# Projects

FOSHAN LYD ENERGY SAVING TECHNOLOGY CO.,LTD

# MACAO 16PU (4 STAR HOTEL)

DEVICE: LYDS-160ZW 2PCS

PROJECT: GAS BOILER REPLACEMENT

SYSTEM: 6PCS 5000L THERMAL TANK

FUNCTION: OFFERING HOT WATER AND COOLING AT THE SAME TIME

# Case description

Ambient: winter min 10℃, summer max 38℃

Requirement: The hotel use gas boiler to offering DHW before, but now need to use a more efficiency and green heat pump. Normal temperature of the DHW is 55℃, but they need to heat up to 70℃ for a few hours during every 7 days to kill the baterial inside the water system,make it clean and healthy。The boiler room has limit space only 6 SQM available for the heat pump.Thanks to the compact design of Co2 heat pump, system well fits.

Analysis: The old gas boiler heat up the portable wate through a second loop. and the hotel has 480 customer rooms, and require 120 ton hot water every day.They also have a gambling hall requires air conditioning 24HX7 supplied by central water chiller.

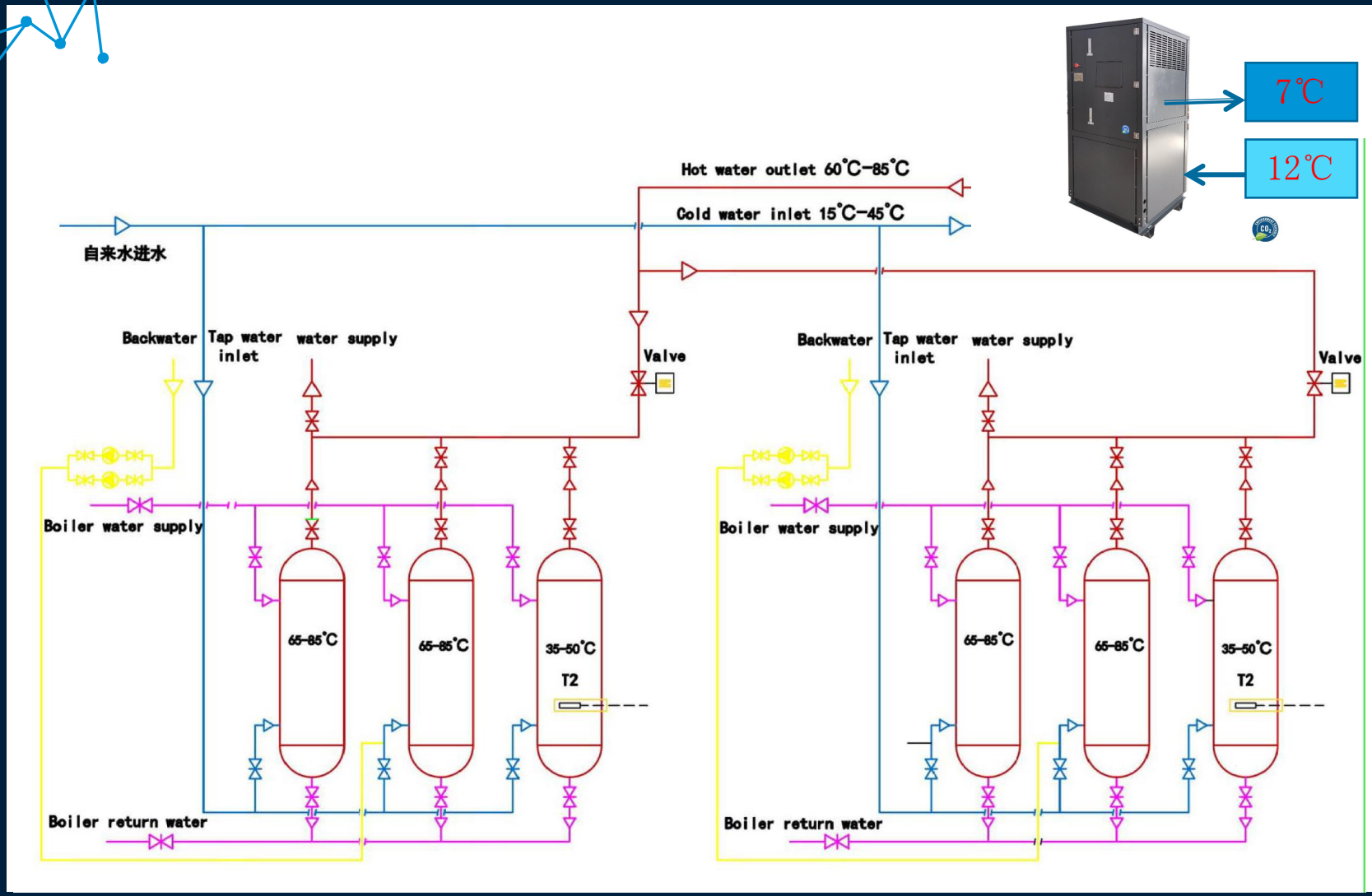
Solution: 2pcs 160KW water to water co2 heat pump, with double wall HX, directly supply DHW to thermal storage tank for rooms, meanwhile supply 7℃ free chilled water to the central air conditioner.

# Cost analysis

| Device | gas boiler | Central Chiller | CO2 water source heat pump | |
|---|---|---|---|---|
| fuction | hot water | cool water | hot water | cooling |
| energy type | gas | electricity | electricity | free |
| efficiency | 85% | 350% | 420% | free |
| energy price | 4.39￥/m3 | 0.80￥/KW | 0.80￥/KW | / |
| hot water price | 30￥/ton | / | 8.9￥/ton | / |
| hot water/day | 120ton | / | 120ton | / |
| cooling capacity | / | 4600KW | / | 4600KW |
| Daily cost | 3600￥ | 1050￥ | 1068￥ | 0￥ |
| enviroment compact | light | light | none | none |
| risk | flammable | none | none | none |

After one year operation, the hotel manager confirmed using the CO2 heat pump can save 3580￥ per day, and the investment return within half a year. Also they do not need specilist to operat the heat pump, save cost and more safer than gas boiler

# Scheme


7℃
12℃
Hot water outlet 60℃-85℃
Cold water inlet 15℃-45℃
自来水进水
Backwater
Tap water inlet
water supply
Valve
Boiler water supply
65-85℃
65-85℃
35-50℃
T2
Boiler return water
Backwater
Tap water inlet
water supply
Valve
Boiler water supply
65-85℃
65-85℃
35-50℃
T2
Boiler return water

## Shanghai(Roche)

## accelerator project

DEVICE: LYD-120ZW 8pcs

PROJECT: GAS BOILER REPLACEMENT FOR AHU HEATING

SYSTEM: SECOND LOOP HX HEATING

FUNCTION: OFFER 75℃ HOT WATER FOR AHU, RETURN 40℃

# Case description

Ambient: winter min -10℃, summer max 38℃

Requirement: Replace the gas boiler by sustainable and green CO2 heat pump to offer hot water and lab constant temperature.Original boiler offers 70℃ hot water 40℃ return.

Analysis: The existing water pipe system and thermal storage can remain, the CO2 heat pump can plug and play with the original system. Save the retorfit cost and meet the Shanghai gas boiler regulations.

Solutions: 8pcs 120KW R744 air source heat pump

# Cost analysis

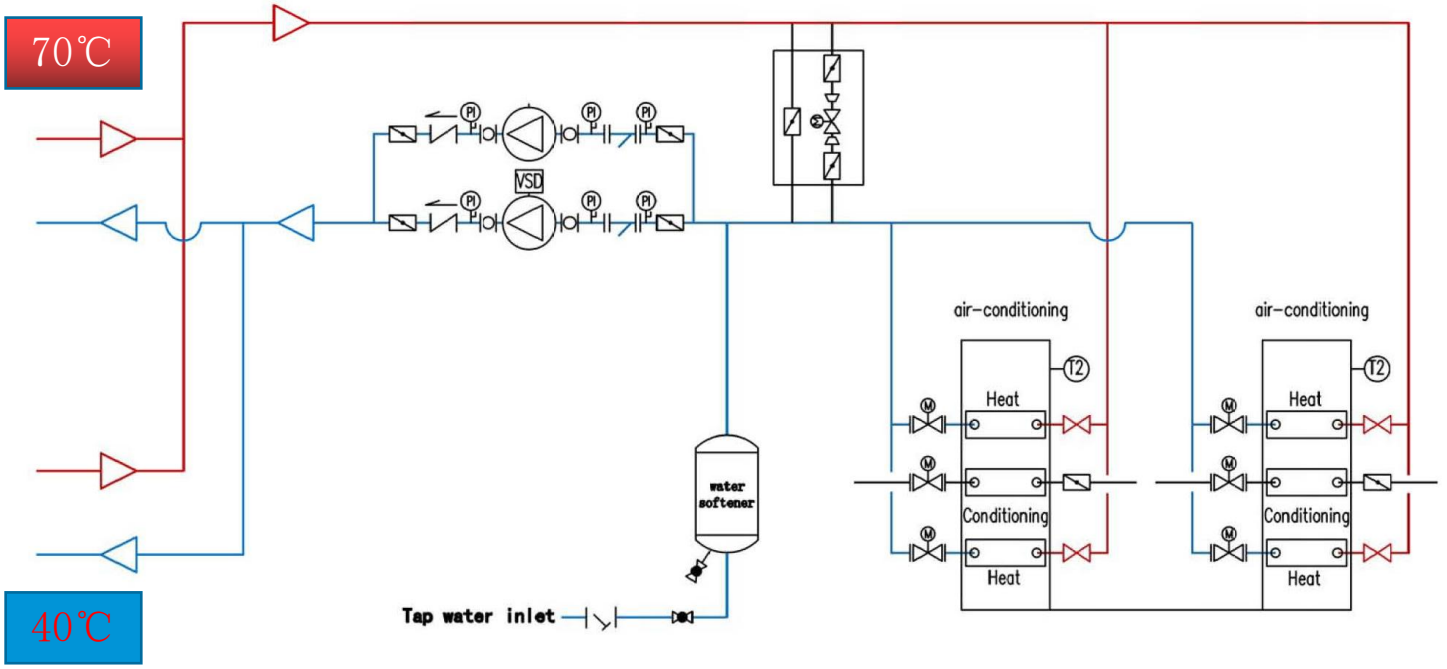
| device | gas boiler | CO2 air source heat pump |
|---|---|---|
| Function | heating | heating |
| Energy | gas | electricity |
| Efficiency | 85% | 250% |
| Energy price | 4.39￥/m3 | 0.80￥/KW |
| Heating price | 0.57￥/KW | 0.32￥/KW |
| Heating capacity per day | 8000KW | 8000KW |
| Daily cost | 4560￥ | 2560￥ |
| Enviroment compact | light | none |
| Risk | Flammable | none |

After the replacement, CO2 heat pump saves 2000￥ per day for the factory, and also meets the shanghai gas boiler regulation. The HP are controlled by central BMS system,no need boiler specilist to maintain

# Scheme


LYDCOTWO


LYDCOTWO


70℃
40℃
PI
VSD
water softener
Tap water inlet
air-conditioning
air-conditioning
T2
Heat
Conditioning
Heat
Heat
Conditioning
Heat

# SUZHOU(Roche)MEDICINE

DEVICE: LYDS-160ZW-R 3PCS

PROJECT: NEW BUILDING

SYSTEM: HEATING AND COOLING WITH TOWER CHILLER

FUNCTION: WINTER OFFER 65℃ HEATING WATER FOR THE AHU,RETURN 35℃ .SUMMER OFFER 7℃ CHILLED WATER FOR CENTRAL AIR CONDITION


# Case description

Ambient: winter min -10℃, summer max 38℃

Requirements: Offer heating in winter, offer cooling in summer and also some heat for the AHU.company states that HFC is not allowed but only natural refrigerant.To avoid any risk of flammable and toxic, CO2 heat pump is the best choice.

Analysis: The AHU fan coil unit requires heating water supply 65℃, return 35℃ in winter.It requires cooling water supply 7℃, return in 12℃in summer.

Solution: Use the air/water combine CO2 heat pump. In Winter, units work as air source heat pump, offering space heating. In summer, work with water to water heat pump, offering hot water for the AHU for preheat, and Cooling water for the AHU for air condition.

# Cost analysis (spring, summer, autumn)

| Device | gas boiler | central chiller | CO2 air/water heat pump | |
|---|---|---|---|---|
| Function | hot water | cool water | hot water | cool water |
| Energy | gas | electricity | free | electricity |
| Efficiency | 85% | 350% | 420% | 320% |
| Energy price | 4.39￥/m3 | 0.80￥/KW | 0.80￥/KW | 0.80￥/KW |
| Hot water price | 30￥/ton | / | 0￥/ton | / |
| Hot water/day | 24ton | / | 24ton | / |
| Cooling/day | / | 4800KW | / | 4800KW |
| Daily cost | 720￥ | 1097￥ | 0￥ | 1200￥ |
| Daily saving | 617￥/day | | | |
| Risk | Flammable | none | none | none |

Spring, summer , Autumn: 24H a day, in summer AHU requires a few heating, only 1 pcs of 120KW for heating

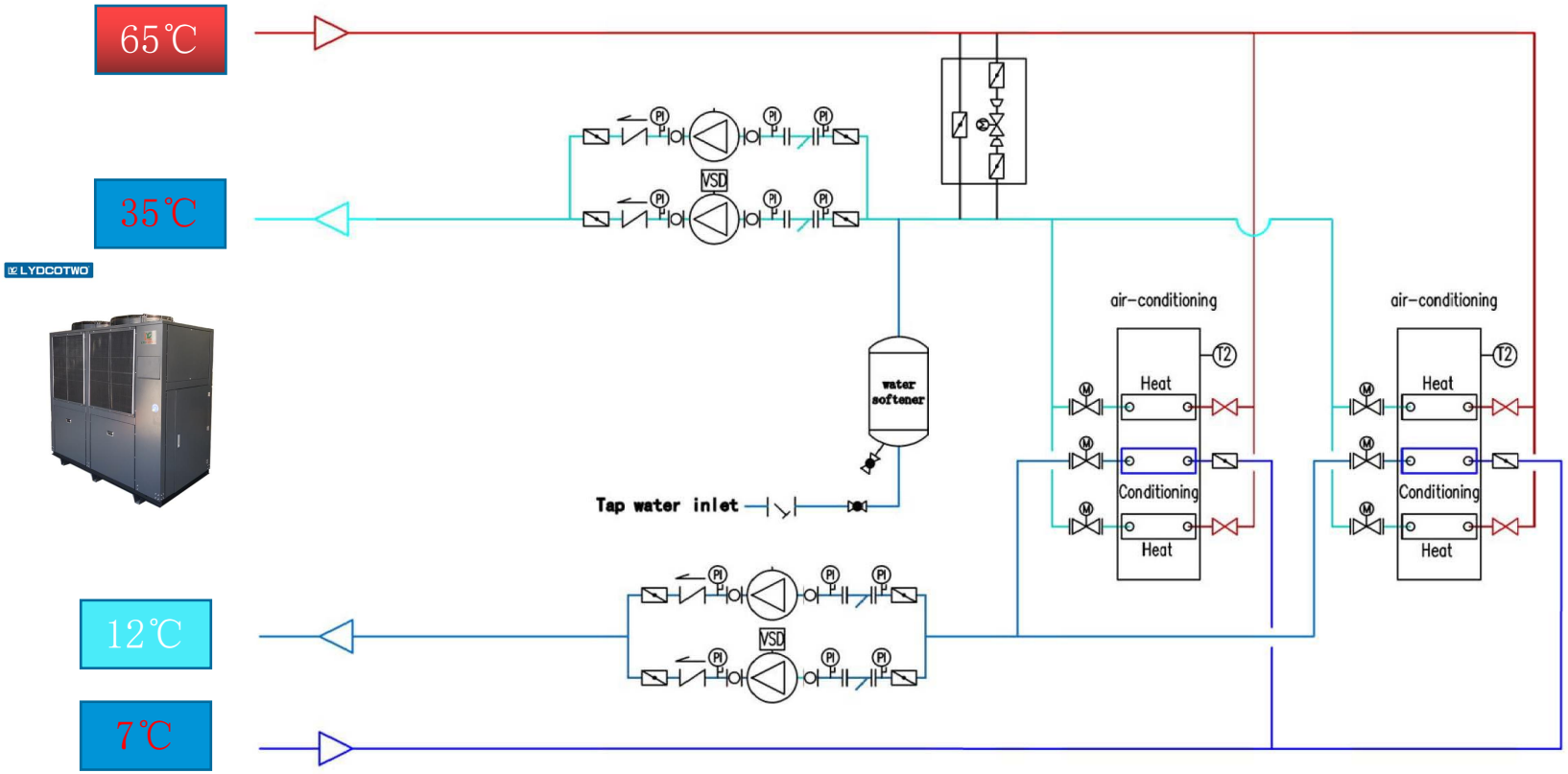
# Cost analysis (Winter)

| Device | gas boiler | CO2 air/water heat pump |
|---|---|---|
| Function | heating | heating |
| Energy | gas | electricity |
| Efficiency | 85% | 320% |
| Energy price | 4.39￥/m3 | 0.80￥/KW |
| Hot water price | 30￥/ton | 8.7￥/ton |
| Hot water/day | 165ton | 165ton |
| heating/day | 4950￥ | 1435￥ |
| Daily saving | 3515￥/day | |
| Enviroment impact | light | none |
| Risk | flammable | none |

Winter: 24 hours per day, 2 machine produce heating, another one as back up.

COP based on ambient 2℃

# Scheme


65℃
35℃
LYDCOTWO
VSD
water softener
Tap water inlet
air-conditioning
Heat
Conditioning
Heat
T2
air-conditioning
Heat
Conditioning
Heat
T2
12℃
VSD
7℃

# SHANGHAI HOT WATER PROJECTS

DEVICE: LYD-120ZW 12PCS LYD-40ZW 4PCS LYD-75ZW 4PCS

PROJECT: GAS BOILER REPLACEMENT

SYSTEM: constant pressure tank

FUNCTION: OFFER 60℃ DOMESTIC HOT WATER

# CASE DESCRIPTION

Old system is combined by gas boiler+solar+compressor heat recovery. now change the gas boiler into CO2 heat pump.。

Summer offer 60℃ hot water for the dormitory, and also offering cool air to the workshop

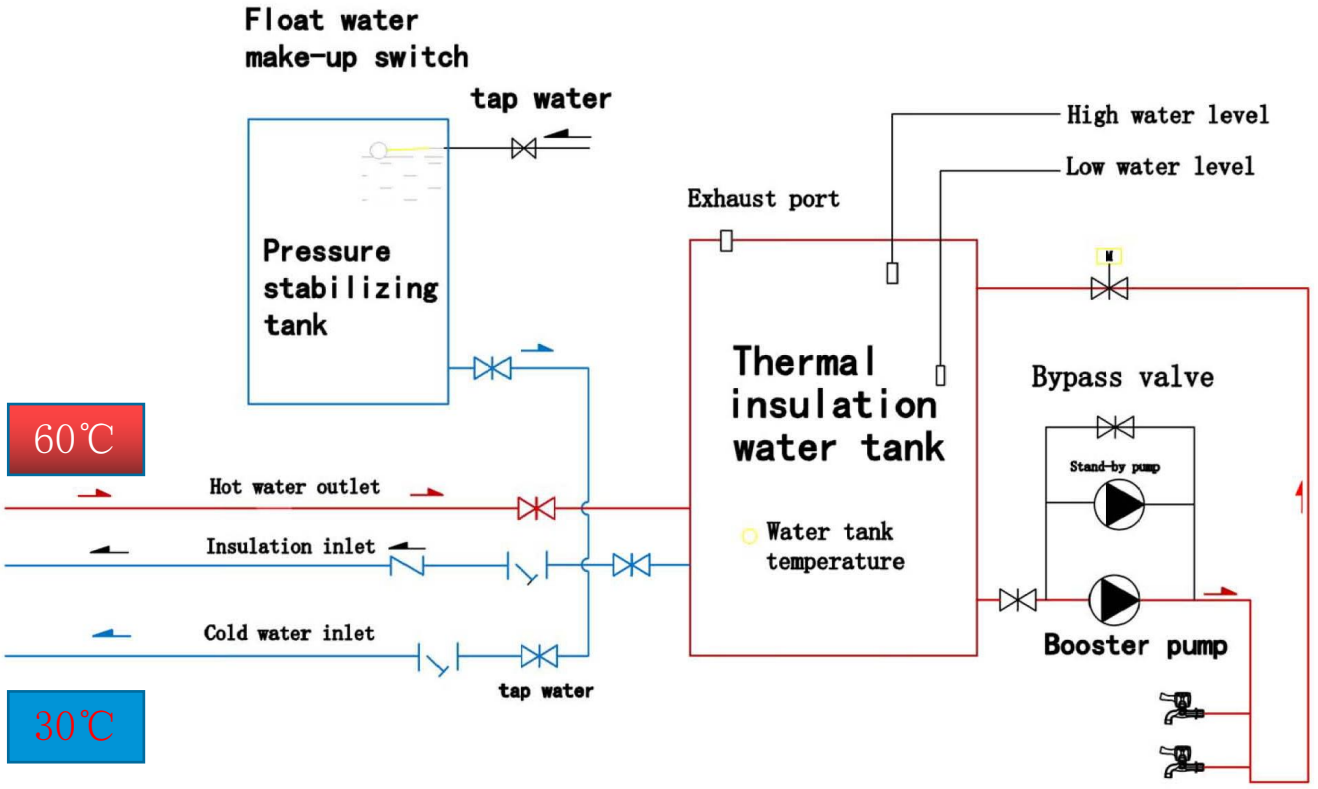
Constant tank is added and also with LYD intelligent control system.

# cost analysis (whole year)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| January | CO2 HP | water | 3095 | electricity | 50497 | cost/ton | 11.42097 |
| | | | | | | | |
| Feburay | CO2 HP | water | 2631 | electricity | 43592 | cost/ton | 11.59802 |
| | | | | | | | |
| March | CO2 HP | water | 2961 | electricity | 47309 | cost/ton | 11.18416 |
| | | | | | | | |
| April | CO2 HP | water | 2714 | electricity | 40427 | cost/ton | 10.42701 |
| | | | | | | | |
| May | CO2 HP | water | 3291 | electricity | 44758 | cost/ton | 9.520085 |
| | | | | | | | |
| June | CO2 HP | water | 2971 | electricity | 35694 | cost/ton | 8.409896 |
| | | | | | | | |
| July | CO2 HP | water | 2328 | electricity | 23399 | cost/ton | 7.035782 |
| | | | | | | | |
| August | CO2 HP | water | 2048 | electricity | 20609 | cost/ton | 7.044092 |
| | | | | | | | |
| September | CO2 HP | water | 2868 | electricity | 34525 | cost/ton | 8.426604 |
| | | | | | | | |
| October | CO2 HP | water | 3098 | electricity | 43645 | cost/ton | 9.861685 |
| | | | | | | | |
| November | CO2 HP | water | 2699 | electricity | 44037 | cost/ton | 11.42123 |
| | | | | | | | |
| December | CO2 HP | water | 2488.861 | electricity | 43896 | cost/ton | 12.34589 |
| Average | | | ton/day | | KW /day | | ￥9.89 |

data from the project,electricity price 0.7￥/KW

# Scheme


Float water
make-up switch
tap water
Pressure
stabilizing
tank
High water level
Low water level
Exhaust port
Thermal
insulation
water tank
Water tank
temperature
Bypass valve
Stand-by pump
Booster pump
60℃
Hot water outlet
Insulation inlet
Cold water inlet
tap water
30℃

SHANGHAI REFIRE ENERGY CO.,LTD

DEVICE: LYDGS-150XW 1PCS

PROJECT: GAS BOILER REPLACEMENT

SYSTEM: STEAM GENERATOR

FUNCTION: MAKING 100℃-120℃WATER STEAM

# Case description

Offer 100℃ high temperature water

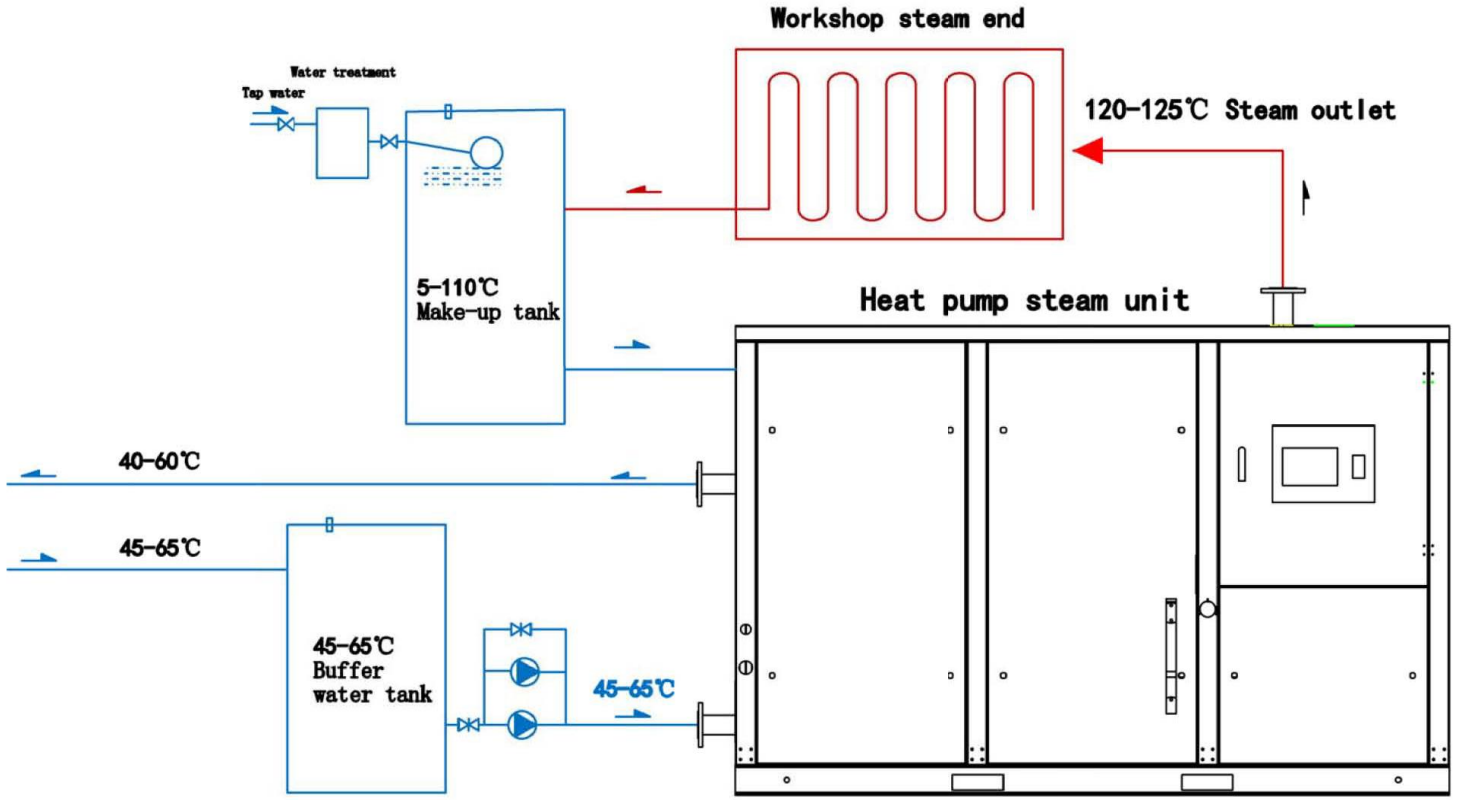
Solution: offer 100℃ hot water for the lab to maintain 90℃ temperature to test the battery. the design of the electricity pipeline is not enough for the heating element. After use our Steam heat pump, the COP of the system is 5. save 80% of electricity, and currency is only 1/5 of the heat element.

# Cost analysis

| Device | heat element | steam heat pump |
|---|---|---|
| function | heating | heating |
| energy | electricity | electricity |
| efficiency | 95% | 500% |
| energy price | 0.80￥/KW | 0.80￥/KW |
| heating/hour | 150KW | 150KW |
| power consumption/hour | 157￥ | 30￥ |
| cost/hour | 126￥ | 24￥ |
| cost saving/hour | 102￥/hour | |

one test lasts 360 hours,

# Scheme


Workshop steam end
Water treatment
Tap water
120-125℃ Steam outlet
5-110℃
Make-up tank
Heat pump steam unit
40-60℃
45-65℃
45-65℃
Buffer
water tank
45-65℃

SHANDONG CHANGYI HIGH WAY REPAIR STATION

DEVICE: LYDH-120XF-L 4PCS

PROJECT: NEW BUILDING

SYSTEM: SPLIT HOT AIR BLOWER

FUNCTION: OFFER HOT AIR FOR SPACE HEATING IN LOW AMBIENT, MAKING 40℃-60℃HOT AIR

# Case description

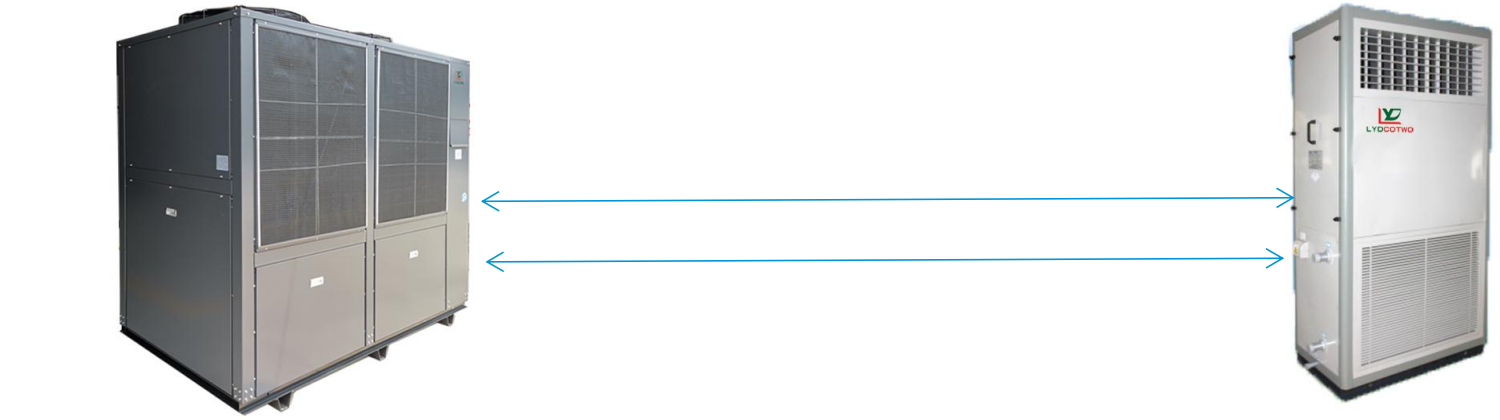
Ambient: lowest ambient is -25℃ in winter. The workshop is not constant open. When reparing is needed, it requires fast and efficient heating for workers. Use 4pcs of our R744 air to air heat pump, can make comfortable heating within one hour for a 2000 SQM workshop

For this project, it can use the max potential of the R744 air to air heat pump, room temperature keep on 20℃,it can release the latent heat from the refrigerant, COP reach Max. And also suitable for low ambient even in -43℃.

# Cost analysis

| Device | heat element | CO2 air to air heat pump |
|---|---|---|
| function | heating | heating |
| energy | electricity | electricity |
| efficiency | 95% | 320% |
| energy price | 0.80￥/KW | 0.80￥/KW |
| heating/hour | 480KW | 480KW |
| power consumption/hour | 505KW | 150KW |
| cost/hour | 404￥ | 120￥ |
| cost saving/hour | 284￥/hour | |

# Scheme



# SHENZHEN LAUNDRY FACTORY

DEVICE: LYDH-130XF-IN 6PCS

PROJECT: GAS BOILER REPLACEMENT

SYSTEM: HEAT PUMP DRYER

FUNCTION: DRY THE FABRIC

# Case description

In shenzhen, gas boiler is not allowed for laundry factory, electricity is only one choice. Use the heat element, daily cost is too high, and use our heat pump dryer, the COP reach 3.4, which means it use only 1/3 energy comparing to heat element.

# Cost analysis

| | steam | heat element | gas burner | heat pump dryer |
|---|---|---|---|---|
| weight per load | 100KG | 100KG | 100KG | 100KG |
| humidity | 55% | 55% | 55% | 55% |
| drying time | 25 Min | 50 Min | 20 Min | 45 Min |
| energy consumption | 160KG | 60KW | 8 CBM | 25KW |
| energy price | 0.2 ¥/KG | 0.8 ¥/KW | 4.3 ¥/CBM | 0.8 ¥/KG |
| cost per load | 32 ¥ | 48 ¥ | 34.4 ¥ | 20¥ |
| device | Steam boiler | NM | Gas burner | Heat Pump |
| maintain | technician | NM | technician | NM |

# SHANXI YANCHI PRIMARY SCHOOL

DEVICE: LYD-150ZW (3PCS) +LYD-650XW-FD (1PCS)

PROJECT: ALCOHOL BOILER REPLACEMENT

SYSTEM: SPACE HEATING

FUNCTION: CASCADE HEATING SYSTEM



# Case description

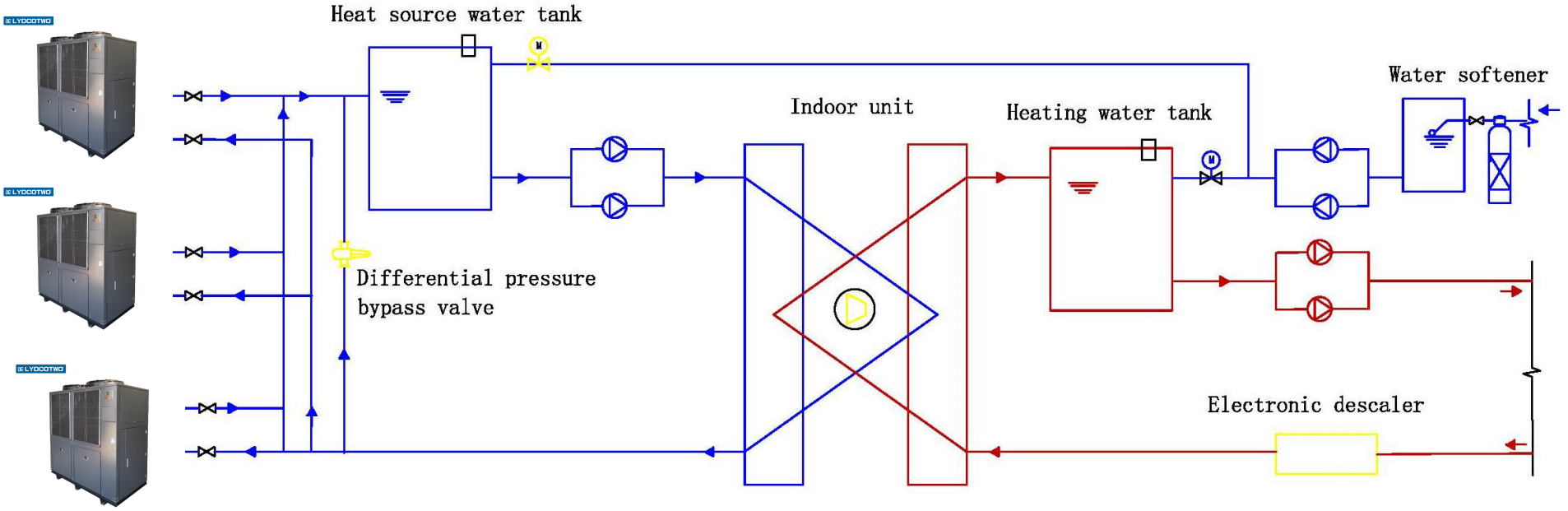
Amient, In winter ambient min -35℃, supply 75℃ hot water, return 55℃;

The radiator is old iron type, the space is 5000 SQM.

Use 3 pcs CO2 air souce heat pump as the first stage, getting heat from ambient and offering water source 30℃ for the screw water source heat pump, the second stage heat pump offering circulation heat for the building

Low the carbon emmission and save the energy cost

# Scheme


Heat source water tank
Indoor unit
Heating water tank
Water softener
Differential pressure
bypass valve
Electronic descaler

# R&D CO2 HEAT PUMP PLATFORM FOR UNIVERSITIES

DEVICE: MANY

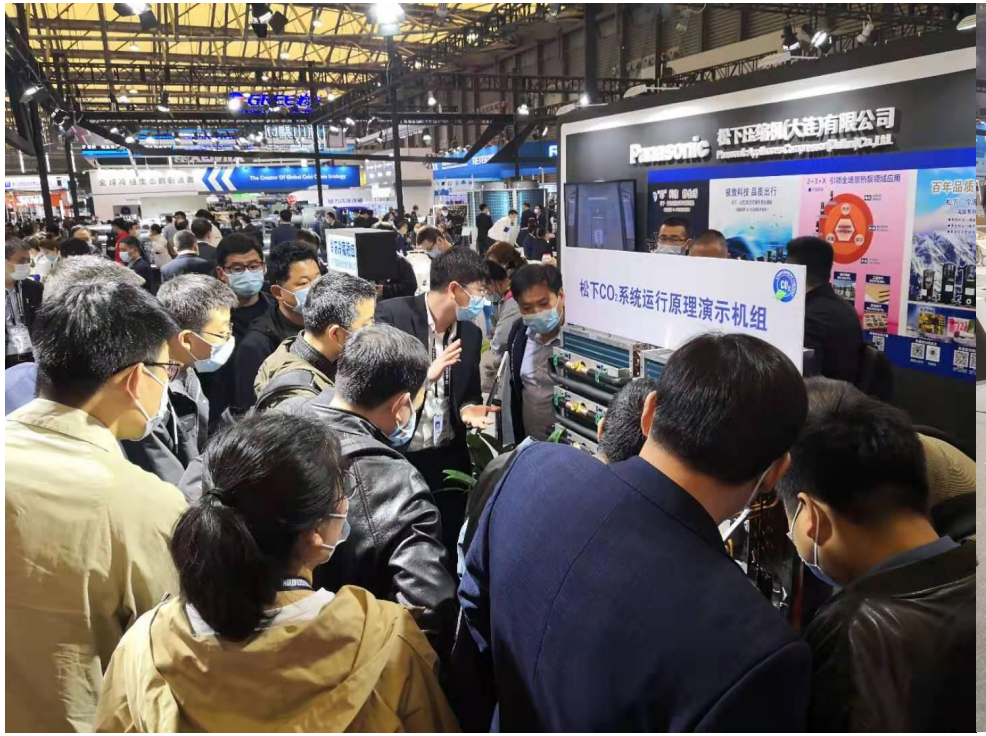
PROJECT: TECHING AND RESEARCH PURPOSE

SYSTEM: CUSTOMIZED

FUNCTION: TEACHING, RESEARCH CO2 SUPCRITICAL ELECTRICITY GENERATOR

# Views

# Coperate with Panasonic to develop his Co2 heat pump showcase




# CASES

Develop CO2 heat pump or Natural refrigerant heat pump for Tianjin commercial university、Jilin University、University of Shanghai for Science and Technology、Xian industry university、University of Shandong for Science and Technology、Donghua University、Beihang University、Nanjing University of Science and Technology、Tianjin University of Technology.

Co-develop with Sun Yat-sen University and South China University of Technology to design CO2 electricity generator and CO2 heat recovery chiller system.

We develop CO2 heat pump showcase for Panasonic many times.

2023年

LYDCOTWO

# THANKS

FOSHAN LYD ENERGY SAVING TECHNOLOGY CO.,LTD