EV ZONE
SHANGHAI · CHINA

Status of Shanghai International EV Demonstration Zone

2012-08-23

中国(上海)电动汽车国际示范城市
China (Shanghai) Electric Vehicles International Pilot City

EVZONE DEVELOPMENT REVIEW

- EVZONE Development Review
- Analysis of Questionnaire
- Next Steps

CHINA REVIEW

	Hybrid City Bus	9148
Public Service Area	Hybrid Passenger Vehicle	3492
	Pure Electric City Bus (include FCV and Plug-in)	1537
	Pure Electric Vehicle Passenger Cars (include FCV and Plug-in)	2657
	Sub Total	16834
Private Purchase	BEV and PEV Passenger Cars	2325
Total		19159

"Ten City One Thousand Vehicle" Energy Saving and New Energy Vehicle demonstration 2009.1 First group

"Ten City One Thousand Vehicle" Energy Saving and New Energy Vehicle demonstration 2010.5 Second group

New Energy Vehicle Private Purchase demonstration program

EV International Demonstration Zone

EV-ZONE Development Review

2011

January: The Department of Energy of the US-The Ministry of Science and Technology of China Signed <Memorandum Of Understanding Shanghai-Los Angeles Cooperation on Electric Vehicle Initiative>

April: First 10 private electric vehicles on road in china, established Shanghai EV Partnership

May: China's first Test Drive/Ride Center opened and official website online

August: GM-EVZONE Signed Cooperation Agreement

November: Volvo-EVZONE Signed Cooperation Agreement,2 C30 EV hand over To Demonstrate. China's First Multi Brand EV Dealer Shop Opened.

2012

January: 1 Volt from GM Hand over to Demonstrate

February: SAIC-EVZONE Signed Cooperation Agreement, By The End of This Year 200 Roewe E50 Will on Road

April: CODA-EVZONE Signed Cooperation Agreement, 2 CODA Hand Over to Demonstrate.

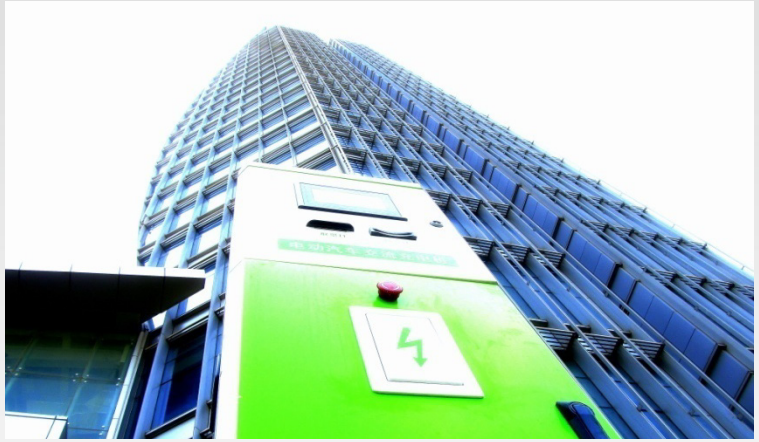
May: TOYOTA-EVZONE Signed Cooperation Agreement,1 Plug in Hybrid Prius Hand Over to Demonstrate

August: NISSAN 1 Leaf EV Hand Over to Demonstrate;15 VOLVO C30 Arrived Shanghai.

EV-ZONE Development Review

INFRASTRUCTURE

- AC Poles:98
- DC Poles: 5(4 From ABB,1 From State Grid)
- Battery Swapping Station: 1
- Hydrogen Station:1
- Charging/Swapping/Energy Storage Station 1(By the end of 2013.June)
- Hydrogen Supply/Battery Charging Station:1(By the end of 2013)



EV-ZONE Development Review

Demonstrate Vehicles

- Sold Passenger Vehicles: 25

Chery	5	ZKLF	4
ZOTYE	14	BYD F 3 DM	2

- Reserved Passenger Vehicles:

ROEWE	63	ZOTYE	24

- Test Drive & Test Ride Vehicles:26

Chevrolet	1	
Volvo C 3 0	1 5	
C O D A	2	
TOYOTA	1	
NISSAN Leaf	1	
Chery	1	
ZKLF	1	
BYD F 3 DM	1	
ZOTYE	1	
Haima	2	

ANALYSE OF QUESTIONNAIRE

- EVZONE Development Review
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Test Drive & Test Ride Basic Information

Test Drive & Test Ride Basic Information

- Answer Sheet Collect Period 2011.10-2012.6
- Number Of Visitor 35745
- Number of Test Drivers and Test Riders 14137
- Total Answer Sheet to Analyze 2285

B. Test-drive evaluation

1. The electric vehicle you test drive: A. BYD B. UCAS C. Chery D. Roewe E. Zhongtai E. others (please fill in)_____
2. According to your test-drive experience, how do you feel about electric vehicle compare to traditional vehicles:
   A. much better than traditional vehicle B. a little bit better C. same D. worse than traditional vehicle
3. Please tick according to your driving experience about electric vehicle compare to traditional vehicles:
   (5 means "very good"; 4 means "good"; 3 means "ordinary"; 2 means "poor"; 1 means "very poor")

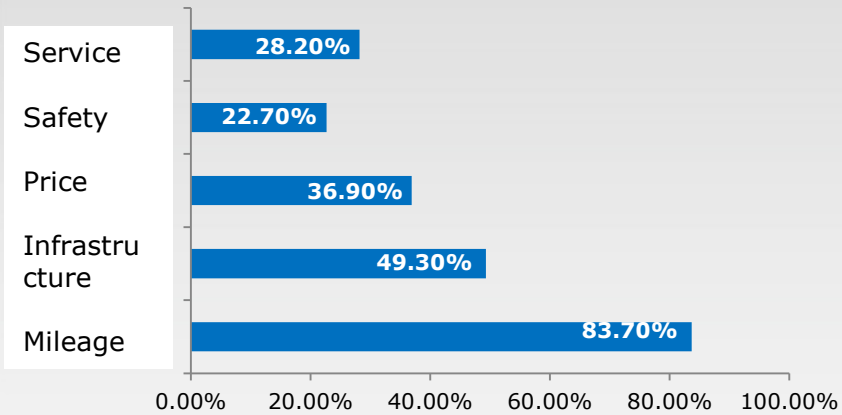
Performance index	A. BYD/ B.UCAS/C. Chery/D. Roewe/E. Zhongtai	A. BYD/ B.UCAS/C. Chery/D. Roewe/E. Zhongtai	A. BYD/ B.UCAS/C. Chery/D. Roewe/E. Zhongtai
Exterior size	5 4 3 2 1	5 4 3 2 1	5 4 3 2 1
Interior and spatial arrangement	5 4 3 2 1	5 4 3 2 1	5 4 3 2 1
Controllability of joystick key	5 4 3 2 1	5 4 3 2 1	5 4 3 2 1
Drive/Ride comfortbility	5 4 3 2 1	5 4 3 2 1	5 4 3 2 1
Air condition	5 4 3 2 1	5 4 3 2 1	5 4 3 2 1
Sharpness of the panel	5 4 3 2 1	5 4 3 2 1	5 4 3 2 1
Noise	5 4 3 2 1	5 4 3 2 1	5 4 3 2 1
Turning	5 4 3 2 1	5 4 3 2 1	5 4 3 2 1
Engine start accelerate	5 4 3 2 1	5 4 3 2 1	5 4 3 2 1
Midway accelerate	5 4 3 2 1	5 4 3 2 1	5 4 3 2 1

Mobile_____ Mail_____ Questionnaire no._____

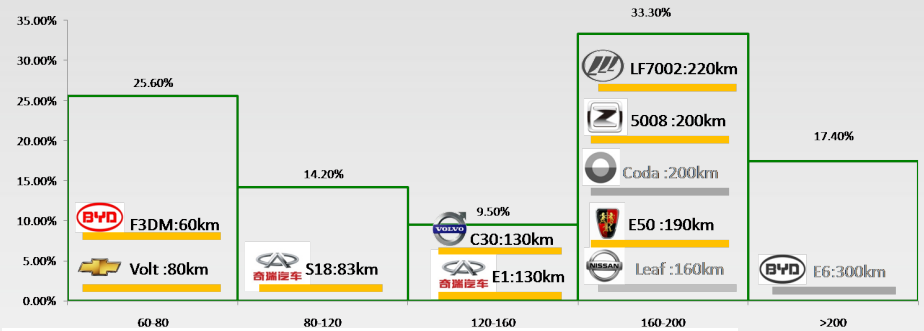
A. Personal information

1. Sex: A. female B. male
2. Age: A. below 20 B. 21-30 C. 31-40 D. 41-60 E. above 61
3. Annual income: A. below 50 thousand B. 50-100 thousand C. 110-200 thousand D. 210-300 thousand E. above 310 thousand
4. Educational background: A. high school or below B. bachelor C. master or above D. others
5. Industry you work in: A. government B. public institution C. any association D. state-own enterprise/peasant business E. foreign company F. others_____
6. Your position: A. normal employee B. front line manager C. mid-level manager D. high-level manager
7. Place of residence: A. shanghai _____ district B. other province (please fill-in)_____
8. Driving age: A. below 1 year B. 1-2 years C. 3-5 years D. 6-8 years E. above 9 years
9. No. of vehicle now you owned: A. 0 B. 1 C. 2 and above
10. Vehicle you owned: vehicle type 1_____2_____ displacement 1_____2_____
11. Have you ever drive electric vehicle: A. never B. have drive, (please fill-in) brand and type 1_____2_____
12. Main method your going out: A. by walk B. non-motor or cycle C. public transport D. by car
13. The average distance you drive to work everyday: A. within 10 kilometers B. 11-20 kilometers C. 21-30 kilometers D. above 30 kilometers

Test Drivers Concern and Expected Mileage



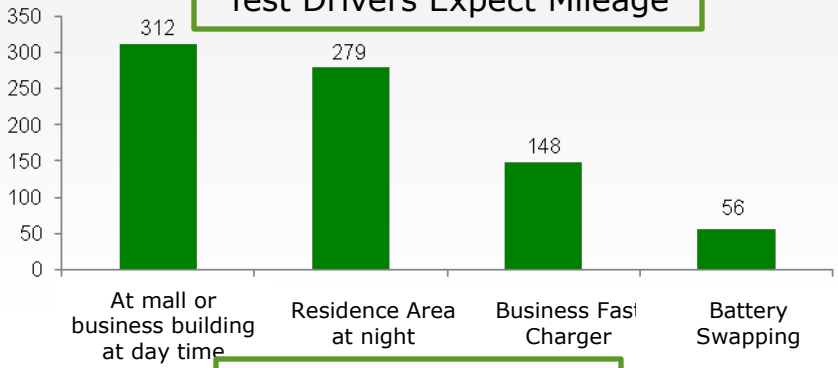
Test Drivers Concern



Note: Mileage calculation according to the official theory, mileage of plug-in hybrids is determined by the driving distance on pure electric mode
The mileage of some stereotypes models is based on the model in test drive center
The yellow label for test drive cars, gray label for models not in test drive center

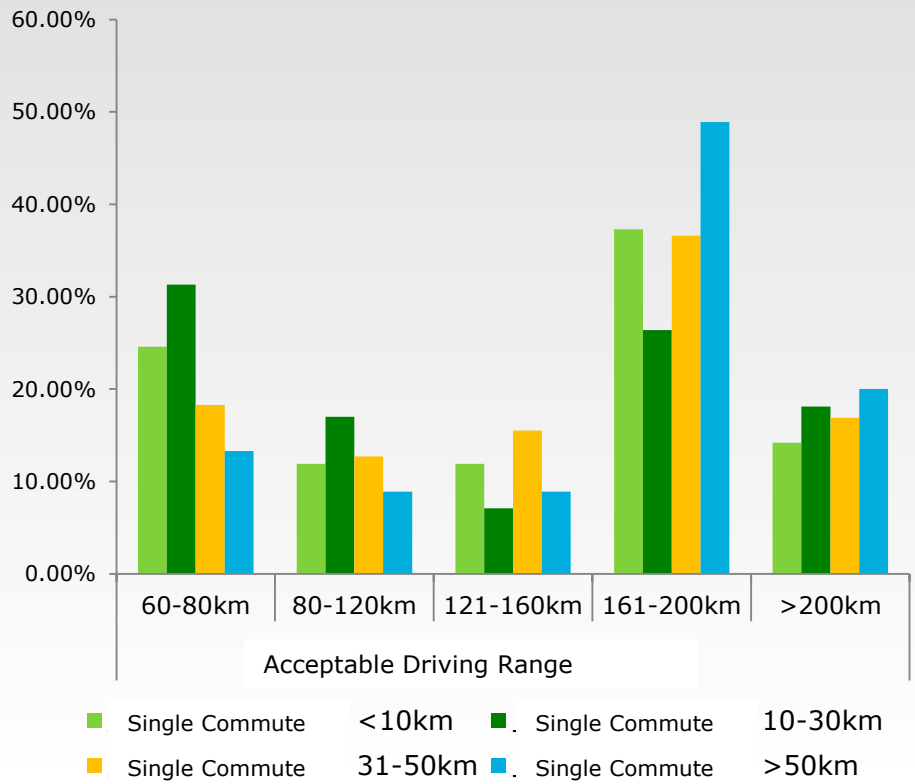
Test Drivers Expect Mileage

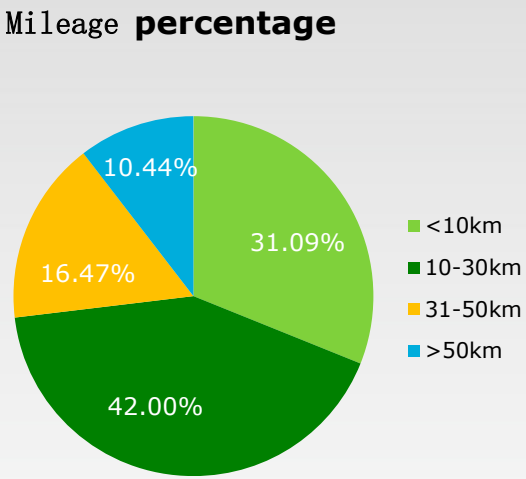
- Most People Worry About mileage and Infrastructure. Then, Price.
- 33%Test Drives Expect the Mileage 160-200KMs,25% Expect 60-80Kms
- People Prefer Charging at Daytime in Company. Night time at Residential area.



Charging Preference

Test Drivers Acceptable Mileage And Real Daily Drive Mileage





- 73% Of Test Drivers Daily Mileage no more than 30KMs. Similar to Shanghai Daily Average Mileage 39KMs
- However, more than 40% People Think The Daily Average Mileage 160-200Kms is Acceptable.

Test Drivers knowledge Affect Purchase intention

Logistic analysis with the degree of EV knowledge as independent variables and intention of purchase intention as dependent：

The Less knowing EV, The more willing to buy EV And People who willing to buy a car in 3 years, more like to buy an EV

=Hosmer和Lamershow检验=

步骤	卡方	Df	Sig.
1	0.000	2	1.000
	4.772	6	0.573

In the logistic regression equation model testing, the second step test Sig = 0.573> 0.1, good fit

Logistic：Y（Buy EV）=−0.589* X1（Less Knowing）–1.401 * X2（buying EV in 1 years）–1.350* X3（ buying EV in 2 years ）–1.912 * X4（ buying EV in 2 years ）+1.341

Logistic analysis with the Personal information as independent variables and intention of purchase intention as dependent：

People who don’t have a car, more like not to buy an EV

=Hosmer 和 Lamershow 检验=

步骤	卡方	df	Sig.
1	0.000	1	1.000

在 logistic 回归方程模型检验中，Sig=1.000>0.1，说明模型的拟合度高。

回归方程中的变量

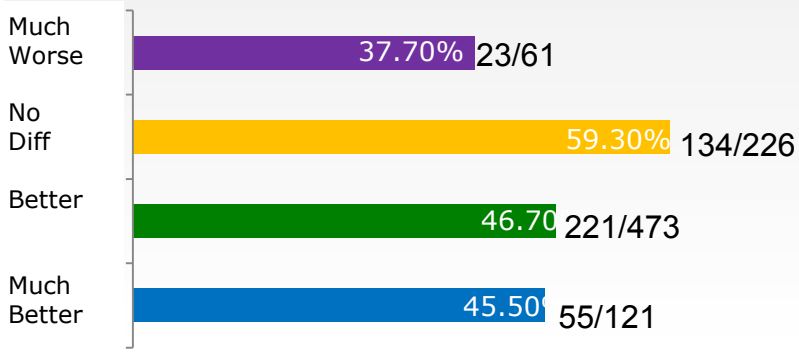
	B	S.E	Wals	df	Sig.	Exp (B)
拥有汽车			17.221	2	.000	
拥有汽车(1)	.805	.244	10.927	1	.001	2.237
拥有汽车(2)	.193	.219	.776	1	.378	1.213
常量	-.299	.201	2.211	1	.137	.741

Logistic回归方程：Y（购买电动车）=0.805*X1（拥有0量小汽车）—0.299

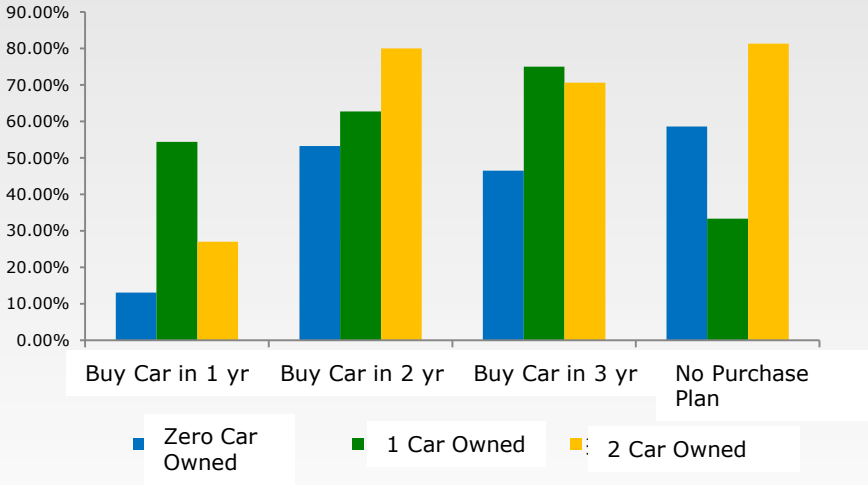
Test Drivers knowledge Affect Purchase intention

Logistic analysis with experience evaluation as independent variables and purchase intention as dependent :

Test Drivers would like to buy EV if they feel the EV is same as normal Vehicles.



EV acceptance vs. No. of vehicles owned and Plan to EV purchase



Among the Test Drivers with intention to Buy EV, the percentage of drivers who plan to buy after one year is higher

EV Performance Affect Purchase Intention

Logistic analysis with EV Performance indicator, outside size, interior layout and space, push button, controllability, comfortable, air-conditioning effect, whether the instrument panel is clear and easy to understand, low noise, flexible steering, and acceleration at start stage as independent variables and EV purchase intention as dependent variable, the result:

=Hosmer 和 Lamershow 检验=

步骤	卡方	df	Sig.
1	3.121	1	.077

在logistic回归方程模型检验中，Hosmer和Lameshow检验Sig=.077接近0.1,模型拟合良好。

方程中的变量

		B	S.E.	Wals	df	Sig.	Exp (B)
步骤 1[a]	仪表盘	-.156	.079	3.871	1	.049	.855
	常量	.499	.322	2.400	1	.121	1.647

Logistic回归方程：

Y（购买电动车）=-0.156* X1（仪表盘清晰易懂）+0.499

Only the factor, whether the instrument panel is clear and easy to understand, has significant impact on consumer purchase intention

Logistic analysis with test drivers' gender, age, annual income, education level, occupation, driving experience, car ownership, EV experience, trave mode, and driving range as independent variables and EV purchase intention as dependent variable, the result:

不在方程中的变量

			得分	df	Sig.
步骤 0	变量	性别(1)	.536	1	.464
		年龄	5.115	4	.276
		年收入	4.888	4	.299
		学历	1.972	3	.578
		单位	5.036	5	.411
		职位	5.212	3	.157
		驾龄	2.407	3	.492
		驾驶电动车(1)	1.914	1	.167
		出行方式	6.677	4	.154
		驾驶单程	6.429	3	.093
	总统计量		44.581	34	.106

None of the factors above has significant impact on consumer purchase intention

Introduce Of On Road EV Data Collect

Basic Situation

- Time: 2011.10-2012.2
- Mileage: 90362km
- Project Standard: Agreement between China-US
- Transmission channel: 2.5G/3G
- Transmission frequency: 1/2S

Model in Operation

奇瑞汽车 S18

5008

LF7002EV

Notes

To ensure the visual effects and the accuracy of the data: only the data from ZOTYE EV, whose data is with better quality and relatively stable, are used to illustrate this.

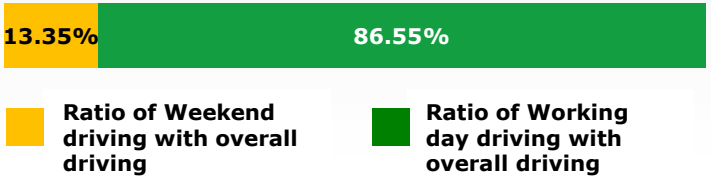
	Data
Vehicle Data	Vehicle ID
	Date/Time Stamp
	Event type (key on / key off)
	Odometer
	GPS (longitude & latitude)
	Consumption of Liquid fuel
Charger data	Date/Time Stamp
	Charging Event Info（Location,ID,Type,etc）
	Battery state of charge
	Connect & Disconnect Times (plugged in & out)
	Start & End Charge Times
	Charging Voltage
	Charging Electric Current
	Total energy (kWh) per charging event
	Environment Temperature
	Battery Temperature
	Battery Ceiling Voltage (plugged in & out)
	Single Cell Min Voltage
	Max & average Instantaneous Peak Power
	Rolling 15 Minute Average Peak Power

Overall Situation of Driving Information

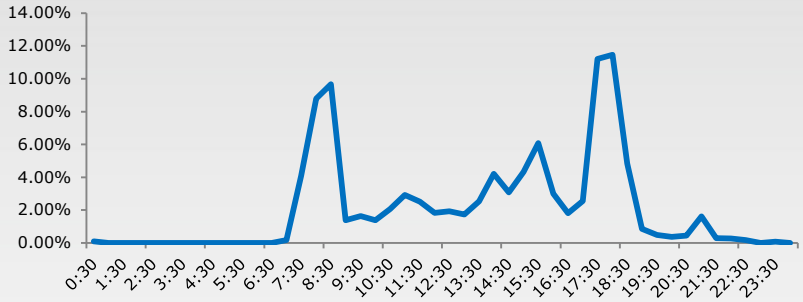
Overall Situation

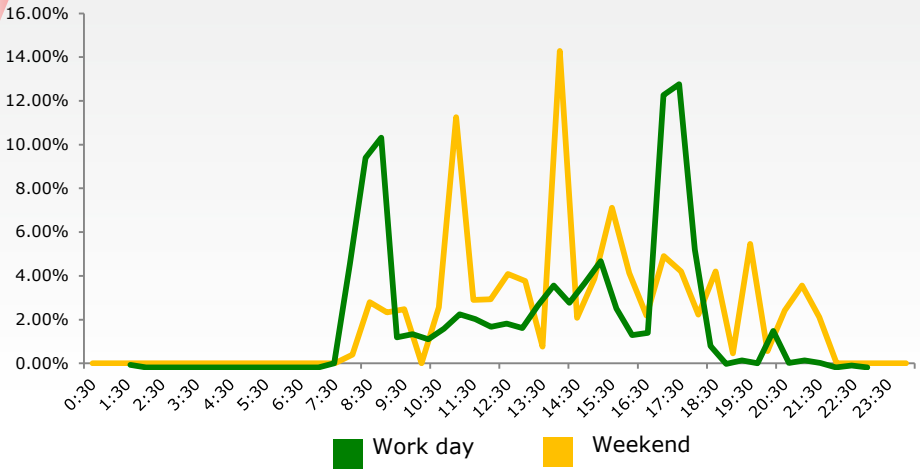
Frequency of driving	275
Total working days	109
Times of driving in working day	238
Density of driving in working day	2.2/day
Total Weekend	44
Times of driving in weekend	37
Density of driving in weekend	0.84/day

Ratio of driving in Weekend with Working day



EV mainly used as daily commuting





Charging socket failure

◆Domestic EV comes with a charging cable. Plug or unplug cause high temperature arcing and damage to the outlet.
◆Charging poles with credit card billing system has no such failure.
◆There is no such failure for international EV brand as there is a power switch on the cable. Pressing the switch is needed for unplug.

◆Equipping switch for three-hole charging socket, and allow users to develop the habits of pressing switch.
◆Equipping switch for EV cable

Domestic Brand

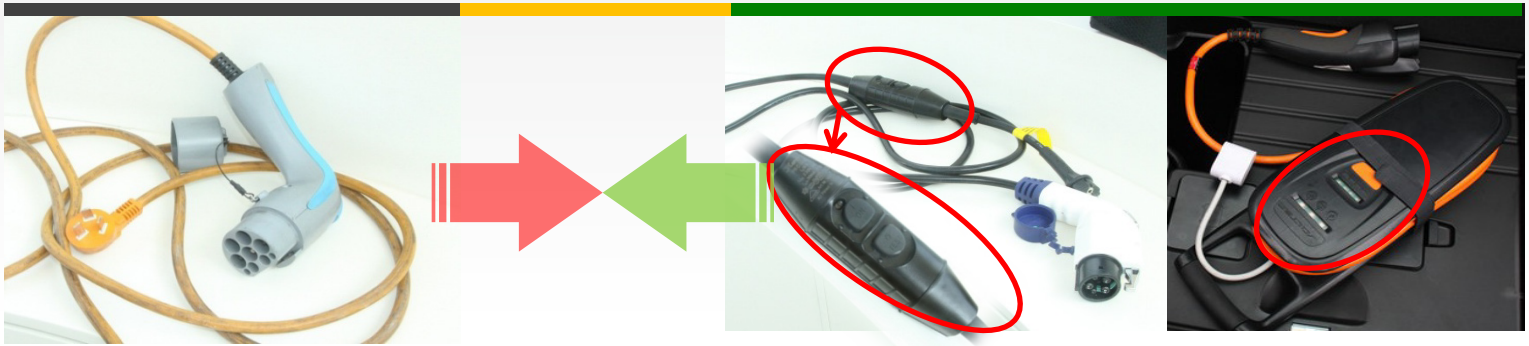
No. Charging vehicle	6
Maintenance times	14 times
Replace the socket	8
Replacement fuses	1 set

Average time for replacing socket 0.5 yr

Internatioanl Brand

No. of Charging Vehicle	3
Times of Failure	0

Domestic Brand — Cable Comparison — International Brand



Note : Usage duration for domestic brand 2011.5-2012.4
Usage duration for international brand 2011.10-2012.4

EVZONE NEXT STEPS

- EVZONE Development Review
- Analysis of Questionnaire
- Next Steps

Job Prospect

- **Data Collection and Analysis**

With Energy Fund support, EVZONE-UC Davis signed <U.S.-China EV Demo Joint Study>to Promote Test Drive Questionnaire Design and Cooperation on Data Analysis.

- **EV Standard Setting**

<Safety & maintenance guarantee specifications for battery electric passenger cars demonstration operating on roads>

- **Data Collect Centre Building**

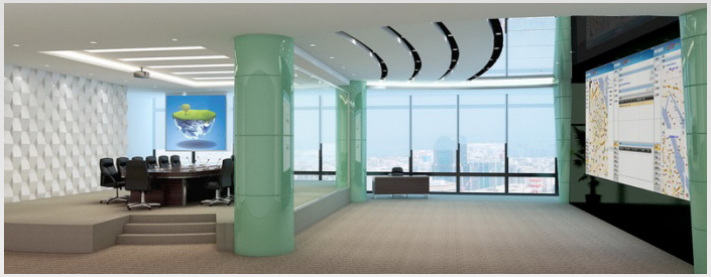
Operate on Dec,2012, to have Real time data collect capability of 2000 EV in stage 1th.

- **Emergency Training**

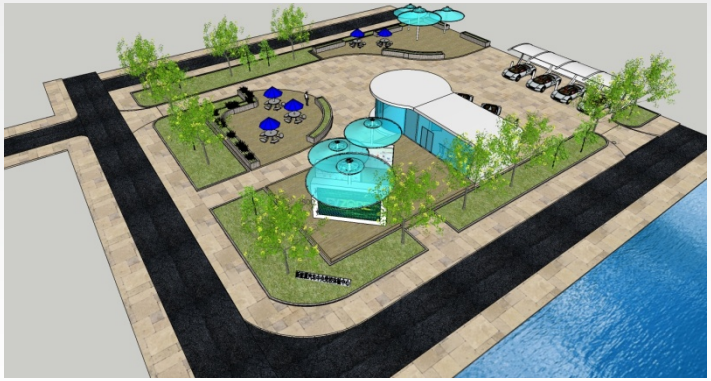
With GM support, develop Emergency rescue training to Fire control institutions. Join The Test Drive & Ride Centre to City Emergency Command Center network.

- **Member of Partnership**

- **Construction of Center Party School Test Drive/Ride Center**



Data Collect Center (on construction)



Construction Plan of Center Party School Test Drive/Ride Center

Thanks

China (Shanghai) Electric Vehicles International Pilot City