provides full details of the subsidy design for each vehicle type. Wherever possible, we provide a comparison between the new and current policies using real vehicle model examples. Figure 3, at the end of this section, provides a comparison between the 2018 and 2019 subsidy levels across vehicle types.

As shown, the 2019 policy tightens the qualification requirements across all vehicle types and technologies except for plug-in hybrid commercial passenger vehicles and trucks. To qualify for the subsidy under the new policy, a battery electric passenger car, for example, must meet a minimum electric mileage of 250 kilometers (km). For an electric truck, that requirement is 80 km. Thresholds for energy efficiency and battery energy density are elevated for battery electric vehicles across all types in 2019 over the 2018 levels. Plug-in hybrid cars with shorter electric drive range (<80 km) must reduce at least 40% of fuel use, on the fuel mode, from the current fuel consumption standards for a comparable fuel vehicle.[3] This fuel saving rate requirement is 10% tougher than the one in the current, 2018 policy. The fuel saving requirements for plug-in hybrid commercial passenger vehicles and trucks, however, remain unchanged from 2018. The minimum electric drive range for all types of PHEVs also stayed the same as in 2018. The 2019 policy removed the constraint regarding battery mass ratio for battery electric and plug-in hybrid commercial passenger vehicles, as the parameter is considered less relevant to the performance of these types of vehicles.

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3   Current fuel consumption standards for fuel-vehicles can be found in the ICCT policy update, Hui He and Zifei Yang, *China Phase 4 passenger car fuel consumption standard proposal,* (2014), https://www.theicct.org/sites/default/files/publications/ICCTupdate_ChinaPhase4_mar2014.pdf

Table 1. Qualification requirements for the 2019 subsidy

Vehicle type	Technology	Year	Design parameters						
			EF	ER (km)	BD (Wh/kg)	BM (%)	CS (C)	SP (km/h)	FS (%)
Passenger Car	**BEV**	2018	o[a]	≥150	≥105			≥100	
	BEV	2019	o[a]	≥250	≥125			≥100	
	PHEV	2018	o[b]	≥50					>35[c]
	PHEV	2019	o[b]	≥50					>40[c]
Commercial Passenger Vehicle	**BEV**	2018	≤0.21	≥200[d]	>115[d]	≤20	>3C[e]		
	BEV	2019	≤0.19	≥200[d]	>135[d]		>3C[e]		
	PHEV	2018	≤0.21	≥50		≤20			>60
	PHEV	2019		≥50					>60
Truck/ Vocational	**BEV**	2018	≤0.4 or ≤0.08[f]		≥115				
	BEV	2019	≤0.3 or ≤0.08[f]	≥80	≥125				
	PHEV	2018		≥50					≥40
	PHEV	2019		≥50					≥40

Notes: BEV = battery electric vehicle, PHEV = plug-in hybrid vehicle; EF = energy efficiency, measured in kilowatt-hour per hundred kilometers (kWh/100-km) for passenger cars, or watt-hour per kilometer per kilogram (Wh/km·kg) for commercial passenger vehicles, trucks, and vocational vehicles; ER = electric range, measured in kilometers (km); BD = battery enery density, measured in watt hour per kilogram (Wh/kg); BM = battery mass as a percentage of vehicle curb mass, measured in %; CS = charging speed of batteries, measured in C; SP = maximum vehicle speed, measured in kilometers per hour (km/h); FS = fuel saving compared with standards for conventional fuel vehicles, measured in %

[a] The energy efficiency requirements are a function of vehicle curb mass
[b] The energy efficiency requirement is expressed as a fraction of the fuel consumption limit under the current light-duty vehicle fuel consumption regulation
[c] For shorter-range (electric range shorter than 80 km) plug-in hybrid cars only
[d] For non-fast-charging (or regular) battery electric commercial passenger vehicles only
[e] For fast-charging commercial passenger vehicles only
[f] The first number is for trucks and specialized delivery vehicles; the second number is for other types of vocational vehicles

PASSENGER CARS

The subsidy for battery electric passenger cars is primarily determined by its electric drive range and battery capacity, but it is also affected by its battery energy density, energy consumption, and ownership type (i.e., privately owned or not). For cars that meet the minimum requirements, the base subsidy is the smaller value between the subsidy level derived from electric drive range and that derived from battery capacity. The final subsidy is then calculated via three multipliers—a battery energy density multiplier, an energy consumption multiplier, and an ownership type multiplier. This is specified in the following equation:

$$Subsidy = min \{Subsidy_{ER}, Subsidy_{BC}\} \times F_{BD} \times F_{EC} \times F_{OS}$$

Where,

$Subsidy_{ER}$ = base subsidy determined by electric range

$Subsidy_{BC}$ = base subsidy determined by battery capacity

F_{BD} = battery energy density multiplier

F_{EC} = energy consumption multiplier

F_{OS} = ownership type multiplier, 1 for private cars and 0.7 for non-private cars

The portion of the base subsidy derived from the electric drive range is indexed in two mileage bins. Vehicles that drive between 250 km and 400 km on electric receive 18,000 Chinese yuan (CNY), and those that drive above 400 km receive CNY25,000 (see Table 2). The portion of the base subsidy derived from battery capacity is a linear function of battery capacity—CNY550 for each kilowatt-hour (kWh).

Table 2. Base subsidy determined by electric drive range

	BEV electric range (R, km)					PHEV electric range (R,km)
	150≤R<200	200≤R<250	250≤R<300	300≤R<400	R≥400	R≥50
2019	0		18		25	10
2018	15	24	34	45	50	22

Note: Subsidy amount in CNY1,000

The battery energy density multiplier is indexed in three battery density bins—0.8 for 125-140 watt-hours per kilogram (Wh/kg), 0.9 for 140-160 Wh/kg, and 1 for 160 Wh/kg and above. See Table 3, below.

Table 3. Battery energy density multiplier (F_{BD})

	BEV battery energy density (Wh/kg)				
	105≤BD<120	120≤BD<125	125≤BD<140	140≤BD<160	BD≥160
2019	0		0.8	0.9	1
2018	0.6	1		1.1	1.2

The energy consumption multiplier is determined by the percentage improvement of a BEV's electricity consumption compared with pre-defined thresholds. The thresholds themselves are a function of vehicle curb mass and were described in greater detail in our May 2017 policy update. They are also plotted in Figure 2.
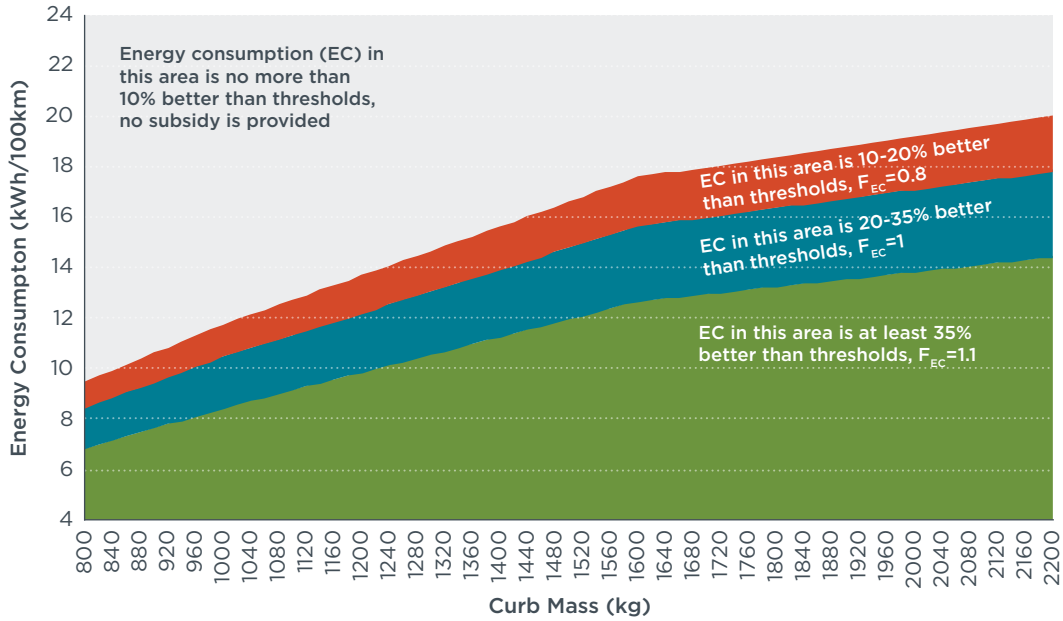
Figure 2. Illustration of energy consumption multiplier for BEVs in 2019

Table 4, below, provides a comparison of the 2019 energy consumption multiplier values against the current, 2018 levels.

Table 4. Energy consumption multiplier (F_{EC})

	% BEV battery energy consumption better than threshold						
	0-5%	5-10%	10-15%	15-20%	20-25%	25-35%	≥35%
2019	0		0.8		1		1.1
2018	0.5	1				1.1	

As the Roewe eRX5 was one of the top-selling battery electric passenger car models in 2018, it is a good example to illustrate how the formula works in the real world. The relevant vehicle specifications are included in Table 5, and they form the basis from which we will calculate the 2019 subsidy for which the vehicle will qualify. With a 320 km electric range and 48kWh battery capacity, the eRX5's base subsidy is CNY18,000; recall that this is determined by the lesser value between the electric-range-based subsidy (CNY18,000) and the battery-capacity-based subsidy (48 x CNY550 = 26,400). Then, with 135Wh/kg battery energy density and 15 kilowatt-hours per hundred-kilometer (kWh/100 km) efficiency at 1,710kg of curb mass, its battery energy and energy consumption multipliers are 0.8 and 1, respectively. Assuming, lastly, that the vehicle is sold to a private owner, the consumer will receive a subsidy of CNY14,440 (18,000 x 0.8 x 1 x1). In comparison, this same car would have received a CNY49,500 subsidy under the 2018 policy.

Table 5. Specifications for the Roewe eRX5

Specification (Unit)	Value
Electric range (km)	320
Battery capacity (kWh)	48
Battery energy density (Wh/kg)	135
Curb mass (kg)	1,710
Energy consumption (kWh/100km)	15
Ownership type	Private

For shorter-range plug-in hybrid electric passenger cars, once qualified, a vehicle's 2019 base subsidy is CNY10,000, compared with CNY22,000 in 2018. Shorter-range PHEVs with more than 45% fuel savings are eligible for the full base subsidy, while those that save between 40% and 45% of fuel consumption only receive half of the base subsidy. These thresholds are also elevated from the 2018 levels, which are 40% and 35%, respectively. Longer-range PHEVs (≥80 km) are subject to the same energy consumption requirments as for battery electric cars, when tested under the electric mode, to qualify for the full base subsidy. In addition, the 2018 policy capped the per kWh subsidy for PHEVs at CNY1,200.

We will use a popular 2018 plug-in hybrid car model, the BYD Qin Pro DM, as an example to illustrate the change of the subsidy from the current policy to the new policy. The model has 80 km electric range, and thus is categorized as a longer-range PHEV. The vehicle's certified electric-mode energy consumption is 12.9 kWh/100km, and this meets the minimum requirement to qualify for a full base subsidy of CNY10,000 in 2019. While the same model qualifies for a base subsidy of CNY22,000 under the 2018 policy, it is also subject to a cap of CNY15,600 in subsidy based on its 13 kWh battery capacity. Therefore, the final subsidy that the vehicle receives under the current, 2018 policy is CNY15,600.

COMMERCIAL PASSENGER VEHICLES

As related in the Notice, non-fast-charging battery electric commercial passenger vehicles (regular BEVs) must consume less than 0.19 watt-hour of of electricity per kilometer driven and per kilogram of mass (Wh/km*kg), and meet a minimum battery energy density of 135 Wh/kg, to qualify for the subsidy. The thresholds in the current, 2018 policy are 0.21 Wh/km*kg and 115 Wh/kg, respectively. The minimum electric drive range requirement for a regular BEV and the minimum charging speed for fast-charging BEVs are identical for both 2018 and 2019, and these are 200 km and 3C, respectively.[4]

For plug-in hybrid electric commercial passenger vehicles, the 2019 policy continues the 60% minimum fuel savings rate requirement and the minimum electric range of 50 km from 2018. The minimum energy consumption requirement for PHEVs no longer applies in 2019. In addition, subsidy levels for natural gas/electric plug-in hybrid

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4   A C-rate is a measure of the rate at which a battery is discharged relative to its maximum capacity. A 1C rate means that the discharge current will discharge the entire battery in 1 hour. For a battery with a capacity of 100 Amp-hrs, this equates to a discharge current of 100 Amps. Source: MIT, "A Guide to Understanding Battery Specifications," (2008), http://web.mit.edu/evt/summary_battery_specifications.pdf

commercial passenger vehicles will be proportional to those for their gasoline plug-in hybrid counterparts, but the Notice does not specify to what extent.

For vehicles that meet the minimum requirements, the base subsidy is the smaller value between the subsidy derived from battery capacity and the maximum subsidy allowed by vehicle length. The final subsidy is then further adjusted by a technical parameter relevant to each vehicle type, as specified in the following equation. For regular BEVs, fast-charging BEVs, and PHEVs, the parameters are energy consumption, charging speed, and energy saving, respectively.

$$Subsidy_i = min \{Subsidy_{BC\text{-}i}, Subsidy_{L\text{-}i}\} \times F_i$$

Where,

$Subsidy_{BC\text{-}i}$ = base subsidy determined by battery capacity for vehicle type i (regular BEV, fast-charging BEV, or PHEV)

$Subsidy_{L\text{-}i}$ = maximum subsidy by vehicle length for vehicle type i (CNY500/kWh for regular BEV, CNY900/kWh for fast-charging BEV, and CNY600/kWh for PHEV)

F_i = multiplier for vehicle type i (energy consumption for regular BEV, charging speed for fast-charging BEV, and energy saving for PHEV)

The values of the base subsidies, the length-determined subsidy caps, and the different multipliers are specified in Table 6. For comparison, the same details for the 2018 policy are shown in Table 7. The 2018 design structure for the commercial passenger vehicle subsidy is very similar to the 2019 one, except that the multiplier for regular BEVs was determined by battery energy density instead of energy consumption.

Table 6. Subsidy for commercial passenger vehicles in 2019

Technology	Base subsidy (CNY/kWh)	Max. subsidy by vehicle length (1,000 CNY/veh)			Multiplier		
		6m≤L<8m	8m≤L<10m	L≥10m	Parameter	Bin	Value
Regular BEV	500	25	55	90	Energy consumption (Wh/km*kg)	0.19≥EC>0.17	0.8
						0.17≥EC>0.15	0.9
						EC≤0.15	1
Fast-charging BEV	900	20	40	65	Charging speed (C)	3<CS≤5	0.8
						5<CS≤15	0.9
						CS>15	1
PHEV	600	10	20	38	Energy saving (%)	60<ES≤65	0.8
						65<ES≤70	0.9
						ES>70	1

Table 7. Subsidy for commercial passenger vehicles in 2018

| Technology | Base subsidy (CNY/Veh) | Max. subsidy by vehicle length (1,000 CNY/veh) | | | Multiplier | | |
		6m≤L<8m	8m≤L<10m	L≥10m	Parameter	Bin	Value
Regular BEV	1,200	55	12	18	Battery density (Wh/kg)	115<BD≤135	1
						BD>135	1.1
Fast-charging BEV	2,100	40	80	130	Charging speed (C)	3<CS≤5	0.8
						5<CS≤15	1
						CS>15	1.1
PHEV	1,500	22	45	75	Energy saving (%)	60<ES≤65	0.8
						65<ES≤70	1
						ES>70	1.1

We'll use two examples to demonstrate how the 2019 new energy commercial passenger vehicle subsidies are calculated. Table 8 provides the relevant vehicle specifications for one regular and one fast-charging BEV model (Model A and Model B, respectively). For the regular BEV, with 141kWh battery capacity and a 10.5-meter vehicle length, its base subsidy is CNY90,000, determined by the lesser value between the battery-capacity-based subsidy (287 x CNY500 = 143,500) and the length-based subsidy (CNY90,000). Then, with its 0.169Wh/km*kg energy consumption, the vehicle qualifies for a multiplier of 0.9. Therefore, Model A can receive a total subsidy of CNY81,000 (90,000 x 0.9) under the 2019 policy. Model B's base subsidy is CNY65,000, following the same base subsidy equation used for Model A. Then, as a fast-charging BEV, Model B's multiplier is determined by its charging speed, and that is 0.8. The total subsidy that Model B can receive under the 2019 policy is CNY52,000 (65,000 x 0.8). In comparison, the two models would qualify for total subsidies of CNY198,000 and CNY104,000, respectively, under the current, 2018 policy.

Table 8. Specifications for two battery electric commercial vehicle models

	Model A	Model B
Model number	BYD6101LGEV10	BFC6128GBEV6
Vehicle type	Regular BEV	Fast-charging BEV
Charging speed (C)	—	3.38
Electric range (km)	535	N/A
Battery energy density (Wh/kg)	141	98
Battery capacity (kWh)	287	106
Vehicle length (m)	10.5	12
Energy consumption (Wh/km*kg)	0.169	0.148

Note: The source of the vehicle specifications is the Ministry of Industry and Information Technology, "New Energy Vehicle Product Catalogue 2019-1 and 2019-3, (2019), http://123.127.164.29:18082/CVT/Jsp/zjgl/nerds/201814.html?tdsourcetag=s_pctim_aiomsg; http://123.127.164.29:18082/CVT/Jsp/zjgl/nerds/201903.html.

TRUCKS AND VOCATIONAL VEHICLES

The subsidies for battery electric and plug-in hybrid trucks and vocational vehicles are determined as a function of their battery capacity and are further subject to various ceilings dependent on type of technology and vehicle weight class (Table 9). The per-kWh subsidy rates for BEVs and PHEVs are CNY350 and CNY500, respectively.

Table 9. Subsidy for trucks and vocational vehicles in 2019

Technology	Base subsidy (CNY/kWh)	Max. subsidy by gross vehicle weight (M) (CNY1,000/veh)		
		M≤3,500kg	3,500kg<M≤12,000kg	M>12,000kg
BEV	350	20	55	55
PHEV	500	—	—	35

The subsidy structure for these types of vehicles under the 2018 policy is provided in Table 10. Compared with the current policy, the 2019 subsidy design is more streamlined. Rather than the complicated, cascading per kWh subsidy rate structure, the new policy adopts a single rate for each kWh of battery capacity. Also, the Notice removed the energy consumption multiplier for PHEVs.

Table 10. Subsidy for trucks and vocational vehicles in 2018

Type	Base subsidy[a]		Cap	Multiplier[b]		
	BC (kWh)	CNY/kWh	CNY/veh	Parameter	Bin	Value
BEV	BC≤30	850	100,000	Energy consumption (4Wh/km·kg)	0.35<EC≤0.4 EC≤0.35	0.2 1
	30<BC≤50	750				
	BC>50	650				
PHEV	BC≤30	850	100,000	N/A		
	30<BC≤50	750				
	BC>50	650				

[a] The base subsidy rate is a tiered structure by vehicle battery capacity. A vehicle's total base subsidy is the sum of subsidies of all battery capacity (kWh) tiers, and the CNY/kWh rate only applies to its correspondent tier. For example, a vehicle has a 60kWh battery pack. It's base subsidy = 30 x 850 + 20 x 750 + (60-50) x 650 = CNY 47,000.
[b] Excluding vocational trucks

We will use a battery electric sanitation truck model (specifications in Table 11) as a real-world example. This vocational truck has met the minimum energy efficiency, electric drive range, and battery energy density thresholds to qualify for the 2019 subsidy. Its base subsidy level is CNY55,000, which is the lesser value between the battery-capacity subsidy, CNY76,650 (CNY350/kWh x 219kWh), and the maximum allowed subsidy for its weight class, CNY55,000. In comparison, the same model would qualify for a total subsidy of CNY100,000 under the 2018 policy.

Table 11. Specifications for a battery electric sanitation truck

Model Number	XZJ5181GQXDBEV
Vehicle type	Vocational BEV
Gross vehicle weight (kg)	10,090
Electric range (km)	255
Battery energy density (Wh/kg)	140
Battery capacity (kWh)	219
Energy consumption (Wh/km*kg)	0.05

Note: The source of the vehicle specifications is the Ministry of Industry and Information Technology, 2019. New Energy Vehicle Product Catalog 2019-2. http://123.127.164.29:18082/CVT/Jsp/zjgl/nerds/201902.html.

Finally, Figure 3 compares the 2019 subsidies against the 2018 subsidy levels for various vehicle types where data is available, in both CNY and U.S. dollar terms, using all the previous examples.
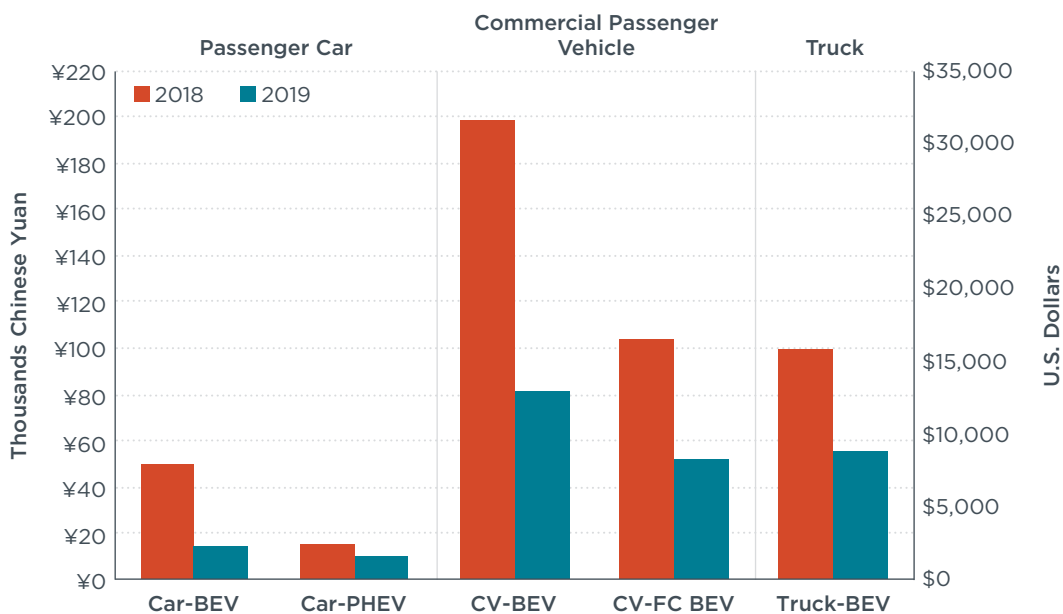

Figure 3. Comparison of NEV subsidies in 2018 and 2019. CV-BEV refers to a regular battery electric commercial passenger vehicle and CV-FC BEV refers to a fast-charging battery electric commercial passenger vehicle.

OTHER PROVISIONS

The Notice also includes details regarding how to calculate the subsidy during the transition (from March 26 to June 25), and guidance for local NEV subsidy programs. Mileage requirements for commercially operating vehicles and vehicle safety requirements are also specified, and these details are all below. Note, also,

that as the Notice did not specify any enforcement measures, the enforcement actions from the previous policy continue to apply.

» *Transitional subsidy schedule*: During the transition period for the new, 2019 policy (as related above, this is March 26, 2019 to June 25, 2019), BEVs and PHEVs that meet the 2018 qualification requirements, but not the 2019 requirements, may receive 10% of the subsidy prescribed in the 2018 policy. BEVs and PHEVs that meet the 2019 qualification requirements can receive 60% of the subsidy levels prescribed in the 2018 policy. (Though the Notice does not generally cover fuel cell vehicles, it does specify that fuel cell vehicles sold and registered during the transition period are eligible for 80% of the subsidy levels prescribed in the 2018 policy.)

» *Local subsidies and incentives*: After the Notice takes effect, local governments shall no longer provide upfront purchase subsidies for NEVs, except for fuel cell vehicles and new-energy buses. Instead, local governments are urged to incentivize the installation and operation of charging infrastructure. If vehicles are found to have received local subsidies after the 2019 policy takes effect, their central subsidies will be discounted accordingly. NEVs that do not qualify for the 2019 central subsidy may still be able to benefit from non-fiscal local incentives, provided they are in the NEV product catalog system managed by MIIT.[5]

» *Mileage requirement*: Similar to the 2018 policy, non-private NEVs are required to demonstrate at least 30,000 km of accumulated mileage to qualify for the subsidies. The Notice further specifies that only a partial subsidy will be provided at the time of vehicle registration, and the rest will be paid after proof of required mileage is provided. Under the new policy, and effective March 26, 2019, NEVs that do not accumulate 20,000 km of mileage in the first two years of operation are not eligible for the subsidy. Vehicle owners who fail to meet this requirement will be required to refund the initial, partial subsidy they received at registration.

» *Vehicle safety requirement*: The regulatory agencies will conduct production conformity tests, including safety-related tests and inspections, on a regular basis. If a design defect that leads to safety concerns is confirmed, the affected vehicle model will be prohibited from production and its subsidies will be suspended.

NEXT STEPS

The central subsidies for NEVs are scheduled to be phased out after 2020. China's top leadership and key central agencies decided to incrementally phase down and ultimately end NEV subsidies in order to reduce the dependency of NEV growth on upfront fiscal support, relieve the financial burden on the central government, and increase the competitiveness of the industry. To further support this transition, China recently introduced a NEV mandate policy that requires auto manufacturers to supply a certain proportion of electric vehicles in new production fleets starting in 2019.[6] The seamless connection between the central subsidy program and the NEV mandate policy has the potential to continue to drive China's electric vehicle market after 2020.

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5 MIIT's NEV Product Catalogue System is a certification system that permits mass production of prototype NEV models. MIIT uses this system to manage the market entrance of new vehicle models.

6 Details can be found in the ICCT policy update, Hongyang Cui, *China's New Energy Vehicle mandate policy,* (2018), https://www.theicct.org/sites/default/files/publications/China-NEV-mandate_ICCT-policy-update_20032018_vF-updated.pdf.