

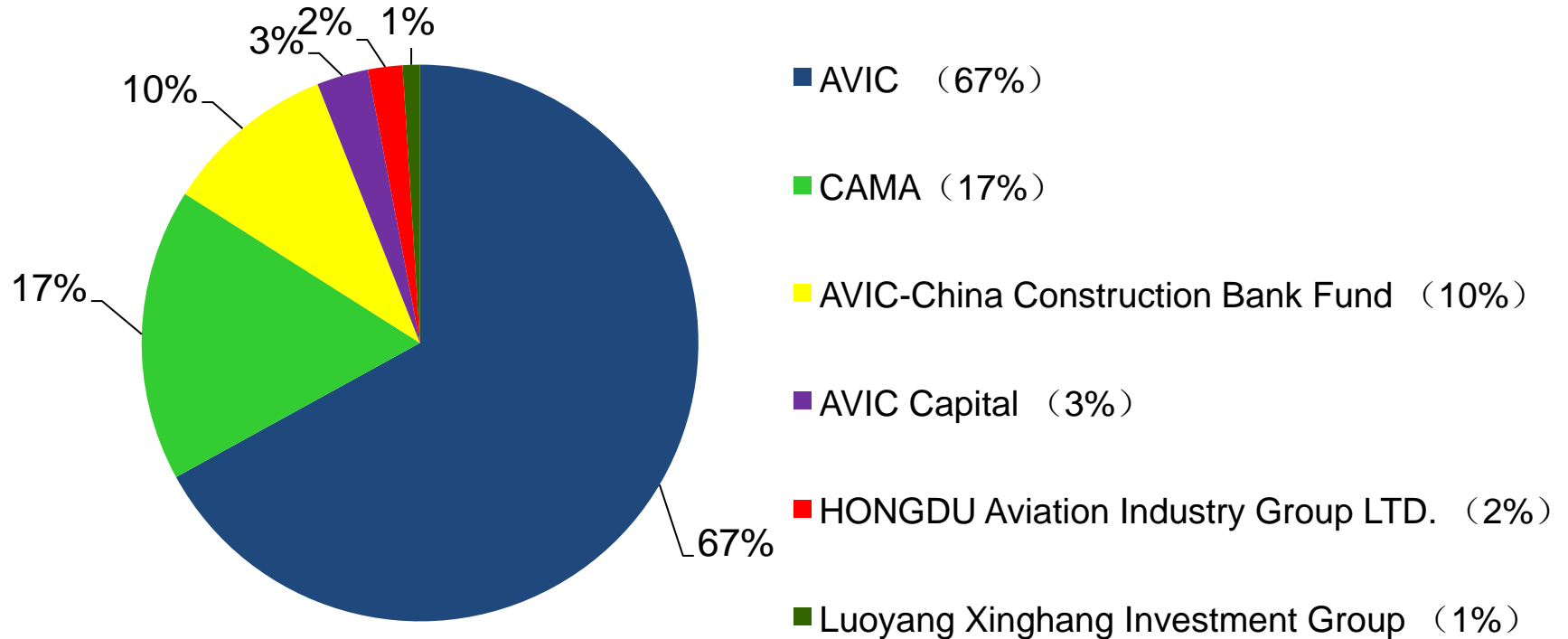


# **Green Energy- For A Brighter Future**

**July 10, 2014**

- 1** Company Profile
- 2** Products & Technology
- 3** Market Application
- 4** Patents & Certification

## Equity structure



In 2011, AVIC raised 160 million USD from stock market, and joined together by other 6 companies controlled by AVIC, invested into CALB for capacity expansion and new research facilities construction.

## Brief Introduction

CALB is a leading company devoted to Li-ion battery for various applications;

---

CALB is headquartered in Luoyang, China with the branch of CALB USA INC. founded in 2012, and Europe Agent operated in 2010;

---

Registered capitals \$130 million;

---

Since 2010, CALB has been investing \$600 million in the new industrial park, covers an area of 86 acres;

---

As going into 2014, CALB now have more than 1,700 professional staffs worldwide, among them more than 200 are core R&D staffs leading by 15 doctors.



## Achievements



CALB Industrial Park  
**\$600 million** Gross Investment

Largest Specialized Large-capacity Lithium  
Battery R&D and Production Project in China

EV Application  
Ranking **Top** in China



Energy Storage Marketing Application  
Ranking **Top** in China

Power Lithium Battery Exporter  
Ranking **Top** in China



Independent R&D Automatic Production Lines  
Production Capacity: **180 MILLION AH**  
One of the Top Large-capacity Power Battery  
Manufacturer in China

# Company Profile



- Customer
- ▣ Agent
- ★ Headquarters

## Main Products



CA40



CA60F I



CA100



CA180F I



CAM72

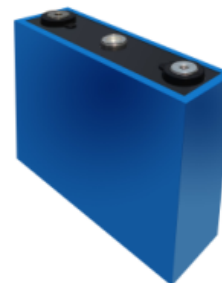
## Products Under R & D



CAM25



CAM50



CAM80

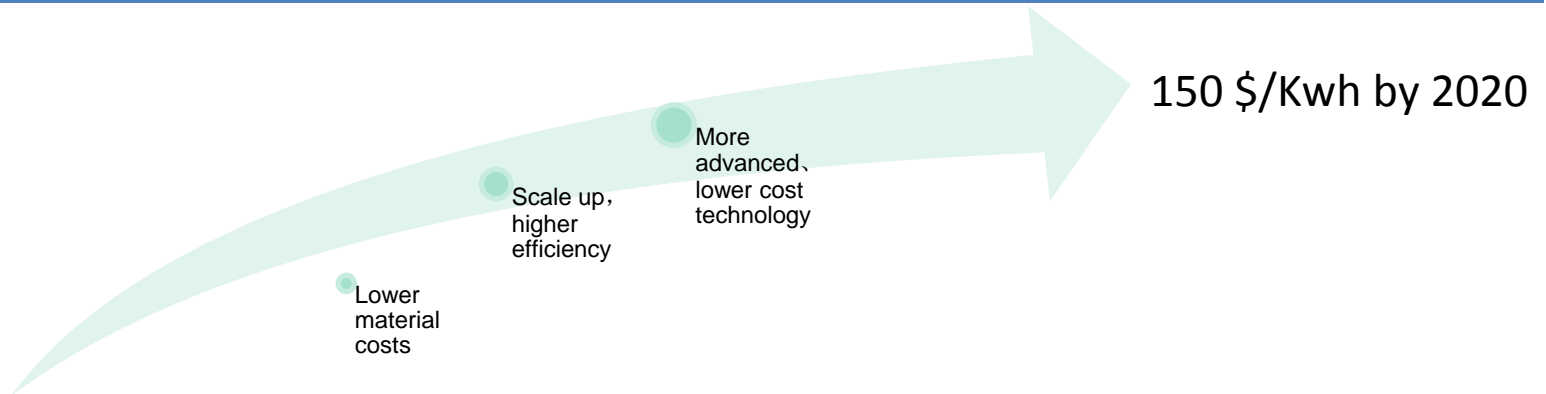
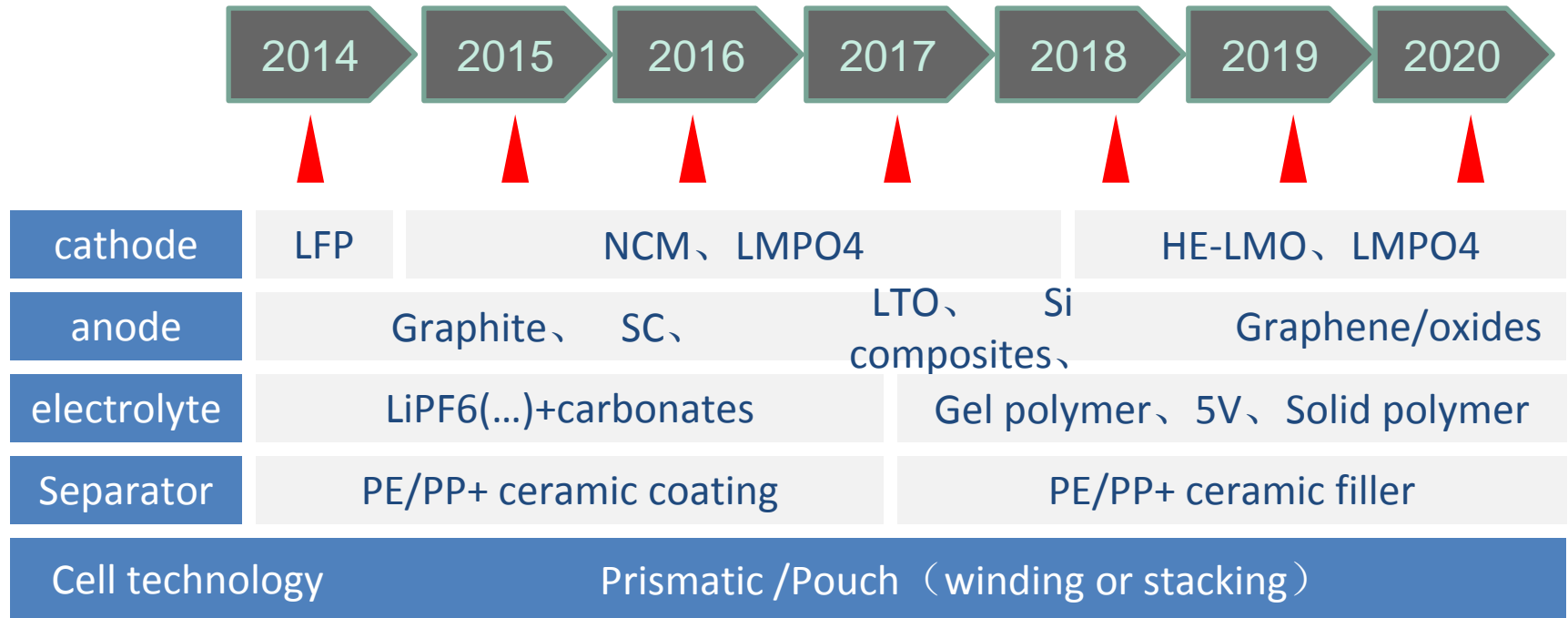


CAS20NI

## Products' Performance Road Map

	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Energy density (wh/kg)	120	140	150	160	180	>200
Cycle life	4000	6000	8000	10000	15000	>20000
Calendar life	8 years	10 years	12 years	15 years	20 years	>25 years
Chemistry	LFP Graphite/SC	LFP/NCM graphite/HC/ SC	NCM/LMPO4 Graphite/HC/ SC/LTO	NCM/LMPO4 SC/LTO	NCM/LMPO4 /HE-LMO SC/LTO	NCM/LMPO4 /HE-LMO SC/LTO/Si composite
Expected price (per Kwh)	400\$	350\$	300\$	250\$	200\$	150\$

## R&D Road Map



**EV**

**ESS**

**Market  
Application**

**Telecommunication**



## EV Modules



**Battery Module for Shanghai World Expo**

**Battery Module for Electric Car**

**Standard Module for Electric Bus**

**Battery Module for Electric Bus**

**Passenger Vehicle Power Module**

Battery Type:  
100Ah

Battery Connection :  
2P x 40S

Battery Type:  
60Ah

Can be  
customized  
according to  
user's demand

Battery Type:  
60Ah/100Ah  
Application:  
Electric Bus

Battery Type:  
180Ah  
Battery Connection:  
2P x 180S

Battery Type:  
66Ah  
Application:  
Electric Car

## EV Car

**Customer Name:** Jiangnan Automobile Manufacturing Co., Ltd. China  
**Cooperation Time:** 4 years (2010 – 2014)  
**Vehicle Type:** Zhongtai pure electric car  
**Battery Type:** 180 Ah  
**Power System Configuration:** 332V 180 Ah

**Customer's Nationality:** Turkey  
**Cooperation Time:** 4 years (2010 – 2014)  
**Vehicle Type:** TOYOTA pure electric car  
**Cooperation Quantity:** 204 sets, more than 2,300,000 Ah  
**Battery Type:** 100 Ah  
**Battery Connection:** 1P x 112S



## State Grid EV Charging Station

**Project:** State Grid-**Chengdu** Passenger Vehicle Charging Station

**Cooperation Time:** 2012- Now

**Cooperative Amount:** 23,000 cells

**Battery Type:** 60Ah

**Battery Connection:** 24S/Box



**Project:** State Grid-**Dalian** Commercial Vehicles Charging Station

**Cooperation Time:** 2013- Now

**Cooperative Amount:** 15,000 cells

**Battery Type:** 60Ah

**Battery Connection:** 96S/Box



## EV Bus

**Key Client:** Dongfeng Xiangfan Travel Car Co. Ltd

**Fortune Global 500:No.145**

**Cooperation Time:** 5 years (2009 - 2014)

**Vehicle Type:** Pure electric bus

**Battery Type :** 180 Ah

**Power System Configuration:** 537V 360 Ah

**Mileage Run:**

Experimental Mileage has reached more than 100,000 km till the end of 2013.

**Key Client:** Zhengzhou Yutong Bus Co., Ltd.

**Cooperation Time:** 3 years (2011- 2014)

**Vehicle Type:** Pure electric bus

**Battery Type:** 100 Ah

**Power System Configuration:** 563V 100 Ah

**Operating Area:**

In 33 cities of China, Beijing, Shanghai etc, for demonstration running till the end of 2013.



## Other EV Applications

**Application Field:** Electric golf vehicle

**Customer's Nationality:** Korea

**Cooperation Quantity:** 100 sets

**Battery Type:** 100 Ah

**Battery Connection:** 1P x 15S



**Application Field:** Postal transport vehicle

**Customer's Nationality:** Switzerland

**Cooperation Quantity:**

1000 sets a year since 2012, more than 2,400,000AH till 2014

**Battery Type:** 160 Ah

**Battery Connection:** 1P x 8S



## Other EV Applications

**Application Field:** Electric Van Detachable Garbage Collector

**Customer:** Dongfeng Motor Corporation

**Battery Type:** 100 Ah

**System Configuration:** 320V/ 100 Ah

**Cooperation Year:** 2013



**Application Field:** High speed and low speed electric sailing boat and pleasure boat

**Customer's nationality:** The United States

**Battery Type:** 60 Ah

**Battery Connection :** 1P x 60S

**Cooperation Year:** 2013



## HESS

### 2.5KWH HESS

Size:605mmx330mmx445mm  
AC Output (V) : 220V  
AC Output Power (VA): 1000  
Max Efficiency: ≥95%  
DC Output (V): 12



### 5KWH HESS

Size:685mm×415mm×490mm  
AC Output (V) : 220V  
AC Output Power (VA): 1000  
Max Efficiency: ≥90%  
DC USB Output (V): 5



### 10KWH HESS

Battery Type: 60Ah  
Battery Connection:  
4P x 16S



Till July 2014, CALB had directly or indirectly sold **5805 sets of HESS**, covering countries in Europe, America and the Asia & Pacific.

## ESS

### 50KWH Commercial ESS

Battery Type: 180Ah/60 Ah  
Applications: Back up power system, stationary energy storage systems.



### 125 KWH Stationary ESS

Battery Type: 60Ah/180Ah  
Battery Connection: 3P x 240S



### 200KWH Mobile Containerized ESS

Size: 20' x 40' x 50'  
Applications : Communities, Factories, Back-up power for equipment.



Till July 2014, **20+ Large-scale ESS projects** have been turned over within China, with accumulated energy storage of **more than 30MWh**.

## National Wind-solar Demonstration Project

Largest new energy project in the world

**Business Owner:** State Grid Corporation of China

**Fortune Global 500:**No.7



**Project Scale:** 500MW wind power generation, 100MW solar PV, 110 MW power

**CALB's Share:** Phase one-3MW × 3h power storage construction

**Total Amount :**60.9 million RMB, applied 88,128 batteries of 40Ah

**Commissioning Date :** Dec 2011

**Description:** Targeting the wind solar and other renewable energy integration, frequency regulation and power backup.

### Concept Diagram Form



## Southern Power Grid - Baoqing Energy Storage Station

China's First MW-class Electric Energy Storage Power Station

**Business Owner:** China Southern Power Grid Co., Ltd.  
**Fortune Global 500:**No.149



**Project Scale:** 10MW×4h, phase one project is 5MW×4h capacity,  
**CALB's Share:** 1MW×4h , total amount 18 million RMB, applied 10368 batteries of 180Ah  
**Commissioning Date :** March 2011.  
**Operating Performance :** Met the requirements and successfully passed the inspection in Nov, 2011, and the system is running well up to now.



## Tibet Ali solar power micro grid energy storage project

**First high altitude energy storage project in the world**

**Commissioning date :** Jan 2013

**Location :** Ali, Tibet, 4300m above sea level

**Project Scale:** 10.64MWh

**Configuration:** 9216 batteries of 180Ah and 48 battery boxes

**Description :** This project is to use the solar+ energy storage to replace the already operating hydropower station +diesel generator system, to improve the stability and reduce the cost.



## Nanji Island - Micro Grid Demonstration Project

**First Off-grid Island MW-class Electric Energy Storage Power Station in China**

**Commissioning Date :** Dec 2013

**Location :** Nanji Island, Wenzhou, Zhejiang

**Project Scale:** 5.3MWh – first phase 2.3MWh, second phase 3MWh

**Configuration:** : 18000 batteries of 60Ah



## Southern Power Grid - Container Energy Storage Project

First 20-foot container ESS in China

**Commissioning Date :** Nov 2013

**Location :** Guangzhou, Guangdong

**Project Scale:** 250 KWh/ 1000 VA

**Configuration:** more than 900 batteries

**Description :** The project is the container type energy storage station of the power distribution station, to guarantee the normal power supply locally.



## Telecommunication Modules



CA48V10Ah



CA48V40Ah



CA48V200Ah



CA48V20Ah



CA48V50Ah



CA48V30Ah



CA48V100Ah



CA48V400Ah

## Standby Power Supply of Mobile Base Station Project

### Project Name

Standby Power Supply Project of Mobile Base Station of Huludao Branch, China Mobile Liaoning Co., Ltd.

### Product Demand

48V 50Ah lithium iron phosphate UPS power module

### Project Name

Standby Power Supply Project of Mobile Base Station of Tangshan Branch, China Mobile Hebei Co., Ltd.

### Product Demand

48V 50 Ah lithium iron phosphate UPS power module



## Standby Power Supply of Indoor Macro Base Station

### Customer Name

Shenyang Branch, China Mobile Liaoning Co., Ltd.

### Project Name

Standby Power Supply Project of Shenyang University of Technology Base Station, China Mobile Liaoning Co., Ltd.

### Product Demand

Use CALB's 48V 1000 Ah li-ion power module to replace the lead-acid battery module.



Material	Parameter	Weight	Area	Supply time
Lead-acid battery	48V600Ah	1056kg	2.1 m <sup>2</sup>	3 hours
Li-ion battery	48V1000Ah	480kg	0.5 m <sup>2</sup>	5.2 hours

## Standby Power Supply of IDC Machine Room

### Customer Name

Shenyang Branch, China Mobile Liaoning Co., Ltd.

### Project Name

Lithium UPS Project of Changjiang Street Office in Shenyang, China Mobile Liaoning Co., Ltd.

### Product Demand

384V 100 Ah lithium iron phosphate power module

### Project Running Conditions

The UPS total power is equivalent to the primary lead- acid battery. The total weight is only 42% of the lead- acid battery, and the duration has always kept for more than 3 hours. The high stability performance of the equipment is fully identified by the owner.



## Patents

From Dec 2007 ~ July 2014, **216** Patents registered

Utility model: 128

Invention: 77

Appearance: 11



## Certification



# Thanks !

**Headquarters:**

No. 66 North Binhe Road, High-Tech Zone,  
Luoyang, Henan, China

P.C: 471003

Tel : (86)0379-6069 7961

Fax: (86)0379-6069 7995

**Shanghai Office:**

Room 3007-3008, Bank of China Tower, No.  
200 Yincheng (Mid) Road, Shanghai, China

P.C: 200120

Tel: (86)021-6878 5780

Fax: (86)021-6878 5790