

# System Comparison

Air Cooled Chiller system



Multi V III System (VRF)

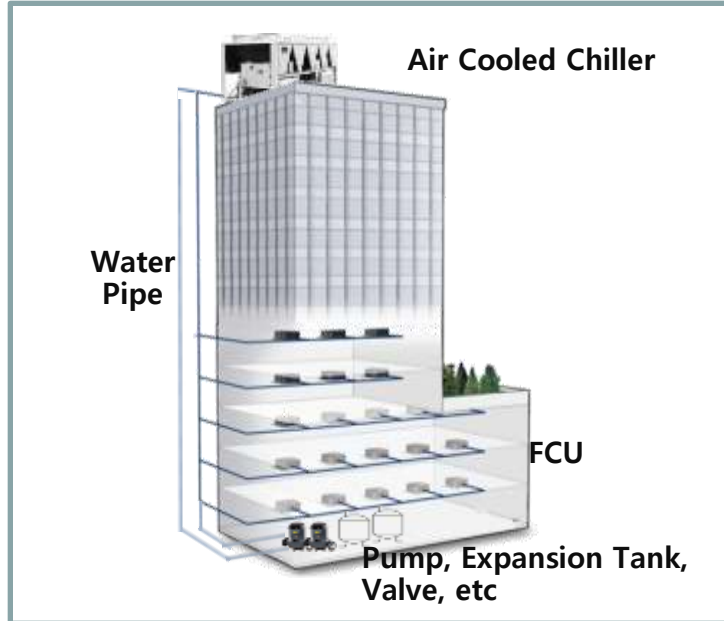
*Tropical*  
**MULTI V. III**

**VS**



# System Summary

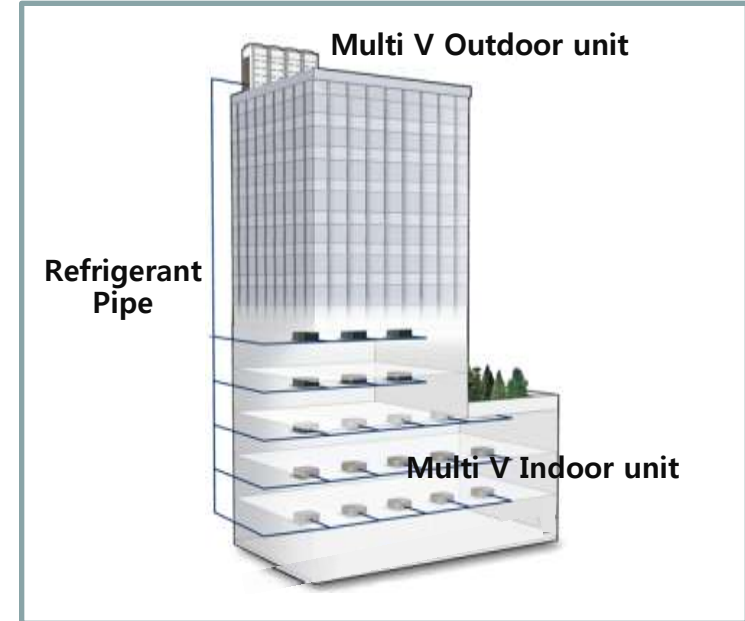
## Air Cooled Chiller system



System  
Diagram

- Air Cooled Chiller
- FCU, AHU
- Chilled Water Pipe
- Water Pump, Expansion Tank,  
Water Treatment system,  
Valve, Sensor

## Multi V III System (VRF)



Refrigerant  
Pipe

Multi V Outdoor unit

Multi V Indoor unit

- Multi V Outdoor unit
- Multi V Indoor unit (or AHU)
- Refrigerant pipe

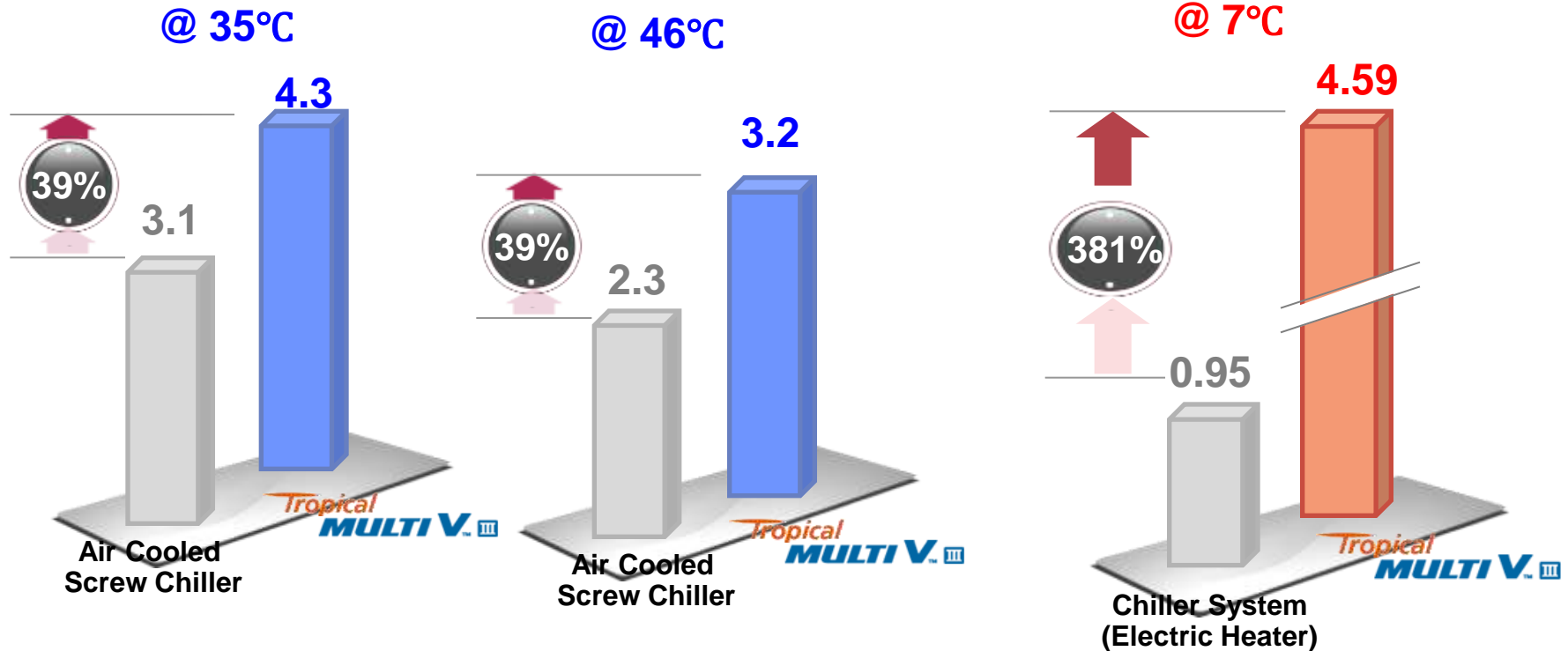
System  
Component

# Efficiency \_ High EER

Multi V produce efficiency is higher than chiller by 39% at cooling mode

## Cooling EER

## Heating EER



Mode	Cooling						Heating		
	35 °C			46 °C			7 °C		
Out Temp.	Capacity(KW)	P/I(KW)	EER(KW)	Capacity (KW)	P/I(KW)	EER(KW)	Capacity (KW)	P/I(KW)	EER(KW)
Chiller (30XA252)	268	87	3.08	241	105	2.30	25	26.25	0.95
Multi V III (ARUN80LH3)	22.4	5.22	4.29	22.4	7	3.20	25.2	5.5	4.58
			39%			39%			381%

# Stand by unit - Auto back up system

A stand-by unit is not required in Multi V system

## Air Cooled Chiller system      Multi V III System (VRF)

250 ton x 4 unit → For Operating  
250 ton x 1 unit → For Stand by

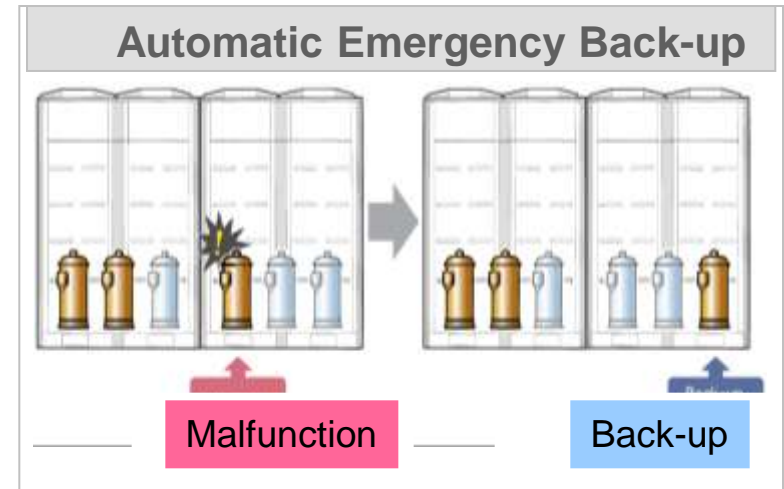
→ Total 1,250 ton

Multi V Capacity

→ 1,000 ton

(Calculated under design condition)

In case building  
cooling load is 1,000 ton

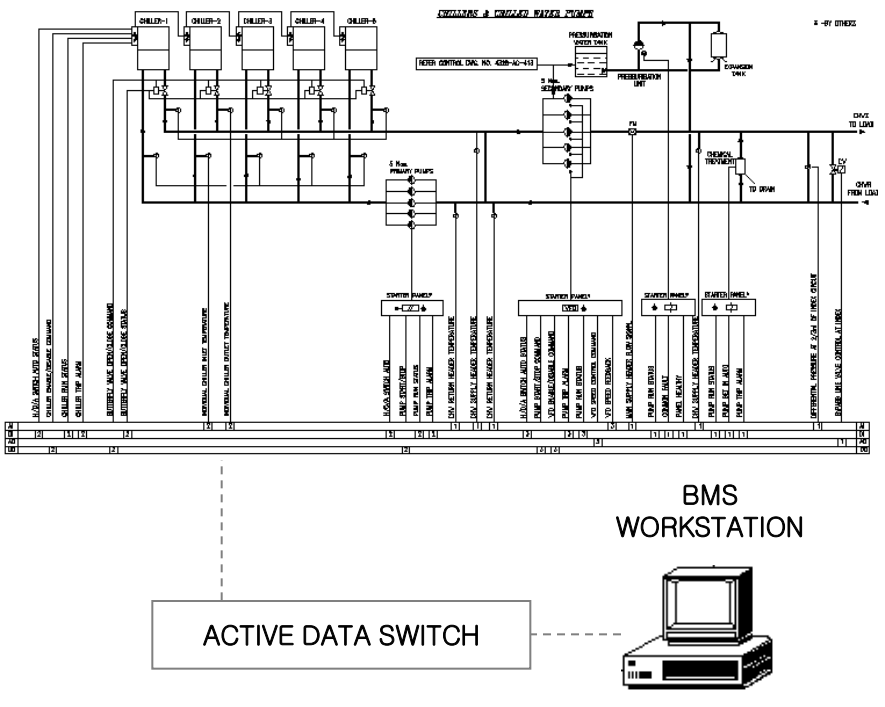


→ Multi V system can reduce initial Cost

## Multi V III → Simple Control system

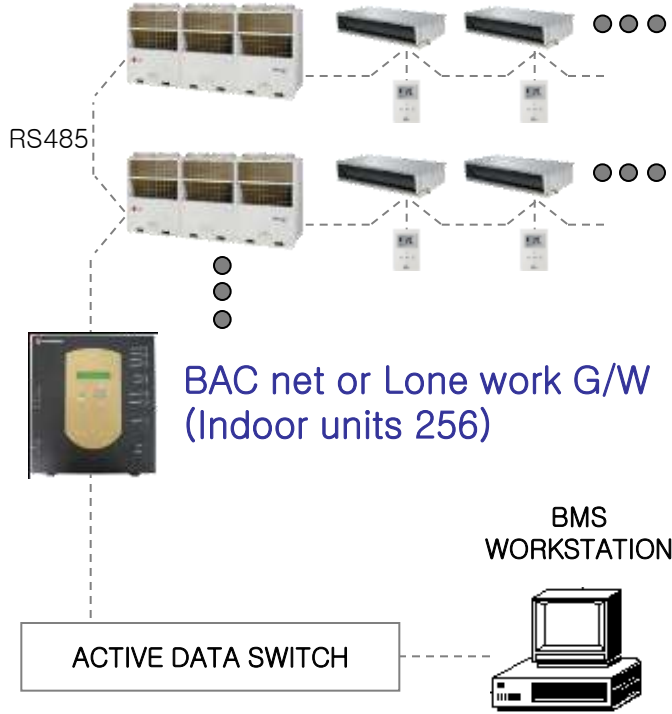
### Air Cooled Chiller system

As DDC system has many connections, its management is relatively difficult.



### Multi V III System (VRF)

Multi V doesn't need DDC. Only communication line and gateway are needed.



Control System of Multi V III is more effective than Carrier air-cooled chiller.

## Air Cooled Chiller system



- Only one type controller for manager
- Indoor unit can't be controlled for user
- Each indoor unit's power consumption can't be checked
- Real-time remote monitoring centre can be done by designated computer

## Multi V III System (VRF)



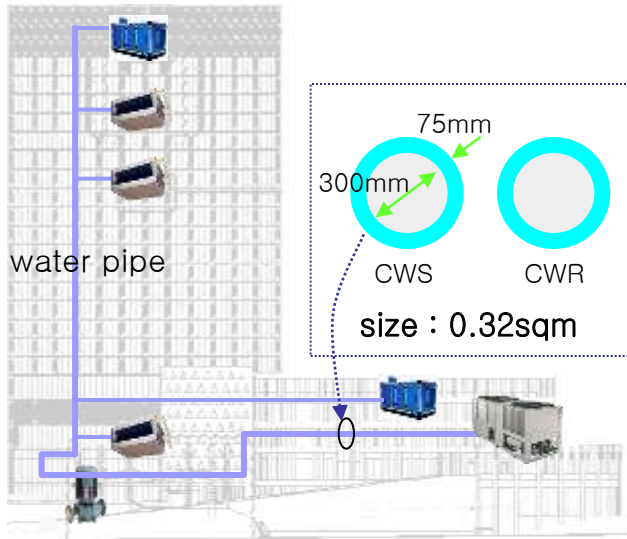
- Many types controller for manager and user
- Individual and group control
- Each indoor unit's power consumption can be checked
- Real-time remote monitoring centre can be done by every computer

# Shaft size – pipe size

## Multi V system can reduce a shaft size of building

### Air Cooled Chiller system

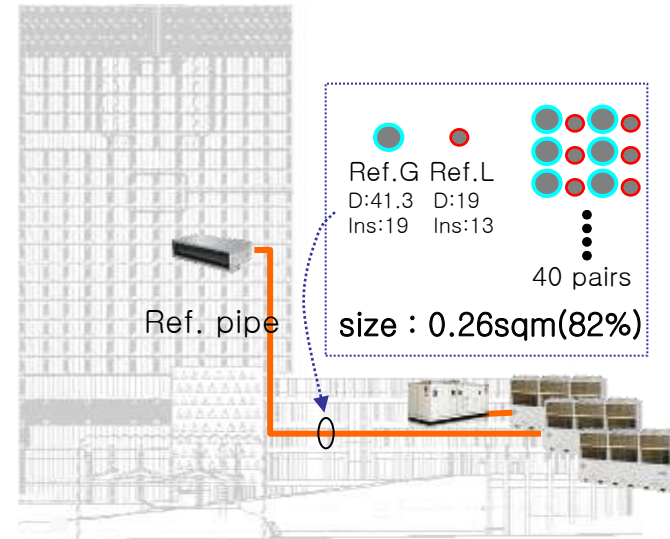
Long single piping from chiller, pump, to FCU.



- Big (diameter 300mm) & long pipe.
- Hard to work
- Leakage test is difficult because of single long pipe.

### Multi V III System (VRF)

Indoors are directly connected to Multi V outdoor units.



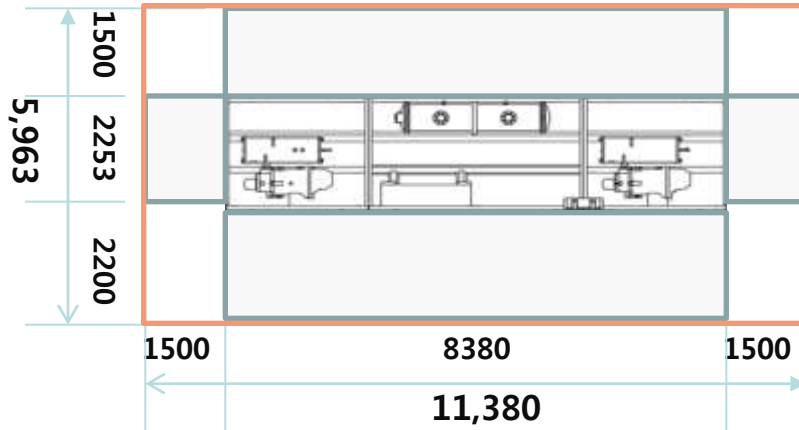
- Easy work with small and flexible pipe.
- Easy expansion of equipment.
- Leakage test with high pressure nitrogen gas (38kgf/sqm) per each system is possible. It can guarantee the installation quality.

# Space Benefit

## Foot print

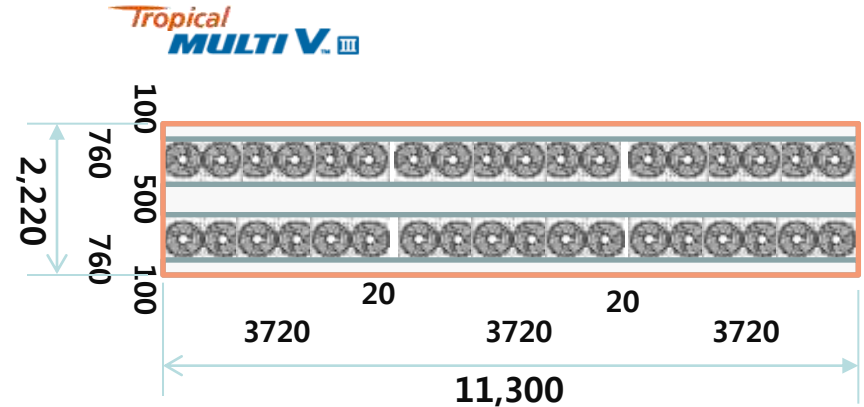
 SVC/ Maintenance & Heat exchange area

### Air Cooled Chiller system



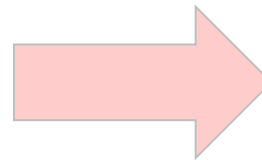
240 ton Chiller " C Company "  
 $5.96\text{m} \times 11.38 = 67.8 \text{ m}^2$

### Multi V III System (VRF)



240 ton Multi V III (48HP x 6 units)  
 $2.22\text{m} \times 11.30 = 25.1 \text{ m}^2$

100%



37%

**Foot print reduce by 63%**



(For Chiller) Certified maintenance and operating staff is needed

## Air Cooled Chiller system

The system requires certified maintenance and operating staff not only for chillers but also pumps, boilers, cooling towers etc.

→ More expensive maintenance cost.



→ **Maintenance Staff is required**

## Multi V III System (VRF)

No need special maintenance staff.  
Economic and easy maintenance



→ **No need Maintenance Staff**

# Commissioning

## Simple Commissioning

### Multi V III System (VRF)



1. PC Connect to Outdoor unit.
  2. Running the LGMV Program.
    - \* LGMV (Testing and checking program)
- Making Report

**2 hours**

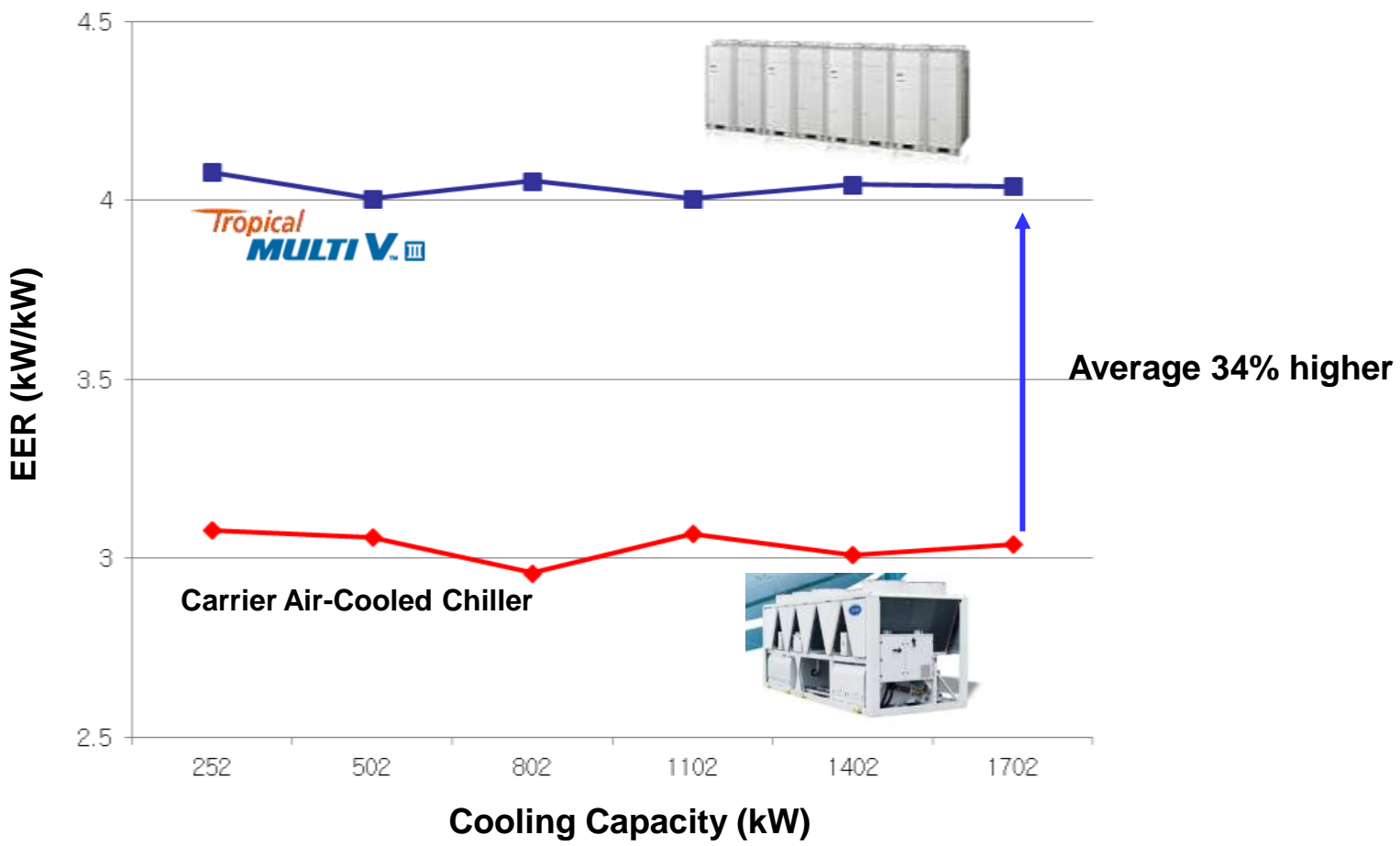
### Air Cooled Chiller system

1. 3<sup>rd</sup> party TAB (Water balance, Air balance)
  - \* TAB (Testing, Adjusting, Balancing)
2. Commissioning for each machine.
3. Matching commission between all machine  
(Pump, Chiller, AHU, FCU, BMS, etc)

**1 week**

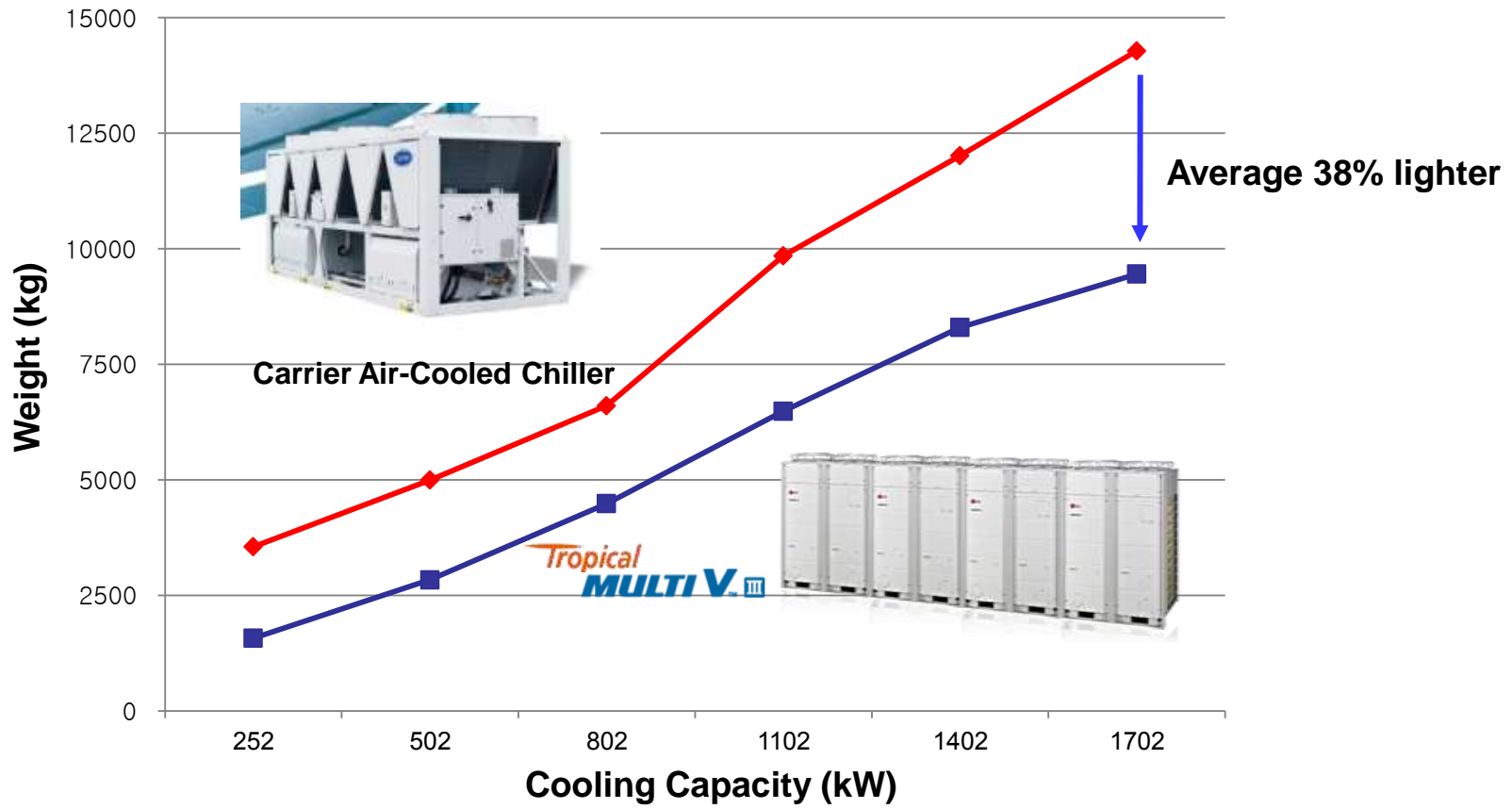
# Mechanical comparison \_ EER

EER of Multi V III is average 34% higher than Carrier air-cooled chiller.



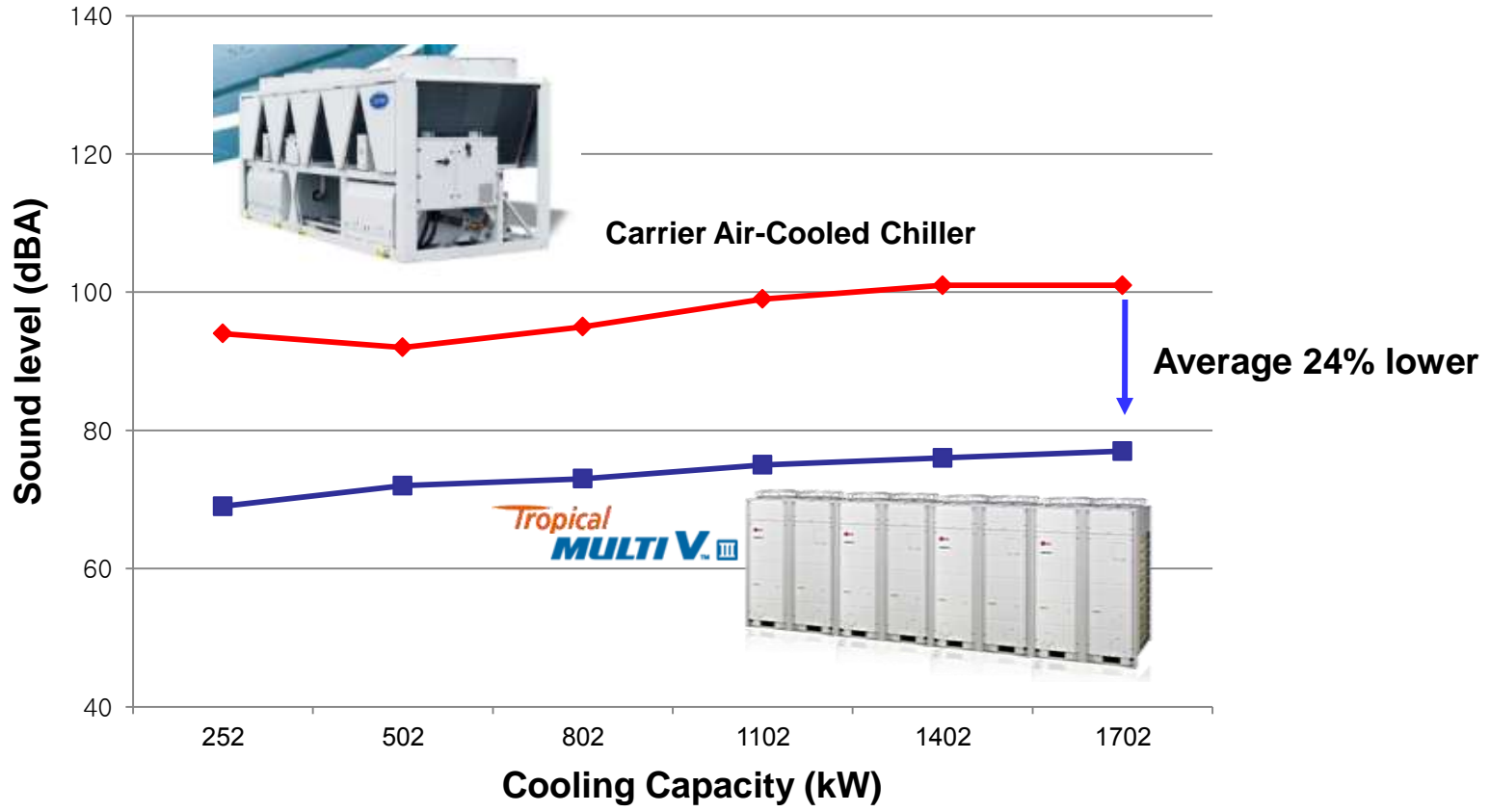
# Mechanical comparison \_ Weight

Weight of Multi V III is average 38% lighter than Carrier air-cooled chiller.



# Mechanical comparison \_ Sound level

Sound level of Multi V III is average 24% lower than Carrier air-cooled chiller.



# Partnership Program of LG



## 1. Proposal

Propose optimal solutions for customers  
- HVAC and energy solutions



## 6. Service & Maintenance

Offer 24/7 online remote monitoring service to ensure a system is always operating at its best

Establish local maintenance team to ensure on-time services



## 2. Design

Create a custom-designed system using LG's accumulated knowledge

- Airflow analysis
- Specialized software:
  - Load calculator, model selection, piping design



## 5. Start up & Commissioning

Test the system for any abnormalities in operation

Ensure system operational reliability



## 3. Training

Operate training centers for CAC installers



## 4. Supervision

Ensure major equipment installations are implemented per design

# LCC (life cycle cost) Analysis

## Life Cycle Cost Analysis → Case Study for Total Capacity 900 ton Building

### Comperaison Sheet

System		Multi V	Chiller system
Initial cost	Prodcut	3,632,030	3,434,899
			95%
	Installation (Expectation)	1,089,609	2,060,939
	total (SR)	4,721,639	5,495,839
ratio			116%
difference (SR)			774,200

Efficency	Nominal Capacity (RT)	714.60	878.70
	Power Consumption (kW) (at OT 46°C)	949.02	1,401.24
	Ratio of Power consumption		148%

Chiller Sys Kw	Pumps Kw
1,356	45

Annual Cost (SR)	864,595	1,296,865
Difference (SR / year)	-	432,270

Charge (SR/kW)	Hour / day	day / year	hour / year	Heat Load Ratio (%)
0.26	16	365	5,840	60%
For Pumps	24	365	8,760	

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