

Background

Brief introduction

As a pioneer of green energy ports in Guangdong-Hong Kong-Macao Greater Bay Area in China, based on the background of the construction of the "Beautiful China", the company actively promoted the construction and application of the port shore power. The construction of the port shore power facilities of the company began on January 10th, 2018 and passed acceptance and was put into operation on February 8th. The shore power facilities can replace 211.82 tons of standard oil per year and the annual carbon dioxide emission reduction is 656.32 tons.

The port shore power project of Guangzhou China Resources Thermal Power Co., Ltd. has a design capacity of 1,000kVA, an output of high voltage of 6.6kV(60Hz) and 6kV(50Hz), an output of low voltage of 440V/(60Hz) and 400V(50Hz), and several power connection modes. It can meet the demands of power supply during the berthing and operation of a 50,000-ton ship. The whole shore power system includes the shore power supply system, a socket box of the shore-based power supply on the port, the local and remote monitoring management system, etc. It has functions such as synchronous grid connection, monitoring, protection, and communication of the shore power supply system. In the process of connecting to and exiting from the power supply of a ship, the ship can switch seamlessly without power failure.

Photos of port shore power equipment



The green energy center of China Resources Port



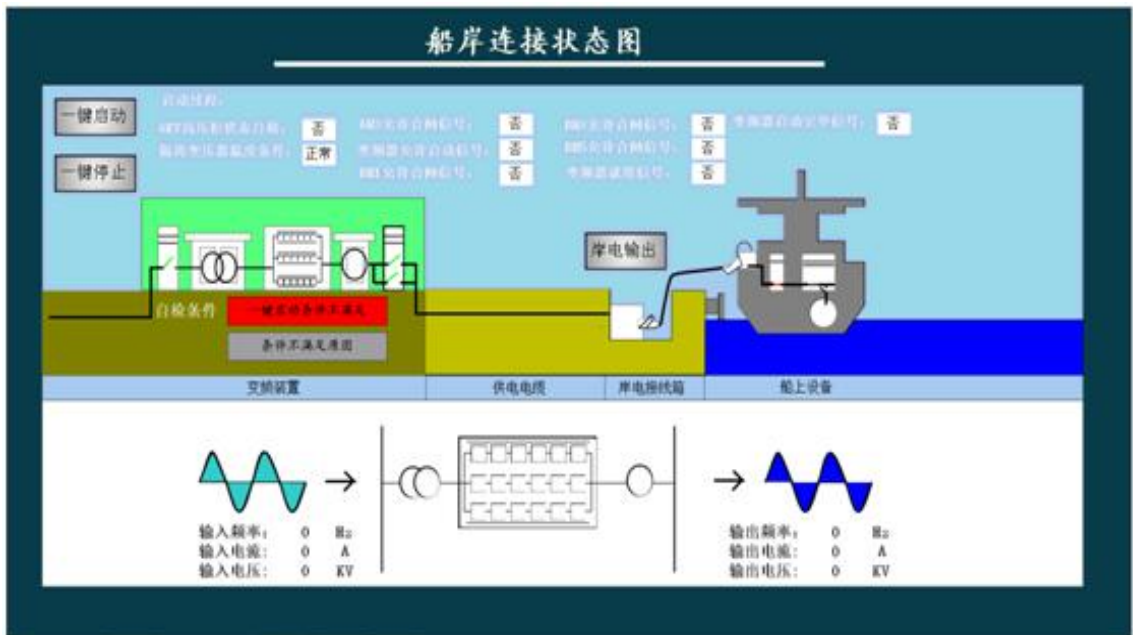
Electricity distribution room of shore power facilities



Lifting device of shore power cables



High-voltage socket box and low-voltage socket box



State diagram of connection between ship and shore

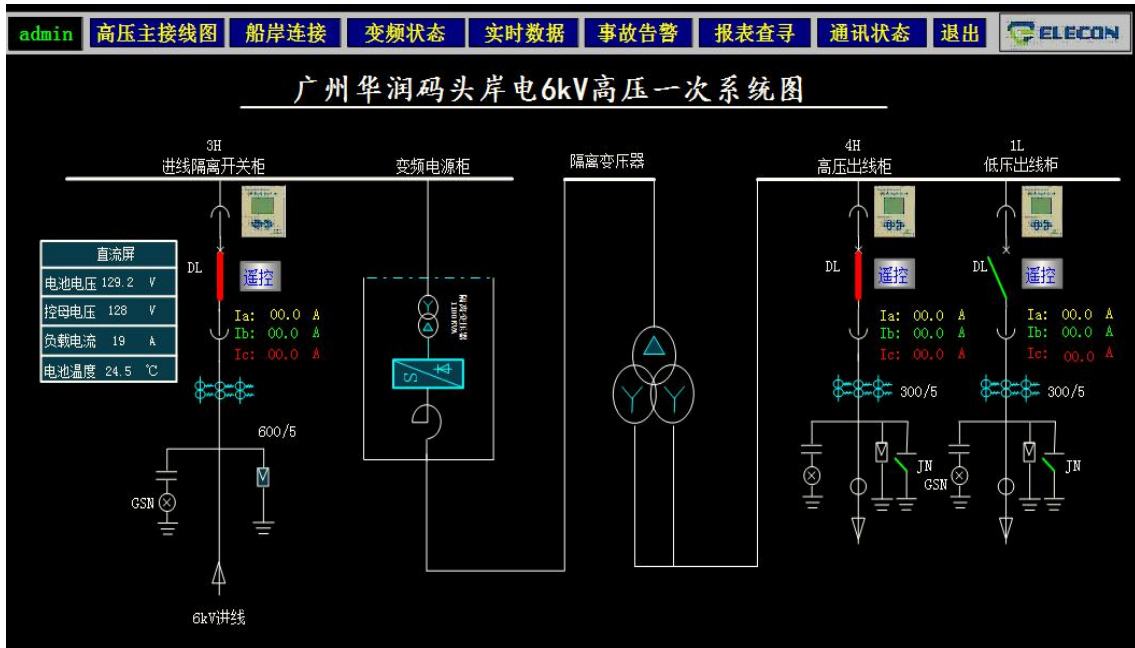
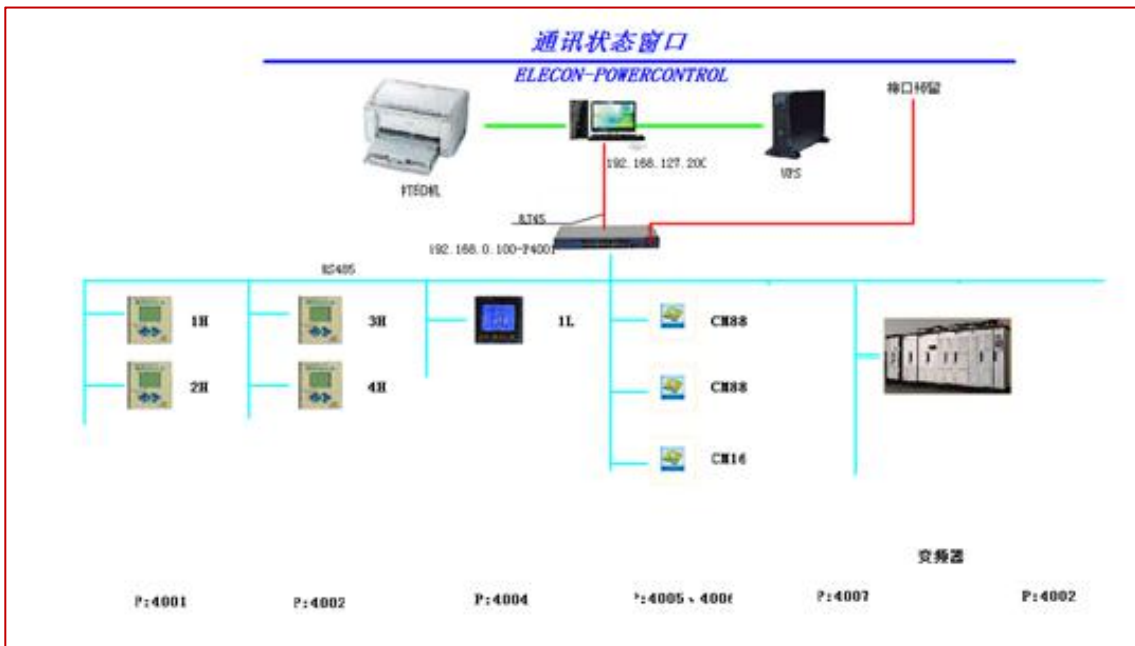


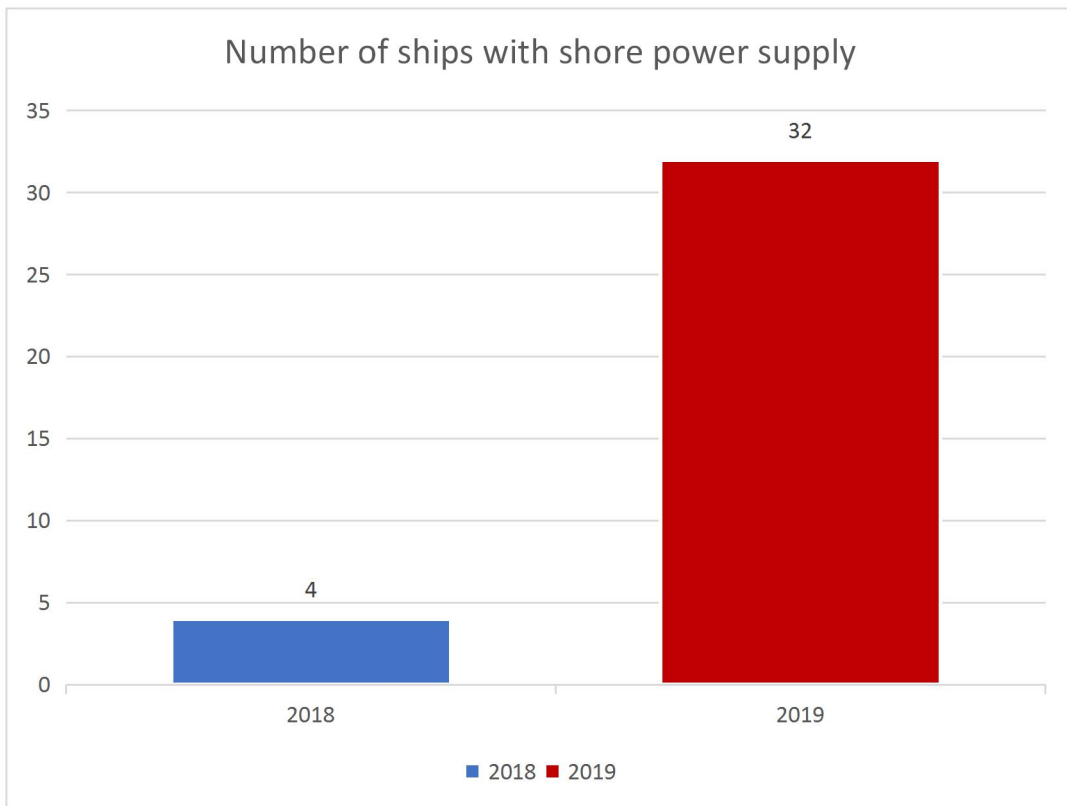
Diagram of 6kV high-voltage primary system of port shore power

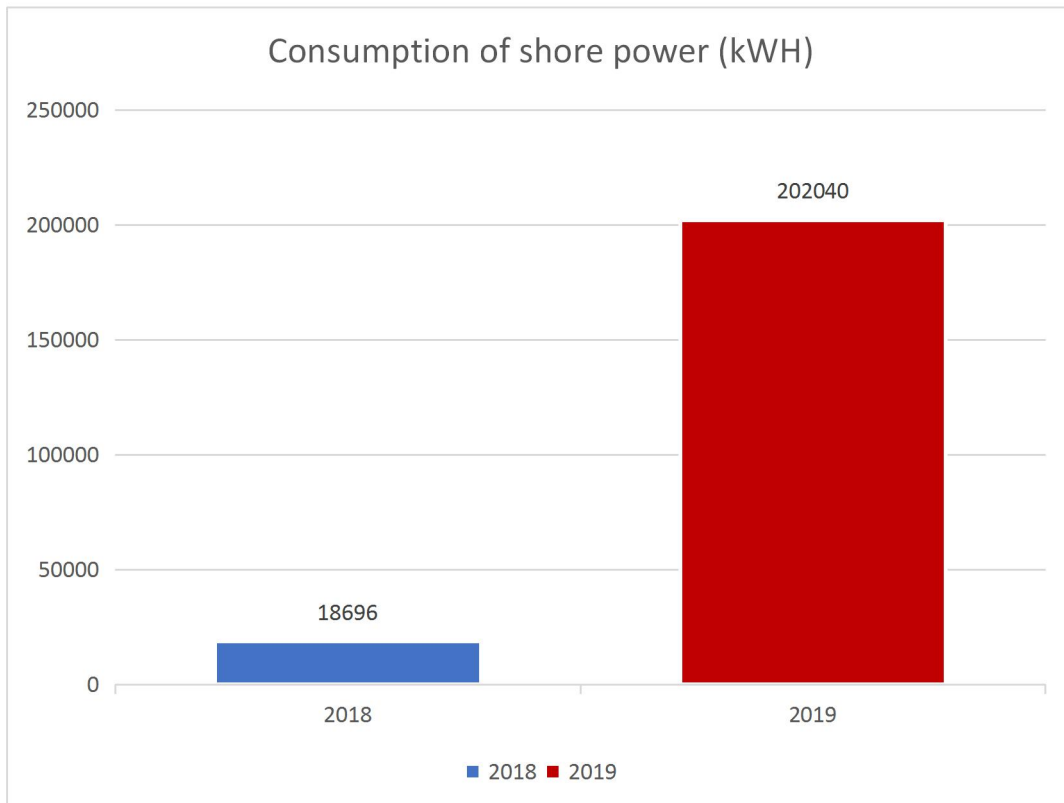


Window of communication state

 Data of shore power supply to ship

Year	Number of ships with shore power supply	Consumption of shore power (kWH)
2018	4	18696
2019	28	202040





Management measures for connection of shore power to ships

1. The company actively responded to the national policy of winning in the "Blue Sky Protection Campaign" and building a green port, implemented the Green Convention of Port and Shipping in Guangzhou, actively provided the shore power supply services to anchored ships, actively protected the ecological environment of the port, increasingly publicized the specific requirements of the emission control area of air pollution of ships in China, and continuously promoted the work of connection of port shore power to ships.
2. The company began to build a cable lifting device connected to a ship in September 2020, which was completed and used in November 2020. It improved the efficiency of connection of shore power to ships and the safety of operation and reduced the amount of labor.
3. The overall design of the shore power facilities of the company meets high requirements and complies with strict standards. It provides the original guarantee for the high connection rate.
 - 3.1 The shore power facilities comply with *Technical Standard for Shore-to-ship Power Supply System Engineering* (GBT51305-2018);
 - 3.2 The capacity of shore power can ensure the normal work of the equipment expected to be used when the unloading ship is connected to shore power. The scope of voltage and frequency adjustment is relatively wide, it outputs at the constant voltage and constant frequency, and the scope of voltage deviation is less than $\pm 5\%$;
 - 3.3 Ensure the equipotential connection and the necessary conditions for a safe circuit;
 - 3.4 There is no harmonic interference on the power grid on the shore and internal grid of ships;

3.5 The short-circuit current of high-voltage cables on board is limited, so as not to improve the existing switching capacity on board;

3.6 After the access to shore power, the use of the original equipments on board will not be affected, including insulation monitoring equipments;

3.7 The shore power system has various protections such as phase loss, short circuit, and interlock. It can ensure that the power supply can be cut off fast if the operation of the cables and transformers is abnormal;

3.8 The connection interfaces of the shore power system are standardized, which can realize fast wiring and access of different types of ships;

4. Publicity of the policy about the use of shore power

4.1 All staffs should study and be familiar with national laws and regulations and have a comprehensive understanding of the importance and necessity of the shore power connection.

4.2 The email of *Declaration on the Use of Port Shore Power of Guangzhou China Resources Thermal Power Co., Ltd.* should be sent to the ship to be berthed through the shipping agent in advance.

广州华润热电有限公司码头岸电使用申明书
Guangzhou China Resources Power Co., Ltd.
Wharf shore power use declaration

船舶名称 Name of vessel _____ 航次 Voyage number _____

1、是否向贵方申明我司码头可以提供岸电设施？（我司码头可以提供先进的稳定的岸基供电设施。）

Whether to declare to you that our terminal can provide shore power facilities? (Our wharf can provide advanced and stable shore-based power supply facilities.)

是(yes) 否 (no)

2、是否向贵方申明我司码头提供岸电的具体参数？（广州华润热电有限公司码头岸电设计容量 1000kVA，输出高压 6.6kV(60Hz)和 6kV(50Hz)；低压 440V/(60Hz)和 400V(50Hz)、最大电流 600A。）

Whether to declare to you the specific parameters of shore power provided by our wharf? (The quayside design capacity of Guangzhou China Resources Thermal Power Co., Ltd. is 1000 kVA, with output voltage of 6.6 kV (60 Hz) and 6 kV (50 Hz); low voltage of 440 V/(60 Hz) and 400 V (50 Hz) and maximum current of 600A.)

是(yes) 否(no)

3、是否向贵方申明我司码头已配备经过专业培训的技术人员并且提供技术支持？（我司码头专业技术人员已通过相关部门培训并持有电气设备操作资格证书可以提供技术支持。）

Whether to declare to you that our wharf is equipped with professionally

Shore power use declaration

4.2.1 Declare to the ship that the port of our company can provide shore power facilities and specific parameters of shore power.

4.2.2 Declare to the ship that the port of our company has technical personnel who have received the professional training and provides the technical support.

4.2.3 Declare to the ship their responsibilities and cut-off points of work during the shore power connection.

4.2.4 Declare to the ship that the ships should first use shore power after berthing.

5. The shore power system must be operated by personnel with corresponding qualifications according to the qualified operation order. Personnel without qualification or operators without the operation order are strictly forbidden to operate the shore power system. The shore power system must be operated by at least two people and supervised by one person. Pay attention to the operation safety and prevent accidents.

6. Check the shore power line at any time and keep good insulation. Protective measures should be taken for the plug-in box and cables in the shore power room. Expect for connection and maintenance, the door of the plug-in box should be closed to prevent coal dust, sand, and dust from contaminating the power supply equipment. During the power supply, the operator should check the shore power system every 2 hours and make records. When the shore power equipment is not used, protection and regular inspection and maintenance are required.

7. Safety management and improvement of the connection stability

7.1 During the use of shore power by a ship, safety fences and safety signs should be placed around the plug-in box, and a specially-assigned person should monitor and check regularly.

7.2 In case of gale and thunderstorm rain, we and the ship should have a specially-assigned person responsible for supervision. Take the safety protection measures and check and record regularly. Notify the other party in a timely manner if any problem is found. The shore power equipment should not be used when the gust is greater than near gale or there is a warning of a violent typhoon.

7.3 It is strictly forbidden to plug in or unplug when the equipment is live. Corresponding protective measures should be taken when you plug in or unplug in rainy days.

7.4 During the use of shore power by a ship, ensure smooth communication with staffs of the ship and ensure that the linkage is fast and the problems can be handled quickly in case of any abnormality during the power supply.

7.5 When disconnecting and connecting the shore power, you must wear protective equipments and ensure sufficient illuminating brightness during operation at night.

7.6 To disconnect and connect the shore power system, it is strictly prohibited to operate when the equipment is live.

7.7 When the shore power system is connected to a ship, it should be connected to the special power interface. Do not pull and connect without authorization and prevent the shore power cable from falling into the water.

END