北京交通发展研究院
Beijing Transport Institute

Beijing Experience of New Energy Vehicles Promotion

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I. Basic Situation

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Beijing, time-honored capital of China, acts as its center for politics, culture, international exchanges and technological innovation.

Area: 16,400 km^2

Permanent residents: 21.707 million

Motor vehicle population: 5.909 million

Motor vehicle population per thousand persons: 272

NEV population per thousand persons: 8

Beijing

I. Basic Situation

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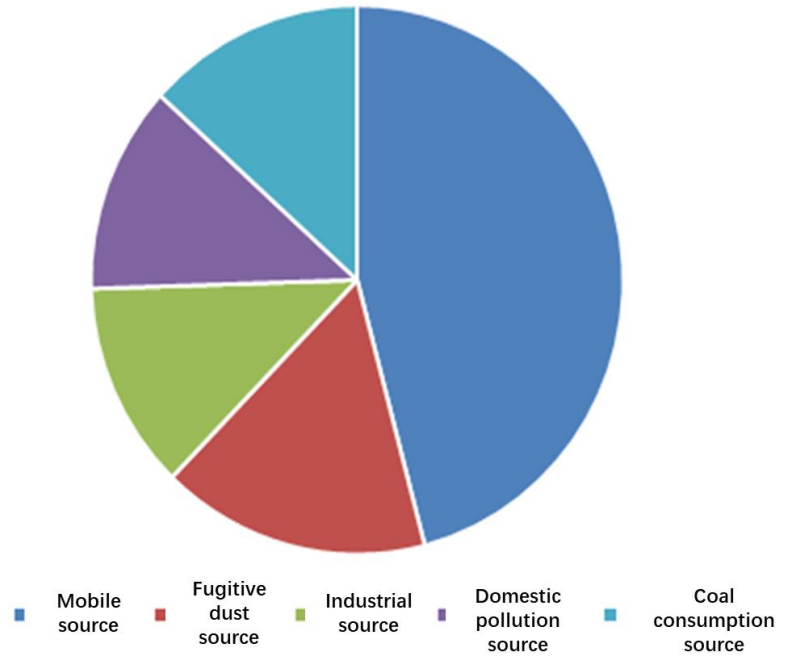
Beijing's transport development is facing severe situation for energy conservation and emission reduction

1. Beijing Clean Air Action Plan (2013-2017) has already been completed with PM2.5 concentration decreased from 90ug/m^3 to 58ug/m^3. The transport system has been a major contributor.

2. The National Three-year Action Plan to Win the Blue Skies Battle plans to take key areas such as BTH region and its surrounding areas as the main battlefield, to greatly reduce fine PM concentration and heavy pollution days after three years' effort.

3. Annual average PM2.5 concentration should fall to nearly 56ug/m^3 by 2020. Ambient air quality should be improved radically by 2035 and reach internationally advanced level by 2050.

At present, mobile source accounts for 45% of local PM2.5 emissions in Beijing



I. Basic Situation

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In Beijing, NEVs consume over 40% less energy and emit over 43% fewer pollutant and 22% fewer carbon emissions than traditional vehicles.

Analysis of real-time monitoring finds, from a full life circle standpoint, compared with traditional internal combustion engine vehicles (ICEVs), NEVs can produce the following effect in energy conservation and emission and carbon reduction:

Energy consumption: 40%-64% less

Pollutant emissions: 43%-89% fewer

Carbon emissions: 22%-58% fewer

Table 1 Energy conservation and emission reduction effect of NEVs in various fields

Field	Energy consumption and emission index	Real monitored energy consumption during operation		Full life cycle		
		Energy consumption (physical quantity) /100km	Energy consumption kgce/100km	Energy consumption 10^9KJ	NOx emission kg	CO2 emission g/km
Private vehicle	Gasoline vehicle	10.95L	11.76	3.3	209.2	247.5
	EV	21.3kWh	6.3	1.2	109.9	140.2
	Energy conservation and emission reduction benefits	/	46.4%	63.6%	47.5%	43.4%
Taxi	Gasoline vehicle	8.29L	9.04	2.5	163.5	197.8
	EV	16.4kWh	4.9	1.5	92.8	82.4
	Energy conservation and emission reduction benefits	/	45.8%	40.0%	43.2%	58.3%
Bus	Diesel vehicle	37.3L	47.4	13.2	12.6	610.8
	EV	120kWh	14.7	7.2	1.4	475.2
	Energy conservation and emission reduction benefits	/	69.0%	45.5%	88.9%	22.2%

***Full life circle in this calculation includes fuel consumption cycle and does not contain cycle of vehicles scrapped or disintegrated**

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Beijing values NEV development, considers pollution emission reduction, and takes battery electric vehicles (BEV) as its technical development route

- **Vehicle scale:** BEV population in Beijing totals 204,000, higher than NEVs in Japan (190,000, ranking the third in the world)
  - 154,000 are for private use
  - 31,000 are in transportation sector, such as public transit, taxi, freight transport and renting.
- **Infrastructure scale:** Until now, 133,000 charging piles have been built and put into operation.
  - 96,000 are for private use , with the proportion of self-owned pile quantity being 70%;
  - 20,000 charging piles in nearly 2,000 stations have been built for public use, forming a public charging network with an average service radius of 5km within the 6th Ring Road.
  - About 17,000 charging piles in nearly 1,900 charging/battery swap stations have been built for dedicated public services.

District	NEV scale （%）	Charging facilities（%）
Haidian district	22.0%	10.9%
Chaoyang district	14.1%	17.4%
Dongcheng district	12.7%	2.2%
Xicheng district	8.7%	3.5%
Daxing district	8.3%	14.7%
Fengtai district	8.1%	10.7%
Tongzhou district	5.9%	7.7%
Changping district	5.7%	6.3%
Shunyi district	3.0%	4.4%
Shijingshan district	2.5%	3.4%
Huairou district	2.4%	3.5%
Fangshan district	2.3%	5.1%
Miyun district	1.3%	3.0%
Pinggu district	1.2%	3.7%
Mentougou district	0.9%	1.5%
Yanqing district	0.8%	2.1%

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II. Experience

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Organization mechanism: In 2009 Beijing established the Joint Committee on New Energy Vehicle led by municipal leaders and supported by relevant government departments to advance the work in various aspects such as policies, planning, investment, construction, and operation.

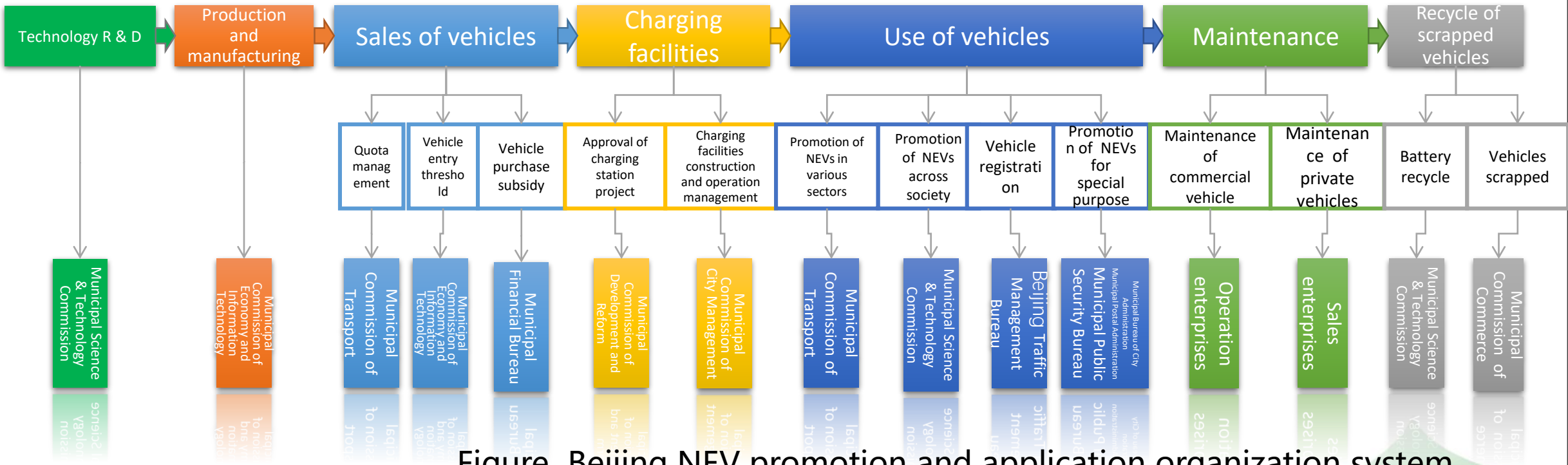

Figure Beijing NEV promotion and application organization system

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Policy System: Under the unified deployment of the Joint Committee, Beijing successively unveiled **24 policies**, including economic policies such as local purchase subsidy and public transportation operation subsidy, and traffic demand management policies such as "no traffic restriction" and quota allocation by application time, to encourage the use of NEVs.

01

Macro-policies

In 2018, Beijing Municipal Science & Technology Commission formulated Beijing Action Plan on Promotion and Application of Smart NEVs (2018-2020).

In Feb. 2018, Beijing Municipal Science & Technology Commission issued Measures for the Administration of Promotion and Application of NEVs in Beijing.

Strategic Planning

02

Purchase

In June 2018, Beijing Finance Bureau and another two municipal bureaus and commissions published Notice on Adjusting and Improving Beijing's Financial Subsidy Policies for Promotion and Application of NEVs.

Encouraging Promotion

In July 2018, the DRC of Shunyi District issued 2018 Detailed Rules for Implementation of NEV Replacement Subsidy in Shunyi District.

Encouraging Replacement

03

Infrastructure

In July 2018, the DRC of Shunyi District issued 2018 Detailed Rules for Implementation of Public EV Charging Facility Subsidies in Shunyi District.

Encouraging Construction

In 2018, Beijing's DRC released Interim Provisions of Beijing Municipal Development and Reform Commission on Government Investment Management.

Improving Use Rate

In Oct. 2018, Beijing Municipal Commission of City Management published Detailed Rules for Implementation of Assessment and Reward for Beijing's Public EV Charging Facility Operation (2018-2019).

04

Use (in service)

In Jan. 2018, Beijing Municipal Commission of Transport published the detailed rules of Interim Provisions on Quantity Control for Small Passenger Cars in Beijing (2018 Revision), **Quota Allocation by Application Time**

In March 2018, Beijing Municipal Government released Notice on Implementation of Area-based Traffic Management Measures during Weekday Peak Hours, **No Traffic Restriction**

Encouraging Use

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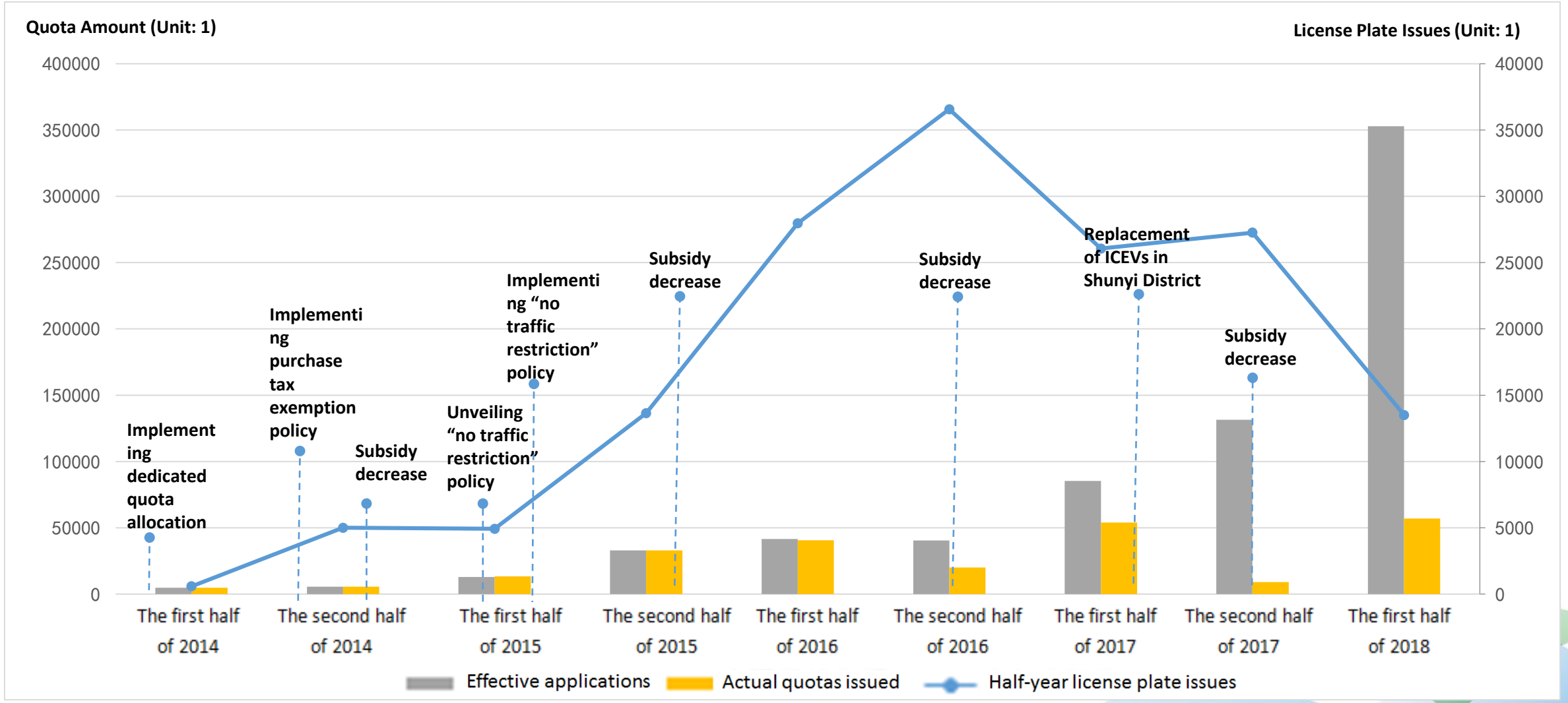
Strongly influenced by policies, typical ones including subsidy, dedicated quota allocation and “no traffic restriction”



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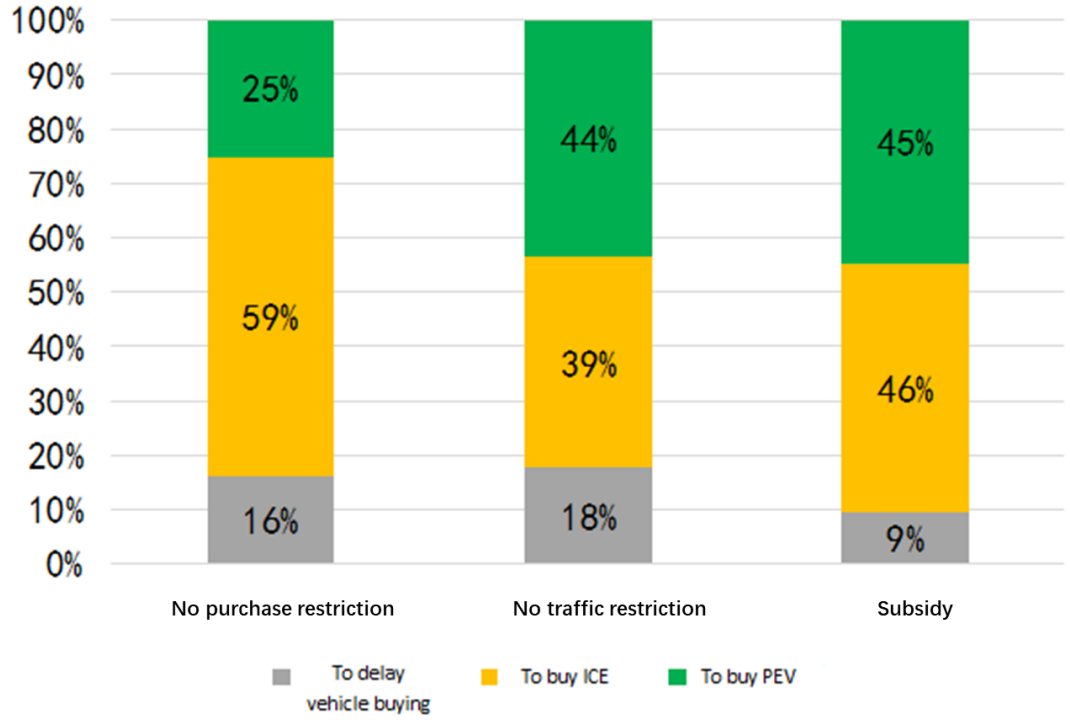
The above policies have worked in advancing vehicle technologies, improving charging conditions and boosting consumer acceptance.

- Presently, the range for major NEVs in the market has increased from 150km in 2015 to 400km. The vehicle models reached as high as 61, accounting for 21% of the total.
- By the end of 2017, Beijing accumulatively established nearly 115,200 charging piles. The proportion of self-owned charging piles rose from 46% in 2015 to 74% in 2017; around 188,00 charging piles are for public use, forming a public charging network with an average service radius of 5km within the 6th Ring Road.
- Despite subsidy cancellation, the environment improvement still prompts a certain proportion of consumers to purchase NEVs.



The consumers' selection of purchasing vehicles after cancellation of certain policies

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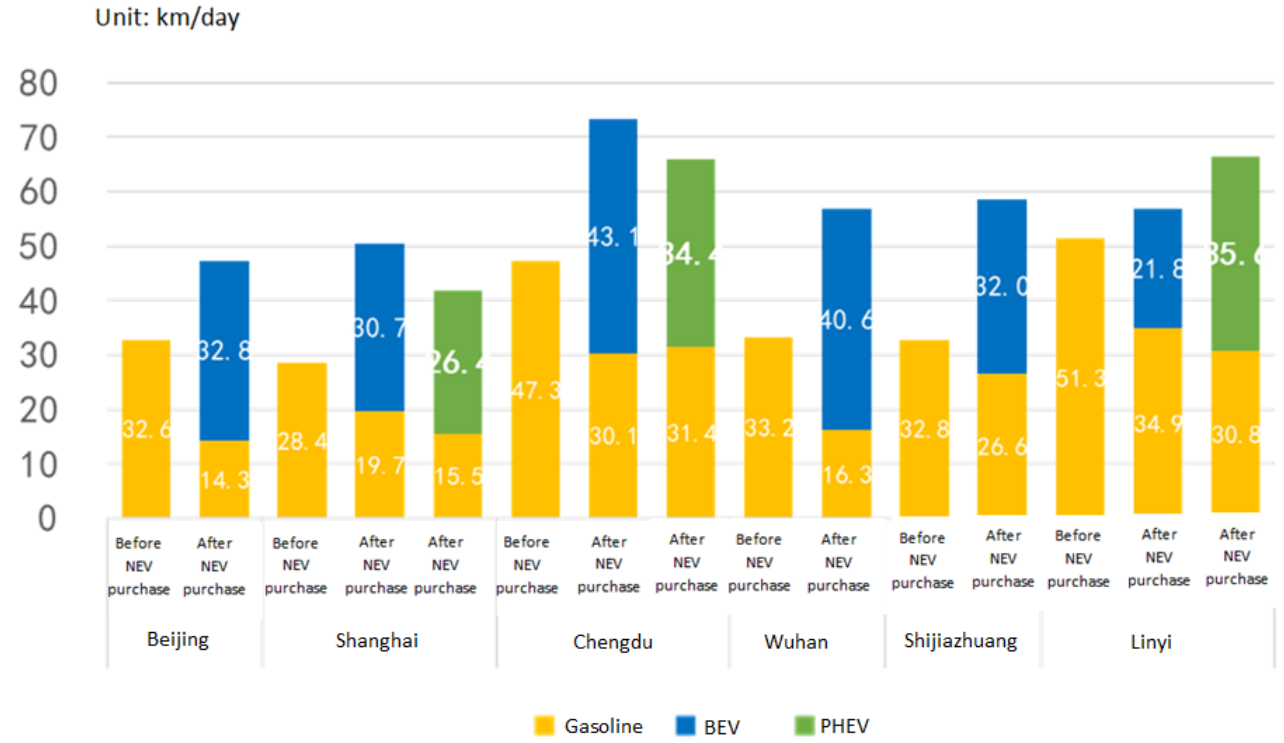
NEVs can basically satisfy the daily travel demands, having a significant effect on replacing the gasoline automobiles

- **NEVs can basically satisfy the daily travel demands.**

In 2017, the average daily travel distance of NEVs (38.1km/day) is prominently more than that of gasoline automobiles(33.9km/day).

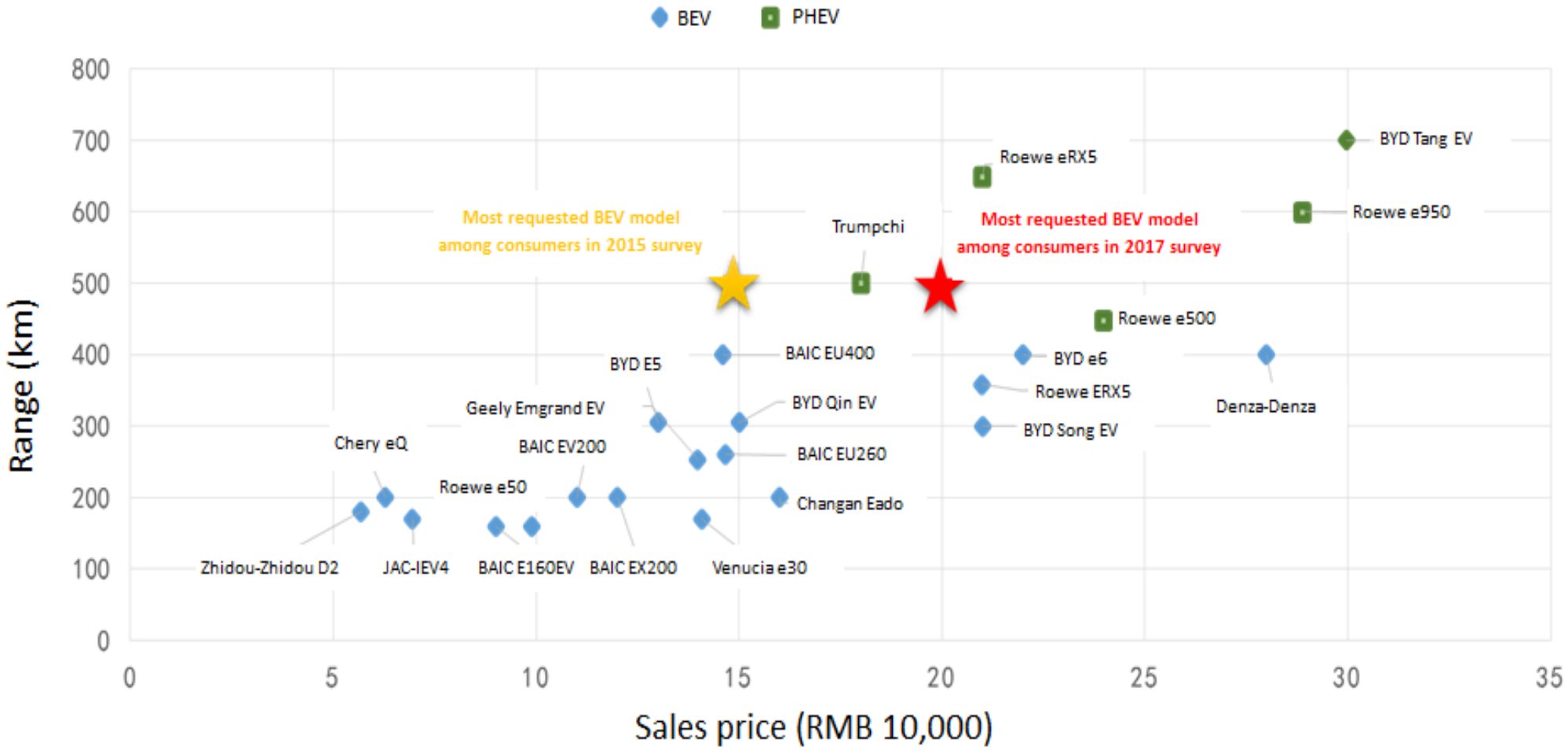
- **NEVs have a significant effect on ICEVs.**

For those families who select NEVs as their second vehicles, the NEV's travel distance is basically as much as that of gasoline automobiles before they purchase NEVs. In these families, the travel distance of gasoline automobile decreased 44.2% and the NEVs become their first choice.



II. Experience

- **Vehicles able to travel 500km through a 30-min charge are still the most expected model for consumers while the consumers become more rational in price expectation.**



Vehicle technologies and charging facilities are still the key factors for NEV development

- **Vehicle technologies:** Heavy-duty and long-distance transport requires NEV technologies of multi-energy mix and the technology improvement fitting the use case scenarios.
- **Electricity resources:** Supply of power resources is a major bottleneck for great leaps in EV. At present, Beijing totally has 120,00 communities. The charging pile establishment rate is only 1% to 2%, while the power load has reached 40% to 80%. Calculated with 38% EVs by 2035, the demands for electricity capacity expansion will be 12% to 24% on average. There are great differences between communities and how to balance the capacity in specific regions becomes a difficult issue.

Community type	Community amount (number)	Status quo of residential communities				Prediction by 2035		
		Maximum residential electricity consumption load(KW)	Household electricity consumption load (KW)	Charging facilities load (KW)	Surplus electricity capacity (KW)	Predicted charging facilities load by 2035 (KW)	Demand for electricity capacity expansion (KW)	Ratio of electricity capacity expansion
Old-fashioned community	289	1842	1384	53	405	707	437	24%
Ordinary community	9080	11830	4009	557	7264	7427	2584	22%
High-voltage self-managed community	1695	2348	1616	53	715	707	437	24%

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III. Outlook

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China's Policy Signals Create More Favorable Environment for NEV Development

- **Dual credits policy:** The new policy pegs the credits to the sales volume of both NEVs and traditional vehicles in order to encourage traditional vehicle manufacturers to innovate. The NEV sales volume is estimated to reach 2 million by 2020. The policy is a clear signal and long-term sustainable mechanism to drive China's NEV development.
- **Research of more stringent control on total motor vehicle population:** Against the backdrop of urban air pollution control, motor vehicle management will proceed based on integrated pollution and congestion prevention, with a shift to NEVs.
- **Research of deadline for fuel-powered vehicle sales prohibition:** Government officials and council staff of some countries have announced on many occasions plans to prohibit sales of internal combustion engine vehicles (ICEVs). China is now researching how to ban sales of ICEVs, with auto makers like Chang'an and BAIC already setting specific plans.

Progress in ban on internal combustion engine vehicle sales in 6 typical countries

Country	Way of release	Content of policy	Definition of sales prohibition
Norway	National Transport Plan (2018-2029) revised by the Norwegian government in June 2017	To realize zero emission or 100% use of biofuels in transportation (covering maritime, land and air) by 2050	Use prohibited
Netherlands	Four-party coalition agreement by the new Dutch cabinet in Oct. 2017	To allow only zero-emission vehicles(zero-carbon-emission automobiles) to be sold from 2030 on;	Purchase prohibited
France	Climate Plan released by the Ministry for the Ecological and Solidarity Transition in July 2017	The government will initiatively propose Euro 7 standard in the EU and end sales of vehicles emitting greenhouse gases by 2040	Sale prohibited
UK	The UK Plan for Reducing Roadside NOx Emissions issued by the Ministries of Environment, Food & Rural Affairs and Transport in July 2017	Sales of all new conventional diesel and petrol cars (including passenger cars and light-duty commercial vehicles) will be banned by 2040; by 2050, the aim is to realize zero emission for all in-use passenger cars or LDCVs	Sale and use prohibited
Germany	A proposal passed by Bundesrat in 2016	To remove ICEVs from the road by 2030 (Just a proposal, not a law)	Use prohibited
India	2017 India Annual Industrial Conference held in New Delhi by the Minister of Coal Goyal in 2017	India will vigorously promote EVs and be self-sufficient in EV. The ultimate goal is to no longer sell vehicles using petrol or diesel by 2030. (No official document and plan)	Sale prohibited

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Now

5.91 million units

0.60 million units

80%

Future

Blue Sky Protection Battle

0.40 million

Vehicle Technology

Charging Facilities

Power Structure

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