



# QUALCOMM HQ, USA



Qualcomm, CDMA patent holder, leader of wireless communication



Mr. Jacobs, Chairman of Qualcomm, and Mr. Zhang Yue, chairman of BROAD take part in the ribbon-cutting ceremony on Jan. 18th, 2008

- Power generator supplies electricity to building, BROAD chillers recycle exhaust for cooling, no fuel input
- Cooling capacity 17,000kW  
3×Exhaust chillers (total 3 phases in 2006, 2012 & 2013)  
Cooling efficiency 115%
- Power generator capacity 13,500kW  
3×Gas turbines  
Power generation efficiency 35%
- Payback period 1.7 years
- **Yearly energy saving 7,000 ton oil**
- Yearly CO<sub>2</sub> cutting 21,000 ton
- Equivalent of planting 1,140,000 trees



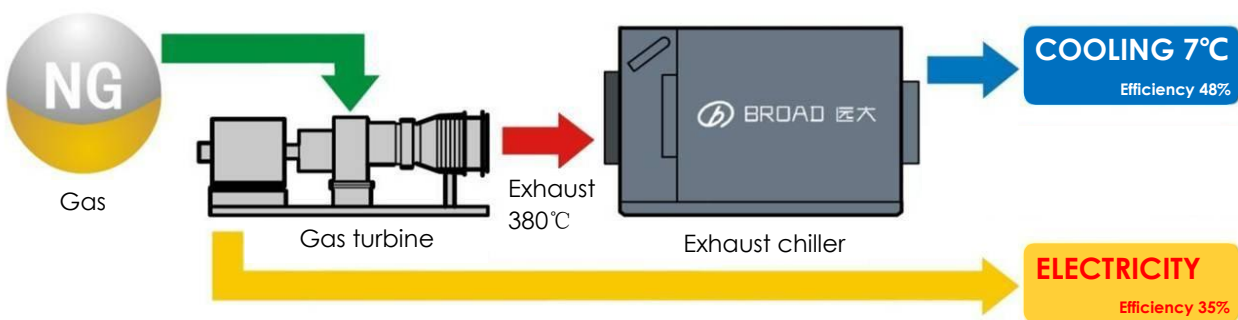
Gas turbine engine



BROAD exhaust non-electric chiller

## BROAD CCHP Exhaust type

Energy efficiency: Power + Cooling 83%



# MILITARY BASE IN NORTH CAROLINE, USA



North Caroline base, one of the six biggest US local military bases

- Power generator supplies electricity to buildings or power grid, BROAD chillers recycles exhaust for cooling, no fuel input
- Cooling capacity 3,500kW  
1 x Exhaust fired chiller  
Cooling efficiency 136%
- Power generator capacity 5,200kW  
1 x Gas turbine  
Power generation efficiency 35%
- Payback period 4 years
- **Yearly energy saving 833 ton oil**
- Yearly CO<sub>2</sub> cutting 2,500 ton
- Equivalent of planting 135,000 trees



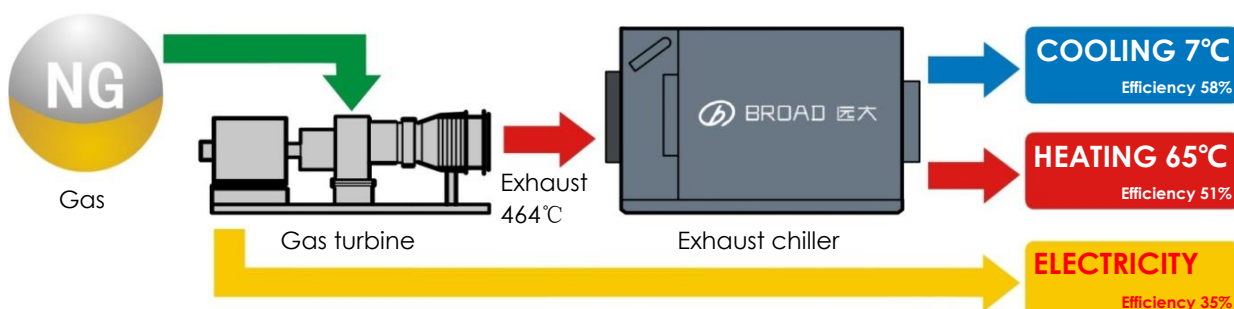
Base of the US 82nd Airborne Division



BROAD CCHP exhaust non-electric chiller

## BROAD CCHP Exhaust type

Energy Efficiency: Power + Cooling 93%    Power + Heating 86%



# MADRID AIRPORT, SPAIN



One of the four largest airports in Europe

- Power generators supply electricity, BROAD chillers use jacket water for cooling, no fuel input
- Total cooling capacity 19,800kW  
6 x Hot water chillers  
Cooling efficiency 76%
- Power generator capacity 33,000kW  
6 x Gas engines  
Power generation efficiency 41%
- Payback period 1 year
- **Yearly energy saving 5,800 ton oil**
- Yearly CO<sub>2</sub> cutting 17,400 ton
- Equivalent of planting 940,000 trees



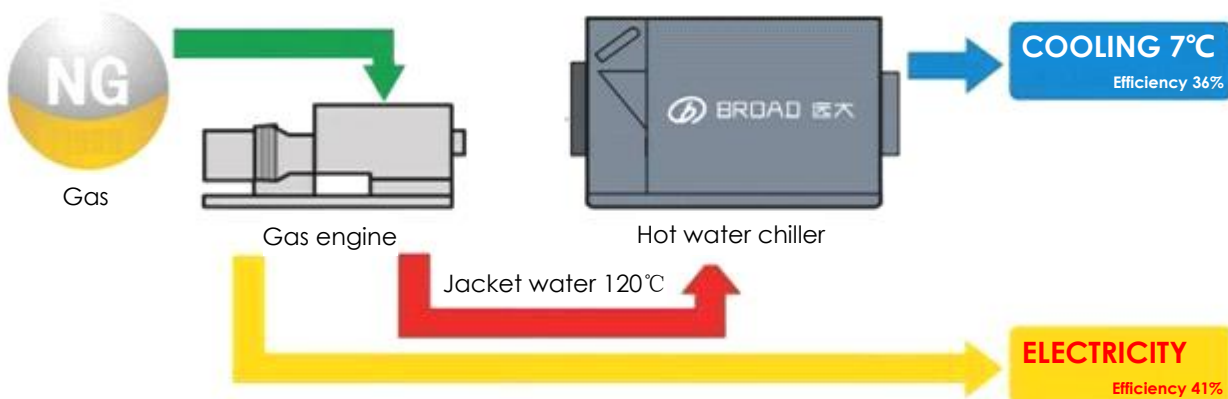
Indoor scene in terminal



BROAD hot water type non electric chiller

## BROAD CCHP Hot water type

Energy Efficiency: Power + Cooling 77%



# SPIN MILL, JAKARTA INDONESIA



A leading enterprise in Indonesian textile industry

- BROAD packaged systems are implemented. Power generator supplies electricity, and BROAD chillers recycle exhaust for cooling
- Cooling capacity 13,700kW  
8x Exhaust & hot water chillers
- Cooling efficiency 112%
- Power generator capacity 16,000kW  
8 x MTU gas engines
- Power generation efficiency 38%
- Payback period 1.6 years
- **Yearly energy saving 6,900 ton oil**
- Yearly CO<sub>2</sub> cutting 20,700 ton
- Equivalent of planting 1,118,000 trees



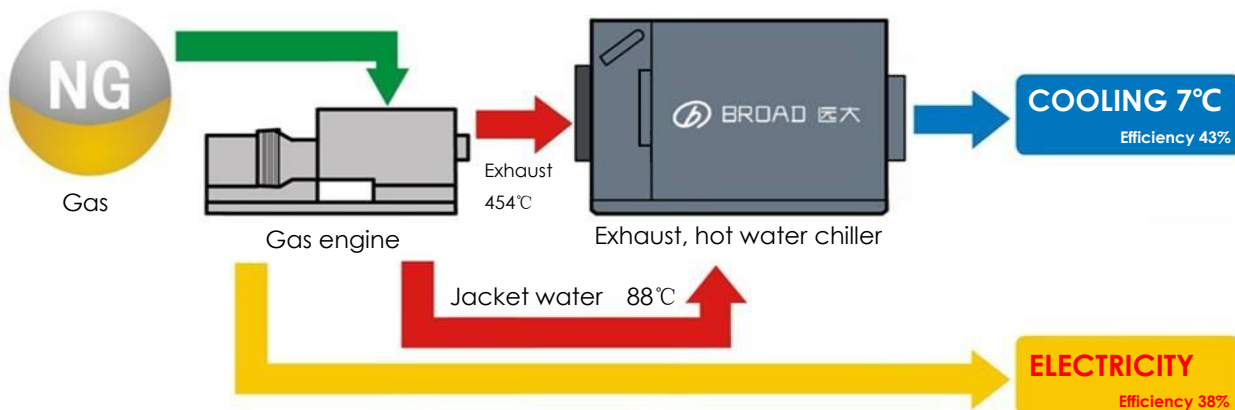
BROAD exhaust & hot water packaged chiller



Gas engine

## BROAD CCHP Exhaust, hot water type

Energy Efficiency: Power + Cooling = 81%

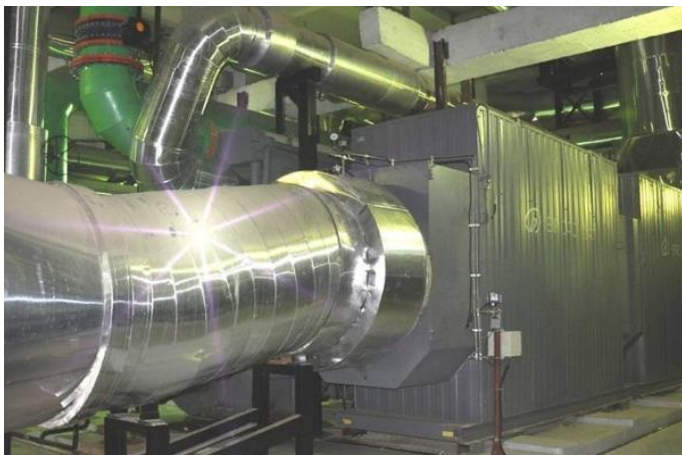


# DLF, INDIA



The world largest typical distributed energy system which was totally unaffected in India black-out in July, 2012

- The generator supplies electricity to buildings, BROAD chillers uses exhaust & jacket water for cooling. The backup burner provides cooling during generators' idle time or partial load
- Cooling capacity 270,000kW  
33×Exhaust, hot water & direct-fired chillers
- Cooling efficiency 120%
- Power generator capacity 186,000kW  
59×Engines & gas turbines
- Power generation efficiency 35%
- Payback period 1.5 years
- Yearly energy saving 137,000 ton oil
- Yearly CO<sub>2</sub> cutting 410,000 ton
- Equivalent of planting 22,000,000 trees



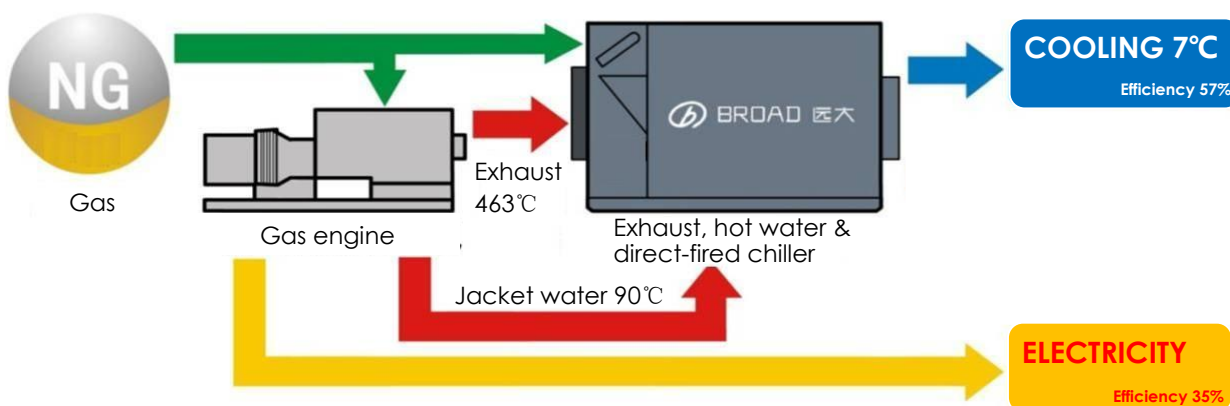
BROAD exhaust non-electric chiller



Gas engine

## BROAD CCHP Exhaust, hot water & direct-fired type

Energy Efficiency: Power + Cooling 92%



# COSTANERA CENTER, CHILE



The tallest building in South America

- Power generator supplies power to buildings, and BROAD chillers use exhaust & jacket water for cooling. The backup burner provides cooling/heating during generators' idle time or partial load
- Cooling capacity 30,000kW  
5 x Exhaust, hot water & direct fired chillers  
Cooling efficiency 125%
- Power generator capacity 14,400kW  
6 x Engines  
Power generation efficiency 40%
- Payback period 1.3 years
- **Yearly energy saving 7,100 ton oil**
- Yearly CO<sub>2</sub> cutting 21,300 ton
- Equivalent of planting 1,150,200 trees



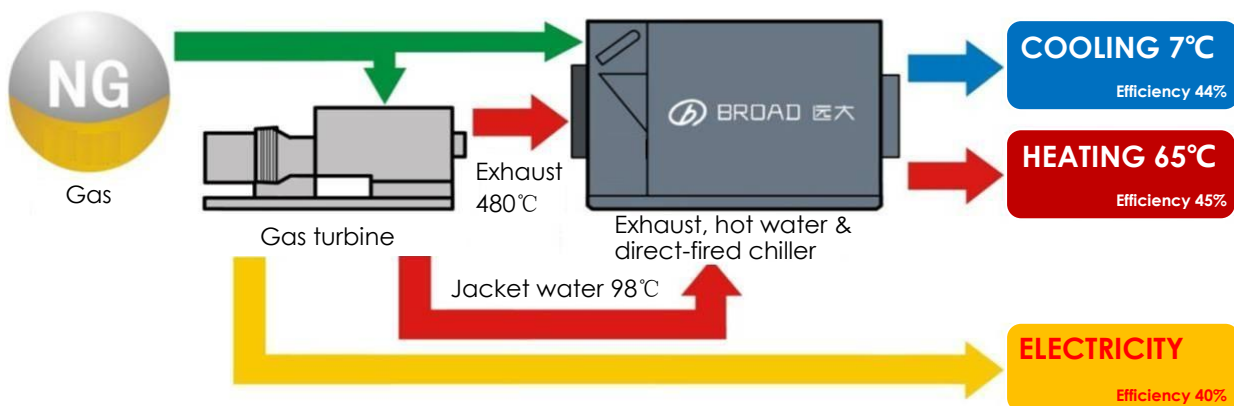
BROAD Exhaust, hot water & direct-fired chiller



Gas engine

## BROAD CCHP Exhaust, hot water & direct-fired type

Energy Efficiency: Power + Cooling 84%    Power + Heating 85%



# TIANJIN FIFTH AEROSPACE INSTITUTE, CHINA



The top satellite and spaceship R&D base in China

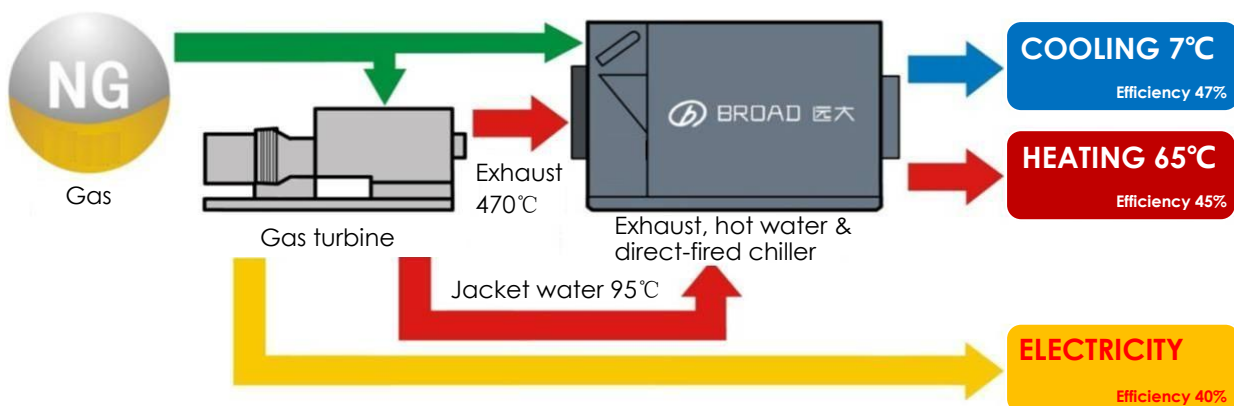
- Power generator supplies electricity to building, and BROAD chiller recycles exhaust & jacket water for cooling, the backup burner provides cooling during the generators idle time or partial load
- Cooling capacity 9,304kW  
1 x Exhaust, hot water & direct fired chiller  
Cooling efficiency 116%
- Power generator capacity 2,320kW  
2 x Gas engines  
Power generation efficiency 40%
- Payback period 4.5 year
- **Yearly energy saving 1,900 ton oil**
- Yearly CO<sub>2</sub> cutting 5,700 ton
- Equivalent of planting 308,000 trees



BROAD exhaust, hot water & direct-fired non-electric chiller

## BROAD CCHP Exhaust, hot water & direct-fired type

Energy Efficiency: Power + Cooling 87%      Power + Heating 85%



# MOOMBAY IN SUZHOU, CHINA



The biggest district non-electric A/C project in China

- Recycle waste heat from power plant to provide district cooling & heating
- Cooling capacity 100,000kW  
Including steam & gas-fired chillers  
Average cooling COP 135%
- Payback period 4 years
- **Yearly energy saving 1,800 ton oil**
- Yearly CO<sub>2</sub> cutting 5,400 ton
- Equivalent of planting 291,600 trees



Energy center

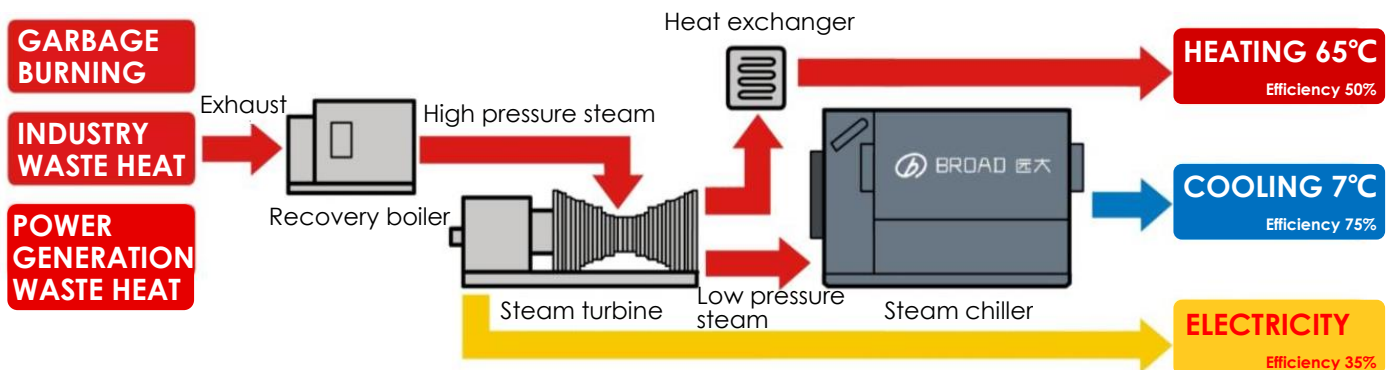


BROAD steam non-electric chiller

- ✧ Awarded 2.5 million RMB by Jiangsu government
- ✧ Awarded 10 million RMB by the "State Budgetary Fund for Resource Conservation and Environment Protection"

## BROAD CCHP Steam type

Energy Efficiency: Power + Cooling 110%    Power + Heating 85%



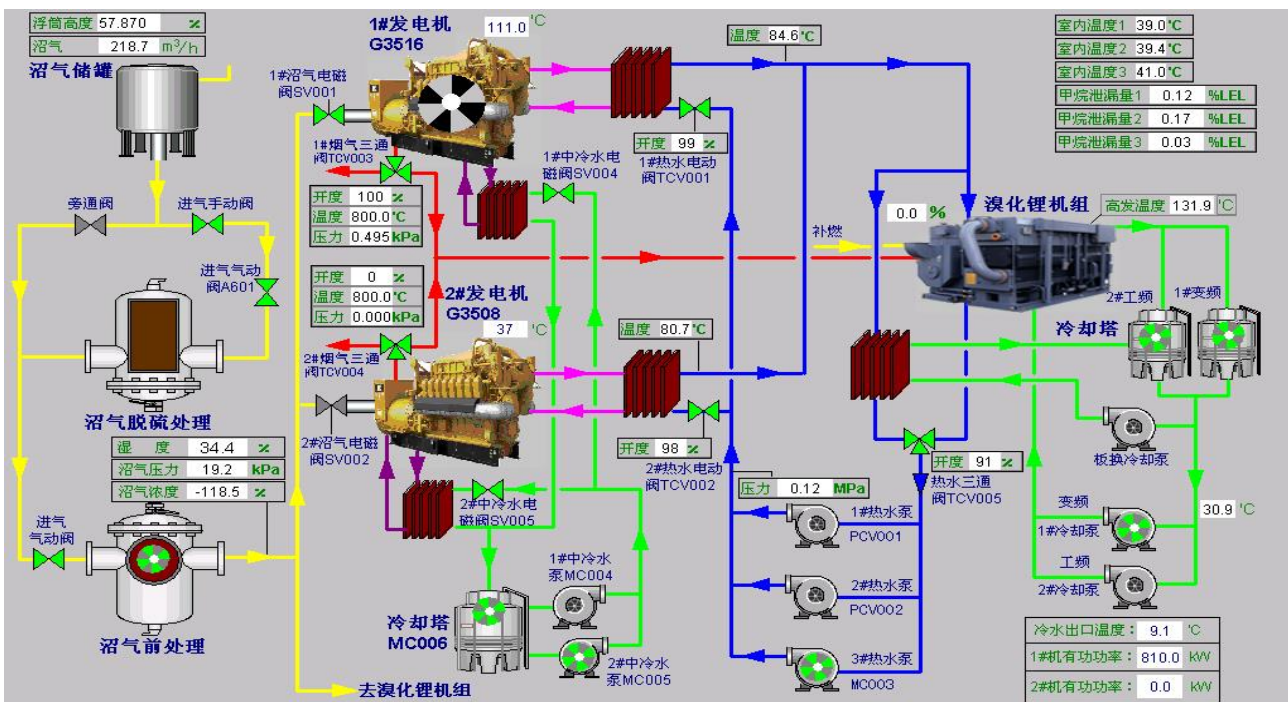


# GUANGZHOU ZHUJIANG BREWHOUSE, CHINA



Machine room

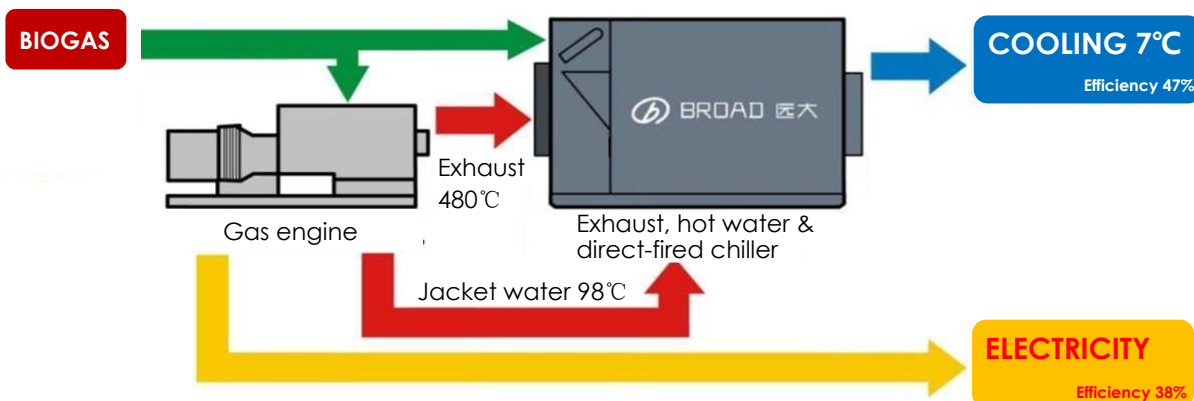
- Power supply to factories, exhaust and hot water drive non-electric chillers. make up cooling by biogas when generators shut down or running at partial load.
- Cooling capacity 1,700kW  
Cooling efficiency 115%
- Power generator capacity 1,450kW  
Power generation efficiency 38%
- Payback period 2 years
- **Yearly energy saving 2,700 ton oil**
- Yearly CO<sub>2</sub> cutting 8,100 ton
- Equivalent of planting 437,400 trees



Control system

## BROAD CCHP Exhaust, hot water and direct-fired type

Energy Efficiency: Power + Cooling 85%



# BEIJING GAS BUILDING, CHINA



Trial operation in Aug. 2004, the first BCHP project in China

- Power generator supplies electricity to buildings, and BROAD chillers use exhaust & jacket water for cooling. The backup burner provides cooling/heating during generators idle time or partial load

- Cooling capacity 3,500kW  
2×Exhaust, hot water & direct fired chillers
- Cooling efficiency 105%

- Power generator capacity 1,200kW  
2 x Engines
- Power generation efficiency 38%

- Payback period 3.7 year

- **Yearly energy saving 667 ton oil**

- Yearly CO<sub>2</sub> cutting 2,000 ton

- Equivalent of planting 100,000 trees



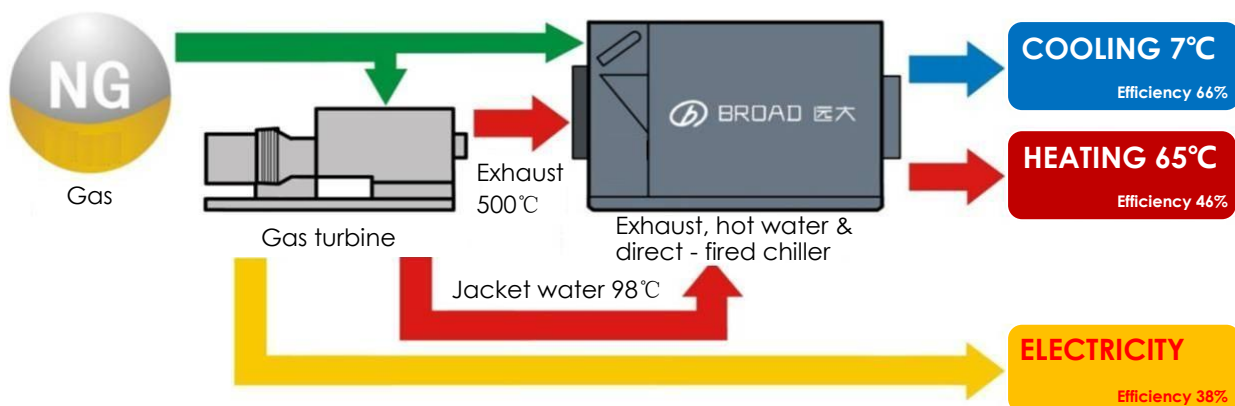
Mr. Zeng Pei Yan, vice premier of China and Mr. Wang Qi Shan, mayor of Beijing visited the machine room



Gas engine & BROAD exhaust, hot water & direct-fired non-electric chiller

## BROAD CCHP Exhaust, hot water & direct-fired type

Energy Efficiency: Power + Cooling 104%    Power + Heating 84%



# SHANGHAI HONGQIAO CBD, CHINA



Hongqiao CBD is a large-scale integrated complex with urban functions

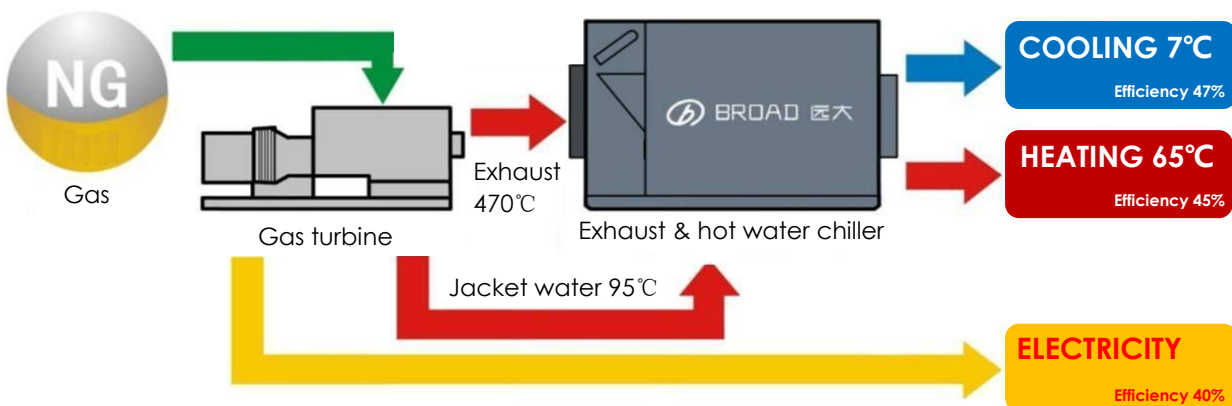
- Power generator supplies electricity to buildings, BROAD chillers recycle exhaust & jacket water for cooling, no fuel input
- Cooling capacity 12,000kW
- Heating capacity 9,978kW  
8 x Exhaust, hot water & direct fired chillers
- Cooling efficiency 106%
- Power generator capacity 12,000kW  
8 x Engines
- Power generation efficiency 40%
- Payback period 3.5 year
- **Yearly energy saving 9,000 ton oil**
- Yearly CO<sub>2</sub> cutting 27,000 ton
- Equivalent of planting 1,458,000 trees



The largest power generation capacity of distributed energy system in China

## BROAD CCHP Exhaust & hot water type

Energy Efficiency: Power + Cooling 87%    Power + Heating 85%



# CHANGSHA HUANGHUA AIRPORT, CHINA



One of top five airports in China

- Power generator supplies electricity to airport terminals or power grid. BROAD chillers recycle exhaust and jacket water for cooling, the backup burner provides cooling during the generators' idle time or partial load
- Cooling capacity 9,300kW  
2x Exhaust, hot water & direct fired chillers  
Cooling efficiency 106%
- Power generator capacity 2,320kW  
2 x Gas engines  
Power generation efficiency 38%
- Payback period 4.5 year
- **Yearly energy saving 2,500 ton oil**
- Yearly CO<sub>2</sub> cutting 7,500 ton
- Equivalent of planting 405,000 trees



BROAD exhaust, hot water & direct-fired non-electric chiller



Gas engine

## BROAD CCHP Exhaust, hot water & direct-fired type

Energy Efficiency: Power + Cooling 85%    Power + Heating 83%

