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## Briefing: China-U.S. ZEV Policy Lab

# UC Davis – CATARC China-U.S. ZEV Policy Lab

with backing from NDRC and CARB

September 6, 2014; Tianjin, China



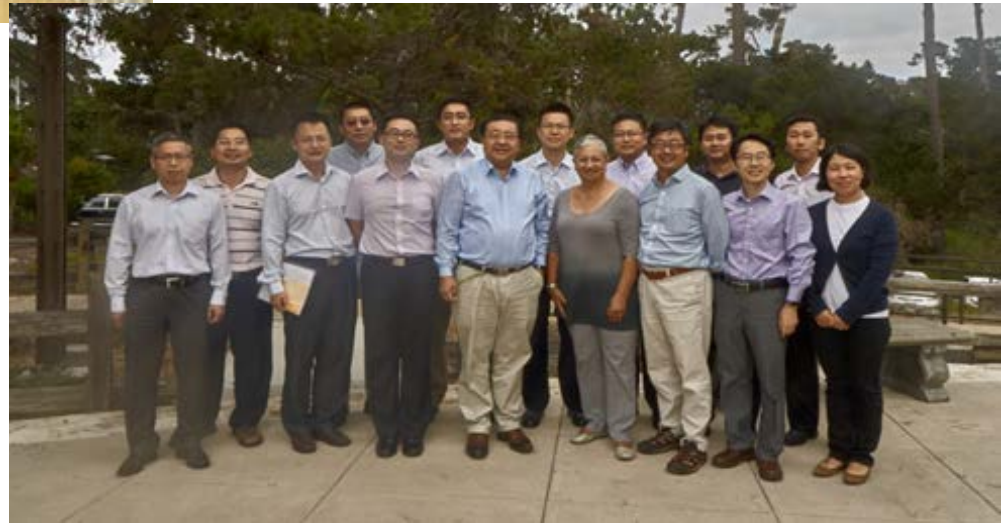


*Inaugural Board of Advisors meeting  
in Beijing, June 8, 2015*

*Board Members:*

Jaguar-LandRover, BMW, Daimler,  
Ford, Honda, Toyota, Nissan,  
ClimateWorks, Energy Foundation

*Asilomar China ZEV Policy Workshop  
with multi-ministry gov't officials  
Aug. 20, 2015*





Unique platform for stakeholder participation  
& informed discussions with gov't officials  
(NDRC, MOF, MIIT, CATARC)



August 20, 2015 Asilomar  
Workshop – intense discussion  
and information exchange



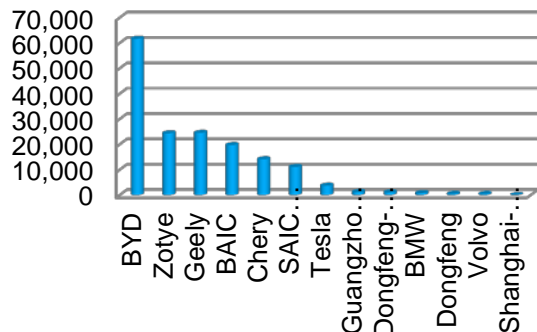


In 2015 PEV sales soared in China (331,092, **up** by 343%) while slightly declined in the U.S. (115,262, **down** by 6.4%)

US PEV Sales	2014	2015	15/14
BEVs	67,851	72,303	6.6%
PHEVs	55,357	42,959	-22.4%
Total PEVs	123,208	115,262	-6.4%
BEVs/PEVs	55.1%	62.7%	5.8%
California PEV Sales		62,166	
Total Auto Sales	16,435,226	17,386,331	
PEVs as % of Auto Sales	0.75%	0.66%	

China PEV Sales	2014	2015	15/14
Total BEVs	45,048	247,482	449.4%
Total PHEVs	29,715	83,610	181.4%
Total PEVs	74,763	331,092	342.9%
Total Auto Sales	23,497,898	24,597,600	4.7%
PEVs as % of Auto Sales	0.32%	1.35%	
Among the total PEVs, 63% are Passenger PEVs		as % of total P-PEVs	
BEV Passengers		146,719	70.7%
PHEV Passengers		60,663	29.3%
Total PEV Passengers		207,382	
Shanghai-Beijing PEV Sales	2014	2015	Passenger Cars (est.)
Shanghai	10,644	44,247	41,526
Beijing (Only BEVs are supported)	8,050	23,500	22,560

# Chinese PEV makers grow fast, but many are micro-EV makers



## The Micro e-Cars:

- Slow speed: 80 km/hr;
- Cheap: Less than \$7,700;
- 5 micro EV companies sold **75 percent** of the total BEVs in China

## 2015 Passenger PEV Sales in China

Company	Total Sales
BYD	61,722
Zotye	24,408
Geely	24,557
BAIC	19,744
Chery	14,147
SAIC (Shanghai Auto)	11,123
Tesla	3,735
Guangzhou Auto Co	1,266
Dongfeng-Nissan	1,127
BMW	801
Dongfeng	511
Volvo	470
Shanghai-GM	68
Source: CPCA	

## 2015 Passenger PEV Sales in the World by Model

PI	WORLD	Dec.	YTD	%	'14PI
1	Tesla Model S	8.296	51.390	9	3
2	Nissan Leaf	3.418	43.651	8	1
3	Mitsubishi Outlander PHEV	7.058	43.259	8	2
4	BYD Qin	1.512	31.898	6	7
5	BMW i3	3.409	24.083	4	6
6	Kandi K11 Panda EV	4.701	20.390	4	26
7	Renault Zoe	3.158	18.846	3	9
8	BYD Tang	5.503	18.375	3	N/A
9	Chevrolet Volt (1)	2.398	17.508	3	4
10	Volkswagen Golf GTE	3.191	17.282	3	33
11	BAIC E-Series EV	1.696	16.488	3	16
12	Zotye Z100 / Cloud EV	2.582	15.467	3	N/A
13	Volkswagen e-Golf	1.286	15.356	3	21
14	Audi A3 e-Tron	1.578	11.962	2	37
15	Roewe 550 PHEV	1.611	10.711	2	34
16	JAC i EV	1.581	10.420	2	35
17	Ford Fusion Energi	1.067	9.894	2	9
18	Ford C-Max Energi	1.127	9.643	2	11
19	Kandi K10 EV e)	1.000	7.665	1	10
20	Chery eQ	1.868	7.262	1	39
TOTAL		86.414	549.414		

## Best sellers of December 2015, ZD (two-seat) and Kandi Panda, are microcars





# Why did the Chinese PEV Market take off in 2014 and 2015?

## 1. Monetary Incentives

- Huge subsidies: USD 8.4 billion in 2015 by the Central Gov. vs USD 865 million or less by Washington (about **10 times**)
  - Local governments' subsidies could match or double that amount as shown in Shanghai and Beijing
  - 84 percent of the USD 8.4 Billion are for commercial vehicles
- Exemption of the 10 percent purchasing price of PEVs
- Subsidies to install chargers at home





# 2013-2020 Government Subsidies

Local governments usually match or near-match central government subsidies)

2013-2020 Subsidies Table For Passenger Vehicles									
unit: Yuan 1'0,000									
车型类别	Range (km)	2013	2014	2015	2016	2017	2018	2019	2020
BEV	2013-2015 年 (80≤R<150)	3.5	3.325	3.15	—	—	—	—	—
	2016-2020 年 (100≤R<150)	—	—	—	2.5	2	2	1.5	1.5
	150≤R<250	5	4.75	4.5	4.5	3.6	3.6	2.7	2.7
	R≥250	6	5.7	5.4	5.5	4.4	4.4	3.3	3.3
PHEV	R≥50	3.5	3.325	3.15	3	2.4	2.4	1.8	1.8
FCEV	—	20	19	18	20	20	20	20	20

Subsidies on Buses in 2015		
Model/Type	Length of Bus (M)	Subsidies in Yuan 1'000/V
BEV Bus	6≤L<8	300
	8≤L<10	400
	L≥10	500
PHEV Bus	L≥10	250
Super Capacitor and Lithium Titaium BEV Bus		150

# Why did the Chinese PEV Market take off in 2014 and 2015?

## 2. Non-monetary Incentives

PEV buyers receive license plates without going through the auction in Shanghai or without going through the lottery system in Beijing, Shenzhen, etc.

(Beijing, Shanghai, Shenzhen almost accounted for 1/3 PEV sales in China)

- Driving privilege: PEVs can be on road 5/5 work-days, avoiding one-day restriction or odd-even day restriction during severe smog days in Beijing
- Parking and charging privilege
- Downtown congestion restriction/fee privilege (under discussion)



# Non-monetary Incentives:

Actual value of a license plate in Shanghai (Beijing & Shenzhen)  
could be much higher than the auctioned price

The Successful Auction Price of A License Plate for a Private Car in Shanghai					
2015	No. Lic. Plates	Bottom Price	Average Price	No. of Bidders	Success Rate
January	7,990	74,000	74,216	98,203	8.14%
February	7,653	76,500	76,618	103,224	7.41%
March	7,406	74,600	74,830	132,690	5.58%
April	8,288	80,600	80,759	152,298	5.44%
May	7,482	79,000	79,099	156,007	4.80%
June	7,441	80,000	80,020	172,205	4.32%
July	7,531	83,100	83,171	166,302	4.53%
August	7,454	82,600	82,642	166,939	4.47%
September	8,727	82,100	82,172	165,765	5.26%
October	7,763	85,300	85,424	170,995	4.54%
November	7,514	84,600	84,703	169,159	4.44%
December	7,698	84,500	84,572	179,133	4.30%
Average/Total	92,947	80,575	80,686	1,832,920	5.07%

## Regional PEV Sales in China

Ranks	Cities and Regions	2013 PEV Promotion Numbers	2014 PEV Promotion Numbers	2015 PEV Promotion Numbers	Total
1	Shanghai	581	10,884	44,247	55,712
2	Shenzhen	1,931	3,668	28,762	34,361
3	Beijing	2,449	6,928	23,428	32,805
4	Jiangsu Province	439	7,482	18,768	26,689
5	Zhejiang Province	3,669	7,977	13,707	25,353
Total PEV Sales in China		17,599	74,763	331,092	

# Why did the Chinese PEV Market take off in 2014 and 2015?

## 3. Innovative Business Models and Others

- **Innovative business model in selling cars (Kandi Panda)** Since 2013, Kandi has sold 38,000 BEVs. 74 percent of those, or 28,000, of them were sold to its car-sharing and leasing company. In 2015, the Kandi EV Group has received RMB 364.6 million from the central government; 200 million bonus from Hangzhou City.
- **Innovative business model in building charging stations (Wanbang JV Charging Stations)** WanBang NEV was able to build 2015 charging poles in Changzhou City, 1268 in Shanghai, 685 Wuhu, 488 in Wuhan, 172 in Beijing, and 128 in Guangzhou, all in the first 11 months of 2015.
- **Car sharing/hourly leasing in Shanghai and Beijing**
- **Rapid infrastructure build-up**
  - Charging and Swap Stations: 3600. Public charging poles 49,000. 2016 Increase Target: 40,000 public charging poles with Yuan 13 billion investment
- **Large varieties of models to choose from**
  - 90 PEV companies with their products have received subsidies and 3409 models were available; the new 2016 list dwindles to 247 models.



# Kandi (Panda) Car Share and Hourly Leasing “Micro Transit” Center

Almost like a vending machine, where cars are being charged waiting for hourly renters



# Car-share Business at Shanghai Autozone: EVCARD

Currently 940 PEVs deployed



已投放车辆940台, 全部为纯电动车辆

已投放车型:



荣威E50

奇瑞EQ

之诺1E

即将投放车型:

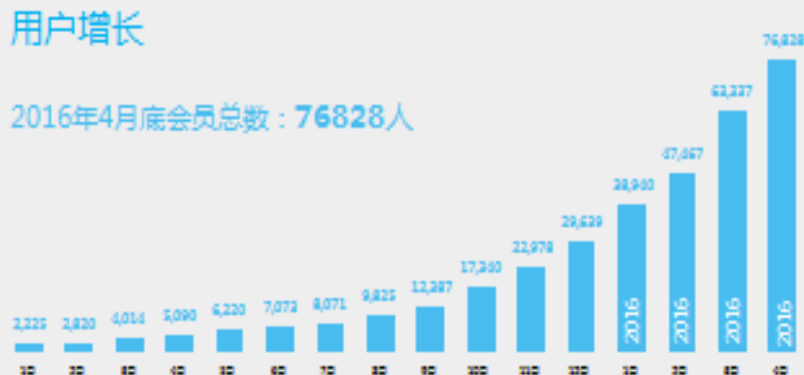


宝马i3, 东风风神

Monthly membership increase: April 2016, 76,828

用户增长

2016年4月底会员总数: 76828人



EVCARD is expected to expand nationwide. 2016: 20 cities, 5,000 PEVs; 2020: 100 cities and 50,000 PEVs.





# A Tale of Two Cities: Beijing and Shanghai

*A Precious Experiment in the History of the Motorized Society*

(Jointly 31 percent of the passenger PEV market)

- Shanghai started to restrict the volume of private vehicles through an auction system in 1994 (8/1000)
- 92,947 vehicles per year (2015) Winning Probability: 5.07%
- Current winning bid: ¥ 80,686+
- Total private vehicles in 2015: 1.41 million (2.72 million in total)
- Policy support value: BEVs and PHEVs (US\$28,615/\$24,993)
- 2015 target: 13,000
- 2015 PEVs sold: 44,247 (BEV: 10,845; PHEV: 29,752)
- Estimated PEV as % of the new car market: 15.6%
- Non-local PEVs: 73% (based on license plates registered)
- Total charging points: 21,700;
- Private charging points 16,500 or 3.38 PEV per Private
- Beijing only started to restrict the volume through a lottery system in 2011
- 120,000 per year (2015); Probability: 0.49%
- June 2015: No 4/5 work-day on-road restriction
- Total private vehicles in 2015: 4.07 million (5.37 million in total)
- Total parking space: 1.8 million
- Policy support value: BEV only (US\$ 28,719)
- 2015 target: 30,000
- 2015 PEVs sold: 23,500
- Estimated PEV as % of the new car market: 5.2%
- Non-local PEVs: 46% (based on license plates registered)
- Total charging points: 21,000
- Private charging points 16,000 or 3.29 PEV per Private

## Current Policy Landscape

- MIIT focuses on new Chinese CAFC standards—multipliers for ZEVs
- NDRC focuses on global climate change and ZEV Credits
- MOF focuses on reducing subsidies and supports NDRC's proposal
- DRC-EV100 focuses on industrial policy and makes everyone happy
- CATARC supports NDRC, but assists MIIT
- What will a final compromise look like?

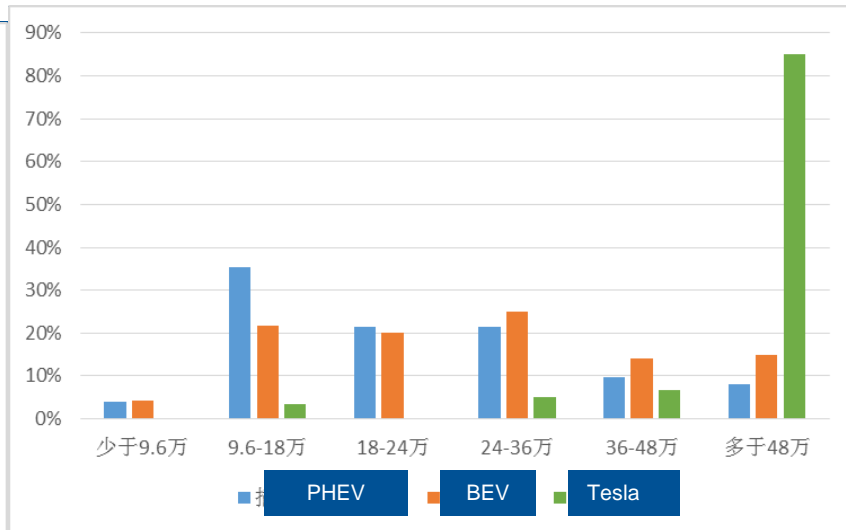
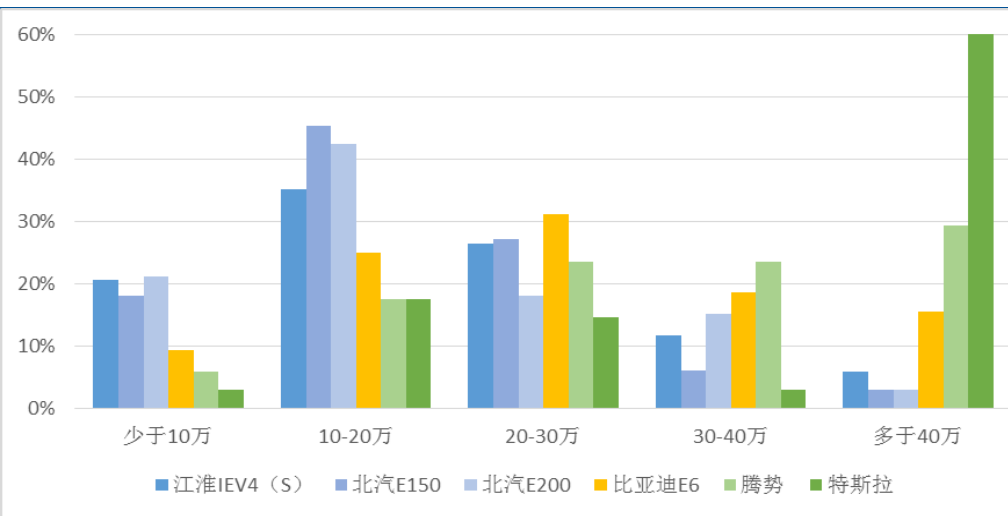


# Joint survey results of PEV users in Beijing (200) and Shanghai (302)

	PEV Drivers	Vehicles ( % )	2015 Market Ratio ( % ) *
<b>Beijing</b>			
BNEV 150	33	16.5	1.70
BNEV 200	33	16.5	44.22
BYD e6	32	16	7.23
JAC IEV4 ( S )	34	17	5.00
Tesla	34	17	3.18
Densa	34	17	3.64
<b>Total</b>	<b>200</b>	<b>100</b>	<b>64.97</b>
<b>Shanghai</b>			
<i>PHEV</i>	122	46.19	82.80
BYD Qin	60	18.39	52.93
Rowe 550	62	27.80	26.16
<i>BEV</i>	180	53.81	17.20
BNEV	60	24.22	5.12
Tesla	60	24.66	2.17
Rowe E50	60	4.93	0.78
<b>Total</b>	<b>302</b>	<b>100</b>	<b>87.16</b>

\*Source: CATARC

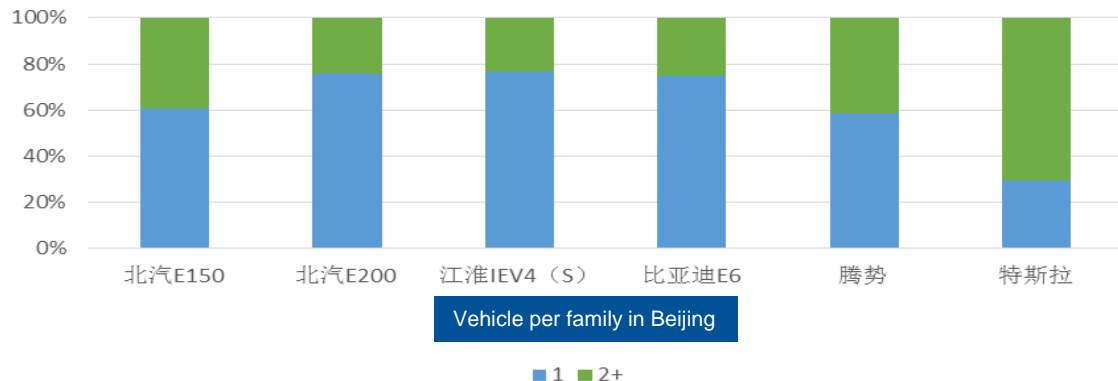
# Annual Family Income



Beijing: 62% Tesla and 29% Denza households report an annual income above 400,000 RMB; 20% of Beijing E150, E200, and JAC IEV4 households earn less than 100,000 RMB, 60% of them less than 200,000 RMB.

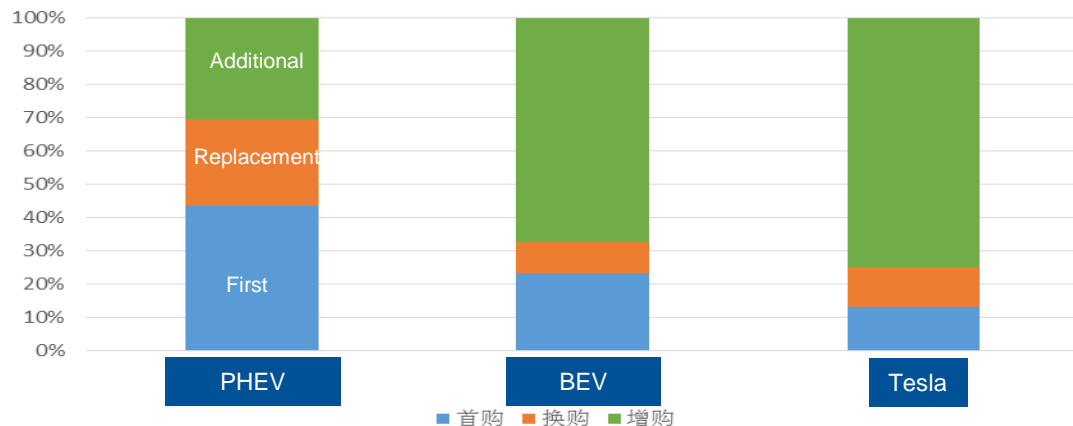
Shanghai: 60% PHEV households earn less than 240,000 RMB annually, more than BEV households 85% of Tesla households earn 480,000 RMB annually

# Number of Vehicles in the Family



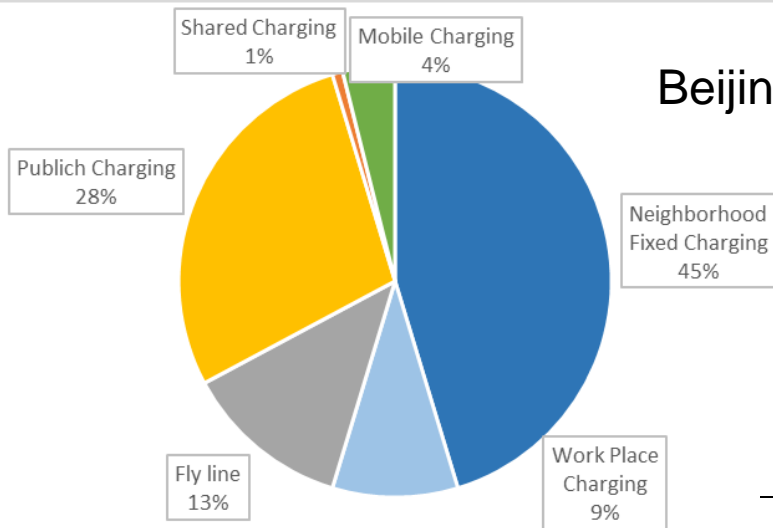
Beijing: 70.6% of the Tesla families have more than two cars, but less than 25% Beijing E200 and JAC IEV4(S) families have more than two cars ; more than 75% of Beijing E200 and JAC IEV4(S) families have only one vehicle, the first buyers.

Shanghai: 43.4% of the families own PHEVs as the first vehicle, higher than BEV families (23.3%) and Tesla families (13.3%); 67.7% BEV and 75.0% Tesla families own their BEVs as second or third vehicles.



# Places of Charging

## Beijing



## Shanghai

Main Charging Place	PHEV	BEV	Model S
Workplace Charging	37.70%	38.33%	8.33%
Fixed Home Charging Poles	80.33%	85.83%	73.33%
Other Charging Poles in the Neighborhood	1.64%	2.50%	0.00%
Shopping or Roadside Charging	2.46%	0.83%	1.67%
Public Charging (Fast)	4.92%	11.67%	48.33%
Public Charging (Slow)	2.46%	4.17%	1.67%





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