



SAMSUNG

Spire Tower

Warsaw, Poland

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Samsung Air Conditioner Europe, 2018

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01. Samsung Electronics Air Conditioner Europe

Introduction

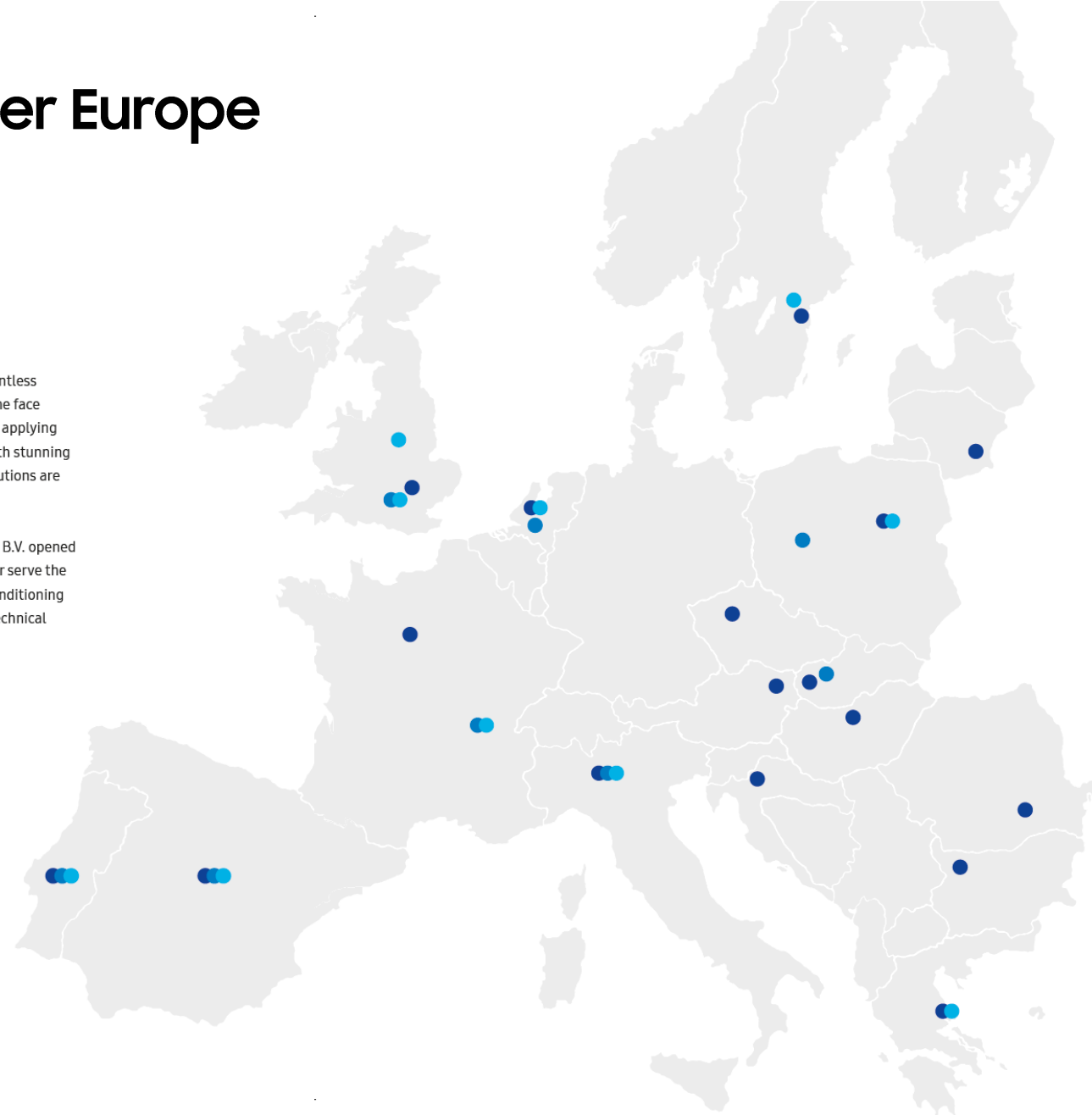
- Established in 2016 – an independent legal entity – part of Samsung Electronics
- SEACE own President – Wim Vangeenberghe
- Operating in 39 European countries, through 18 local branch offices
- Headquartered in Amsterdam, SEACE employs over 120 AC dedicated employees
- AC Factories (5) – Korea, China, Thailand, etc
- SEACE operates 8 main warehouses – Netherlands, Slovakia, Poland, UK, Italy, France, Spain, Portugal
- Aimed delivery time 24-48hrs in all EU countries
- Spare parts stocked in Breda, NL and SK. Aimed lead time 24hrs (if order by cut-off)

The Future of Climate Solutions

As a global leader in technology, Samsung uses relentless innovation and discovery to continually transform the face of electronics. For the last forty years, we have been applying this same groundbreaking innovation to air care. With stunning designs and advanced performance, our climate solutions are revolutionising the world of air conditioning.

In 2017, Samsung Electronics Air Conditioner Europe B.V. opened its Amsterdam-based headquarters in a bid to better serve the European market – the world's second largest air conditioning market. Our dedicated sales office offers training, technical support and unique distribution operations.

- Samsung Offices (17)
- Warehouses (8)
- Training Centres (10)



01. Samsung Electronics Air Conditioner Europe

Samsung HVAC Solutions

Samsung Air Conditioning, Ventilation and Hot Water Solutions are Engineered to Deliver Optimum Comfort with Outstanding Energy Performance while our Smart Control & Energy Management Systems take Air Conditioning beyond competition.



Building Management System

- ✓ Samsung DVM Systems can be fully integrated into KNX, Modbus, LonWorks, BacNET protocol BMS and Fidelio.
- ✓ Zensys is Samsung's HVAC PMS



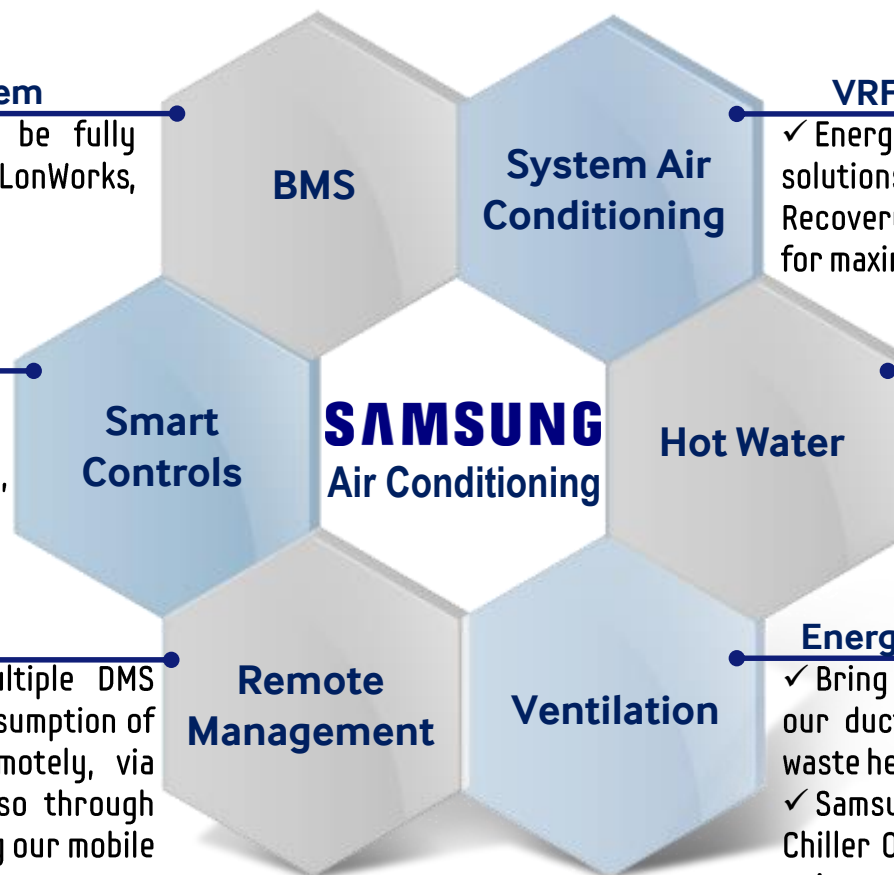
Advanced AC controls

- ✓ DMS2 can provide full AC control, power consumption distribution and utility metering, remote access, scheduling and error management.



Remote Manager (RMS)

- ✓ Access, control, monitor multiple DMS systems and analyse energy consumption of the entire building estate remotely, via internet, anytime, anywhere. Also through any Android phone or tablet using our mobile app.



VRF Heat Pumps & Chilled Water

- ✓ Energy efficient heating and cooling solutions, air or water cooled. Heat Recovery and Flash Injection technologies for maximum efficiency.



Low Carbon Hot Water

- ✓ More efficient than gas boiler, depending on hot water demand. Hydro units can produce



Energy Recovery Ventilation & AHU

- ✓ Bring 100% fresh air into the building with our ducted units and recover 70% of the waste heat with ERV units.
- ✓ Samsung AHU kits allow connecting VRF or Chiller ODUs to an AHU and integrate into a unitary control system.



0.2 Project Overview

□ Information

- Site: **Spire Tower**
- Location: **Warsaw, Poland**
- Type: **Office, 100 000 sq. m, 220m, 48 levels**
- Developer: **Ghelamco**
- Project Size (Samsung): **7MW**
- Solution: **HR Water Cooled VRF**
- Delivered: **2016**



□ Product

- DVM S Water (172)
- Duct S (2289)
- DVM S (4), w/m (9)
- Simple touch r/c DMS2.5, b.IoT

□ Key winning factors

- Flexible DVM Water solution
- Energy Efficiency
- Smart Building pilot
- Customer Support



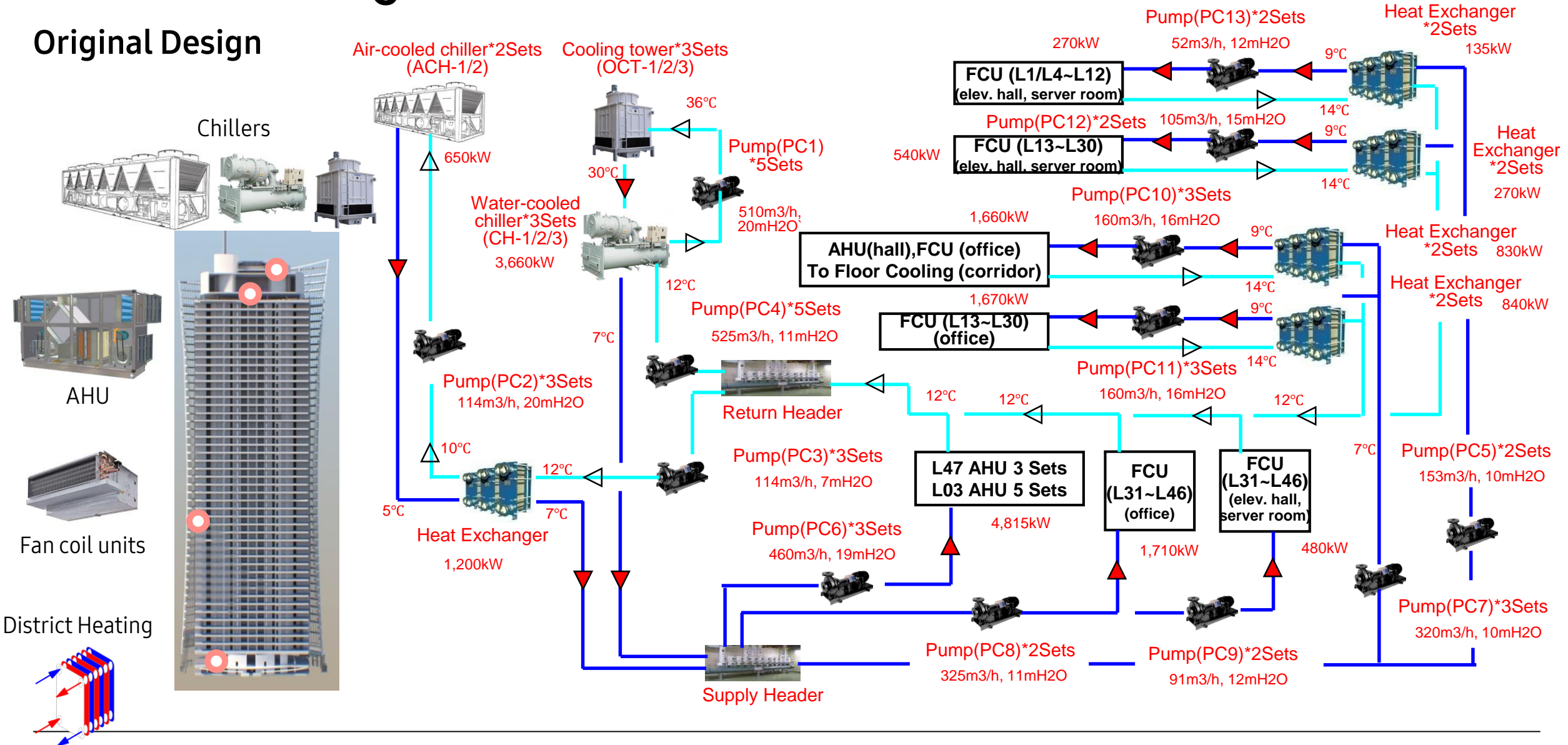
02. Project Overview

Spire Tower



03. Technical Design

Original Design



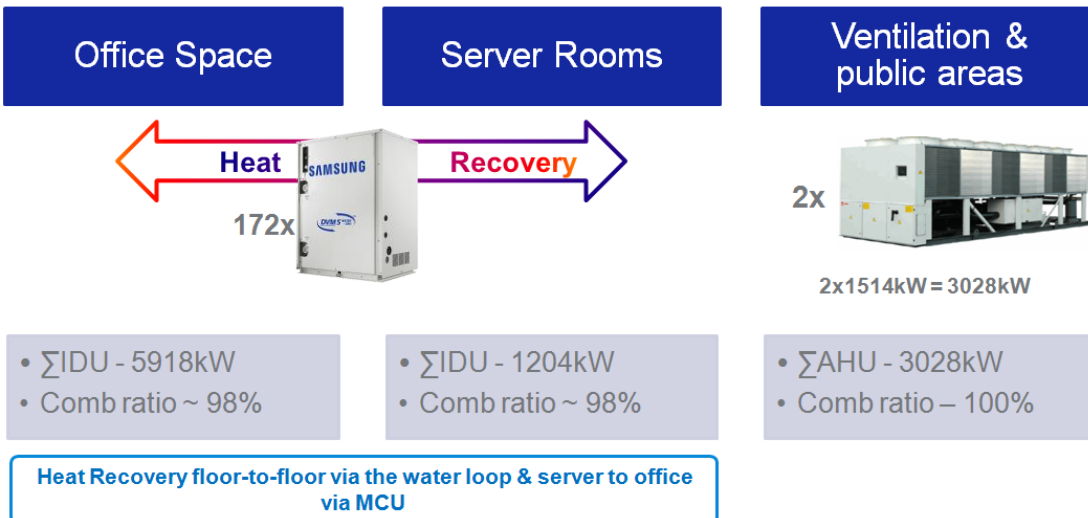
03. Technical Design

The concept – benefits & application of DVM S Water

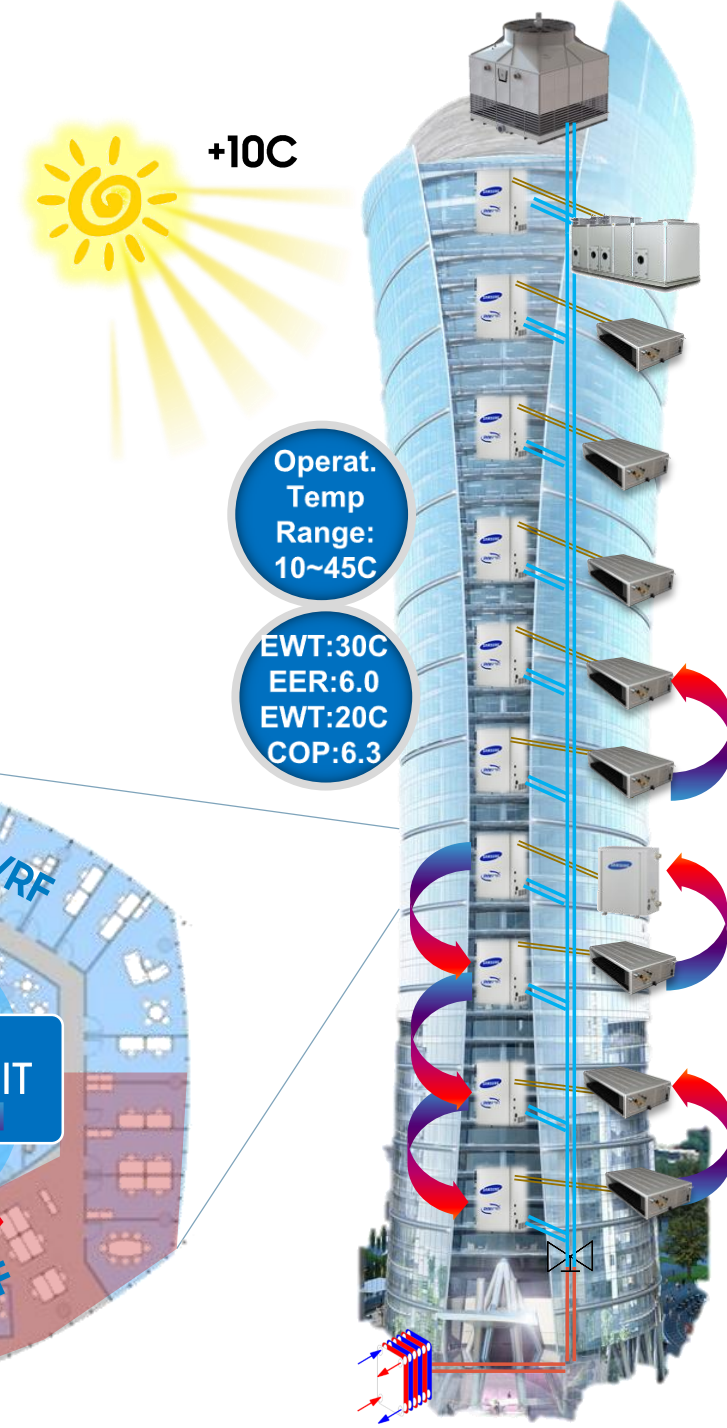
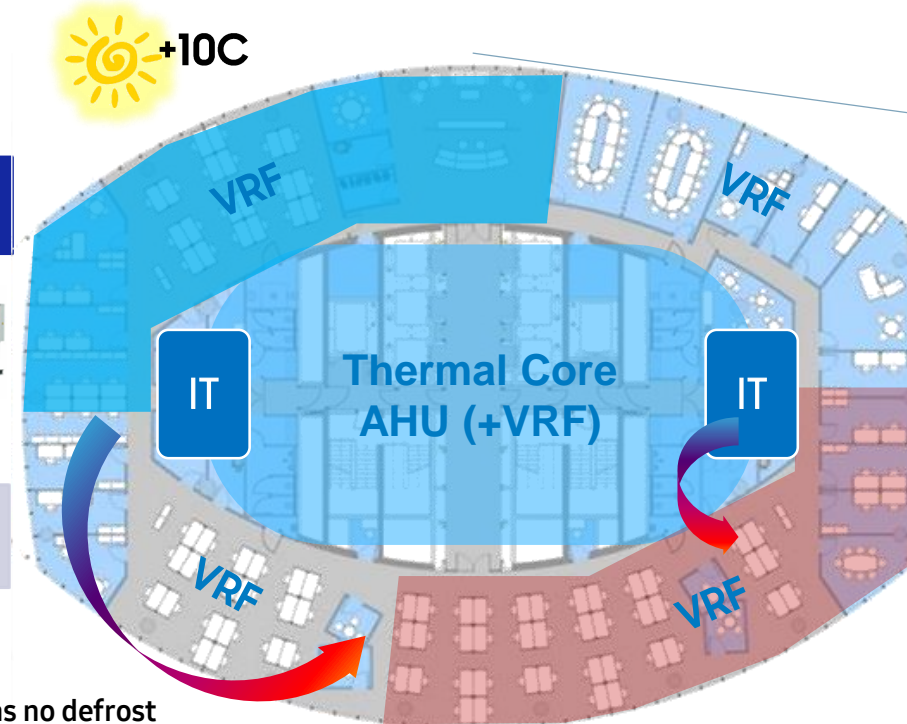
- Air source chillers serve the AHUs (Ventilation and lobby)
- Water cooled VRF serves office spaces and IT rooms

DVM S Water solution can achieve excellent energy efficiency compared to centralised cooling systems by utilising dual heat recovery effect whilst consuming less floor space:

- ✓ Water Cooled VRF has no defrost cycle
- ✓ Heat Recovery via the water loop from one floor to another
- ✓ Heat Recovery via the 3-pipe VRF



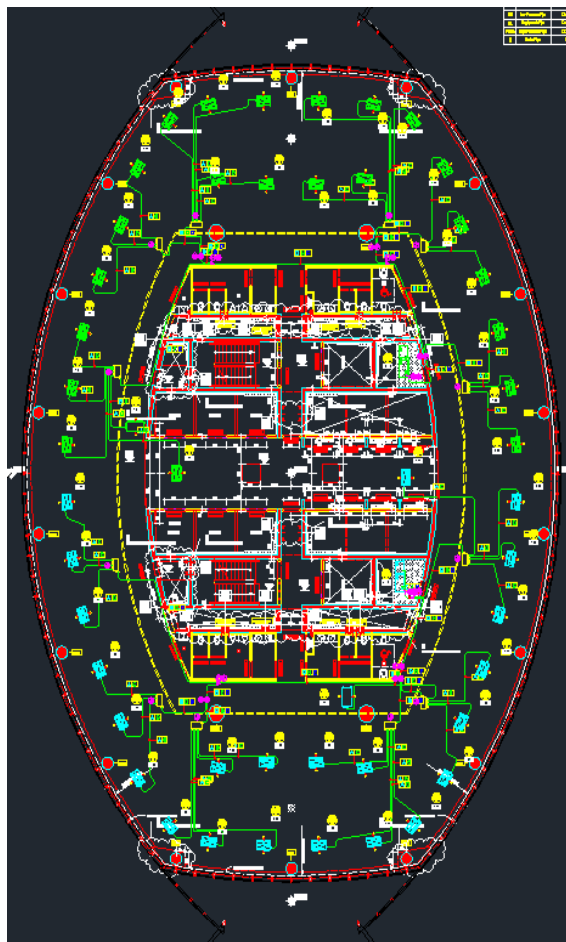
*Water Cooled VRF has no defrost



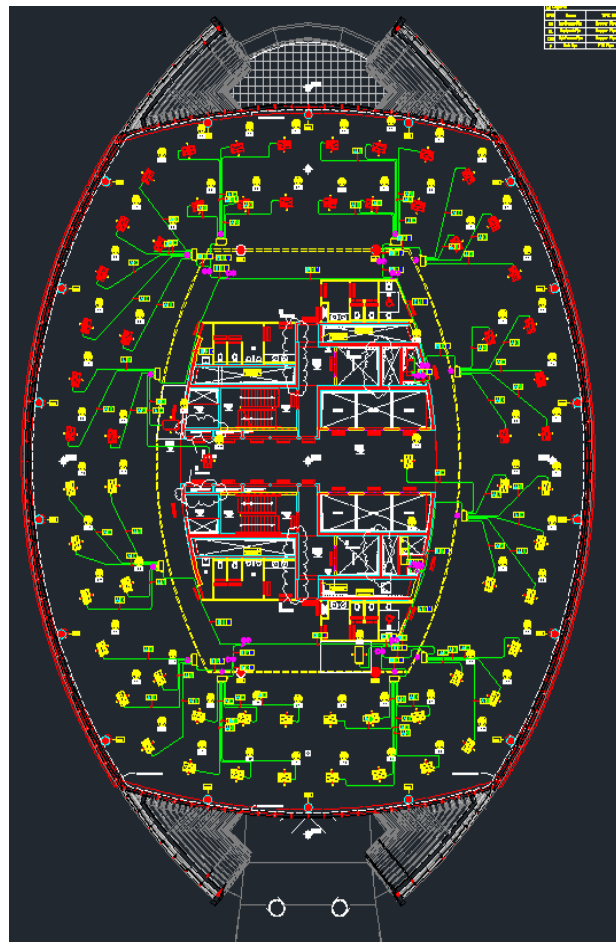
03. Technical Design

Final Design – Floor Plans

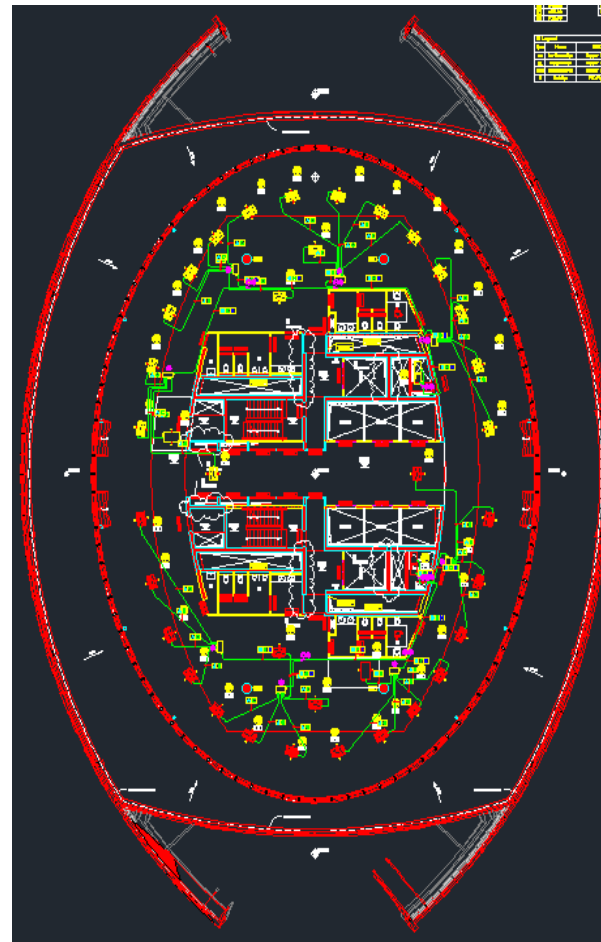
DVM S Water on each of the 43 office levels of the tower



VRF layout plan on 11-37th floor



VRF layout plan on 4-10 & 38-45th floor



VRF layout plan on 46th floor

Office & server rooms		
OU DVM S Water HR	AM080FXWANR/EU	22
OU DVM S Water HR	AM100FXWANR/EU	30
OU DVM S Water HR	AM120FXWANR/EU	36
OU DVM S Water HR	AM200FXWANR/EU	84
Duct indoor MSP	AM022FNMDEH/EU	818
Duct indoor MSP	AM028FNMDEH/EU	1088
Duct indoor MSP	AM036FNMDEH/EU	300
Duct indoor MSP	AM140FNMDEH/EU	86
Wired RC	MWR-SH00N	1146
Temp sensor	MRW-TA	1146
MCU box	MCU-S6NEE1N	512
T joint	MXJ-TA3819M	86
T joint	MXJ-TA3100M	86
Y joint	MXJ-YA3419M	168
Y joint	MXJ-YA3100M	168
Y joint	MXJ-YA2815M	46
Y joint	MXJ-YA2500M	258
Y joint	MXJ-YA2512M	212
Control & monitoring		
PIM	MIM-B16N	22
DMS2	MIM-D00AN	12
Zen Manager	MST-R5A	1

Final Design – Schematic Diagram

Technical Design

Fact Sheet

- ✓ Cooling Load: approx. 7MW
- ✓ Heating Load: approx. 1.5MW
- ✓ Heat Recovery from IT rooms: 1.5MW
- ✓ DH: (x2 PHE) high pressure, hot water at 135C → 80C
- ✓ 80C Hot water mainly serves AHUs and other sanitary hot water needs
- ✓ After AHUs 80C DH water cools down to 50C and is injected into the DVM S Water loop when and as much is required.
- ✓ In coldest months of winter (at approx. -20C ambient): heat injection happens x2 per day



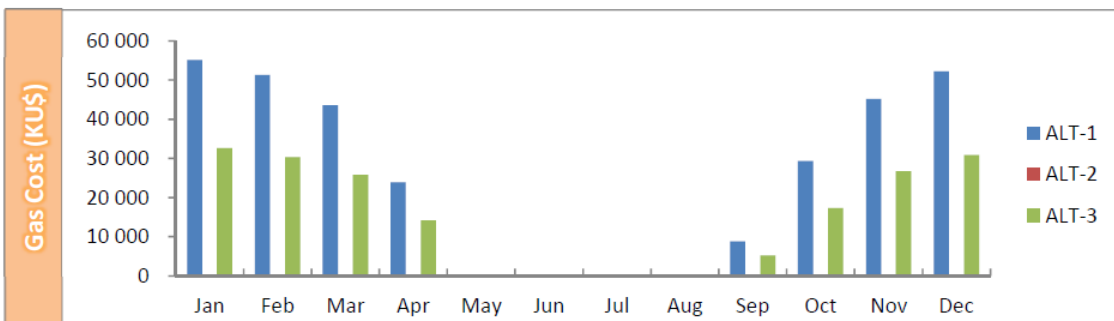
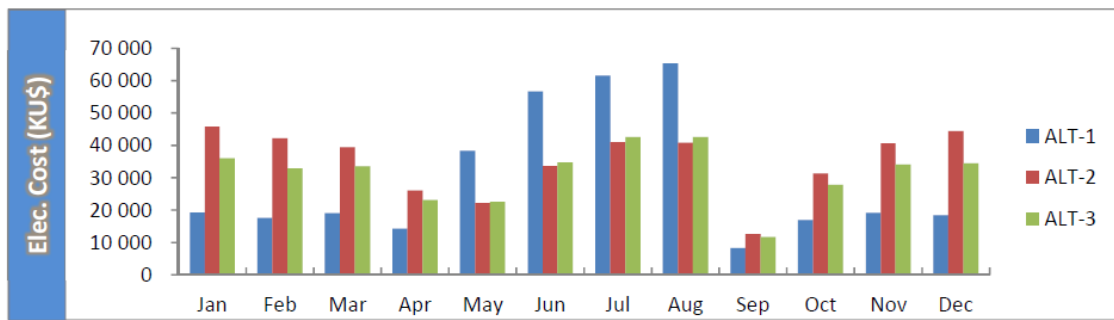


04. Energy Consumption Simulation

Simulation

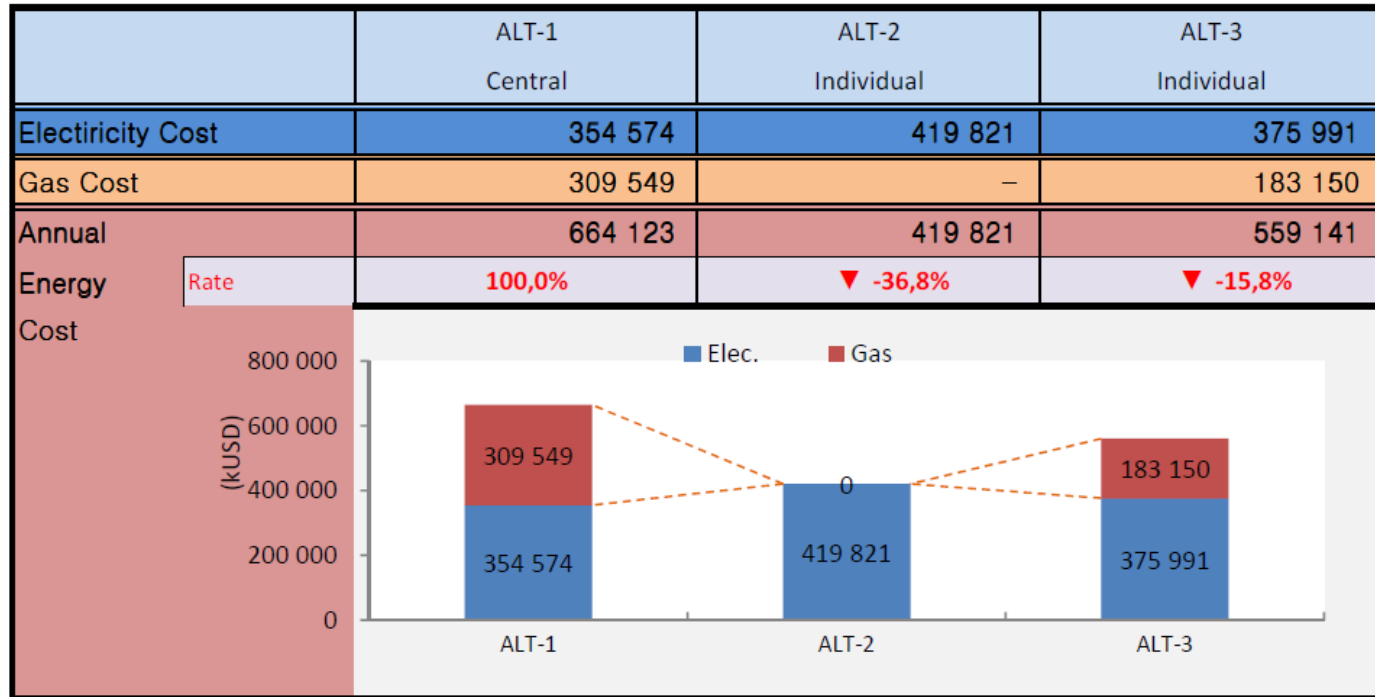
- Simulation was carried out on Centralised system, Air cooled VRF and Water cooled VRF.
- Expected energy consumption savings circa 20% versus the original centralised solution.

► Monthly Energy Cost



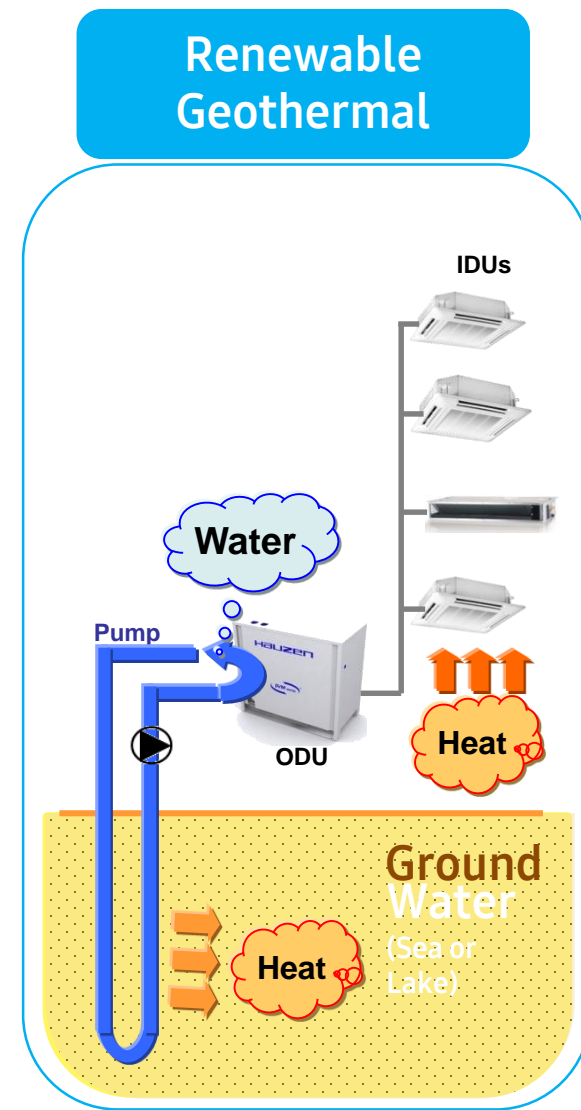
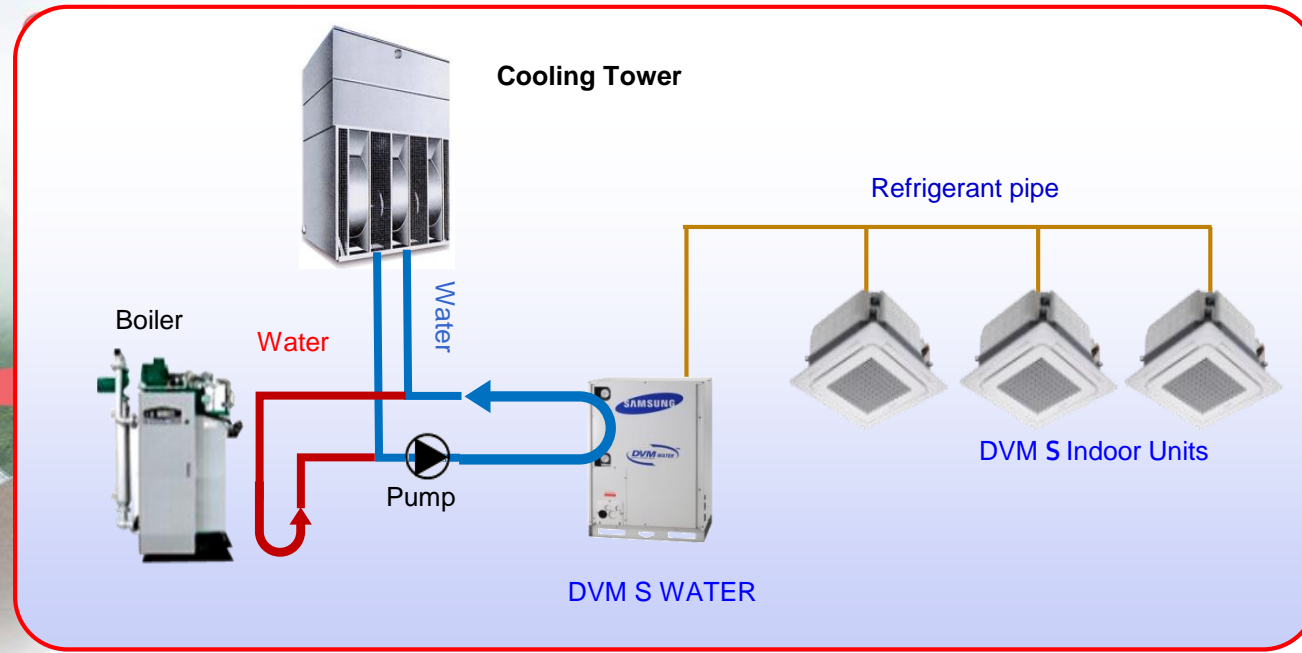
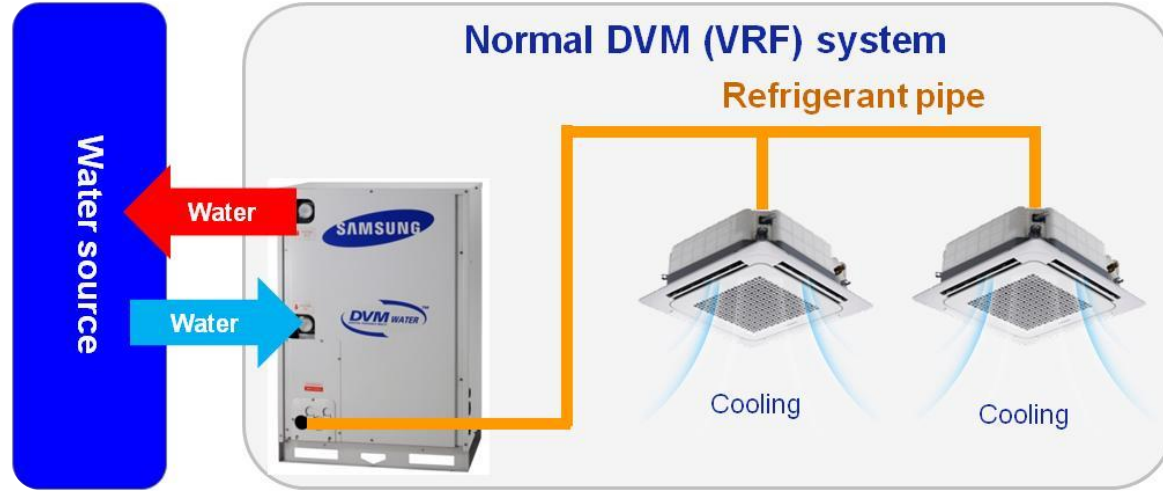
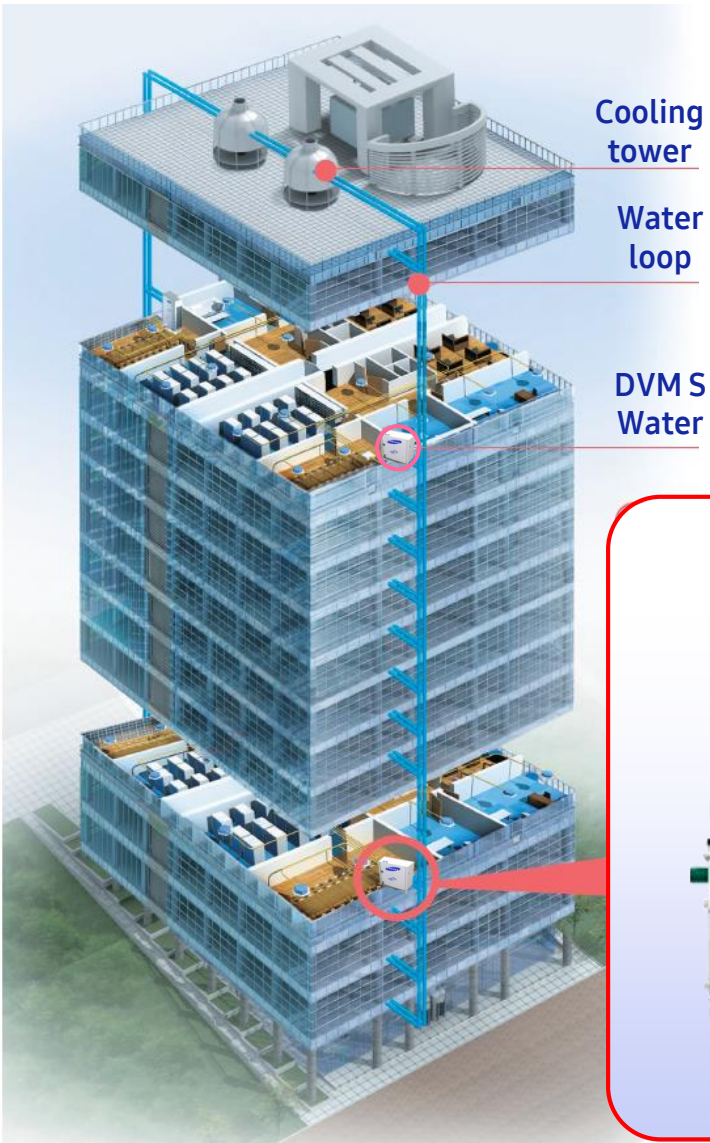
► Annual Energy Cost

(Unit : PLN)







05. DVM S Water

What is Water Cooled VRF (DVM S Water)



05. DVM S Water

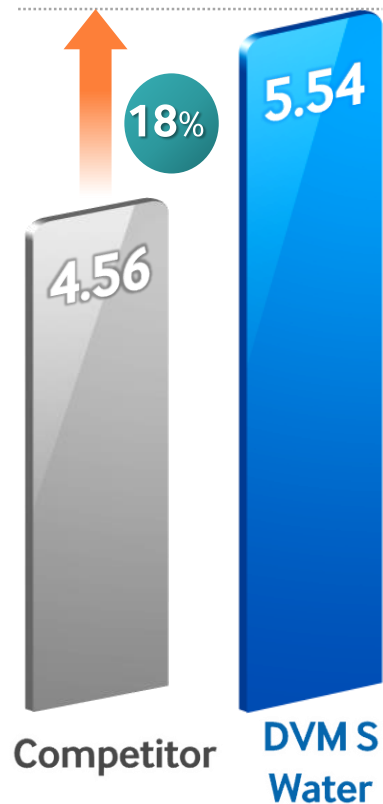
Samsung DVM S Water Line-up

DVM S Water	8 HP	10 HP	12 HP	20 HP	30 HP	Max. HP
<div>Heat Pump/ Heat Recovery</div> <div></div>	<div>W : 770 H : 1000 D : 545</div> <div></div> <div>AM080FXWANR AM100FXWANR AM120FXWANR</div>			<div>W : 1100 H : 1000 D : 545</div> <div></div> <div>AM200FXWANR AM300FXWANR</div>		<div>90HP 3 x 30HP</div> <div></div> <div>AM***FXWANR</div>
Compressor	Scroll x 1	Scroll x 1	Scroll x 1	Scroll x 2	Scroll x 2	Scroll x 6

05. DVM S Water

Samsung DVM S Water – Key Features

DVM S Water	8HP	10HP	12HP	20HP	30HP
EER	6.10	5.75	5.60	5.20	5.00
COP	6.35	6.25	6.05	5.80	5.60



Product Features

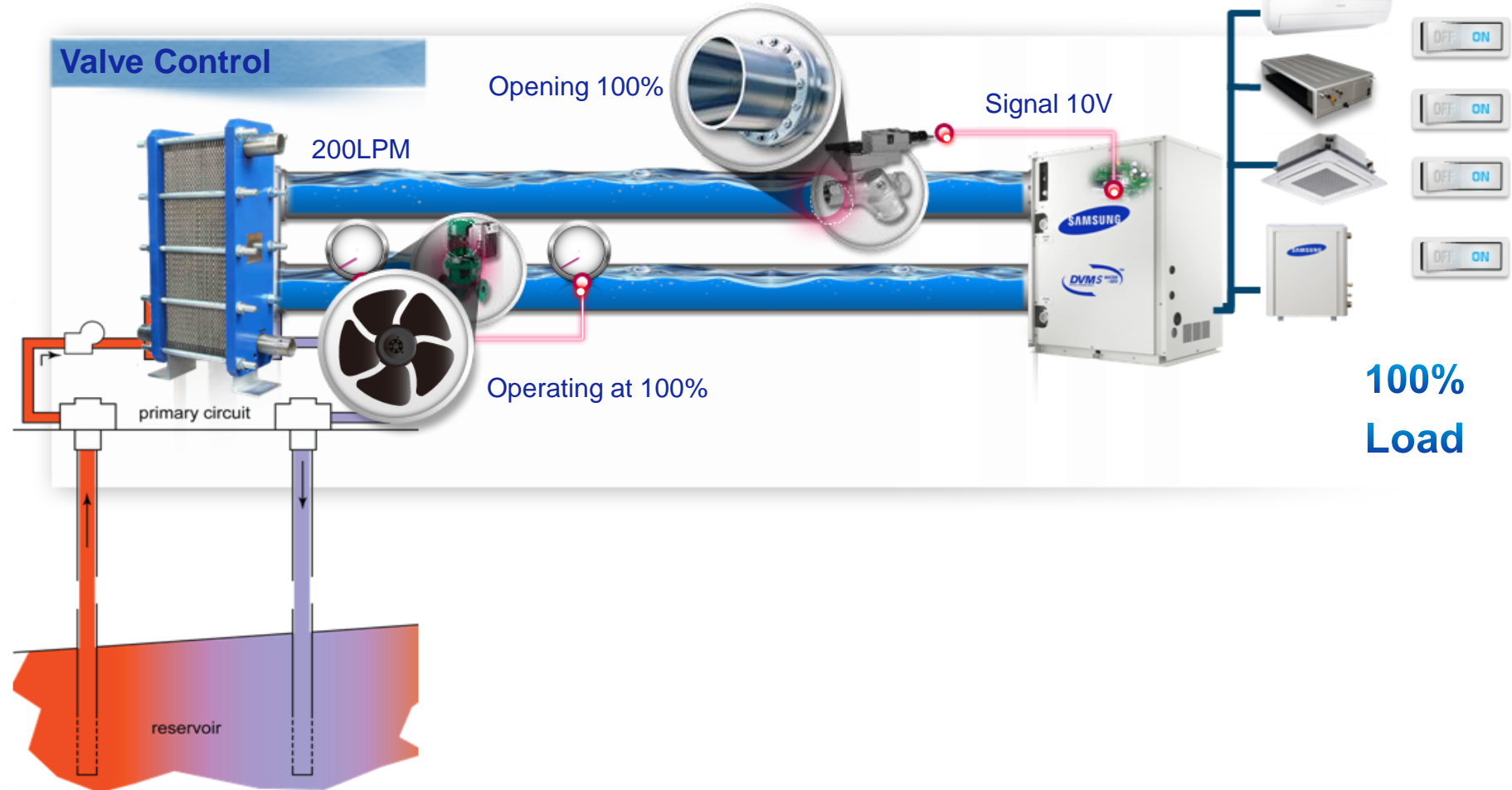


05. DVM S Water

Variable Water Flow Control

Voltage Signal to Water Flow
Rate Conversion Table

Signal(v)	Water Flow
10	100%
9	90%
8	80%
7	70%
6	60%
5	50%
4	40%
3	30%
2	20%
0	0%

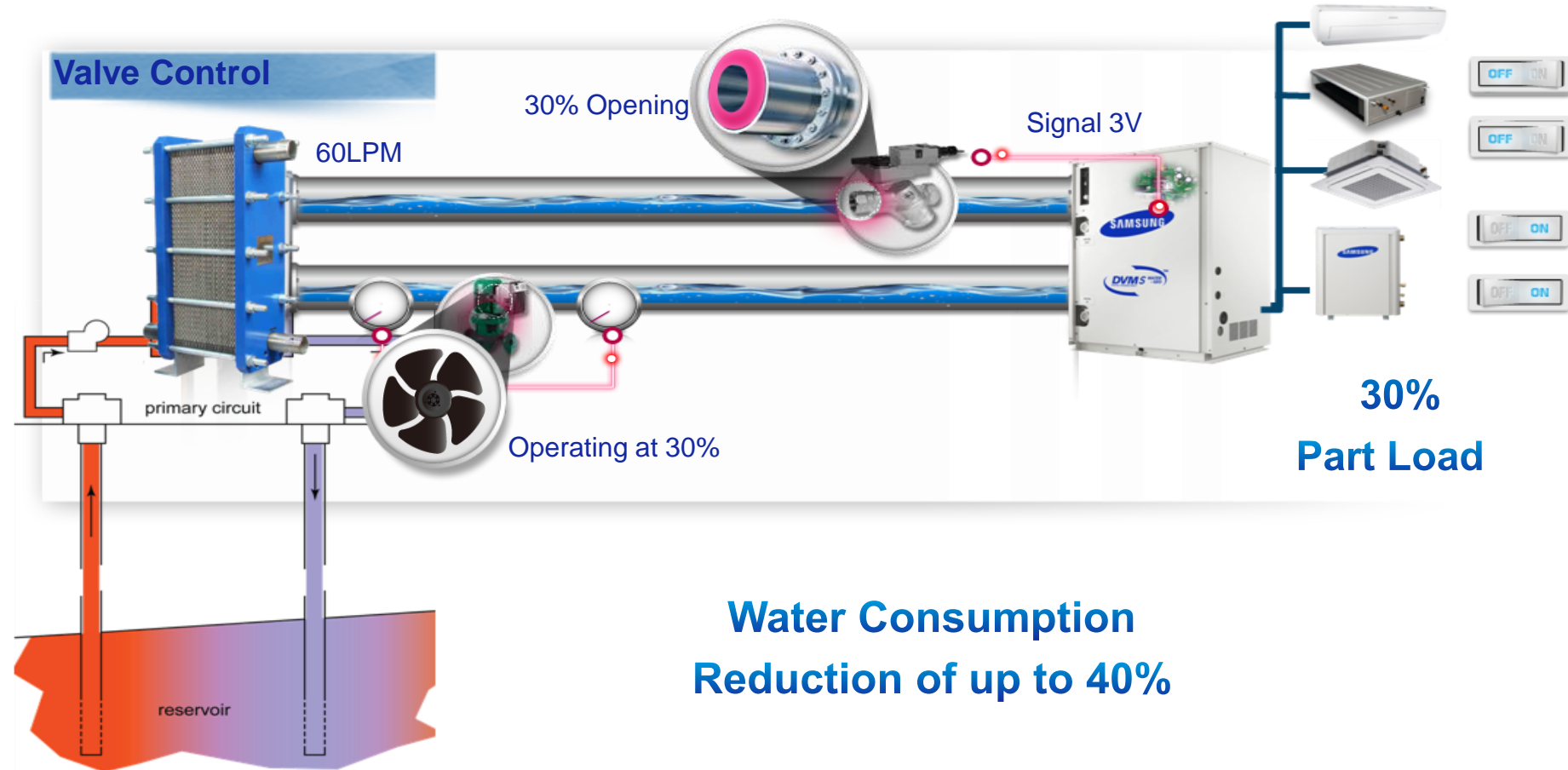


05. DVM S Water

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10	100%
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6	60%
5	50%
4	40%
3	30%
2	20%
0	0%



05. DVM S Water



Various equipment is needed for cooling water circulation systems connected to DVM S Water

Control Solution

Samsung DMS25



◆ DMS 2

- 24 hour stand-alone web-server
- **No special software required**
- All management functions integrated

A zone

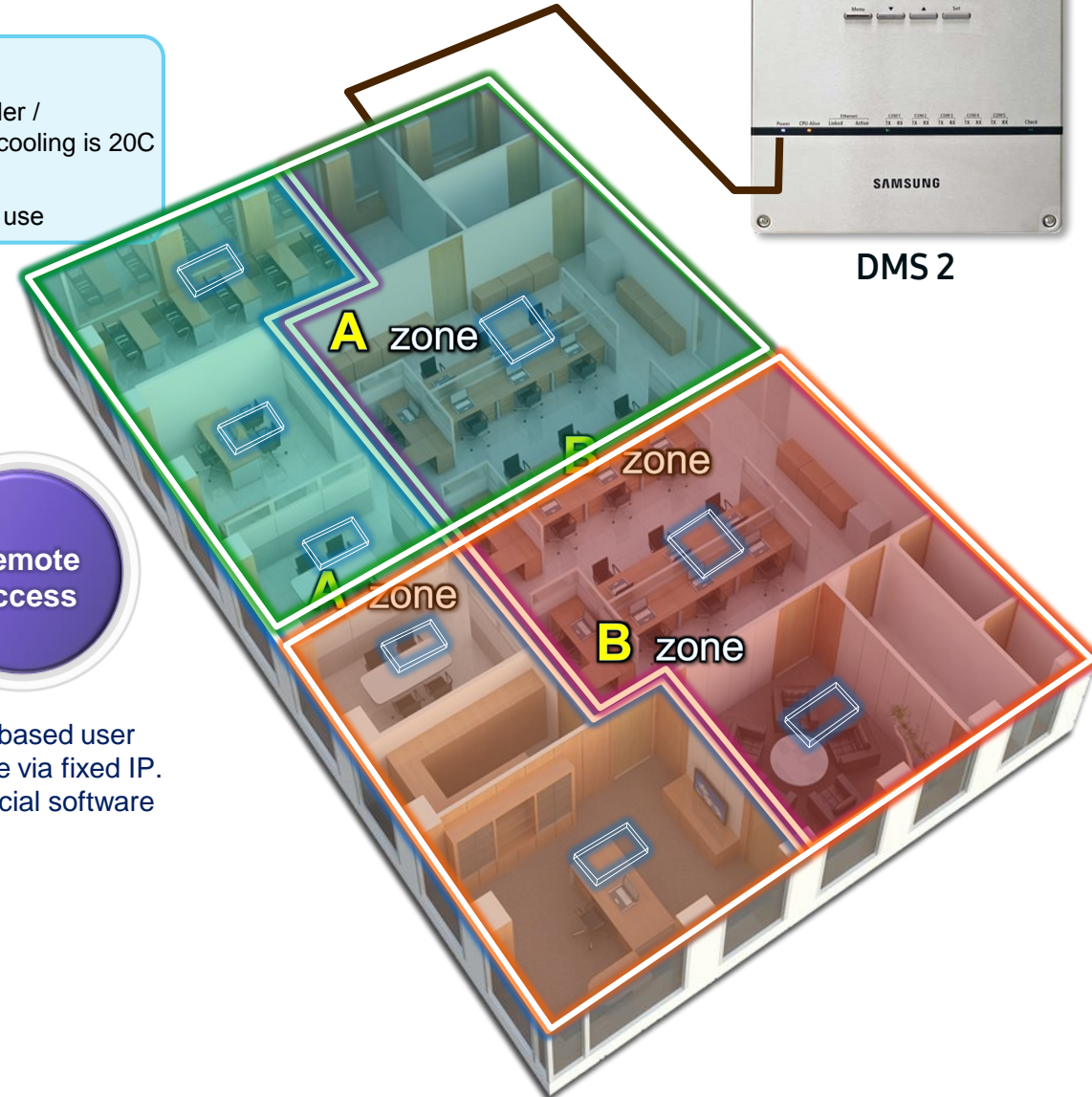
- Cooling only / No remote controller / Minimum setting temperature in cooling is 20C

B zone

- Cooling only / Remote controller use



DMS 2



Remote Access

Web-based user Interface via fixed IP.
No special software

Utility Metering

Connect additional gas, water, Electrical etc Meters via Samsung Pulse Interface Modules

Power Consumption Distribution

Power Consumption distribution by tenant or individual Indoor Units

Full AC Control

Individual/Zone Control
Daily/Weekly schedule
Controls logics
Error Management

BMS Integration

DMS provides gateway integration to Bacnet & Lonworks BMS. Also, compatible with Fidelio

Smart Building Pilot

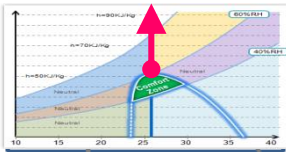
Spire Tower is used by Samsung as b.IoT testbed – Smart Building Solution

Optimal Energy Saving with Comfort Control via Data Analytics



Comfort Control

Comfort Zone



Pattern Learning Control

Location Aware Control

Presence & Location



Adaptive
Control



Energy Cost Optimization

User Data & Cost



Recommending Best Service Plan



Warsaw Spire Tower

49 Storey Office Tower supplied with
Samsung Air Conditioning

Thank You!



SAMSUNG b.i.o.T

