Helius New Energy Co., Ltd.

中光新能源
HELIUS

Company Profile

Company Structure

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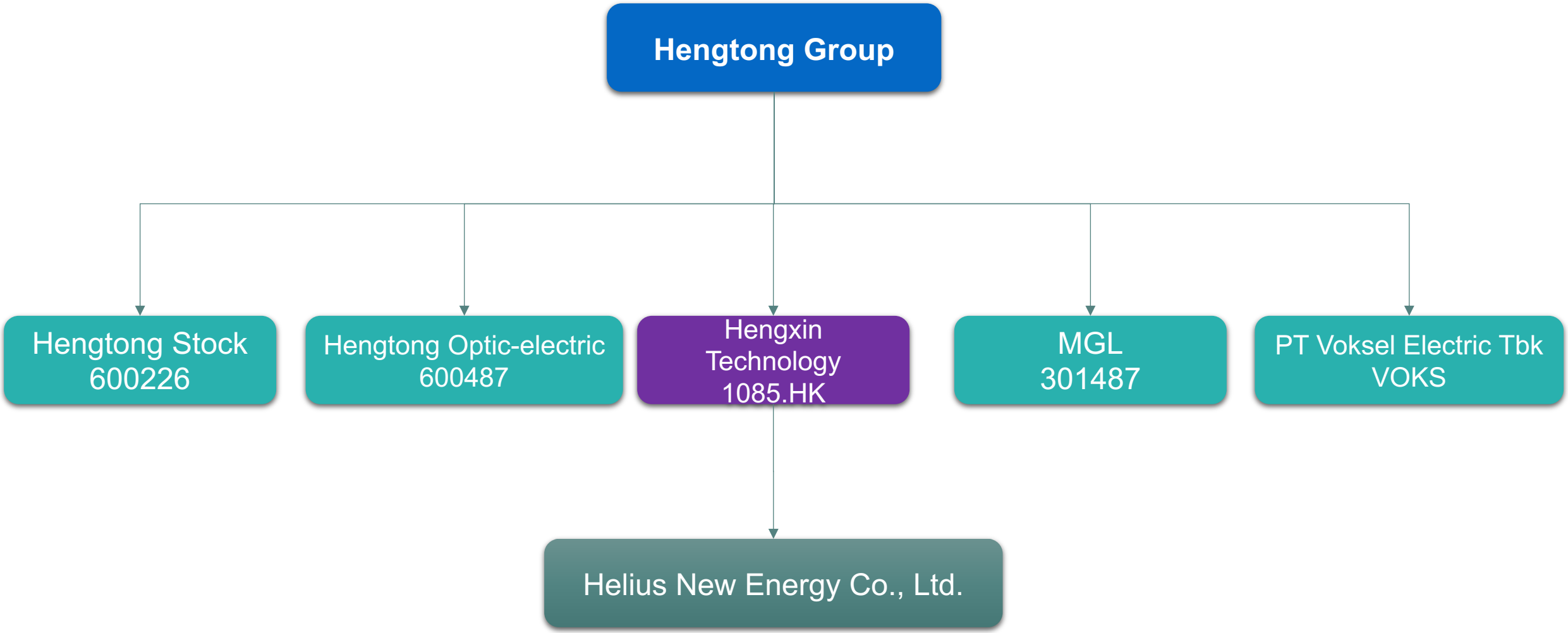

Majority of Shareholders

Jiangsu Hengxin Technology Co., Ltd.

- Hengxin Technology (01085.HK) was established in June 2003 with a registered capital of USD 138 million as a subsidiary of Hengtong Group. It is also listed in both Singapore and Hong Kong.

- Hengxin Technology is a green and low-carbon technology company focused on various forms of new energy, such as wind and PV energy storage, in line with peak carbon dioxide emissions and carbon neutrality goals. Additionally, it is a large high-tech enterprise providing wireless access system solutions. Its main business involves designing wireless access system solutions and producing antennas, RF cables, RF components, and base station modules for wireless communication systems. The company's operations cover more than 70 countries and regions across Europe, Asia-Pacific, and Central Asia, with trademarks registered in 14 countries and regions. It is a world-renowned provider of wireless access system solutions.

About Us

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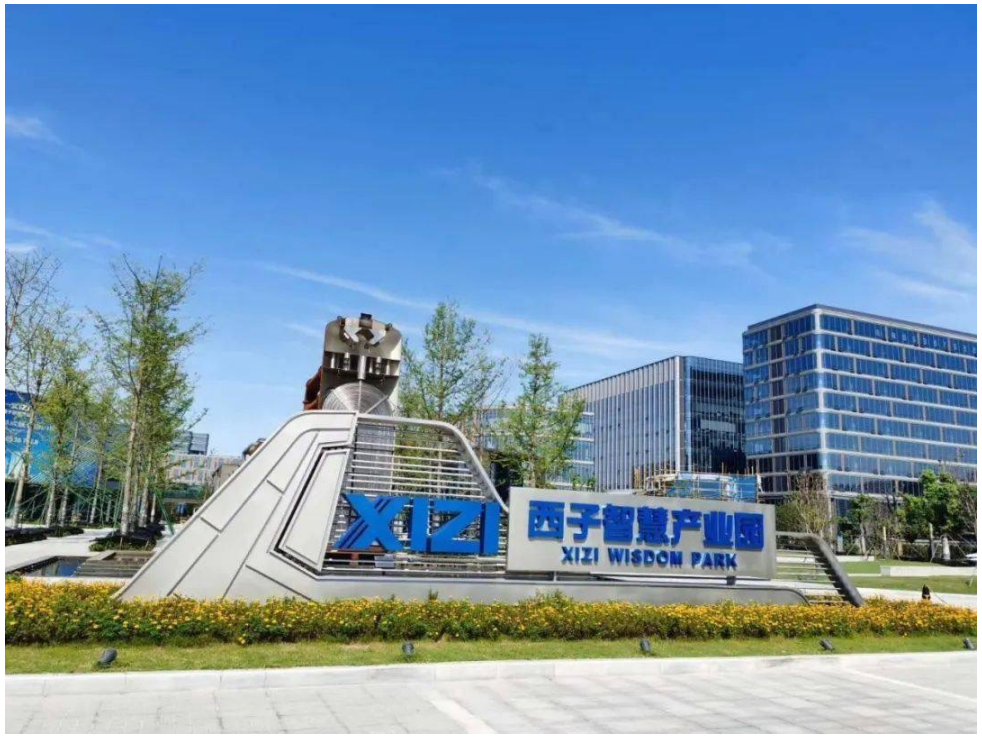
Helius New Energy Co., Ltd. is a leading provider of Concentrated Solar Power (CSP) and molten salt storage power generation solutions. Helius was the first pioneer to build a CSP and molten salt energy storage power station in China. We are dedicated to becoming an international platform company for investment, construction, and management in the field of CSP and molten salt storage power generation..



- We focus on three core strategic business development directions: Concentrated Solar Power (CSP), molten salt energy storage, and power station operation and maintenance.
- We run businesses around the world based on China's Belt and Road Policy, striving to build an international company with high technology, high quality, and global competitiveness.
- We have invested in the development and construction of CSP and molten salt storage power stations in numerous countries around the world..

Global Layout

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History

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2018

January 8, 2018

Helius New Energy Co., Ltd. was established with a registered capital of RMB 1,124,514,000.

2018

December 2018

Delingha 50MW CSP Station was connected to the grid for power generation. It is one of the first batch of CSP generation demonstration projects in China and the largest single project invested by Zhejiang Province in pairing assistance to Qinghai.

2020

December 2020

Qinghai Zhongkong Solar Power Generation Co., Ltd. has been wholly owned by Helius New Energy Co., Ltd.

2022

December 2022

The accumulative actual power output of Delingha 50MW CSP Station in 2022 was 146.4 million kWh, reaching 100.26% of the annual design power output, making it the first tower molten salt energy storage CSP power station with an annual power output exceeding the annual design power output in China and even in the world.

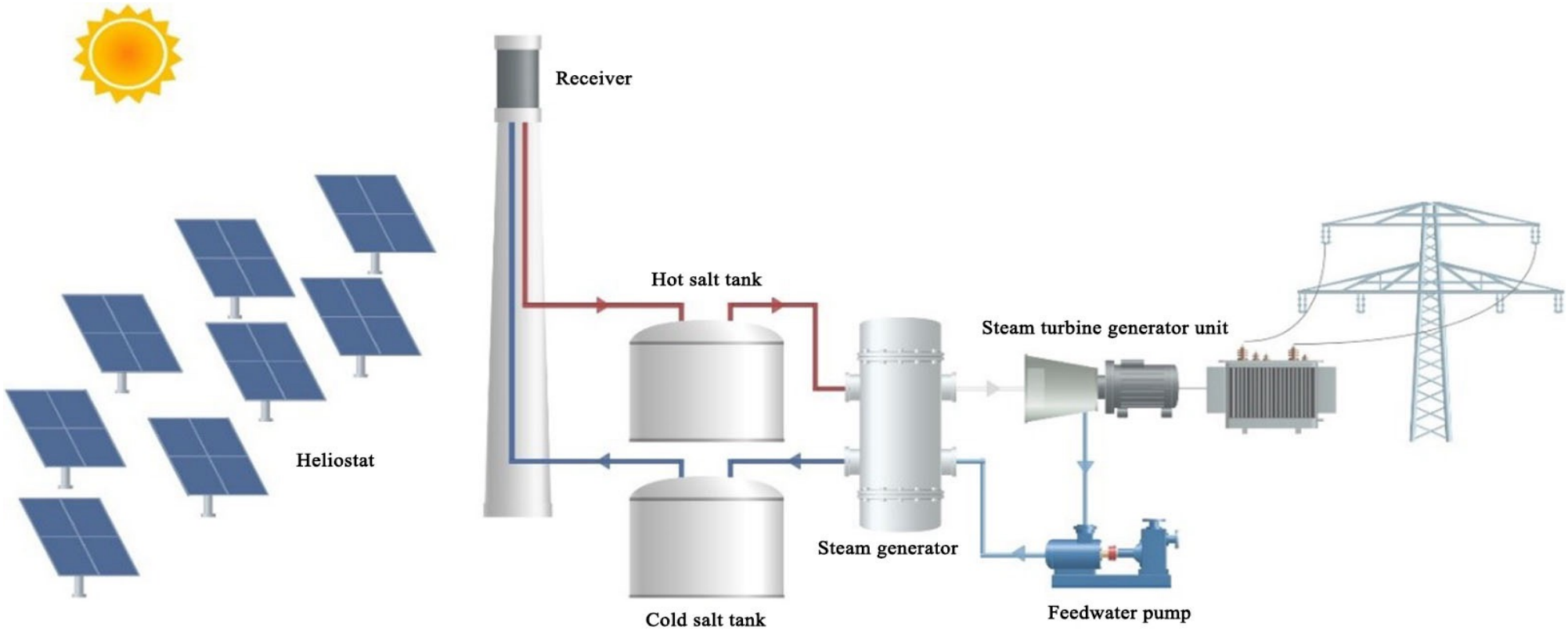
2024

June 2024

It has invested in the development and construction of CSP molten salt energy storage power stations in Chile, Greece, Mozambique and other countries, becoming an international CSP enterprise with leading technology and the largest installed capacity.

Main Technology

Composition and Principle of CSP Generation System



The heliostat gathers the sunlight and heats the molten salt to generate high-temperature and high-pressure steam to drive the steam turbine generator unit for power generation.

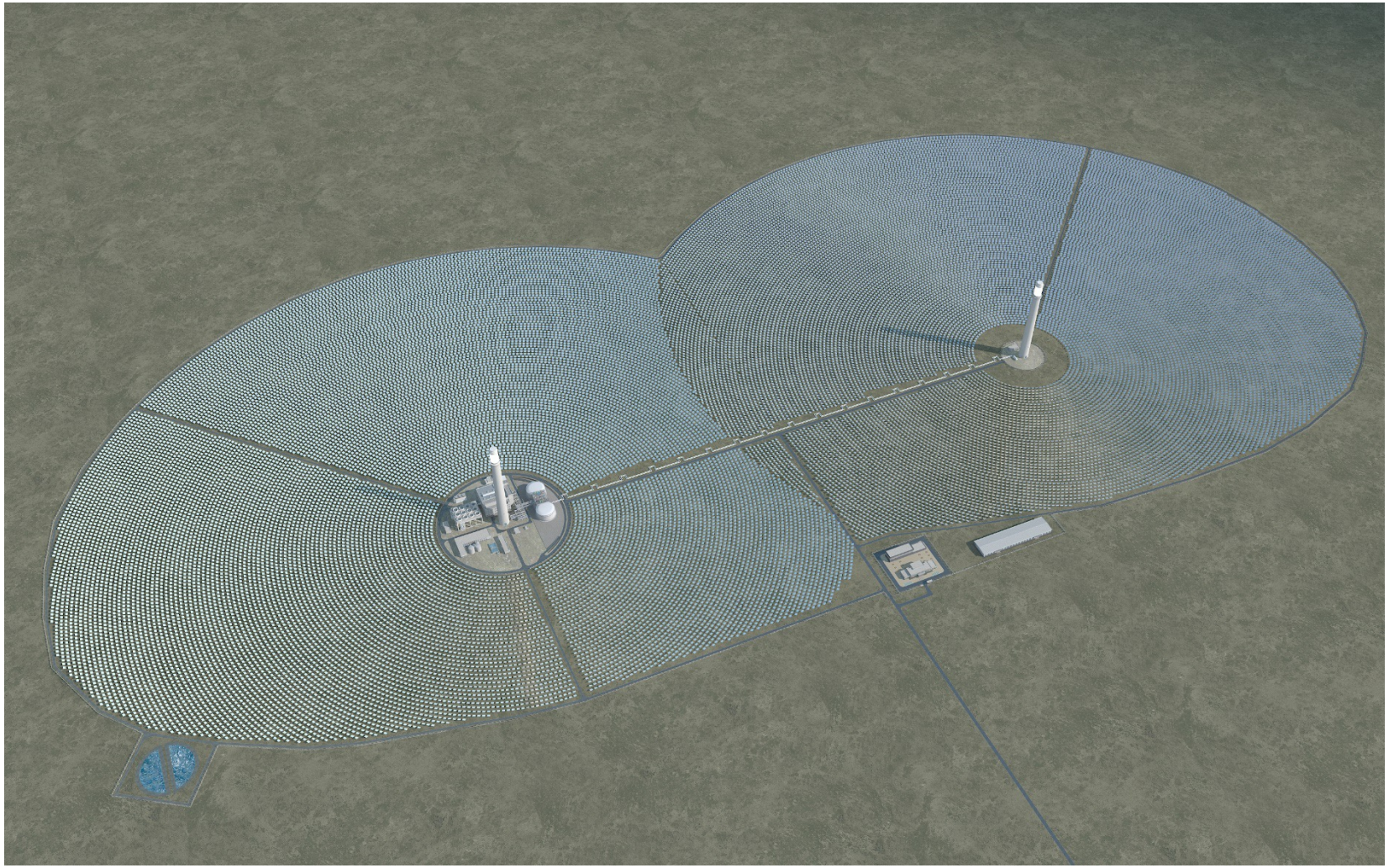
Qinghai Delingha 10MW CSP Power Station

- In July 2013, it was connected to the grid for power generation through hydraulic working medium;
- In August 2016, the two-hour energy storage transformation of molten salt working medium was completed;
- It is the first large-scale energy storage CSP power station in China and the third one in the world;
- The technical route of tower-type water/molten salt binary working medium is adopted;
- It is the only CSP power station that has been approved by the National Development and Reform Commission for a feed-in tariff of RMB 1.2/kWh;
- It has been running stably for more than 9 years, and 97% of the targets to be reached for power generation have been realized.

Qinghai Delingha 50MW CSP Station

- On December 30, 2018, it was connected to the grid for power generation;
- The total investment exceeds RMB 1 billion;
- It covers an area of 3.5 square kilometers, with 27135 heliostats, each heliostat covering an area of 20 square meters, and the heat absorption tower is 200 meters high;
- Designed annual power output: 146 million kWh;
- The achievement rate of power generation has continuously exceeded 100%, making it the first CSP and molten salt energy storage power station with an annual power output exceeding the annual design power output in China and even in the world!

Qinghai Delingha 350MW CSP Station

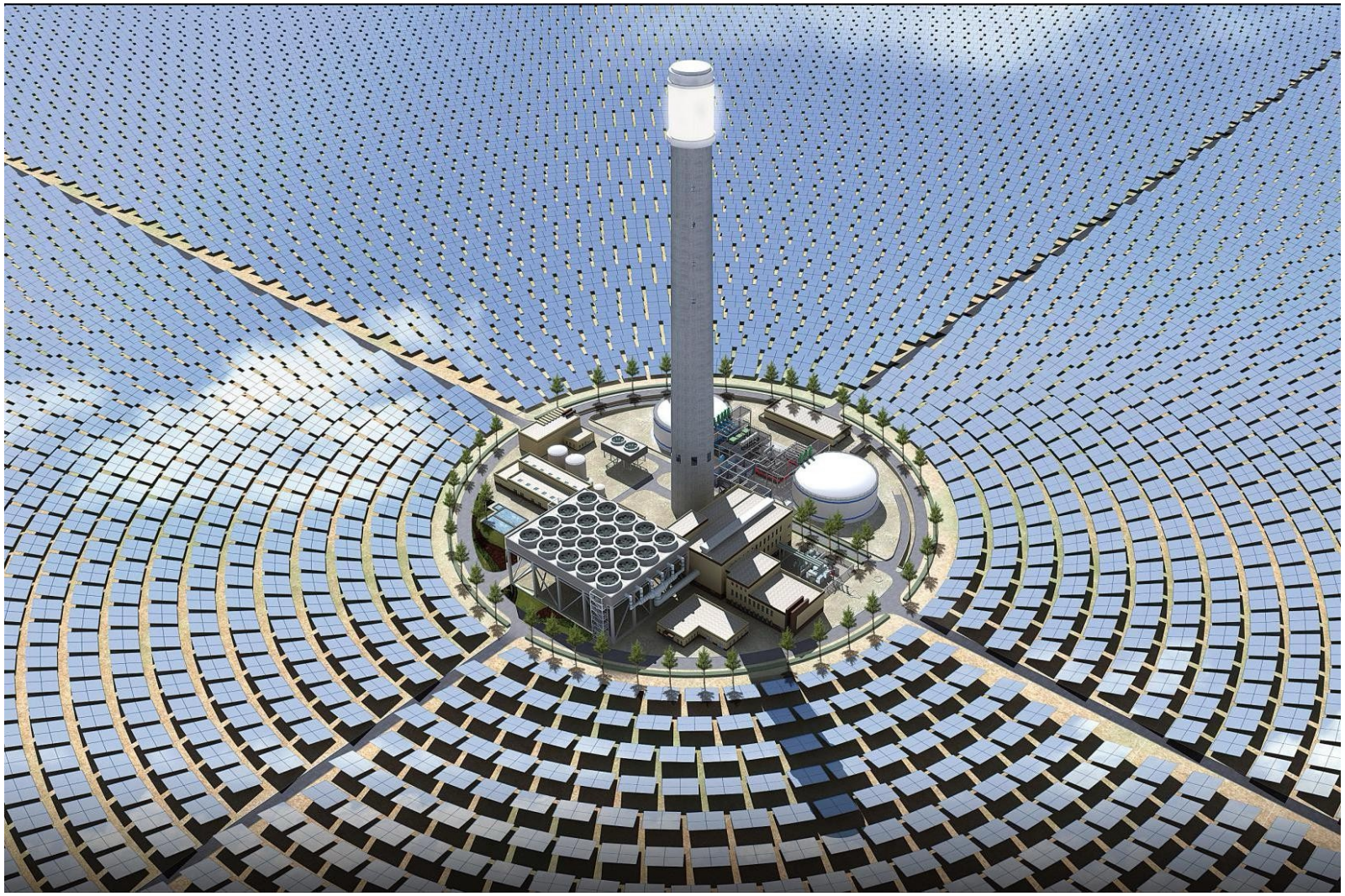


- The total investment exceeds RMB 4.5 billion;
- It covers an area of 16 square kilometers, with a heliostat field area of 2.8 million square meters and an energy storage duration of 10 hours;
- Designed annual power output: 832 million kWh;
- With a single installed capacity of 350MW, it is the largest CSP project in China and even in the world in terms of installed capacity that has been completed, under construction or planned.

50MW CSP Station in Crete, Greece

- The total investment exceeds RMB 1.5 billion;
- It covers an area of 3.5 square kilometers, with a heliostat field area of 390,000 square meters and an energy storage duration of 5 hours;
- Designed annual power output: 127 million kWh;
- The project is equipped with 5MW PV power to make up for the auxiliary power consumption.

Chile Calama 2 of 235MW CSP + PV Power Station

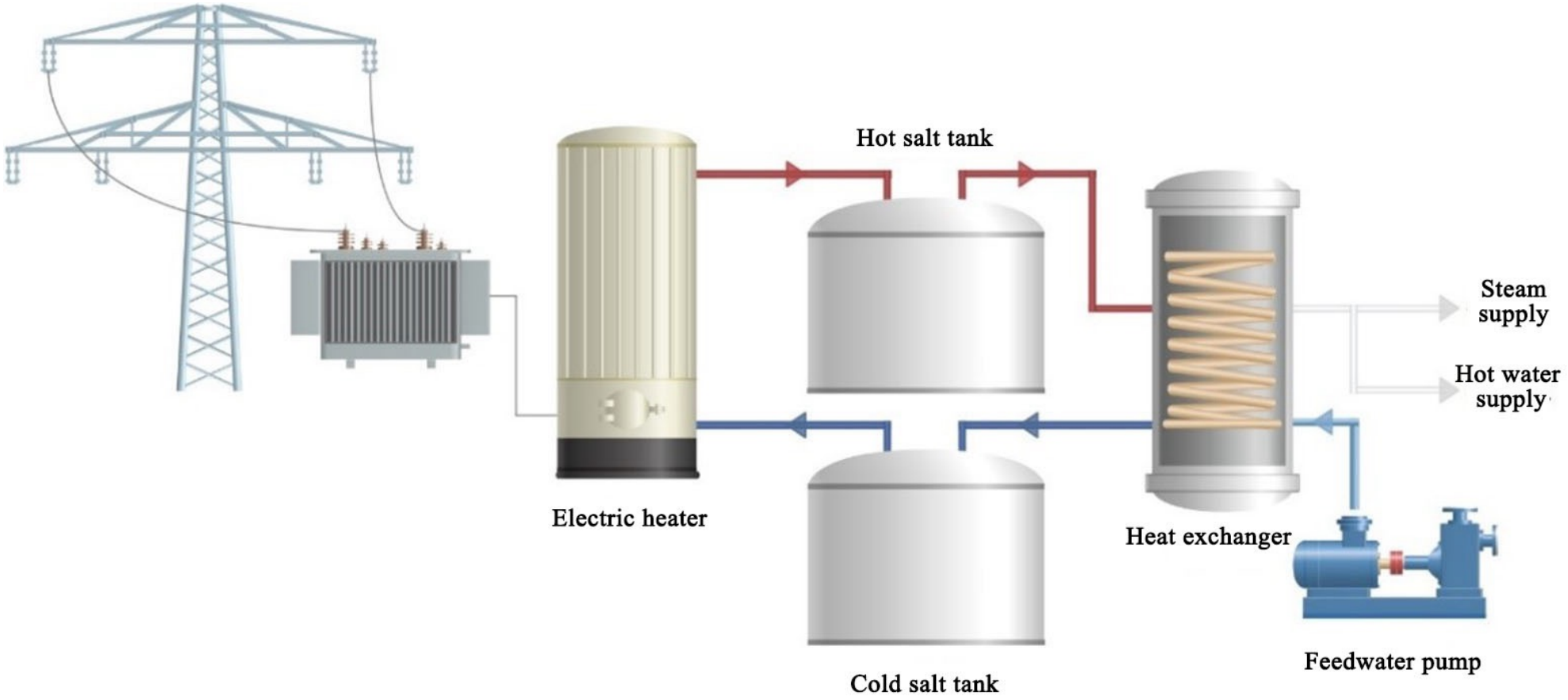


- The project adopts 2×235MW twin-tower double-units of CSP and 2X242MW PV to generate electricity on a 24-hour basis;
- The total investment exceeds RMB 8.5 billion;
- It covers an area of 20 square kilometers, with a heliostat field area of 150X20,000 square meters and an energy storage duration of 13 hours;
- Designed annual power output: 2,947 million kWh.

135MW CSP + 135MW PV Power Station in Atacama, Chile

- The project is a multi-energy complementary integrated power station of CSP + PV;
- In the project, the installed CSP capacity is 135MW, the total reflection area of the heliostat field is 1.3 million square meters, and the energy storage duration is 16 hours; the installed PV capacity is 135MW, with a capacity ratio of 1.3;
- The total major investment in the project exceeds RMB 4 billion;
- Designed annual power output: 1,095 million kWh;
- The project mainly supplies power to two local copper mines to meet their mining electrical load demands.

Composition and Principle of Molten Salt Storage Power Generation System

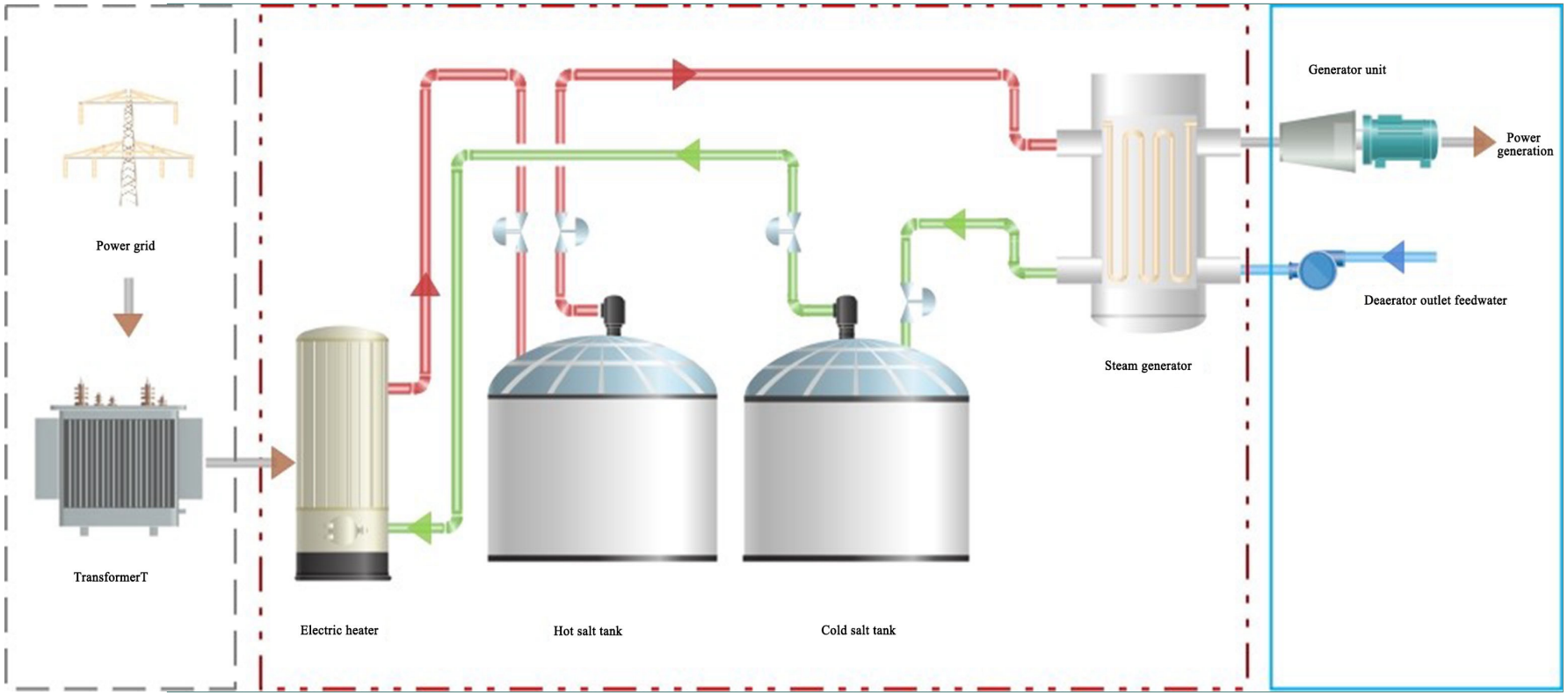


The molten salt is used to store energy at low temperature and release energy at high temperature for off-peak use.

SPR Molten Salt Storage Power Station in the United States

- In this scheme, electric power is stored in the molten salt storage system as thermal energy during charging, and this energy is released during discharging. The steam generated by the SGS enters the steam turbine generator unit for power generation.

- Project construction scale: 50 MW/500 MWh Molten Salt Storage Power Generation Project (including a 50 MW molten salt electric heating system, a 500 MWh molten salt storage system, a 50 MW steam generation system, and an N25 (8.83/535) steam turbine generator unit)



"Molten Salt Energy Storage+" Technology Demonstration Project in China

S/N	Project name	Construction scale
1	Molten Salt Energy Storage Demonstration Project for Zero-carbon Power Plant at Hangzhou Pharmaceutical Port	144MW/880MWh
2	Thermal Energy Storage Power Station Demonstration Project of Huangyan Thermal Power	42.5MW/340MWh

Heat

Heating, heat for production, hot water, steam, etc.

Electricity

Electricity for living and production equipment, etc.

Cooling

Commercial and public building cooling, production cooling, etc.

Gas

Compressed air, oxygen and nitrogen

Project Operation and Maintenance Services

With over ten years of practical experience in the construction, operation, and maintenance of CSP stations, the company provides standardized and systematic O&M solutions covering the entire life cycle, ensuring the healthy operation of most CSP station owners.

1 world record

Delingha CSP Station is the first molten salt storage power station in the world to achieve an annual actual power output that exceeds its designed annual power output.

2 service bases

Qinghai Base and Gansu Base can provide spare parts sharing and technical support for CSP stations throughout the entire northwest region.

3 major service resources

- An O&M team with 10 years of experience.
- The first training center for operation and maintenance talent in CSP generation in China.
- Continuous optimization of O&M costs

4 ace strategies

- Operation strategy for complex weather conditions.
- Conventional island frequent startup and shutdown, battery, and operation strategies.
- Stable operation strategy for heat storage and heat exchange power equipment.
- Efficient cleaning strategy for the heliostat field.

5 service products

- O&M hosting
- Talent dispatch
- Joint inventory and spare parts management
- Predictive maintenance
- Value-added sharing

Operation and Maintenance Training Center

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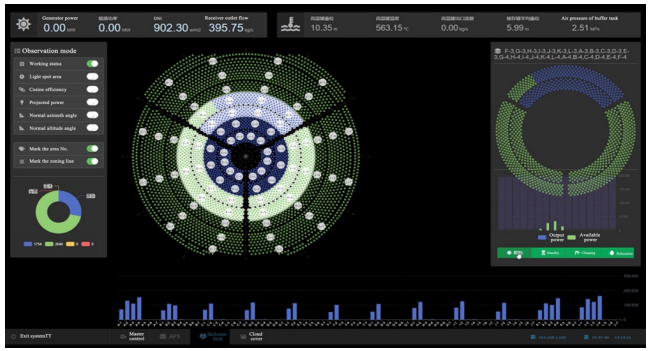
The first training center for operation and maintenance of CSP power generation in China

- The center has over 30 front-line CSP operators and maintenance experts, as well as more than 20 college professors and industry experts.
- Training is implemented through a combination of theoretical frameworks, simulation operations, and practical participation.

The first domestic verification platform for CSP generation in China



Training Courses

- ✓ Overall understanding of the overall process flow of molten salt energy storage power generation in a systematic way;
- ✓ Site safety education and safety examination for CSP power station;
- ✓ Emergency plan and accident handling;
- ✓ Identification and control of hazard sources;
- ✓ Responsibilities and division of labor of each post;
- ✓ Operation requirements for each post;
- ✓ Site visit + on-site teaching;
- ✓ Training examination (examination on basic knowledge of safety and operation).

Layout of Other New Energy Directions

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The company actively seeks new energy cooperation opportunities, such as high-temperature heat pumps, PV, electrode boilers, and solid heat storage, to expand its business scope.

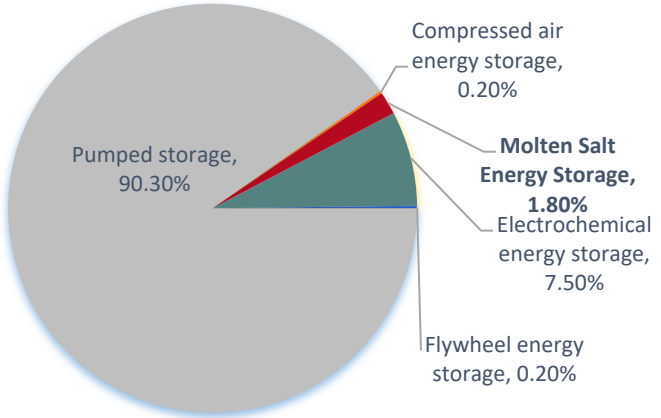
Scene Prospect

Current Status of Molten Salt Energy Storage Applications

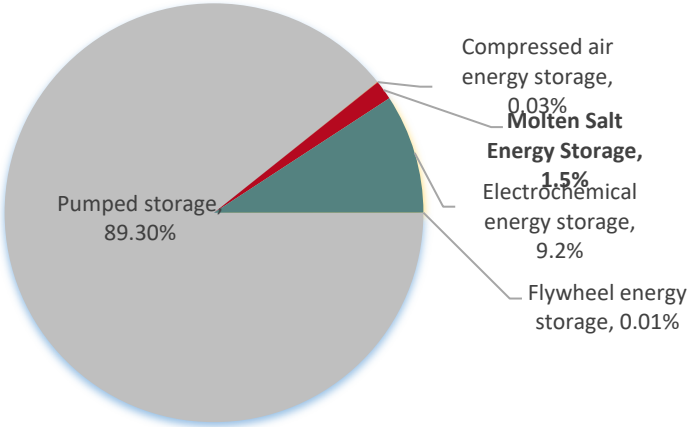
Under the "dual carbon" policy, China's energy industry has undergone significant changes: the proportion of new energy sources is increasing, the use of fossil fuels is being limited, the electrification of energy-consuming terminals is accelerating, and new demands are emerging for power grids and energy consumption methods. Energy storage has become a crucial link in the new power system

- Worldwide
  - A total of 191.1GW has been put into operation, with a year-on-year growth of 3.4%
  - Molten salt heat storage: **3.4GW** in total, with a year-on-year growth of 9.7%
- China
  - A total of 35.6GW has been put into operation, with a year-on-year growth of 9.8%
  - Molten salt heat storage: **0.5GW** in total, with a year-on-year growth of 25%
- Technical route
  - The cumulative installed capacity of pumped storage is the largest, less than 90% for the first time
  - Electrochemical energy storage develops rapidly, with lithium-ion batteries dominating
  - **The molten salt heat storage industry develops rapidly and the market scale continues to expand**

Worldwide



China



Data source: China Energy Storage Alliance (CNESA), Energy Storage Industry Research White Paper 2021

Characteristics of Molten Salt Storage Technology

Heat storage technology has the characteristics of **high energy storage capacity, long service life and low unit cost**, which is suitable for heating scenarios.

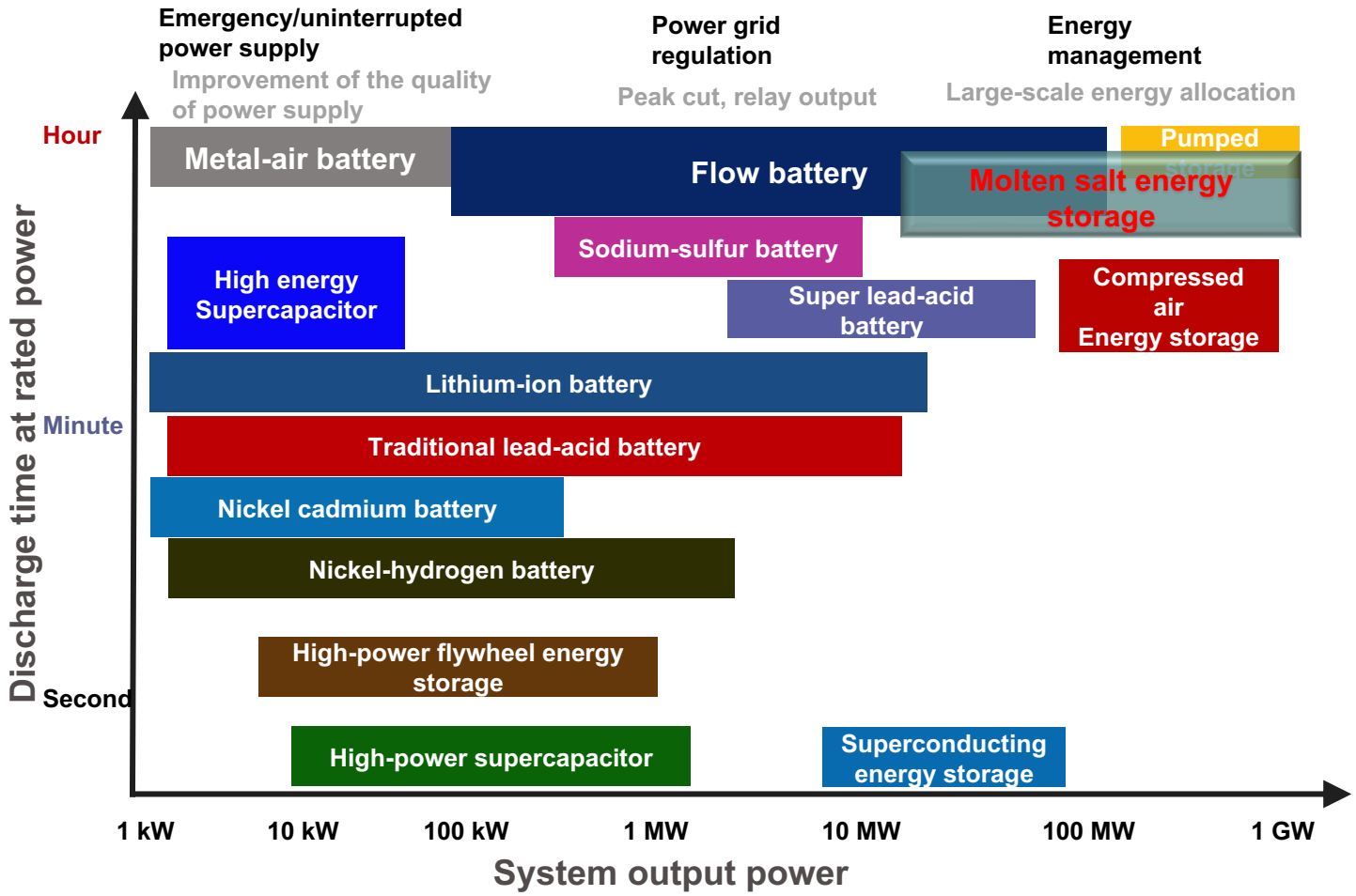
- Heat storage technology includes molten salt heat storage, solid heat storage, water heat storage, chemical heat storage and other types of technologies.

Type of energy storage		Efficiency	Service life/year	Energy storage capacity	Advantages	Disadvantages	System cost
Mechanical energy storage	Pumped storage	75%	>40	100MW level	Long service life and good stability	Difficulty in site selection	RMB4000-6000/kW
	Compressed air energy storage	60%	>25	10~100MW level	Large capacity	Difficulty in site selection	RMB6000~7000/kW
	Flywheel energy storage	Storage time related	15~20	100kW-1MW	Good cycle stability and high power density	High self-discharge rate and low current efficiency	RMB45000/kwh
Electrochemical energy storage	Lithium-ion battery	88%	5~10	Megawatt-hour level	High energy conversion efficiency and high energy density	High cost and poor safety	RMB 1600-2300/(kW-h)
	Vanadium redox flow battery	75%	5~20	Megawatt-hour level	Separate control of energy and power	Low electrolyte energy density	RMB 3500/(kW-h)
	Sodium-sulfur battery	75%	10~15	Megawatt-hour level	Fast response speed	Needs to be maintained above 300°C	RMB 5000/(kW-h)
	Lead-carbon battery	80%	5-7	Megawatt-hour level	High cost performance, high recovery rate and mature technology	Low energy density	RMB 1500/(kW-h)
Electromagnetic energy storage	Superconducting energy storage	95%	>20	1MJ level	Instant response and high overall efficiency	Short energy storage time, high temperature requirements and immature technology	-
	Supercapacitor energy storage	95~99%	5~15	Megawatt level	Instant response and maintenance-free	Low capacity, short energy storage time and high cost	RMB 10000/(kW-h)
Thermal energy storage	Sensible/latent heat	92~95%	25	100MW level	Stability, long service life and large-scale storage	A variety of high-temperature chemical thermal mass is required, with limited application	RMB 3000-5000/kW RMB 300~800/kWh
Chemical energy storage	Hydrogen energy storage	30~40%	25	Up to TWh level	The energy stored is large; the time of storage is also long	Low full-cycle efficiency	-

Technical characteristics of thermal energy storage:

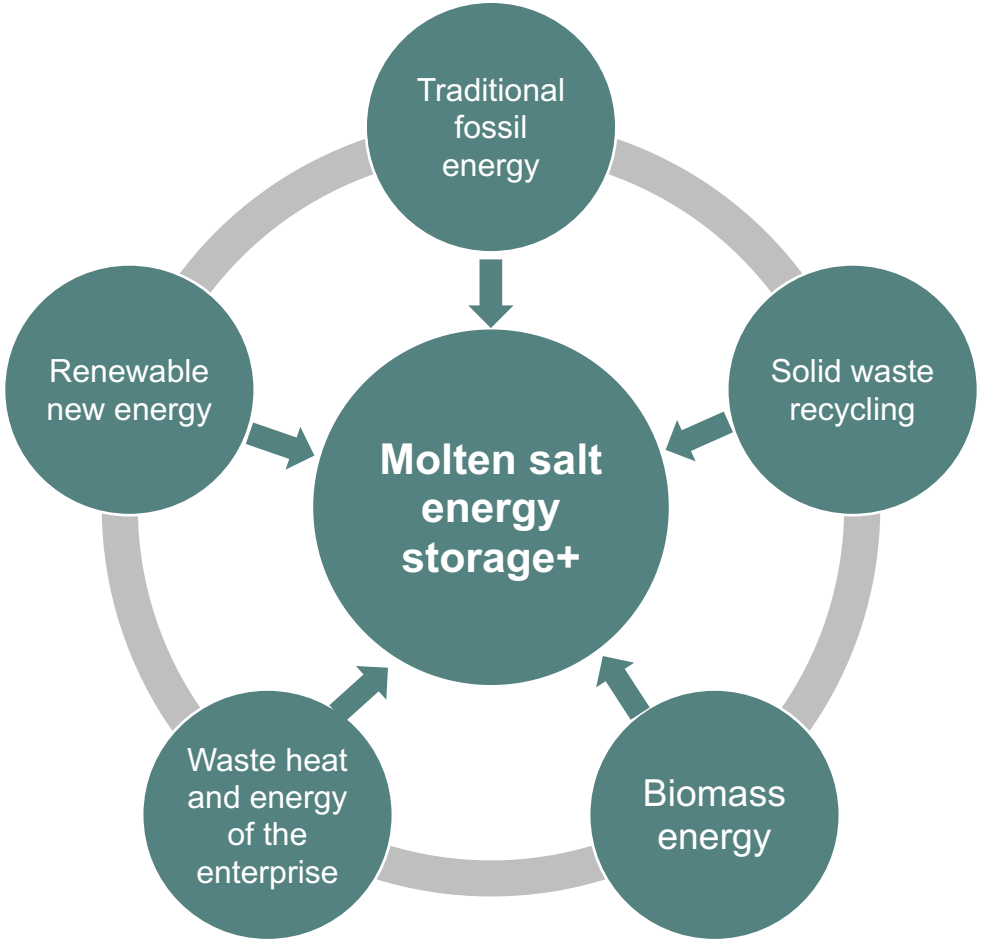
- ✓ Thermal energy storage has high capacity, long service life and low unit cost;
- ✓ In the heating scenario, the thermal efficiency is as high as 92~95%;
- ✓ High output power, 10~100MW;
- ✓ Long duration, 2~12h;
- ✓ Quick start and minute-level response;
- ✓ Low daily operating costs;
- ✓ Long service life (>30 years), safety and environmental protection.

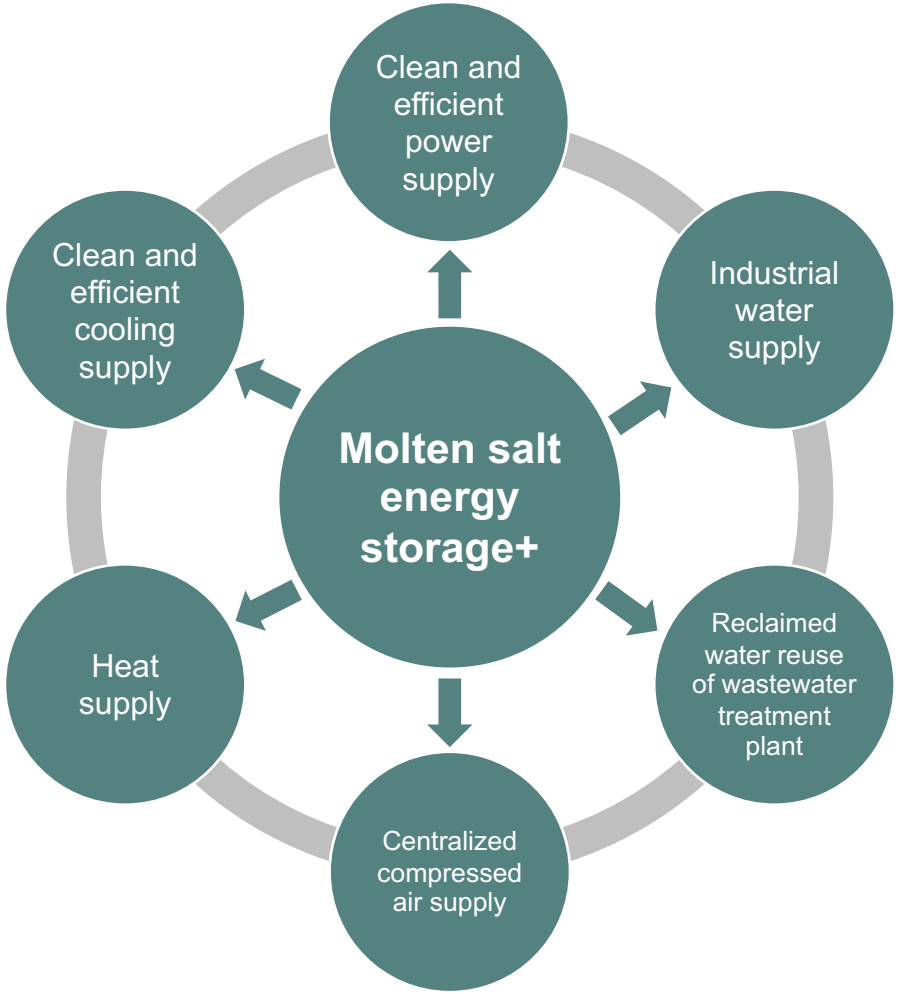
Characteristics of Molten Salt Storage Technology



Molten salt storage can meet the requirements of **high-power and large-capacity** energy storage

Applications





Heat Storage Products

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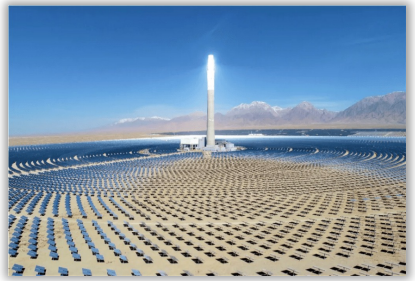
Focusing on various heat storage technologies, we provide a range of core technology products to meet the diverse steam demands of users.

Steam above 50t/h

- Photothermal power station

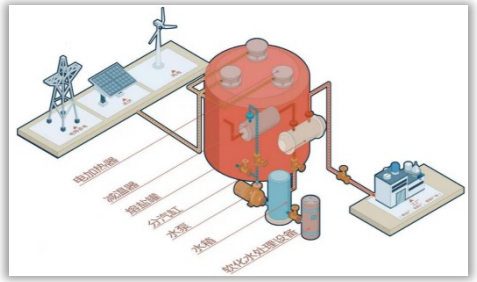


Steam 10-50t/h

- Molten salt energy storage station

Steam below 10t/h

- Single-tank molten salt steam generator



Large area of clean heating

- Heat pump

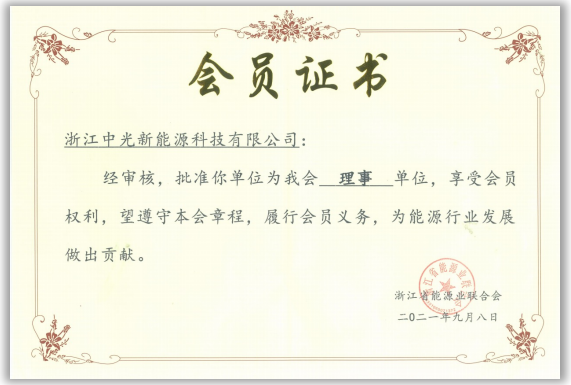
Small area of clean heating

- Air heater

Company Awards

Win-win Cooperation

- Qinghai Zhongkong Delingha 50 MW Photothermal Power Station has successfully passed a comprehensive technical evaluation by Fichtner, an independent engineering consulting company in Germany. The design technology of this power station is at the most advanced level among similar facilities worldwide.
- It is a council member of the China Solar Thermal Alliance, a member of CSPPLAZA, a council member of the Hangzhou Energy Storage Association, and a council member of the Zhejiang Provincial Energy Association.
- The company holds 27 patents, including 17 invention patents and 5 software copyrights



Win-win Cooperation

- In April 2023, Qinghai Zhongkong Solar Power Generation Co., Ltd. was awarded the "National May Day Labor Award" by the All-China Federation of Trade Unions.

- In May 2023, Helius New Energy Co., Ltd. successfully obtained the ISO "three-system" certification, which includes ISO 9001 (Quality Management System), ISO 14001 (Environmental Management System), and ISO 45001 (Occupational Health and Safety Management System)..

Win-win Cooperation

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太阳能光热联盟 CSTA China Solar Thermal Alliance

中广核 CGN

中核集团

BLUESTAR 中国蓝星

国家电投 SPIC

ST 世杰电器®

国家电网 STATE GRID

国网浙江综合能源服务有限公司
STATE GRID ZHEJIANG INTEGRATED ENERGY SERVICE COMPANY

西子洁能 XIZI CLEAN ENERGY SINCE 1955

Elpanne teknik

DREIECK ENERGY

国机集团 SINOMACH
中国联合工程有限公司

CosinSolar 可胜技术

CEEC 中国能建 ENERGY CHINA
浙江省电力设计院有限公司
ZHEJIANG ELECTRIC POWER DESIGN INSTITUTE CO., LTD.

中沃能源 ZHONG WO NEW ENERGY

SDPump®

哈电集团 HARBIN ELECTRIC CORPORATION

Foryou®

We are willing to join hands with partners in the energy industry to contribute our wisdom for the realization of China's dual carbon goals and create a better future.

Win-win Cooperation

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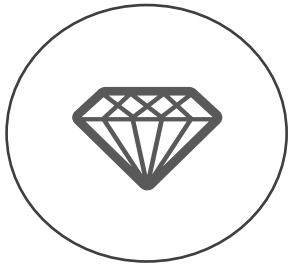
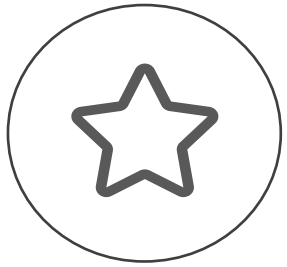


Abundant Capital

The shareholders of the Company actively lay out the opportunities for energy transformation and are willing to share industrial benefits with partners



Good Standing

State-owned capital participation, multiple media interviews for operation projects, annual reception of thousands of inspection personnel, open and transparent

Multiple Modes

With the comprehensive energy consumption scheme as the core, project cooperation is carried out in multiple modes such as **investment and EPC general contracting**

HELIUS

THANK YOU

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