

# Solar Power Tower Generation Technology

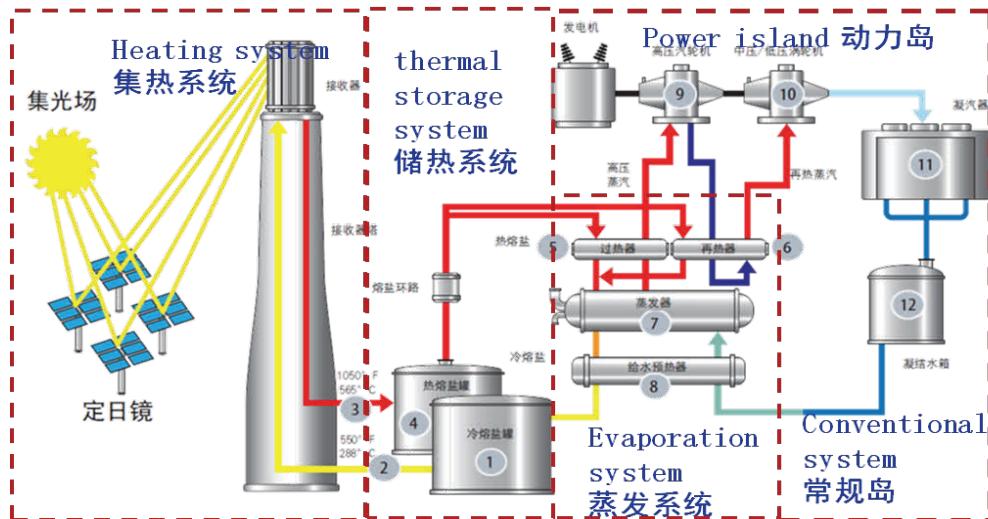
## 塔式光热发电技术

When solar radiation exists, turbogenerator generates electricity while storage system stores heat. In the absence of solar radiation, turbogenerator generates electricity at full load by utilizing heat release from storage system. When the capacity of the heat storage system is sufficient, the unit can generate electricity 24 hours in a row.

太阳能热发电机组通过配置储热系统并增大集热系统的容量，当太阳辐射存在时，汽轮发电机组发电的同时，储热系统进行储热；在太阳辐射缺失的情况下，汽轮发电机组利用储热系统的放热，仍然可以满负荷发电。储热系统的容量足够的情况下，机组可以连续24小时发电。

### HBC can supply 哈锅可提供：

- Heating system 集热系统：Mirror Field 镜场、Receiver 吸热器
- Thermal storage system 储热系统：Cold/hot storage tank 冷/热储罐
- Evaporation (heat transfer) system 蒸发（换热）系统：Preheater 预热器、Evaporator 蒸发器、Superheater 过热器、Reheater 再热器
- Conventional system 常规岛：High pressure heater 高压加热器、Low pressure heater 低压加热器、Degaerator 除氧器
- Other 其他：Expansion tank 膨胀箱、Sewage tank 排污罐、Other tanks 其他容器

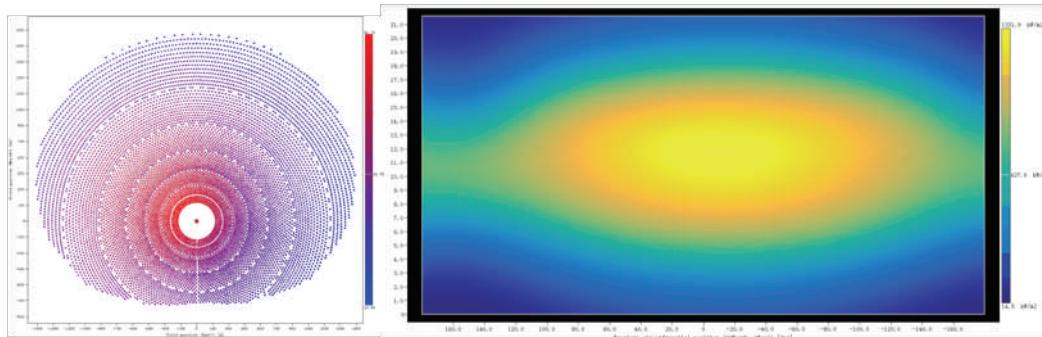


# Solar Power Tower Generation Technology

## 塔式光热发电技术

### Heat Collecting System: Mirror Field 集热系统：镜场

- Design and calculation of the whole solar field 整个镜场的设计和计算
- Intelligent control system 智能化控制系统
- Reliable assembly concept and optical guarantee 可靠的组装概念及光学保证
- The ray tracing algorithm is used to model the detailed energy density 光线跟踪算法进行详细能量密度建模
- Optimize solar field, reduce cost and save land 优化镜场，降低成本、节约土地



## Solar Power Tower Generation Technology

### 塔式光热发电技术

#### **Heat Collecting System: Receiver 集热系统：吸热器**

➤ The receiver of **10MW~200MW power station**;

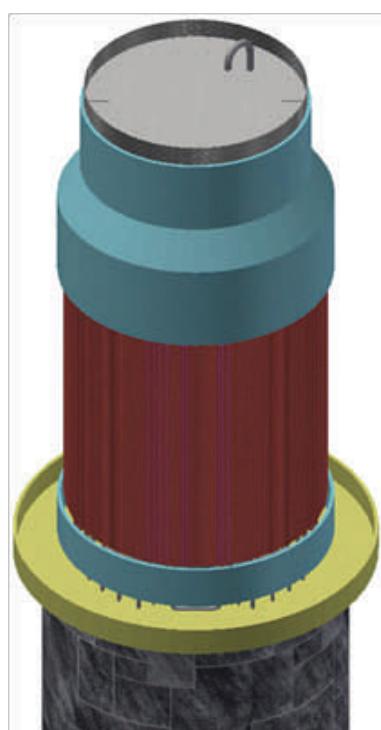
**10MW~200MW** 等级塔式光热电站的吸热器；

➤ The allowable limit heat flux can be up to **1100KW/m<sup>2</sup>** ;

允许极限热流密度可达**1100KW/m<sup>2</sup>**；

➤ Equipped with infrared camera temperature measurement system and back-plane temperature measurement system, it can avoid the problem of **excessive metal temperature** and **temperature difference stress** caused by excessive local heat flux.

配备红外摄像测温系统以及背板温度测量系统，能够避免局部热流密度过高导致**金属超温及温差应力**过大问题。光线跟踪算法进行详细能量密度建模。



Receiver panel 吸热器管屏

# Solar Power Tower Generation Technology

## 塔式光热发电技术

### Storage tank 储罐

➤ provide thermal storage system of 10MW-200MW Solar power station.

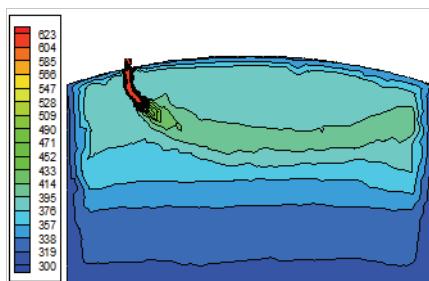
能够提供10MW–200MW光热电站储热系统。

➤ The medium temperature in the tank can reach 570 °C.

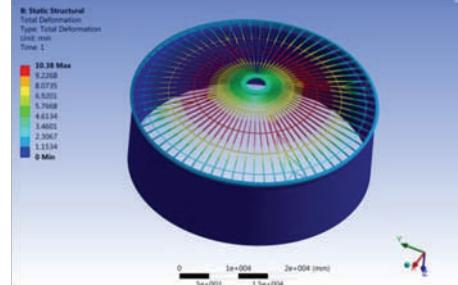
罐体内介质温度可达570℃

➤ The diameter of the tank can reach 50 meters.

罐体直径可达50米。



Preheating of tank 罐体预热



Tank stress analysis 储罐整体应力分析



# Solar Power Tower Generation Technology

## 塔式光热发电技术

### Evaporation (heat transfer) 蒸汽发生(换热) 器

➤ The performance calculation software and system heat balance calculation software of steam generator are designed and developed.

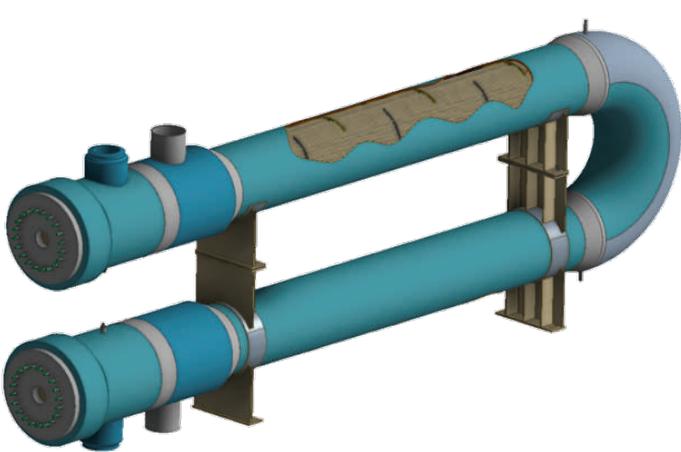
设计开发了蒸汽发生器设备性能计算软件及系统热平衡计算软件；

➤ Capable of island design.

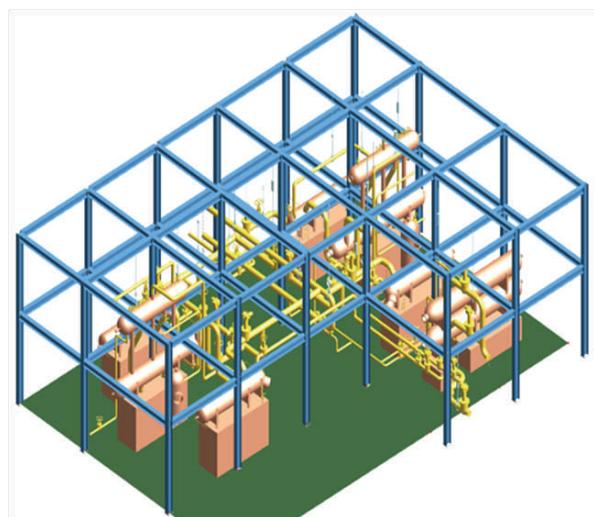
具备整岛设计能力。

➤ A 10MW-200MW oil - water, salt - water steam generator was designed ;

设计完成10MW-200MW等级油-水、盐-水蒸汽发生器。

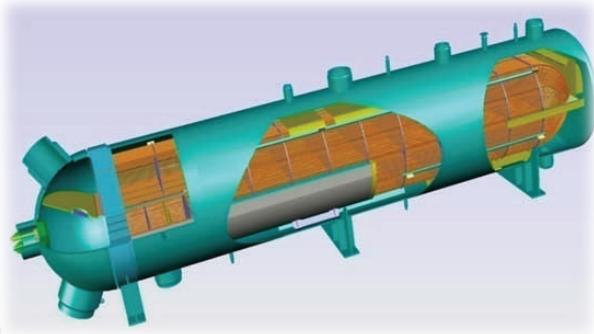


Hairpin heat exchanger 发夹式换热器

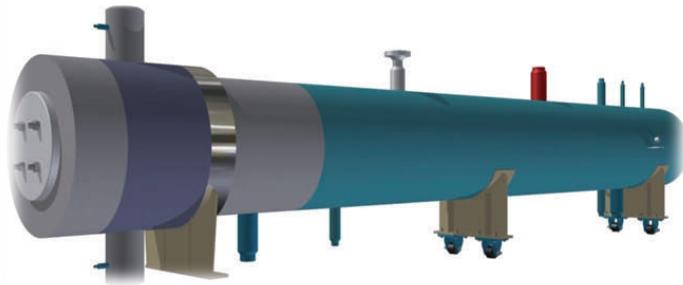


## Solar Power Tower Generation Technology 塔式光热发电技术

Conventional System and Others 常规常规岛及其他设备



High pressure heater 高压加热器



Low load preheater 低负荷预热器



Deaerator 除氧器



Steam separator 汽水分离器