The development of charging station industry is lagging behind that of EV industry, so great efforts are needed to accelerate construction of charging infrastructure, Yao Jie, Deputy Secretary General at China Association of Automobile Manufacturers (CAAM), said on July 11. Meanwhile, several state departments, including Ministry of Industry & Information Technology (MIIT) and National Development & Reform Commission (NDRC), are also working to push for charging infrastructure construction.

The 2016 New Energy Vehicle Blue Paper was released on August 1. As of the end of 2015, the number of EV/ the number of chargers ratio was less than 10:1 in China, acting as a bottleneck for development of EV industry, Wu Zhixin, Deputy Director at China Automotive Technology & Research Center (CATARC) said. Data from the National Energy Administration (NEA) showed China’s EV production and sales reached nearly 500,000 units as of the end of 2015, while just 3,600 public charging and swap stations and 49,000 chargers had been built. China still has a long way to go in achieving its goal of building 12,000 charging stations and 4.8 million distributed chargers before 2020.
Contents

1 Historic Events 4
2 Market Research 7
3 Key Enterprises Analysis 23
4 Opportunity Exploring 32
China has frequently released guidelines for EV charging infrastructure construction since State Grid Corporation of China (SGCC) opened EV charging and swap station market in May 2014.

**Important Policies**

- China’s State Council released the Guidelines for Speeding Up EV Charging Infrastructure Construction.
- The NDRC, NEA, MIIT and Ministry of Housing and Urban-Rural Development (MOHURD) jointly released the EV Charging Infrastructure Development Guidelines 2015-2020, which sets a goal of building 4.8 million chargers, 12,000 charging stations and bringing No. EV/No. chargers ratio to 1:1 by 2020.
- A notice was issued regarding EV charging infrastructure reward policy and promoting EV applications during the 13th Five-Year Plan period (2016-2020).
- As of July 2016, 18 provinces and 16 cities had released plans for new energy vehicle charging infrastructure after 2016.
- The MOHURD issued a notice about enhancing EV charging facility construction in urban areas.
- Five state departments, including the NEA and MIIT, jointly released revised 5 national standards for EV charging interface & communication protocol (short as new charging national standards), which add rules for charging speed and set higher requirement for battery safety.
- The China Electricity Council (CEC) released the EV Charging and Battery Swap Service Information Exchange (draft to seek public opinions).
Investment & Financing Events

- Capital has poured into EV charging pile industry since SGCC opened EV charging and swap station market in May 2014

DZ.TT, new energy vehicle charging integrated service operator, announced it obtained tens of millions of yuan of A round of financing from LETV. Both sides will join hands in introducing EV intelligent charging equipment.

Qingdao TGOOD Electric spent RMB 600 million in establishing charging subsidiary company named as Teld, and formally investing in EV charging project, becoming one of the first social capital to enter the field of charging station.

SPI spent RMB 30 million in acquiring 60% stake in Beijing Yiwei, a Chinese EV leasing company, in an effort to establish EV charging networks in China's first-tier cities.

Chargerlink announced it completed nearly USD 20 million in the A round of financing, used mainly in expanding business and team.

Ecaray announced it obtained RMB 80 million in the A round of financing, which will be used to establish 6 operating centers and 10 offices across China in 2016.

SAIC Motor announced to spend RMB 300 million in establishing a subsidiary company named SAIC Anyocharging Technology and plans to build 50,000 public chargers before 2020.

Shenzhen Clou Electronics announced it plans to invest RMB 210 million together with CDB Development Fund in establishing charging pile construction company.

China Southern Power Grid announced the result for its first round of bid invitation for EV charging device, involving RMB 80-100 million.
Definition of Charging Point & Classifications of Chargers

“Gas station” for EV

Basic functions: set the time, the power usage and the money of charging

Classified by installation conditions
- Vertical chargers
- Wall-mounted chargers

Classified by service objects
- Chargers for public use
- Chargers for special use
- Chargers for self-use

Classified by the number of charging interface
- One charger for one vehicle
- One charger for multiple vehicles

Classified by charging method
- Alternating current (AC) chargers
- Direct current (DC) chargers
- AC-DC integrated chargers

Basic functions: set the time, the power usage and the money of charging
Current Market Supply & Demand

EV Ownership VS Number of Chargers

- Far more EVs than Chargers:
  Limited number of chargers is one of the constraints for EV popularization

- Huge Gap:
  There is a huge gap between current number of chargers and its target number, so explosive growth is expected in the foreseeable future

EV Growth VS Chargers Growth

- EV production and sales maintain fast growth, reaching a peak in 2015

- EV production and sale growth, though down, remained high in H1 2016, boosting demand for supporting facilities

- Supply & Demand Contradictory:
  EV production and sales grow much faster than charger construction, leaving chargers in severe shortages

Sources:
- CATARC, abaogao.com
- CAAM

Unit: 10,000 vehicles, chargers
Main Problems

Causes

- Quality varies from company to company
- Acceptance & supervision standards need improving
- Public charging points are built in non-business districts and suburbs where population density is low and there is information asymmetry
- Parking lots for chargers are occupied by gasoline cars in downtown where parking lots are in shortages
- In response to high charging costs at public charging points, car owners prefer to charge at home
- There is inconsistency between charging interface and communication protocol
- Charging fees vary greatly due to discrepancy in settlement standards
- Unsound policies

Problems

Quality and safety issues
- Poor packaging
- Lack of protection device
- Discontinuous charging process
- Complicated operations & inconvenient payment

Low utilization rate for public chargers
- High utilization rate 5%
- In use 25%
- Not in use 70%

Note: based on incomplete statistics

Incompatibility between Chargers and Vehicles
- No information exchange among different charging service providers
- Incompatibility between different chargers and vehicles

Note: based on incomplete statistics
Industry Chain Structure

Upstream

- Cobalt Ore
- Lithium Ore
- Graphite Ore
  
  - Cathode Material
  - Electrolyte
  - Anode Material
  - Diaphragm

- Battery Core Manufacturing & Packing
- BMS
- Electric Motor Control System
- Powertrain Control System
- Electric Motor

- Power Battery System
- Electrical Control System
- Electric Motor Drive System
- Other Systems & Parts

Downstream

- Marketing
- Maintenance
- Charging Service
  
  - Vehicle Sales
  - Leasing
  - Charger
  - Supporting Equipment

Note: Operator refers to “Pure Operator” and “Operator + Equipment”.

Overall Solution Provider

Power Supplier (Power Sales Station) → Operator → Equipment Provider (Pure Producer)
## Business Model

<table>
<thead>
<tr>
<th></th>
<th>Traditional Business Model</th>
<th>Solution-Based Business Model</th>
<th>Integrated Business Model</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1 Features</strong></td>
<td>A stable mode dominated by compression operating costs and the key to which is reducing power purchasing costs and operating costs</td>
<td>Provide equipment or equipment integrated solutions for charging operators, equipment producers, automakers and commercial property developers</td>
<td>Form the industry closed-loop by integrating industry value chain (automakers, charging equipment producers, charging operators, users, etc.) and/or by introducing App that connects vehicles, chargers and car owners</td>
</tr>
<tr>
<td><strong>2 Source of profit</strong></td>
<td>Charging business (differential power tariffs + charging service fees)</td>
<td>Consulting fees</td>
<td>Fees from charging business + Fees from other value-added services, such as charger-based advertisements, insurance, finance, car sales, vehicle leasing and big data service</td>
</tr>
<tr>
<td><strong>3 Problems</strong></td>
<td>Fees from charging business cannot cover equipment costs, given low utilization rate of chargers</td>
<td>A lack of unified industry standards</td>
<td>Difficulty in resource integration and innovation in business model</td>
</tr>
</tbody>
</table>

**Note:**
- Traditional business model is the **mainstream** at present, which is difficult to recover equipment costs in the short term, given low charger utilization rate
- Integrated business model is direction of industry development
Main Roles in Industry Chain

**Equipment Producer**
- Equipment producers without technical strength are uncompetitive. Over 300 equipment producers are expected to face big reshuffling after new charging national standards took effect.
- Almost all equipment producers are trying to set foot into charging operation business.

**Charging Operator**
- **Heavy asset model** is mainstream, which refers to “Charging facilities + Operations”. Profit from equipment could help offset losses from operations.
- **Light asset model** is rare: The number of pure operators is small. Pure operators simply provide operation management platform and reservation payment function.

**Overall Solution Provider**
- Provide overall solutions based on customer needs, including consulting, planning & design, solutions, energy efficiency management, maintenance, system optimization, etc.
- Multiple businesses can help reduce risks but it is difficult to do well in each business.

**Note:** These three types of roles can overlap with each other. For example, one company could play two or more than two of the roles mentioned above. Operator plays the main role, whose development direction is integrating industry chain.
- **Risk level:** Operator > Equipment Producer > Solution Provider.
- **Room for growth:** Operator > Equipment Producer > Solution Provider.

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## Operator Operation Model

<table>
<thead>
<tr>
<th>Model</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government-led Model</td>
<td>• Orderly construction</td>
<td>• Add to government’s financial pressure</td>
<td>• Beijing Olympics charging station</td>
</tr>
<tr>
<td></td>
<td>• Helpful to unified and centralized development</td>
<td>• Hamper marketization</td>
<td>• Shanghai Expo charging station</td>
</tr>
<tr>
<td>Enterprise-led Model</td>
<td>• Guarantee capital input; Better operation efficiency and management level</td>
<td>• Disorderly construction; A lack of unified standards among different enterprises can lead to inconsistency between vehicles and chargers</td>
<td>• Tesla provides multiple charging solutions for Tesla car owners</td>
</tr>
<tr>
<td>Mixed Model</td>
<td>• Ease government financial pressure and reduce investment risks for enterprises; Improve operation efficiency</td>
<td>• Difficulty in coordinating government and enterprise</td>
<td>• TGOOD obtained RMB 25 million subsidies from central government</td>
</tr>
<tr>
<td>Crowd funding Model</td>
<td>• Integrate multiple resources; Improve efficiency</td>
<td>• Difficulty in coordinating parties involved</td>
<td>• Star Charge builds chargers by crowd funding, mainly for free and partly from institutions</td>
</tr>
</tbody>
</table>

**Government-led Model**: Government, as main investor, is responsible for construction and operation. Examples include Beijing Olympics charging station and Shanghai Expo charging station.

**Enterprise-led Model**: Enterprise is responsible for investment and operation. This model guarantees capital input and better operation efficiency and management level. Examples include Tesla providing multiple charging solutions for Tesla car owners.

**Mixed Model**: Led by the enterprise supported by government and government participates in projects. It aims to ease government financial pressure and reduce investment risks for enterprises while improving operation efficiency. Example: TGOOD obtained RMB 25 million subsidies from central government.

**Crowd funding Model**: Collect capital from enterprise, society, and government and promote the construction by crowd funding on the internet. This model integrates multiple resources and improves efficiency. Example: Star Charge builds chargers by crowd funding, mainly for free and partly from institutions.
Contents

1 Historic Events 4

2 Market Research 7
   • Market Overview
   • Industry Chain Analysis 11
   • Policy Analysis 16

3 Key Enterprises Analysis 23

4 Opportunity Exploring 32
Policy Analysis

1. Ambitious Goal
   - Build 4.8 million chargers, 12,000 charging points, raising EV/charger ratio to 1:1 by 2020
   - NDRC, NEA, MIIT, MOHURD

2. Subsidies
   - Offer subsidies for charging infrastructure construction and operations during 2016-2020 and developed a reward standard
   - MOF, MOST, MIIT, NDRC, NEA

3. New Regulations
   - Likely to connect EV, charger and operator
   - AQSIQ, SAC, NEA, MIIT, MOST

4. Local Policies
   - As of July 2016, 18 provinces had released policies for new energy vehicle charging infrastructure construction after 2016, and 18 cities had proposed plans for charging infrastructure construction after 2016
   - Beijing, Shanghai, Hebei, Xi’an, Guangzhou, etc.

Note: EV charging stations can be located in traffic artery, streets, communities, parking lots and are equipped with many chargers
Ambitious Goal

Charging Facility Construction Goals by Region by 2020

- **Clear Regional Goal**
  - 4.300 charging points
  - 2.2 million chargers

- **Clear Construction Site**
  - 4.8 million chargers
  - 12,000 charging points
  - EV/Charger Ratio at 1:1

Number of Charging and Swap Stations by Category by 2020

- **Regions for accelerated development**
- **Regions for active promotions**
- **Regions for demonstration and popularization**

Charging Pile Construction Goal Nationwide by 2020

- **Resident-use**
  - 280 charging points
  - 100,000 chargers

- **Business-use**
  - 150 charging points
  - 2.5 million chargers

- **Distributed public-use**
  - 50 charging points
  - 4.3 million chargers

Source: EV Charging Infrastructure Development Guidelines 2015-2020
### Subsidy Policy

#### Subsidy by Region

- **Regions with heavy air pollution**
- **Central provinces and Fujian**
- **Other regions**

#### Subsidy Threshold

### EV / Standard EV Conversion Ratio

<table>
<thead>
<tr>
<th>Vehicle Type</th>
<th>Conversion Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>pure electric passenger vehicle (driving range &lt; 150km)</td>
<td>0.8:1</td>
</tr>
<tr>
<td>pure electric passenger vehicle (driving range ≥ 150km)</td>
<td>1:1</td>
</tr>
<tr>
<td>plug-in hybrid passenger vehicle</td>
<td>1:1</td>
</tr>
<tr>
<td>pure electric bus</td>
<td>12:1</td>
</tr>
<tr>
<td>pure electric fast charging bus</td>
<td>20:1</td>
</tr>
<tr>
<td>plug-in hybrid bus</td>
<td>5:1</td>
</tr>
<tr>
<td>fuel battery passenger vehicle</td>
<td>30:1</td>
</tr>
<tr>
<td>fuel battery bus</td>
<td>50:1</td>
</tr>
<tr>
<td>plug-in hybrid special-purpose vehicle</td>
<td>0.6:1</td>
</tr>
<tr>
<td>pure electric special-purpose vehicle</td>
<td></td>
</tr>
<tr>
<td>mass ≥ 3500kg</td>
<td>3:1</td>
</tr>
<tr>
<td>mass &lt; 3500kg</td>
<td>1.5:1</td>
</tr>
</tbody>
</table>

Note: Subsidy threshold is based on popularization of standard new energy vehicles.

Source: Notice on New Energy Vehicle Charging Infrastructure Subsidy Policy and Enhancing New Energy Vehicle Popularization 2016-2020
## Subsidy Policy

### EV Charging Infrastructure Subsidy Standards by Region 2016-2020

<table>
<thead>
<tr>
<th>Year</th>
<th>Regions with heavy air pollution</th>
<th>Central provinces and Fujian</th>
<th>Other regions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>subsidy threshold</td>
<td>subsidy amount</td>
<td>subsidy above threshold</td>
</tr>
<tr>
<td>2016</td>
<td>30,000</td>
<td>9,000</td>
<td>Additional RMB 7.5 million subsidy for 2,500 vehicles above threshold; subsidy ceiling at RMB 120 million</td>
</tr>
<tr>
<td>2017</td>
<td>35,000</td>
<td>9,500</td>
<td>Additional RMB 8 million subsidy for 3,000 vehicles above threshold; subsidy ceiling at RMB 140 million</td>
</tr>
<tr>
<td>2018</td>
<td>43,000</td>
<td>10,400</td>
<td>Additional RMB 9.5 million subsidy for 4,000 vehicles above threshold; subsidy ceiling at RMB 160 million</td>
</tr>
<tr>
<td>2019</td>
<td>55,000</td>
<td>11,500</td>
<td>Additional RMB 10 million subsidy for 5,000 vehicles above threshold; subsidy ceiling at RMB 180 million</td>
</tr>
<tr>
<td>2020</td>
<td>70,000</td>
<td>12,600</td>
<td>Additional RMB 11 million subsidy for 6,000 vehicles above threshold; subsidy ceiling at RMB 200 million</td>
</tr>
</tbody>
</table>

Source: Notice on New Energy Vehicle Charging Infrastructure Subsidy Policy and Enhancing New Energy Vehicle Popularization 2016-2020

Note:
- The Ministry of Finance will continue allocating money for charging infrastructure construction and operations during 2016-2010
- Local governments must reach thresholds to be able to obtain subsidies
- Subsidy threshold and amount increase year by year, with the former increasing faster than the latter
New Regulations

- Five state departments, including the NEA and MIIT, jointly released revised 5 national standards for EV charging interface & communication protocol (short as new charging national standards), effective January 1, 2016

Issues in Charging Pile Industry

Safety
- Add functions, such as charging interface temperature monitoring, electronic locks, insulation monitoring, bleeder circuit, etc.
- Specify DC charging vehicle terminal interface protection measures
- Forbid applications of unsafe charging models

Compatibility
- AC/DC charging interface types and structures are compatible with previous standards; new standards modify specifications on sizes of some contactors and mechanical locks, but plugs and sockets under new standards are compatible with those in previous standards
- DC charging interface adds electronic locking device, but this does not affect electric connection between new and old products. Users can realize basic charging functions simply by updating communications protocol
- The relations between AC charging duty ratio and current limits are compatible with international standards

New Charging National Standards

• EV Conductive Charging System Part 1: General Requirements
• EV Conductive Charging Connecting Device Part 1: General Requirements
• EV Conductive Charging Connecting Device Part 2: AC Charging Interface
• EV Conductive Charging Connecting Device Part 3: DC Charging Interface
• Communications Protocol between EV Non-Vehicle-Carried Conductive Charger and BMS
Local policies

- As of July 2016, 18 provinces had released policies for EV charging infrastructure construction after 2016, and 18 cities had proposed plans for charging infrastructure construction after 2016.

**Charging Pile Target by 18 Provinces by 2020**

- Distribution of Provinces that Have Released Policies

**Note:** Red dots refer to cities. Deep blue refers to provinces.

**Note:** 18 cities include Guangzhou, Shenyang, Yuncheng, Luzhou, Harbin, Xi'an, Weifang, Hengshui, Zhengzhou, Shijiazhuang, Huizhou, Wuxi, Hangzhou, Changzhou, Wenzhou, Dongguan, Ningbo, Tongling.

- Central and local policies will boost development of charging pile industry.
- **Except Beijing and Shanghai,** other regions need to improve their policies and most regions have not released implementation programs.
- Policies by some local governments did not mention specific charging facility construction goals and subsidies.
- Policy implementation will meet obstacles from land use, power grid planning, property management, charging pile utilization rate, etc.
## Contents

1. Historic Events  
2. Market Research  
3. Key Enterprises Analysis  
   - Overview of Chinese Key Enterprises  
   - Examples of Chinese Key Enterprises  
   - Examples of Foreign Key Enterprises  
4. Opportunity Exploring
# Overview of Mainstream Chinese Enterprises

<table>
<thead>
<tr>
<th>Ownership</th>
<th>Company Name</th>
<th>Target Markets</th>
<th>Direction of Charging Business</th>
<th>Advantages</th>
<th>Targets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central SOE</td>
<td>SGCC</td>
<td>Nationwide intercity traffic artery</td>
<td>Power grid construction &amp; operations; charging pile construction</td>
<td>Directly under the State Council; industry leader</td>
<td>Build 10,000 public fast charging stations, 120,000 chargers nationwide by 2020</td>
</tr>
<tr>
<td></td>
<td>Petevio New Energy</td>
<td>Beijing, Shanghai, Shenzhen, Hefei</td>
<td>Charging networks construction, operation and service</td>
<td>Complete set of solutions for charging station and charging pile</td>
<td>Cooperate with BMW in “ChargeNow” service; sign strategic cooperation agreement with JVC Motor over coordinated development of vehicle and charging facility networks</td>
</tr>
<tr>
<td>SOE (not central SOE)</td>
<td>Huashang Sanyou New Energy</td>
<td>Beijing</td>
<td>Charging infrastructure construction and operation</td>
<td>Build many chargers for SGCC</td>
<td>It plans to launch “electrical community initiative” to solve no electricity in parking lots</td>
</tr>
<tr>
<td></td>
<td>Xuji Electric</td>
<td>Chongqing, Yichang, Zhuhai</td>
<td>Charging pile, EV charge/discharge station solutions</td>
<td>EV charging and battery swap core technology</td>
<td>It won bid for 61 DC chargers and 228 AC chargers in China Southern Power Grid’s first round of EV charging device bid invitations in 2016</td>
</tr>
<tr>
<td>Private</td>
<td>Tellus Power</td>
<td>Beijing</td>
<td>Charging infrastructure manufacturing and operation</td>
<td>The only charging pile manufacturer that has passed certifications from US UL, EU CE and China CQC</td>
<td>It plans to invest RMB 3.55 billion in building 710 super charging stations and 28,800 chargers and double investment in 2017</td>
</tr>
<tr>
<td></td>
<td>TGOOD</td>
<td>Beijing</td>
<td>Intelligent charging system construction</td>
<td>Connects power grid, vehicle networks and Internet</td>
<td>Its charging subsidiary company Teld plans to cover over half of China’s EV charging market in cooperation with BAIC</td>
</tr>
<tr>
<td></td>
<td>ZHONHEN</td>
<td>Hangzhou</td>
<td>EV charging and battery swap system</td>
<td>Complete set of mature DC and AC charging device</td>
<td>It plans to invest RMB 500 million in building new energy vehicle intelligent charging equipment production lines</td>
</tr>
<tr>
<td></td>
<td>Shenzhen Auto Electric Power</td>
<td>Shenzhen</td>
<td>Charging station and charging pile solutions</td>
<td>Early entry into EV charging field</td>
<td>It plans to invest RMB 312 million in building and operating EV concentrated charging facilities in Shenzhen</td>
</tr>
<tr>
<td></td>
<td>Clou Electronics</td>
<td>Shenzhen, Luoyang</td>
<td>EV charging pile</td>
<td>Cover the widest range of charging and battery swap products</td>
<td>It plans to invest RMB 7.5 billion in building several projects in Luoyang, including “smart city construction” and “concentrated charging networks platform”</td>
</tr>
<tr>
<td></td>
<td>EAST</td>
<td>Huaibei</td>
<td>EV charging pile</td>
<td>Key hi-tech company; complete set of charging device</td>
<td>It plans to invest RMB 8 billion in building eco-tourism agricultural PV power generation project and supporting facilities in Huaibei</td>
</tr>
</tbody>
</table>

Note: Red denotes listed companies.
# Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Historic Events</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>Market Research</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>Key Enterprises Analysis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Overview of Chinese Key Enterprises</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>• Examples of Chinese Key Enterprises</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>• Examples of Foreign Key Enterprises</td>
<td>29</td>
</tr>
<tr>
<td>4</td>
<td>Opportunity Exploring</td>
<td>32</td>
</tr>
</tbody>
</table>

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### Examples of Chinese Companies

#### Basic Information

- **Headquarters:** Beijing
- **Annual operation revenues:** USD 329.6 billion
- **Financing:** investment is subject to approval by the State Council
- **Main business:** power grid investment, construction and operations
- **Collaborators:** China Energy Engineering Corporation, local governments, foreign power companies, etc.

- **City and intercity charger networks**
- **construction & operations**
- **Issue bids to buy charging equipment**

#### Business Model

- “**Power Supplier + Charger construction & Operations**” Model

- **SOE:** National authorized investment, industry benchmark
- **Scale:** It has built “2 south-north, 2 east-west, 1 ring” highway intercity fast charging networks and is beginning to build “7 south-north, 4 east-west, 2 grids” highway fast charging networks. It plans to cover highway fast charging networks across Beijing-Tianjin-Hebei-Shandong circle, all cities in Yangtze River Delta and major cities in other regions by 2020

#### Power Supplier + Operator: SGCC

- **Charging solutions**

#### Advantages

**Note:** “2 south-north, 2 east-west, 1 ring” refers to Beijing-Shanghai, Beijing-Hong Kong-Macao, Qingdao-Yinchuan, Shanghai-Chengdu and Shanghai-Ningbo-Hangzhou; “7 south-north, 4 east-west, 2 grids” refers to Shenyang-Haian, Beijing-Shanghai, Beijing-Taibei, Daqing-Guangzhou, Beijing-Hong Kong-Macao, Erenhot-Guangzhou, Baotou-Maoming highway, Qingdao-Yinchuan, Lianyungang-Horgos, Shanghai-Chengdu, Shanghai-Kunming highway, Beijing-Tianjin-Hebei-Shandong circle and Yangtze River Delta
### Basic Information

- **Headquarters:** Shenzhen
- **Annual operation revenues:** RMB 12.37 billion
- **Financing:** restricted stock (41.53%), subscribed capital contribution RMB 495 million; circulating shares without restrictive selling (58.47%), subscribed capital contribution RMB 697 million
- **Main business:** power equipment, power use management system
- **Collaborators:** CDB Development Fund, China Southern Power Grid, etc.

### Equipment supplier + operator: Shenzhen Clou Electronics

- **City and intercity charger** networks construction & operations
- **Issue bids to buy charging equipment**

### Business Model

- **“EV Operations + Charger Construction & Operations” Model**

### Advantages

- **Technology:** It is the first company in China whose products have passed tests under high temperatures, in extreme cold and plateau
- **Bid winning:** It won RMB 282 million bid for charging equipment from SGCC in May 2016, and won bid for EV charging device from China Southern Power Grid in July 2016
- **It raised share holdings in Zhongdian Lvyuan and bought share in DST, allowing it to integrate charging pile manufacturing and operations**
Examples of Chinese Companies

<table>
<thead>
<tr>
<th>Basic Information</th>
<th>Business Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>• <strong>Headquarters</strong>: Beijing</td>
<td>• “Charger APP + City Intelligent Charging Networks + Operation System” Model</td>
</tr>
<tr>
<td>• <strong>Annual operation revenues</strong>: not listed, company value estimated at over RMB 1 billion</td>
<td>• Establish service and sharing networks by connecting equipment suppliers, automakers, governments, distributors and users</td>
</tr>
<tr>
<td>• <strong>Financing</strong>: It obtained A round of financing from LETV in tens of millions of yuan in 2015 and has now completed B round of financing.</td>
<td>• Realize “Vehicle-Charger-Internet” integration and begin establishing Internet of chargers and Internet of Vehicles</td>
</tr>
<tr>
<td>• <strong>Main business</strong>: EV integrated service operations</td>
<td>• <strong>Scale</strong>: It has entered over 30 cities in China and city landmarks</td>
</tr>
<tr>
<td>• <strong>Collaborators</strong>: LeSEE, ZOTYE Auto, China Life Insurance, Amap, etc.</td>
<td>• <strong>Innovation</strong>: It has developed China’s first vehicle-carried charger system in cooperation with ZOTYE Auto, which initiates vehicle and charging pile system at the same time, allowing car owners to look for charging piles, check charging status and pay for charging in the car</td>
</tr>
</tbody>
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**Pure operator: Beijing DZ Technology (App brand——DZ)**

- **Intelligent charging destinations**: cities and landmark
- “DZ”App: charging destination search; convenient applications for charging facility construction; charger sharing; EV sales and maintenance stores; EV owner’s life circle
- **Charging pile installation solution**: cooperate with automakers who recommend chargers to car owners, and introduce China’s first charger insurance in cooperation with China Life Insurance

**Charging solutions**

<table>
<thead>
<tr>
<th>Advantages</th>
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<tbody>
<tr>
<td>• <strong>Scale</strong>: It has entered over 30 cities in China and city landmarks</td>
</tr>
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</table>
### Examples of Foreign Enterprises

#### Basic Information

- **Headquarters**: California
- **Annual operation revenues**: USD 33.22 billion
- **Financing**: It completed D round of financing in 2007, with total financing in excess of USD 105 million. It obtained financing from Fidelity Investment and Alyeska Investment Group in Q2 2016
- **Main business**: high-performance pure EV
- **Collaborators**: It will establish Chinese partners within 2016

#### Business Model

- “EV Manufacturer + Charger Construction & Operations” Model

#### Charging solutions

- Focus on **home chargers**, also target **destination charging points** and super charging points as well as general-purpose mobile chargers
- Super charging points provide life-time free charging service for Tesla car owners
- Establish destination charging points at hotels, shopping malls and office buildings; have established over 200 super charging points in China so far

#### Advantages

- **Home charging service**: Tesla installs home-use chargers for Tesla car owners, offer 2-year maintenance and spot detection within 48 hours
- **Fast charging**: Owing to its unique battery structure and BMS, Tesla is now the only EV manufacturer that is able to charge EVs at 120 kW. Vehicles can run up to 270 km with just 30 minutes of charging at Tesla super charging station

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*Note: Virtually no chargers common in the market are compatible with Tesla vehicles, so Tesla vehicles must be equipped with Tesla charging piles.*
Examples of Foreign Enterprises

### Basic Information

- **Headquarters:** California
- **Annual operation revenues:** not listed
- **Financing:** It has raised USD 164 million capital and completed F round of financing in USD 50 million from Linse Capital and US Constellation Energy, etc.
- **Main business:** charging equipment construction & operations
- **Collaborators:** Volkswagen, BMW, etc.

### Business Model

- **O2O closed-loop:** “Online App + Charging Networks + Offline Charging Equipment” connects car owners, vehicles and chargers
- **Sell chargers to shopping malls, hotels, etc. by “Net+” installment and collect service fees every month

### Operator + Solution Provider: ChargePoint

- **Intelligent charging system:** provide charging hardware and charging service management by connecting different charging facility to “Cloud Service” platform
- **App service:** locate and make reservations for available charging piles, check charging status on a real-time basis, make payment for charging service

### Advantages

- **Scale:** As of August 2015, it had built 22,885 charging piles, claiming 70% of public charging pile market in the US, and most chargers offer charging for free
- **“Cloud Service”:** users check information with App; charging station operators make pricing strategy and improve management efficiency via data analysis; power companies conduct remote technology diagnosis
- **Integrate value chain:** connect drivers, charging station operators and EV manufacturers
Problems & Opportunities

Problems:

- Huge gap between current number of chargers and government target by 2020
- Quality and safety issues; low utilization rate
- Traditional business model can hardly survive

Industry Uptrend

Opportunities:

- Grab market share in rising market
- Improve product competitiveness and comply with new national standards
- Optimize charging solutions and integrate value chain

Note: Five state departments, including the NEA and MIIT, jointly released revised 5 national standards for EV charging interface & communication protocol (short as new charging national standards), effective January 1, 2016
Future Trend

Utilize Basic Functions

- Charging-payment
- Collect differential power tariffs and charging service fees

Dig Potential Functions

- Chargers can have data collection and storage functions, which upload real-time data, such as working status of chargers and charging time, onto "cloud" terminal so as to form "cloud service" that allows for easy remote monitoring and scheduling
- Chargers can serve as payment terminal
- Chargers are combined with intelligent parking system, which allow data to be updated on a real-time basis and improve parking lot utilization rate

As an entrance for Internet of Vehicles and Internet of Things and then form charging service ecosystem

Note: The Internet of Vehicles refers to the networks that encompass a large amount of information on vehicle location, speed and route, etc. The Internet of Things (IoT) is the internetworking of physical devices, vehicles, buildings and other items, embedded with electronics, software, sensors, actuators, and network connectivity that enable these objects to collect and exchange data. The IoT allows objects to be sensed and/or controlled remotely across existing network infrastructure.

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