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Energy Saving by Installation of Double Bundle-type Heat Pump

IndonesiaJCM Model Project

Date: 22nd February 2016
Venue: Bogor, Indonesia

Project Owner:
(Japan) Toyota Tsusho Corporation,
(Indonesia) PT.TTL Residences

PT. TAKENAKA INDONESIA

Ckarang Hotel Residence
AXIA SOUTH CIKARANG Tower 1　Project outline

■Project Outline

1)	Location	LIPPO Cikarang, Bekasi West Java, INDONESIA
2)	Type, Use	Hotel, Service apartment
3)	Land Area	8,284㎡
4)	Structure	RC structure　13 Floors（Maximum height　54.4m）
5)	Floor Area	13,358m² （Residential area：10,700m²）
6)	Schedule	1st June 2013 ～ 31st July 2014（14 Months）

■ Mechanical and Electrical Facility Outline

1)	Substation	3φ 3W 20kV/400-230V　1,000kVA x 1
2)	Generator	3φ 4W 400-230V 630VA x1　（50% Back up）
3)	Main Feeder	CVT Pre-fabrication Branch cable
4)	Lighting	Public：LED Down light, Tube FL Lamp　Corridor 150Lx, Office 500Lx
		Residence：LED Ceiling Lamp with Variable lumen and color
5)	Weak current	TEL、LAN、Pubric Address、CCTV、Card Key security
6)	Plumbing	Direct supply with inverter pump　Under ground tank 240m³
7)	Hot water	Kitchen, SPA：Central system from Boiler 230kW x 2sets with solar
		Residences：Local system with 100 liter hot water tank, and heater
8)	Filtering	SPA：22m³/h(2turn/h)、Swimming Pool：16m³/h（4turn/day）
9)	Fire fighting	Splinkler, Internal and External Hydrant system, fire extinguisher
10)	AC system	Air cooled Heat pump with Freon R-410
		Pubric area：Multi system with ceiling cassette
		Residence：Single wall mounted and small multi system

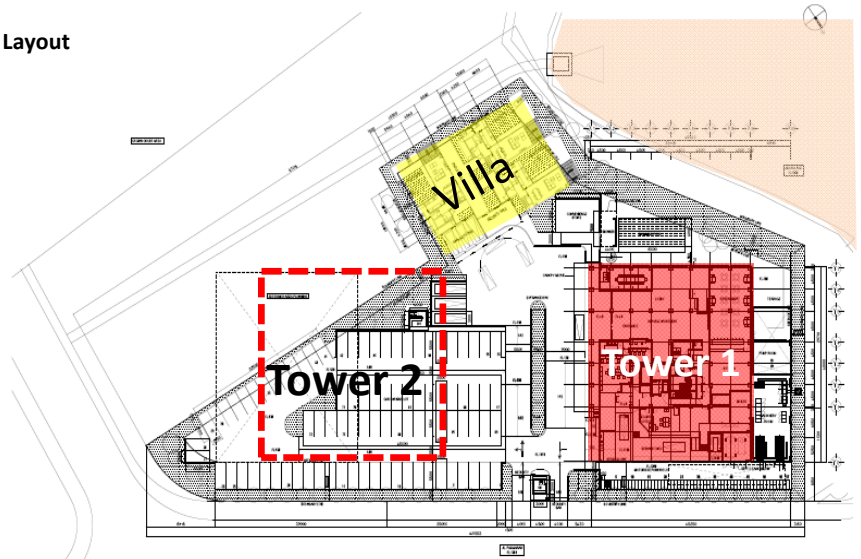
■ Project Organization

Project Manager	Site Manager	ME manager	ME Chief	Total Site staff
Kitayama	Butarbutar	TADA	Yanto	63 staffs

■ Schedule　Construction：July 2013 – September 2014 (15 months)

■External view

■Layout



Entrance

Papaya and AXIA

Lobby view from Pool

View from Moon Lake

Lobby

Type B

Restaurant

Public bath

PT. TAKENAKA INDONESIA

Ckarang Hotel Residence
AXIA SOUTH CIKARANG Tower 2 Project outline

■Project Outline

1) Location LIPPO Cikarang, Bekasi West Java, INDONESIA
2) Type, Use Hotel, Service apartment, Restaurant
3) Land Area 8,284㎡
4) Structure RC structure 13 Floors (Maximum height 52.88m)
5) Floor Area 13,303m² (Residential area : 8,219m²)
6) Schedule 1st Oct 2014 ～ 31st March 2016 (18 Months)

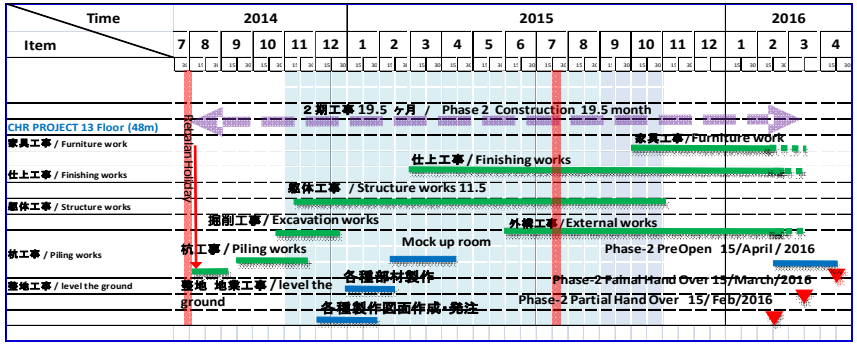
■ Mechanical and Electrical Facility Outline

1) Substation 3φ3W 20kV/400-230V 1,000kVA x 1
2) Generator 3φ4W 400-230V 630VA x1 (Back-up : 70%)
3) Main Feeder CVT Pre-fabrication Branch cable
4) Lighting Public : LED Down light, Tube FL Lamp Corridor 150Lx, Office 500Lx
   Residence : LED Ceiling Lamp with Variable lumen and color
5) Weak current TEL、LAN、Pubric Address、CCTV、Card Key security
6) Plumbing Direct supply with inverter pump Under ground tank 60m³
7) Hot water Kitchen, SPA : Central system : 37.8kW x 6 set
   Double bundled Heat pump With 45m3 hot water tank
   Residences : Local system with 100 liter hot water tank. and heater
   Only 12-13F rooms are included in central system
8) Filtering SPA : Internal Bath 22m³/h(2turn/h)、Roten(External) : 16m³/h (2turn/h)
9) Fire fighting Splinkler, Internal and External Hydrant system, fire extinguisher
10) AC system Public : Double bundled (Water cooled) chiller 27.6kW x 6set
    with Heat storage tank 240m3, Secondary FCU, AHU
    Residences : Wall mounted single type R-410

■ Organization

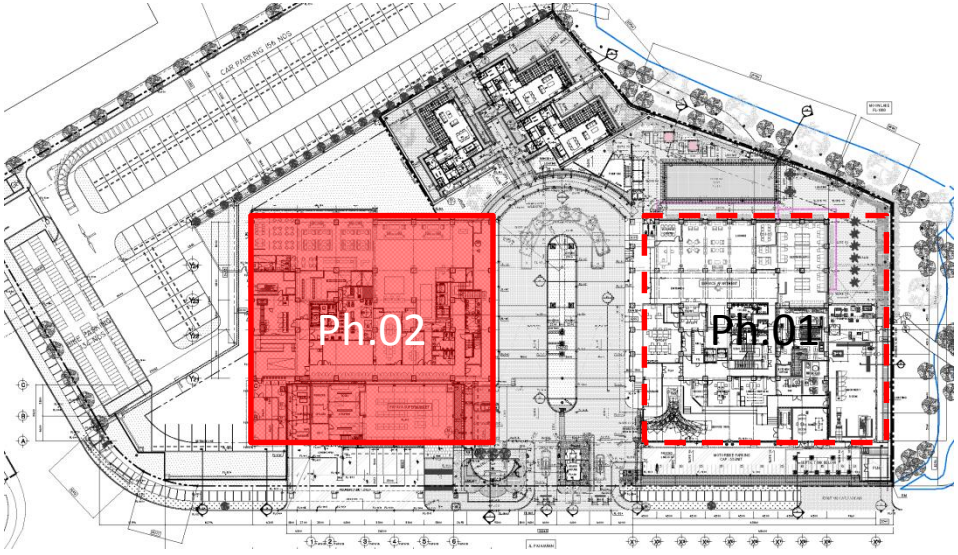
Project Manager	Site Manager	ME manager	ME Chief	Total Japanese	Indonesian staff
Kitayama	Butarbutar	TADA	Yanto	4 staffs	61 staffs

■ Schedule 1st Oct 2014 ～ 31st March 2016 (18 Months)



■External View (Completed Image)

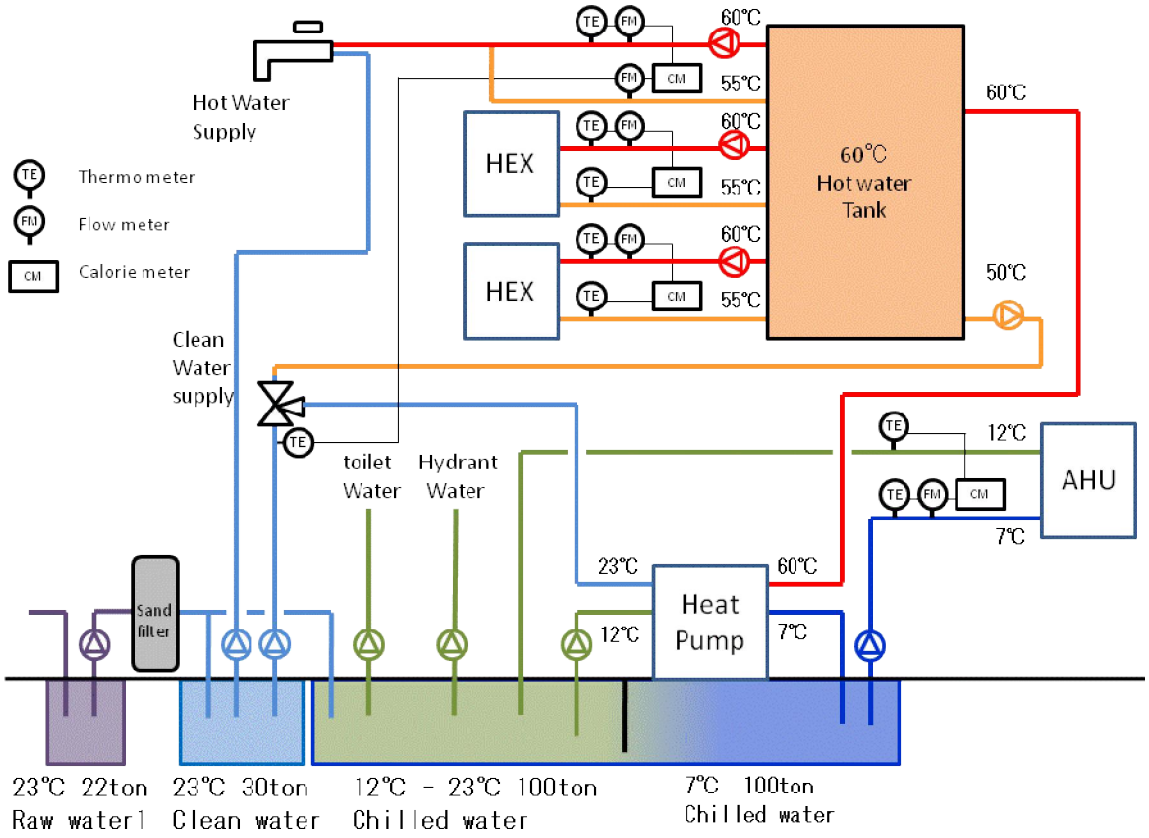
■Layout



Funded by JCM Model Project

	Standard system (tower1) Boiler + VRV system	Advanced System (Tower2) Heat pump + AHU	
CO2 emission	: 450 ton-CO2/ year	→ 380 ton-CO2/ year	= 170 ton-CO2/ year
Solar consumption	: 112 m3/ year	→ 0 m3/ year	= 112m3/ year
Running Cost	: 980,000,000 Rp / year	→ 280,000,000 Rp/ year	= 700,000,000 Rp / year
Initial Cost	: 8,300 juta Rp.	→ 8,900 juta Rp.	= 600 juta Rp. up (Expected 0.8 year pay back)

System schematic



Tower 1 system
(Standard)

Boiler + VRV system

Tower 2 system
(Advanced system)

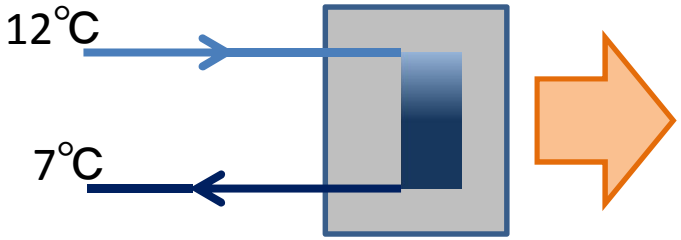
Double bundled Heat pump system + AHU

Double Bundled Heat Pump system (Water cooled chiller)

Why Save Energy and reduce CO2

Tower 1 (Standard system)

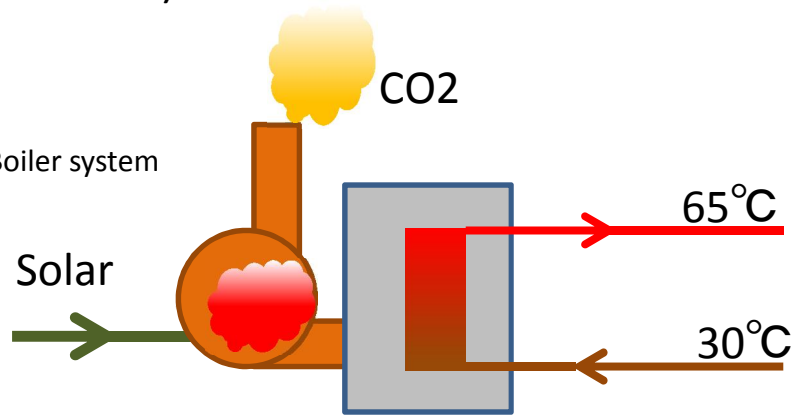
Air cooled Chiller or VRV system



For making 5 degree cooler water

Discharge the 5 degree heat to air

Boiler system

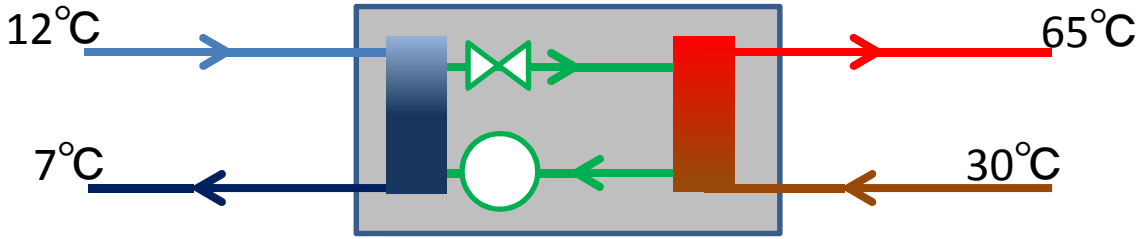


For making 35 degree hotter water

Burn the solar for heating and CO2 discharge

Tower 2 (Advanced system)

Double bundled Heat pump



For making 5 degree cooler water

Shift heat to Freon Cycle

For making 35 degree hotter water

Get Heat from Freon Cycle

Without discharge the Heat and CO2

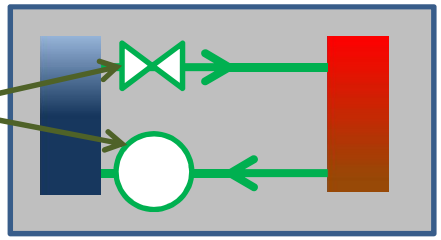
What is the advanced technology

1. Sensitive Freon control

   Hot water side 35℃ differential

   Cool water side 5 ℃ differential

   Balanced in the same cycle



2. Heat balance design

   Cooling water for Air Conditioning cannot be made without Hot water Consumption

   Heat balance in the building designed equally

【Invention the Combined system of the Air conditioning and hot water supply Suited for the Tropic Region 】

Theme/Plan

①Reduction of CO2 emission
②Reduction of Fossil Fuel Consumption
③Less and Easier work for Facility Staff
④Better Profitability Balance
⑤Make Superiority in the Market

Solution/Do

①High Efficiency with Double bundled system
②No consumption of solar for heat source
③Better Reliability and Automatic Operations
④Reduction of Initial and Running Cost
⑤Symbolized as the Friendship between Indonesia - Japan

Achievement/Check

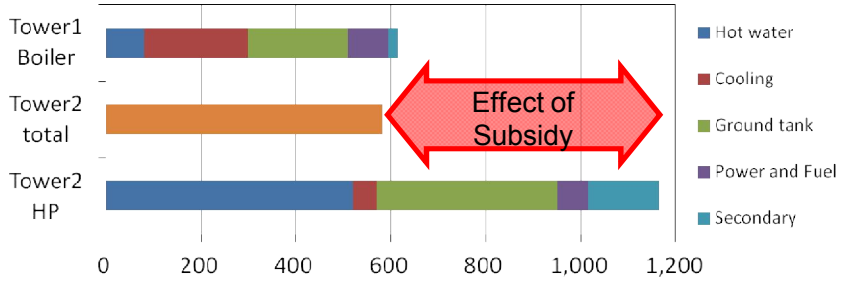
- Authorized as the JCM Project
- Get the Subsidy by Government
- Reduction of running cost Rp.700 juta/year
- Reduction of CO2 emission 170C-ton/year
- Invent the New Parallel operated small units

Development/Action

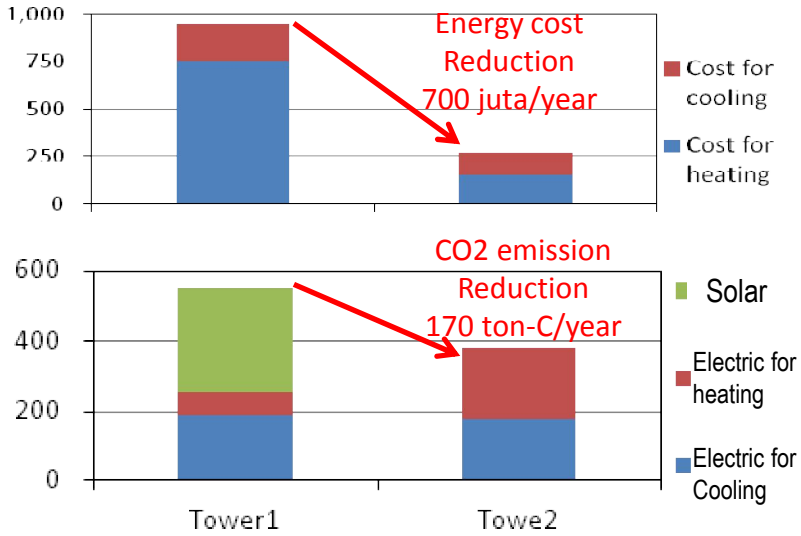
- Find best balance between cool and heat during the monitoring term of CO2 reduction
- Analyze the profitability except subsidy
- Establish the fascinating scheme from Japan only based on the Advanced technology and Subsidy

JCM authorized

Double bundled Heat pump



Cost comparison tower 1 and 2



Status of this Project

- Mar 2015: Installed all equipment
- Jun 2015:apploved JCM Methodology
- Sep 2015: Start PDDF to end of Mar 2016
- Apr 2016: start System operation
- “**Validation”** within one year after start operation(Mar 2017)
- **“Verification “** After one more year(Mar2018)

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Thank you