1. Hengtong Overview
2. Intelligent energy solutions
3. Battery energy storage system
4. Cold & heat storage system
5. Electric vehicle fast charging system
6. Renewable energy
7. Hydrogen energy
Hengtong Overview

- Dedicated in Optical fiber networks, Power Networks, Internet of Things, New energy, New Material
- Endeavored to be optical and power network integrator and network service provider
- 70 subsidiaries (including 3 public companies)
- Manufacture in 9 countries
- Service office in more than 30 countries
- Registered trade marks in 119 countries
- Operates in more than 130 countries
- Top 3 in optical fiber globally
- Top 10 in cable industry
PART 02

Smart energy solutions
Smart energy solutions

A. Plants + Power Generation Energy Storage System
B. City Building + Commercial Energy Storage System
C. Smart Homes + Residential Energy Storage System
D. Cooling, Heating & Power Trigeneration System
E. Solar Farm
F. Wind Farm
G. Electric Vehicle + Fast Charging System
H. Public Facilities + Cold & Heat Storage System
I. Large Scale Industrial & Grid Energy Storage System
PART 03

Battery Energy Storage System

-- Hengtong Energy Storage (HTES)
Battery Energy Storage System

The role of ESS in the grid regulation
Battery Energy Storage System

Typical ESS applications across the utility network
Battery Energy Storage System

Our focus

Residential
3kW~10kW

- BMS hardware and software design
- EMS hardware and software design
- ESS System design and integration
- Battery & System products manufacturing
- Solution technical support and consultation
- Remote monitoring and online management

Commercial
30kW~300kW

- PV self-consumption
- Back-up and off grid solution
- Load shifting/Peak shaving
- Micro grid
- Virtual power plant
- EV fast charging combined with ESS

Industrial & Grid
250kW~10MW

- Residential
- Commercial
- Industrial & Grid

Enlightening the future
Battery Energy Storage System

**Commercial**

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**C-T30**
- 30 kW Battery Inverter Module
- 69 kWh LFP Battery
- All-in-one Cabinet

---

**C-T50/100/150**
- 50 kW/100 kW/150 kW Hybrid Inverter Transformer
- Integrated Modular Design

---

**HV-CLUSTER**
- 28.7-63.0 kWh Battery Cluster
- 5 to 11 Units of 5.7 kWh
- Easy to parallel to MW

---

Enlightening the future
Battery Energy Storage System

Industrial & Grid

We customize ESS solutions for industrial applications:

# **PCS**:
- 250 kW, 500 kW, 1 MW expandable to MWs

# **Battery**:
- 5.7 kWh (1C) module, 8.1 kWh module (0.5C), LiFePO4 chemistry

# **BMS**:
- Intelligent battery management system

# **EMS**:
- Intelligent energy management system

# **Container**:
If a container is used, our standard ESS container includes the following facilities:

- Fire fighting system
- Air-conditioning system
- Ventilation system
- Lighting system and power distribution system

Depending on the application, the maximum capacity in container can vary:

- 10 feet_ 300 kWh (1C)
- 20 feet_ 600 kWh (1C) / 1.3 MWh (0.5C)
- 40 feet_ 1.6 MWh (1C) / 2.8 MWh (0.5C)
AlphaESS is one of the shareholders of HTES, which jointly launched residential energy storage products with HTES.
HTES only goes with LFP for safest operation and longest cycle-life.

Whilst HTES’s batteries are of slightly larger sizes compared to other types of Li-Ion batteries used in electronics and EVs, they do not suffer from safety issues such as thermal runaway because we have chosen LiFePO4 for its superior life span and safety.
HTES uses only the Metal CAN cells with aluminum casing in all of its battery packs for long life-span and safety.

**Battery Energy Storage System**

**Cell type**

Small Cylindrical
- Calendar Life: 5 years
- Cost: Low

Big Polymer Pouch
- Calendar Life: 3 years
- Cost: Medium

Plastic Cell
- Calendar Life: 5 years
- Cost: Medium

Metal Can
- Calendar Life: 20 years
- Cost: High

Enlightening the future
Battery Energy Storage System

Premium cells supplier

HTES never compromise on LFP cell quality

LISHEN - one of the world’s top 5 LFP cell producers
EVE - one of the tier-1 lithium battery producers in China
HTES BMS and EMS are the brain of the system. It manages the ultimate function of the battery and also provides critical safeguards to protect and prolong the life of batteries.

- Real-time volt./temp./current monitoring on cell level
- Multiple-level protections based on the data monitored
- Communication to EMS (Energy management system)
- Reliable battery cell balancing management
- Intelligent SOC (state of charge) algorithm
- Capable to be remotely upgraded to latest technology

- PV self-consumption maximize
- Load shifting
- Peak shaving
- Demand response
- Micro grid control
- Virtual power plant
- Auxiliary control
- Fully programmable for tailored design
Battery Energy Storage System

HTES cloud

- Lifelong free monitoring via Web and APP
- New function and latest version upgrade
- Setting parameters, control system and build VPP
- IoT compatible

Enlightening the future
Battery Energy Storage System

Typical cases

- Project: 150 kW/360 kWh, off-grid solution
- Application: Fuel Saving, off-grid
- Location: South Sudan, Africa

- Project: 500 kW/1.26 MWh, pharmaceutical factory
- Application: UPS + Load Management
- Location: Cambodia

- Project: 60 kWp PV, 300 kWh storage
- Application: Solar + Storage + Diesel mini-grid
- Location: Apo Island, Philippines

- Project: 5 x 50 kW/160 kWh rural electrification
- Application: Solar + Storage + Diesel mini-grid
- Location: Myanmar

Enlightening the future
PART 04

Cold and Heat Storage System

-- Hengtong Huahoo Energy (HTHH)
Phase change, which means the matter changes from one phase to another, such as solid-liquid and liquid-gas phase transformation. Phase change latent heat is an important criterion to measure the thermodynamic performance of a substance. In the process of phase change, the material absorbs and releases a lot of heat, and the temperature is constant in the process of phase change.
Cold and Heat Storage System

Phase change material

Original phase change energy storage material combination, achieve full coverage of the temperature range.
Cold and Heat Storage System

Storage cold and heat

Application scenarios:
- heating companies
- power plants
- power grids
- office buildings
- highway service areas
- railway passenger stations
- industrial parks
...
Cold and Heat Storage System

Products & APP

RED·HOO

BLUE·HOO

RED·HOO-PRO

CL OUD·HOO

COLORhOO

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**Product parameters of RED·HOO heat storage module**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy storage efficiency</td>
<td>95.29%</td>
</tr>
<tr>
<td>Heat storage capacity</td>
<td>180-220 kWh</td>
</tr>
<tr>
<td>Temperature of supply and return water</td>
<td>75/60°C</td>
</tr>
<tr>
<td>Circulating water volume</td>
<td>3.2 t/h</td>
</tr>
<tr>
<td>Maximum pressure at water side</td>
<td>1.6 MPa</td>
</tr>
<tr>
<td>Diameter of inlet and outlet pipe</td>
<td>φ76 mm</td>
</tr>
<tr>
<td>Combined supply area</td>
<td>800-300000 m²</td>
</tr>
</tbody>
</table>
Cold and Heat Storage System

Product --- RED·HOO

- Heat exchange station
- Electric to heat transfer device
- Source of electrical energy: 220V-35kVA
- Water pump
- Accumulation energy

Sources of electrical energy:
- Photovoltaic
- Wind power
- Thermal power
- Optothermal

Enlightening the future
## Cold and Heat Storage System

### Products --- BLUE·HOO

### Application:
Independent Intelligent Cold Storage Device

### Installation:
Indoor or outdoor, Vertical type

<table>
<thead>
<tr>
<th>Product parameters of BLUE·HOO cold storage</th>
<th></th>
</tr>
</thead>
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</table>
Cold and Heat Storage System

Product --- BLUE·HOO

[Diagram showing the flow of energy from solar, wind, and thermal power sources to theBLUE·HOO system, with temperatures and energy pathways labeled.]
Cold and Heat Storage System

HTHH cloud

Intelligent Management  Energy Management  Energy Consumption Statistic  Big Data of Energy

Intelligent management of temperature
Management of constant temperature and humidity
Building energy consumption statistics
Cold and Heat electricity online monitoring

Enlightening the future
Cold and Heat Storage System

Typical case---Tianjin Binhai Photothermal Industrial Park

Use RED·HOO phase change energy storage heating system

Enlightening the future
Project proposal: Tianjin Binhai Photothermal Investment Co., Ltd. Photothermal Industrial Park is located in Tianjin Dongli District High-tech Third Road, with a phase change energy storage heating plan of 400,000 feet. The heat load of heating building is 660 kW, the heating time is 24 hours per day, and the annual power consumption is 1.38 million kWh. The project is equipped with two 960 kW electric boilers and 26 sets of RED.HOO energy storage equipment. By optimizing the system and combining the advantages of Huahou Energy Intelligent Control System, we can make full use of valley power, improve system efficiency, refine heating, achieve precise heating, real-time regulation, and achieve energy saving and cost reduction. This project saves 40% of the annual heating cost for the owner.
# Cold and Heat Storage System

## Typical case---Tianjin Binhai Photothermal Industrial Park

### Analysis of project economic

<table>
<thead>
<tr>
<th>Project</th>
<th>Construction Conditions</th>
<th>Advantage</th>
<th>Disadvantage</th>
<th>Construction cost</th>
<th>Energy price</th>
<th>Efficiency</th>
<th>Operating Cost of Single Square Meter</th>
<th>Annual operating cost</th>
<th>Service life</th>
<th>Equipment payback period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase change energy storage</td>
<td>Electric</td>
<td>Mature technology, energy saving, environmental protection and flexible heating</td>
<td>Large capacity for power capacity expansion</td>
<td>2.2 million kWh</td>
<td>0.4273</td>
<td>95.3%</td>
<td>26.6 yuan / (m² · year)</td>
<td>585,000 yuan</td>
<td>20-30years</td>
<td></td>
</tr>
<tr>
<td>Electric boiler direct supply</td>
<td>Electric</td>
<td>Mature technology, environmental protection</td>
<td>High heating costs</td>
<td>660000 kWh</td>
<td>0.8962</td>
<td>98%</td>
<td>54.4 yuan / (m² · year)</td>
<td>11.97 million yuan</td>
<td>8-10years</td>
<td></td>
</tr>
<tr>
<td>Gas heating</td>
<td>Municipal Gas Pipeline Network</td>
<td>Potential safety hazards mild pollution</td>
<td>0.197 million m³</td>
<td>3.2</td>
<td>78%</td>
<td>36.7 yuan / (m² · year)</td>
<td>0.808 million yuan</td>
<td>6-10years</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
PART 05

Electric Vehicle Charging System

-- Hengtong New Energy (HTNE)
Electric Vehicle Charging System

Create Eco-system of New Energy Vehicle Charging Network

Intelligent Charging of New Energy Vehicles

Energy storage battery

Clean energy

Feed

New Energy Vehicle Charging City Solution

Sanitation car

Official car

Streetlight Charging pile

Ad

Freeway

Airport

Living Area

City

Airport parking

Bus stop

CBD

Hengtong Group

Enlightening the future
Electric Vehicle Charging System

Operation Status of Charging Network in China

- **23 provinces**
- **76 cities**
- **300 charging stations**
- **5,662 charging terminals**
- **400,000 kWh daily charge**
Electric Vehicle Charging System

Products – one-piece double gun series

1. TN-QCZ02-A08, 500V/750V 30/45KW Standard/High Double gun equally charged and wheel charged (compatible with single gun)
2. TN-QCZ02-A09, 500V/750V 60/90KW Standard/High Double gun equally charged and wheel charged
3. TN-QCZ02-A10, 500V/750V 120/150/180KW Standard/High Double gun equally charged and wheel charged
4. TN-QCZ02-A11, 500V/750V 300/360KW Standard/High Double gun equally charged and jointly charged

Advantages:
1. Multiple closed loop safety guarantee system
2. System function and safety self-test diagnostics
3. Level 4 active safety protection in the whole process of charging
4. Random adaptive power allocation technology
5. 15W ultra low standby power consumption

The value to you:
1. Electricity savings increased by 5% and profits increased by 5%
2. Each pile: 1226 yuan (120 KW) saved per year
3. Station (20 sets): saving 24528 yuan a year
4. Full life cycle (8 years): save 196224 yuan
5. Extend battery life by 30% and increase user profitability

Charging control strategy: (take 180KW as an example)
1. Double gun equally charged: 90KW per gun
2. Double gun wheel charged: One gun 180KW, another waiting
3. Double gun jointly charged: Two guns charge a car at the same time.
**Advantages:**

1. Meet the needs of fast charge and multi-vehicle simultaneous charging
2. Charging terminal can be equipped with LCD screen and card reader

**Charging control strategy:** (Take the total power of the main engine 180KW, terminal 45KW as an example)

1. One gun charge by main engine: 180KW
2. The main engine charges with two guns at the same time: equally charged 90KW and wheel charged 180KW
3. Main engine one gun, terminal two guns charging: main engine one gun 90KW, two terminal guns 45KW
4. Four guns charge at the same time: 45KW respectively
5. Customized power allocation strategy according to customer requirements

**The value to you:**

1. Reduce equipment input cost by 30%
2. Free the driver from the trouble of moving the car
3. Easy to operate
Advantages:
1. Meet the needs of fast charge and multi-vehicle simultaneous charging
2. Charging terminal can be equipped with LCD screen and card reader
3. The front and back door of the main engine is opened, and the installation and maintenance are convenient. The high-power system can be installed in parallel cabinets.

Charging control strategy:
(Take the total power of the main engine 360KW, two main guns 180KW and six auxiliary guns 45KW as examples)
1. Main gun charges: 180KW
2. Two main guns charge: 180KW for each gun
3. Eight guns charge simultaneously: 45KW for each gun
4. Two main guns and three auxiliary guns charge: one main gun 180KW, one 45KW, and three auxiliary guns 45KW respectively
5. Customized power allocation strategy according to customer requirements

The value to you:
1. Reduce equipment input cost by 40%
2. Reduce the usable area of the site
3. Free the driver from the trouble of moving the car
4. Easy to operate and easy to maintain
Electric Vehicle Charging System

Product advantage

- Redundant integrated design, no need to replace parts twice
- Maximum charging rate of 10C
- Automatic power distribution, maximum utilization of charging power
- Level four protection for vehicle batteries
- Nine real-time protection/fault automatic power off
- Long-distance power-on and power-off of charging pile

Enlightening the future
Electric Vehicle Charging System
High efficient and energy-saving design

Value of ultra-low standby power consumption:
Electricity savings increased by 5% and profits increased by 5%
Each pile: 1226 yuan (120 KW) saved per year
Station (20 sets): saving 24528 yuan a year
Full life cycle (8 years): save 196224 yuan
Extend battery life by 30% and increase user profitability

The ultra-low standby power consumption of the whole machine is 15W. In the standby state, the power system power is disconnected, the fan stops working, and the LCD screen sleeps.

The highest efficiency of the whole system is 96%.

Through the random adaptive power distribution technology of the Dingchong system power module, the charging process is fully charged and the charging efficiency is maintained above 94%.
Electric Vehicle Charging System

Intelligent group charge (double flexible charging reactor)
Electric Vehicle Charging System

Centralized fast charging station
Electric Vehicle Charging System

Typical case --- bus

Enlightening the future
Electric Vehicle Charging System

Typical case --- logistics

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Electric Vehicle Charging System

Typical case --- market
PART 06

Renewable Energy
Renewable Energy
Wind farm/Solar farm + ESS

Full industry chain service

- Investment in distributed photovoltaic power generation and distributed wind power generation
- Configure energy storage to maximize the use of renewable energy, zero waste
Renewable Energy
Typical Case——Dongying, China

Shandong Dongying Yuguang Complementary Project:
Hengtong is responsible for the project design and construction. After the project is connected to the grid, through the use of advanced remote control system, remote real-time monitoring, fault diagnosis, centralized operation management, reduce management costs and improve management efficiency; quick investment, stable electricity revenue, 6-8 years of project return cycle, phase II 140 MW has been prepared to carry out.

Project content:
100MW photovoltaic power generation BOO

Customer:
Dongying Xihe New Energy Co., Ltd.

Location:  China

Contract award: 2017
Contract amount: 720 million yuan
Current status:  Grid connected
PART 07

Hydrogen Energy
Hydrogen Energy

Hydrogen energy is the ultimate energy: efficient energy carrier, easy to store and convert, the most abundant, clean and sustainable, power density is three times that of other energy sources.

We are focusing on high-efficiency electrolyzed water hydrogen production and organic liquid hydrogen storage technology, and will soon launch products.
Thank you!

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