

CO2 Heat pump water heater for commercial use EcoCute

Q-ton
Air to Water

Recovering heat of the air



Transferring the heat to water and supplying hot water

1. Product Outline
2. Case study:
Actual operational status and
actual cost-saving result
3. Various example



 **MITSUBISHI**
HEAVY INDUSTRIES, LTD.

Our Technologies, Your Tomorrow

Ultra Efficient Technologies from MHI

Mitsubishi Heavy Industries introduce 30kW Heat Pump Water Heater



MHI's **NEW** "Q-Ton"

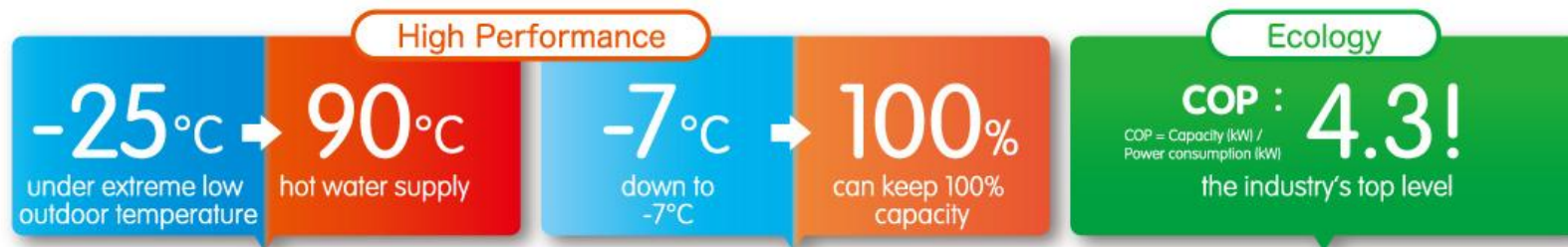
The World's **FIRST** 2-Stage CO2 Compressor

Provides Hot Water up to 90°C

COP of up to 4.3
[430% efficiency!]

Operation down to -25°C Ambient

Utilises **NATURAL REFRIGERANT**



Performance issue to be solved on conventional air to water heat pump

When operating under low outdoor temperature, heating capacity and heating efficiency decrease significantly.

MHI solution

Point 1 The world's first CO₂ two-stage compressor (Scroll + Rotary) is adopted.

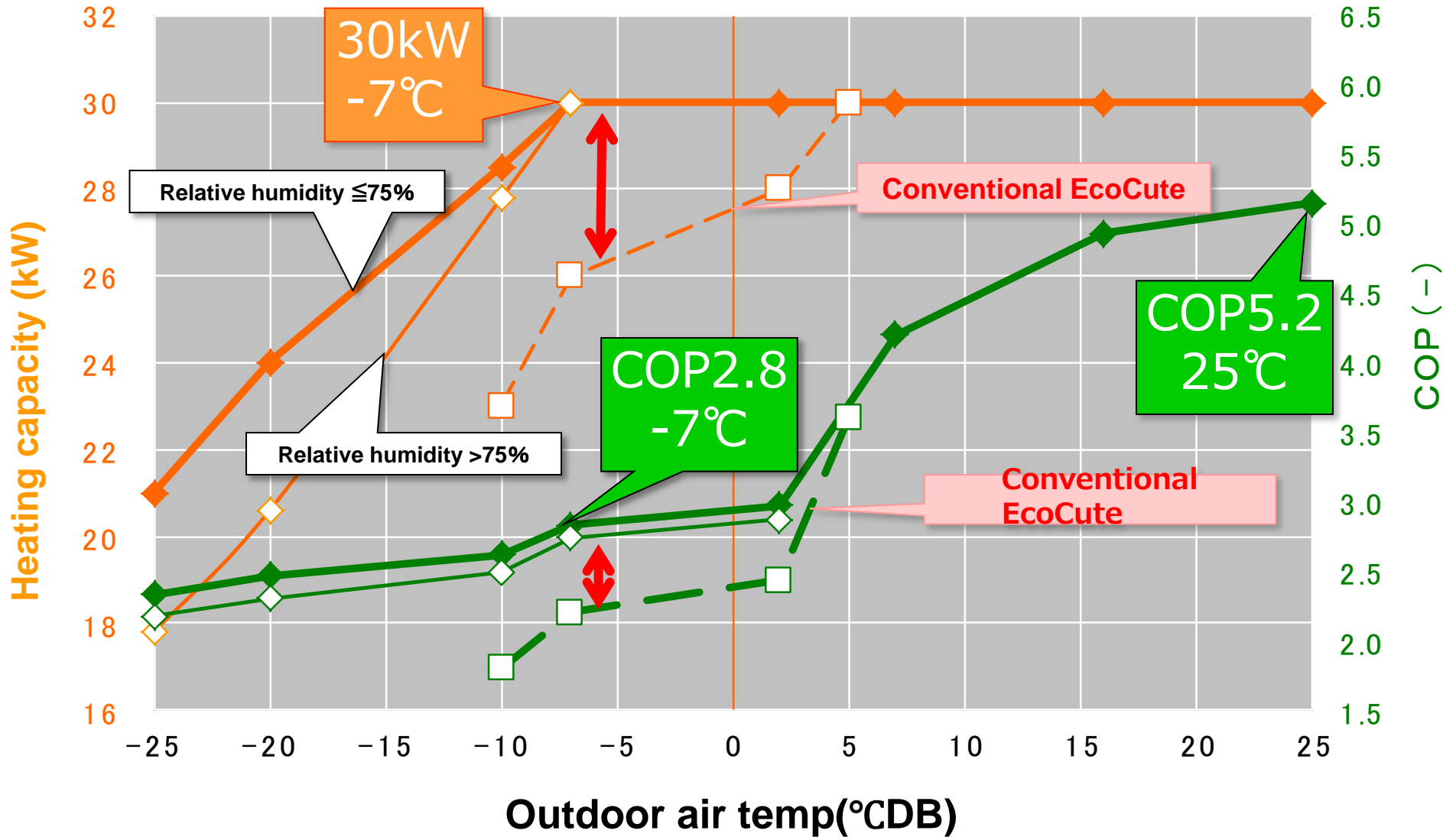
Point 2 The rated heating capacity is 30kW and sustainable at ambient air temperature as low as -7°C

Point 3 The COP on rated conditions reaches 4.3, which is the highest level in the industry

Point 4 A 90°C hot water supply is available even an ambient air temperature as -25°C

Heating performance characteristics curve

【Hot water outlet temp : feed water inlet temp 5°C→outlet water 65°C】



Field Test installation site

A certain pharmaceutical company



- **System composition**

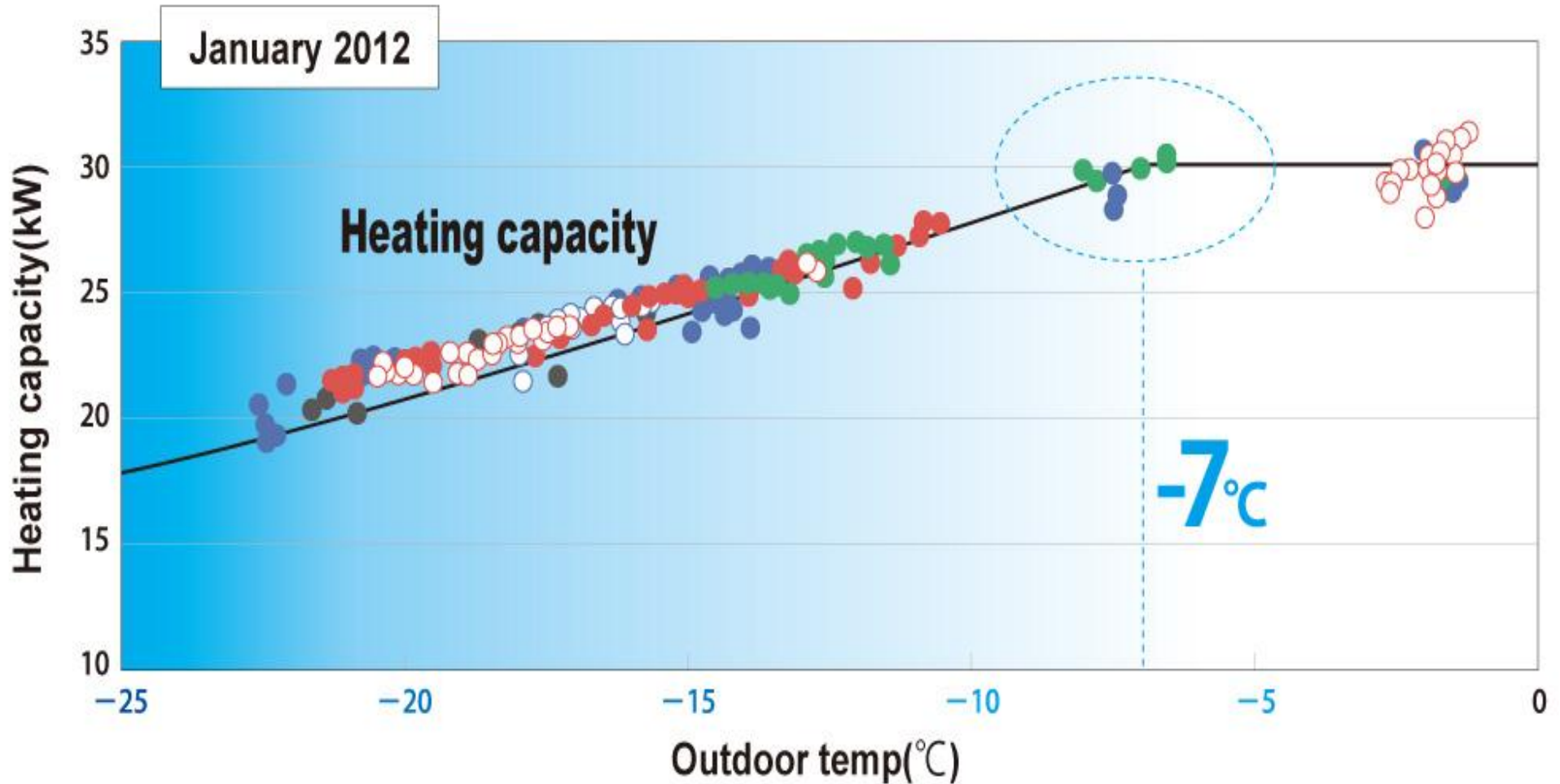
- Q-ton 1 unit,
 - Unvented cylinder 500ℓ x 4units

- **Purpose of use**

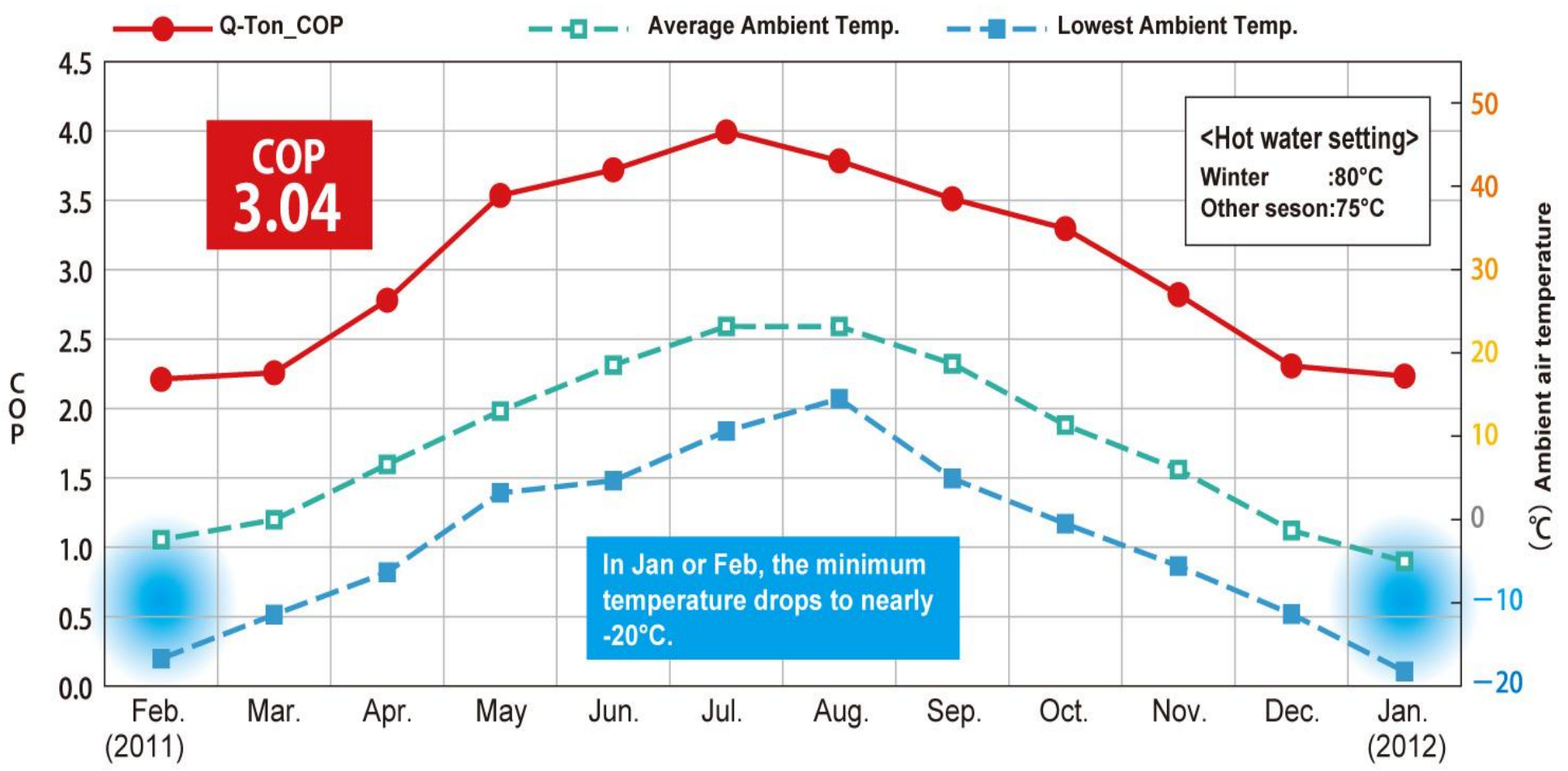
- Kitchen and bathroom



◆ Relationship of heating capacity and the outside air temperature



Cost-saving result ① Annual COP in this site



Cost-saving result ② Annual results summary



Running cost
-61%

Co2 emission amount
-29%

[Calculation conditions]

Price rate	
Q-ton/electric rate	The summer : ¥11.65/kWh, The other season: ¥10.70/kWh
Boiler/kerosine	: ¥ 90/L
CO2 emission amount	
Q-ton/electric	: 0.546kg-CO ₂ /kWh
Boiler/kerosine	: 2.490kg-CO ₂ /L

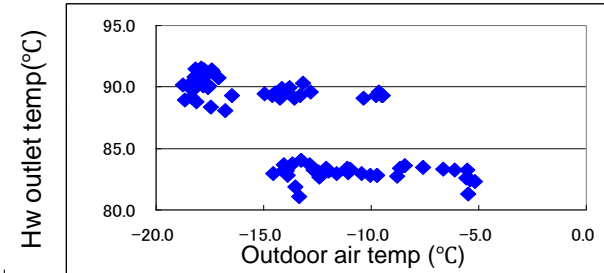
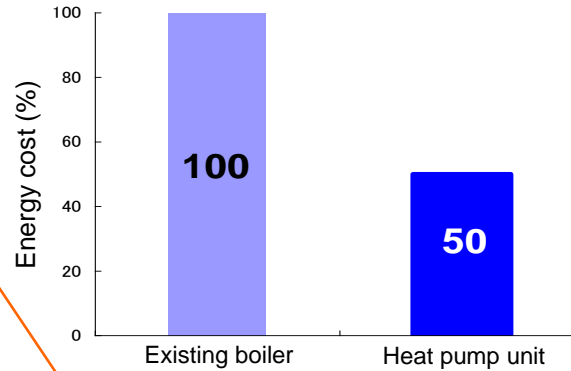
■ Energy cost was reduced to 43-54% in comparison with the conventional boiler in the winter season when operation conditions were the severest for heat pump unit. And there was no trouble. (at the lowest temperature: -20°C)

■ In the intermediate season and summer season when heat pump performance improves, it can be presumable that energy cost may be reduced further.

Hokkaido

In Hokkaido (Dec/2010 to Jan/2011)

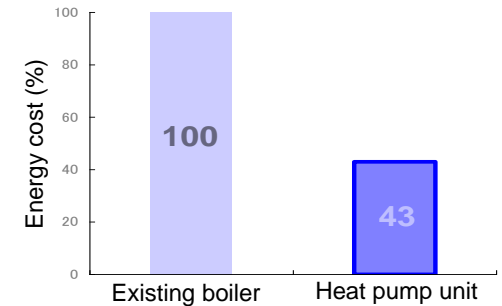
- Supplying hot water for kitchen and hand-wash
- 30kW x 1set + unvented cylinder
- Installation site: Hokkaido area severely cold area (-20°C or lower)



Iwate

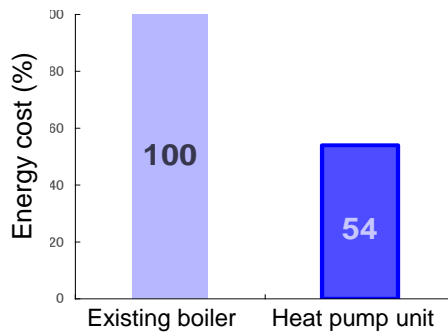
- Supplying hot water for kitchen and bath
- 30kW x 1set + unvented cylinder
- Installation site: North Iwate area severely cold area in Tohoku

In Iwate (Jan/2011 to Mar/2011)



Toyama

Toyama (Jan/2011 to Feb/2011)



- Preheating feed water to the boiler
- 30kW x 1set + heat exchanger
- Installation site: Toyama area Low temp and high humidity area

The hybrid system combined with a boiler takes advantage of good sides of 2 system.

Japanese hot spring inn in Matsumoto and Kanazawa



- **System composition**
Q-ton 1unit,
Unvented cylinder
500ℓ x 2units
- **Purpose of use**
Bathroom, shower, faucet Utilizing
existing tank and boiler.

Installation Sample② (School lunch center)

This site is the largest all-electric school lunch center in Japan.

- **System composition**
Q-ton 12units,
Large open tank
- **Purpose of use**
hot water supply for
dishwashers



Installation Sample③ (warm-bathing facility)

- **System composition**
Q-ton 12units,
Large open tank
- **Purpose of use**
preheating water supply for boiler

静内温泉
新ひだか町町民保養施設



Installation Sample④ (Food factory)

- **System composition**

Q-ton 4units,
Open tank 4,000L, 15,000L

- **Purpose of use**

Cleaning in the factory, food manufacturing process use



SUMMARY

The rated heating capacity of 30kW is sustainable at ambient air temperature as low as -7°C

In the field-test, the Q-ton operational cost was really lowered by almost half.

Q-ton came to be used in the various fields

Thank you for your kind attention