

# Training on applicable low-carbon technologies in Thailand.

14th, Nov.2018

Azbil(Thailand)Co.,Ltd.



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## Global Network

Please find us near you



5,335  
(consolidated basis 9,585)  
Employees  
As of March 2013

From JAPAN to GLOBAL



### Group Company in Thailand



Company Name: **Azbil(Thailand)Co.,Ltd.**  
 Established: **October 1, 1995**  
 Paid-in Capital: **฿ 40 million**  
 Employees: **150**  
 Address of HQ: **9 G Tower Grand Praram 9, 14<sup>th</sup> Floor, Rama 9 Road, Huay Kwang, Huay Kwang, Bangkok 10310, Thailand**  
 Business: **Product Sales  
 Consultation, Design and Engineering  
 Installation, Test & Commissioning  
 Maintenance  
 Energy Saving & Solution Business**



Company Name: **Azbil Production (Thailand)Co.,Ltd.**  
 Established: **February 20, 2013**  
 Paid-in Capital: **฿ 140 million**  
 Employees: **350**  
 Address of HQ: **700/1013 Amata Nakorn Industrial Estate Moo 9, Mabpong A. Phanthong Chonburi 20160, Thailand**  
 Business: **Production of Controller**



# Building Automation



# Building Automation

Air Conditioning  
Lighting ON/OFF  
Security  
Ventilation  
Fire Safety



# Building Automation



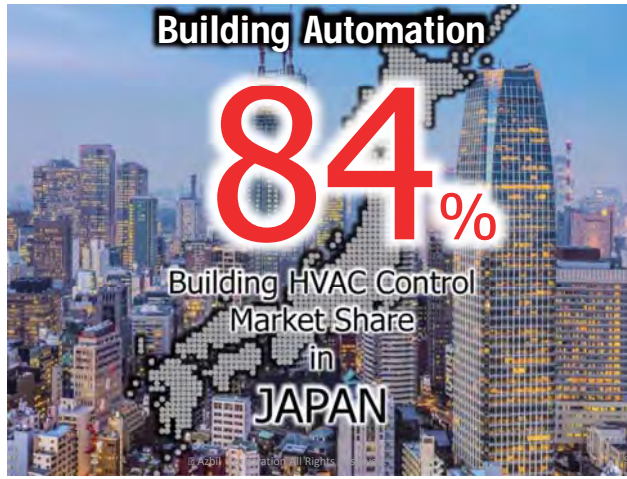
# Building Automation

## azbil Building Management System

**savic-net™ G5**  
Brand New Building Management System

Open System  
Full BAC-net

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Business-oriented automation



**Public Building *azbil* Ref. in Thailand**



**Chakree Maha Prast**



การไฟฟ้านครหลวง  
Metropolitan Electricity Authority

**MEA Watriap Bldg.**



**Embassy of France**



**Embassy of Japan**

**Recent *azbil* PJ. in Thailand**



**Mae-Sot Airport**



**Ari Hill**



**Arize  
Shiracha**



**Marriott  
Surawon**



**Boonthavon  
× 8 shops**



**Burapa  
University**



**Shwsberry  
International School**

## Bangkok Area **azbil** Ref.



## Recent **azbil** PJ. in Thailand



Latest Service

15

## Beyond Building Automation

**Energy Saving**  
**Remote Maintenance**  
**Area Management**  
**BOSS ( Operation )**

Air Conditioning  
Lighting ON/OFF  
Security  
Ventilation  
Fire Safety

**Azbil focuses;**  
**building performance to**  
**make value maximize !**

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**azbil**  
Business centered automation

Latest Service

16

## Building Automation + **az** Energy Saving

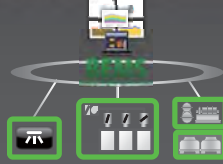
Amari Watergate	Amarin Plaza (Gaysorn Gr.)	Crown Plaza HOTEL (RAMALAND)	Yakult HQ	Ploenchit Center (Erawan Gr.)
2012	2013	2014	2015	2015
Bldg. Total Save 15%	Pump System Save 58%	Pump System Save 40%	Pump System Save 30%	Pump System Save 40%





# BEMS

Building Energy Management System



azbil

BEMS  
has  
Visualization  
&  
Optimization  
Control

BEMS  
has  
Visualization  
&  
Optimization  
Control

lose your weight





Running?

Muscle training?



Get on a Weight Scale.

know your current condition first.

- 5%

You can reduce your weight by only check it.

Profile

23

### Building Automation

## azbil Building Management System



savic-net™ G5

Brand New Building Management System



Open System  
Full BAC-net



Compare Today's & Yesterday consumption

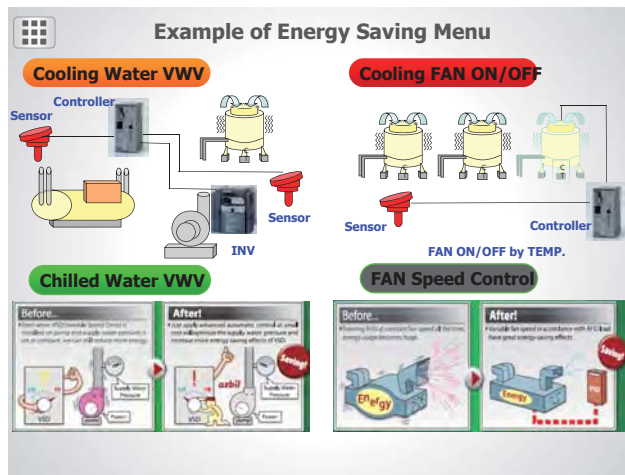


From Anywhere  
-Staff PC-  
-Mobile-  
-From JPN HQ-



Reception Always show Energy Trend

# BEMS has Visualization & Optimization Control



But  
Key  
is  
How to use  
BEMS Data

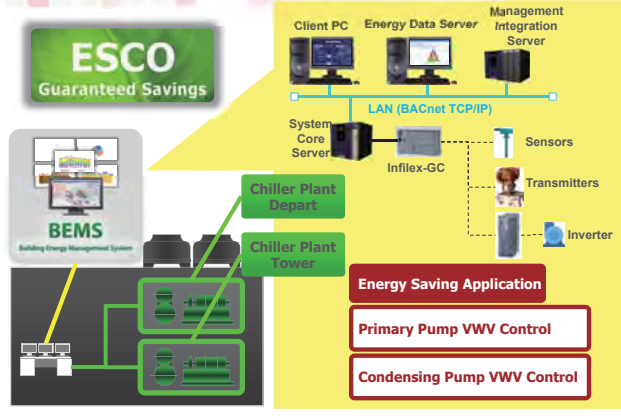
## Energy Saving Reference in Thailand

### Amarin Plaza

Building Type	Shopping Center
Floor Size	48,600 m <sup>2</sup>
Location	Bangkok, Thailand
Completed	Dec. 2013
Energy Saving Applications	BEMS CHP VWV Control CDP VWV Control CT Fan VSD Control



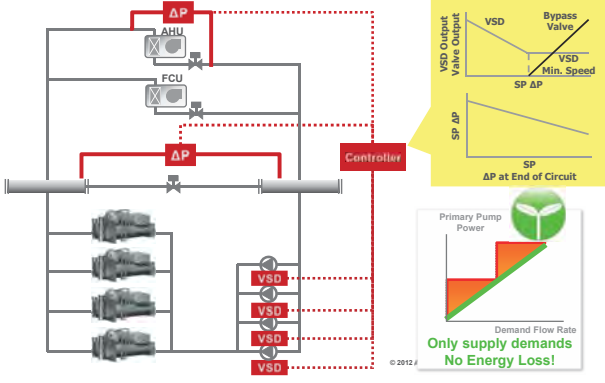
# For Amarin Plaza **azbil**



# For Amarin Plaza **azbil**

## Primary Pump VWV Control

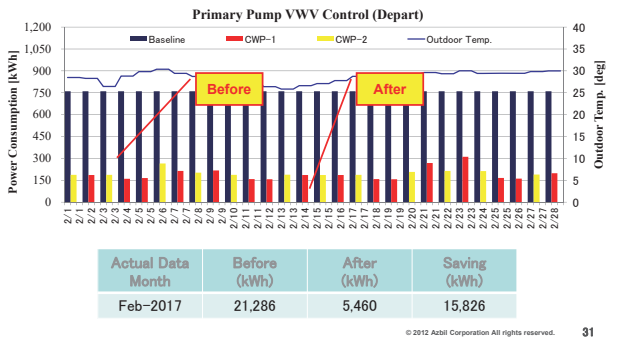
\* VWV: Variable Water Volume



# For Amarin Plaza **azbil**

## Primary Pump VWV Control

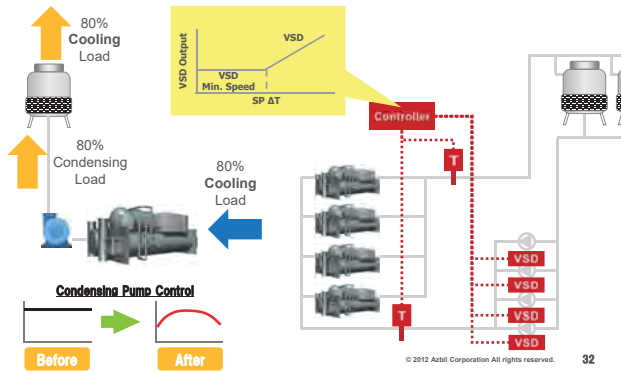
Saving  
▲74% saved



# For Amarin Plaza **azbil**

## Condensing Pump VWV Control

\* VWV: Variable Water Volume

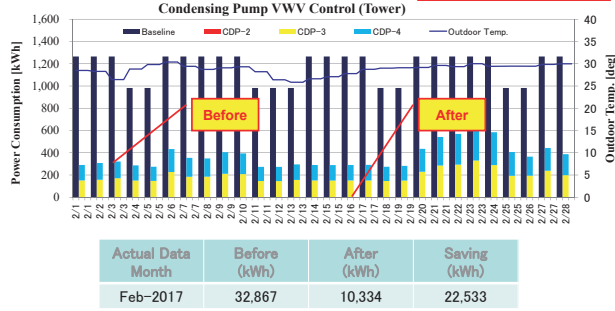




# For Amarin Plaza **azbil**

## Condensing Pump VWV Control

Saving  
▲68% saved

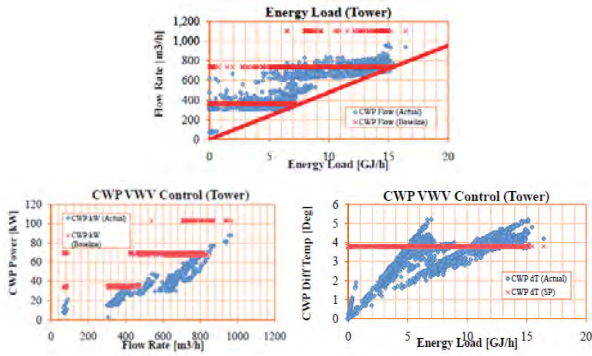


# Monthly report **azbil**



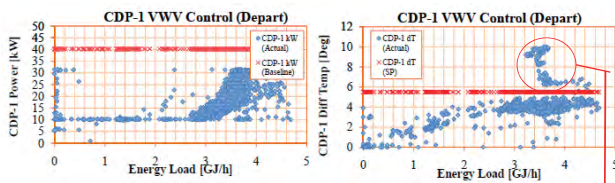
# Detail Analysis by Plant **azbil**

## Primary Pump VWV Control for Tower Plant (as of September 2014)



# Detail Analysis by Plant **azbil**

## Condensing Pump VWV Control for Department Plant



Power consumption of CDP pumps were more than baseline consumption because pump speed was fixed 50Hz caused by CT trouble.

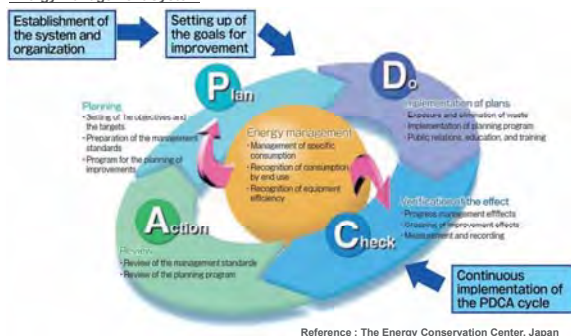
Cooling Tower Efficiency Improvement



For Successful Effective Energy Savings **azbil**

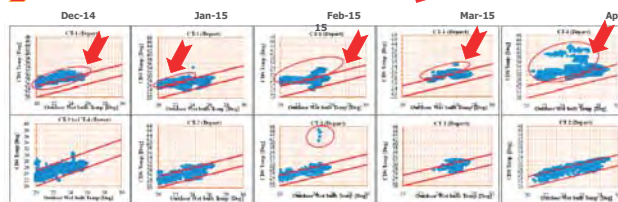
PDCA's activities have to be kept executing continually in order to achieve the energy savings. Building Energy Management System "BEMS" helps you to manage not only your building facilities but also energy and environment in your building.

Energy Management System



Plan : Identify & Analyze Problem **azbil**

Cooling Tower Problem : LOW efficiency

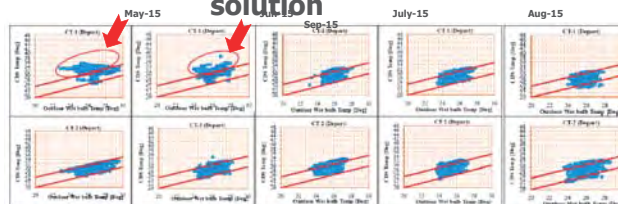


Actual data from Amarin Plaza Monthly Report collected by BEMS

> From December 2014 : The report was indicated about low cooling tower efficiency. It could not reduce water temperature in between approach temperature of design spec (red line).

It need repairing

Do : Develop & Implement solution **azbil**



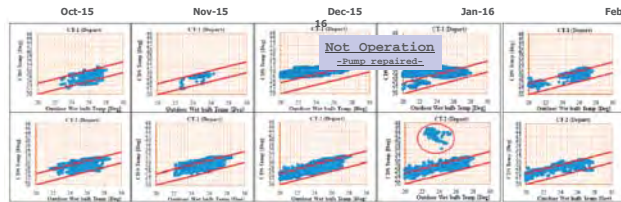
Actual data from Amarin Plaza Monthly Report collected by BEMS

> Until JUNE 2015 : Cooling Tower (CT-1) was fixed by Amarin staffs.  
 > On JULY 2015 : Cooling Tower (CT-1) was normally operated. Its efficiency was in the range of the design spec.



## heck : Evaluate the results

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Actual data from Amarin Plaza Monthly Report collected by BEMS

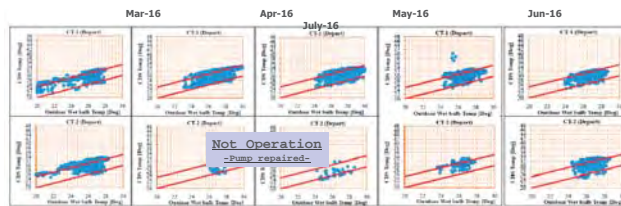
Continued evaluate the result



- > All data are recorded by Building Energy Management System
- > It can provide central automatic control and monitoring
- > Easy to analyze and check back data

## ction : Standardize the solution

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Actual data from Amarin Plaza Monthly Report collected by BEMS

That why we need to continuously implement PDCA cycle

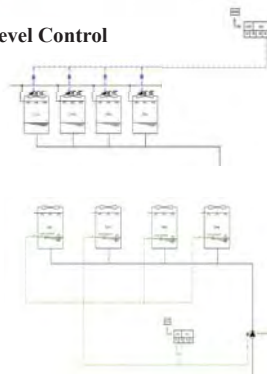


- > Monitoring the whole system
- > Record all necessary data and easy to check back
- > Recognition of equipment efficiency

## Phase 2 : Cooling Tower

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1. Cooling Tower Make-up Water Level Control
2. Cooling Tower Fan VSD Control

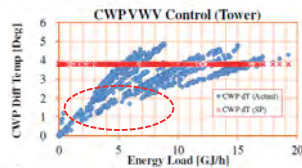


## Phase 3 : AHU Temp Control

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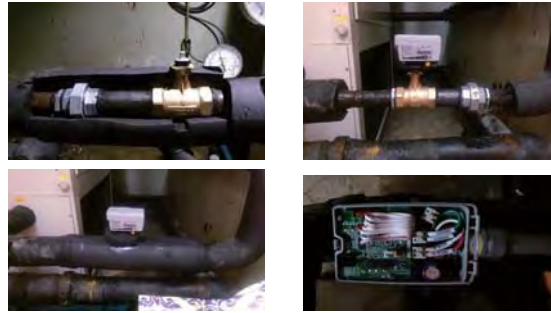
As The Year 2016

Before



## Phase 3 : AHU Temp Control *azbil*

After



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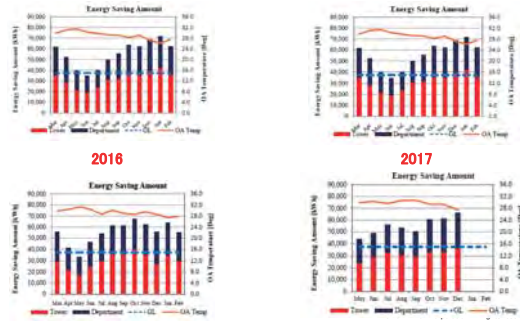
## Phase 3 : AHU Temp Control *azbil*



## Summary of Total Energy Saving *azbil*

Total Energy Saving Amount : **2,322,538 [kWh]** as of Dec 2017.

Approximately **THB 9,29,152** (Unit Rate: 4.0THB/Kwh)



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**Azbil Success Energy Saving**

**TOTAL**

**azbil**



**Energy Saving Provider**

**-1,207,022 t-CO2**

# Site Survey Activities

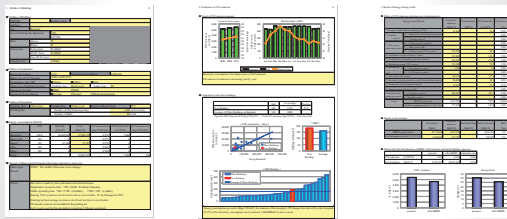
Plan



# Example of Energy Health Check Report

Plan

## Output Image



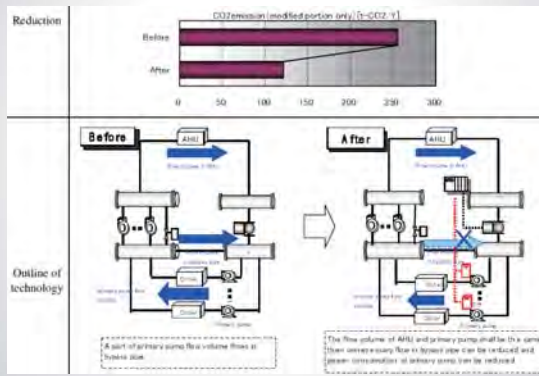
### Including

- ANALYSIS OF ENERGY USAGE
- MENU OF ENERGY SAVING OPTIONS
- SIMULATION OF ENERGY SAVING IMPACTS AND INITIAL COST BUDGET

The Energy Health Check report will serve as a good reference for your preventive maintenance and energy saving activity!

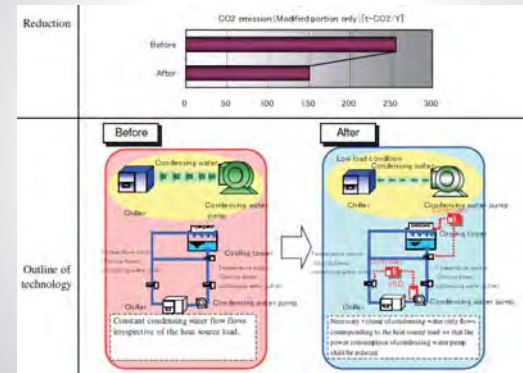
# Project In Thailand

## Primary Pump VVW Control



# Project In Thailand

## Condensing Water Pump VVW Control



# Installation

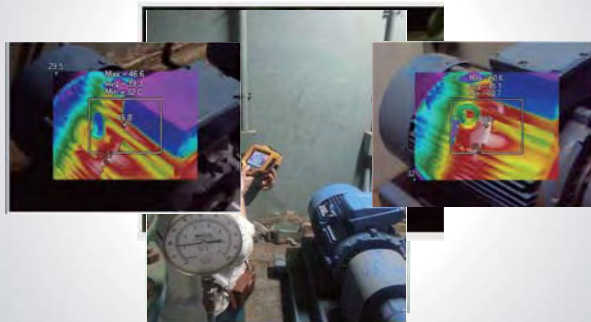
Do



# Test & Commissioning

Do

Thermal, Noise and vibration



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# Monthly report

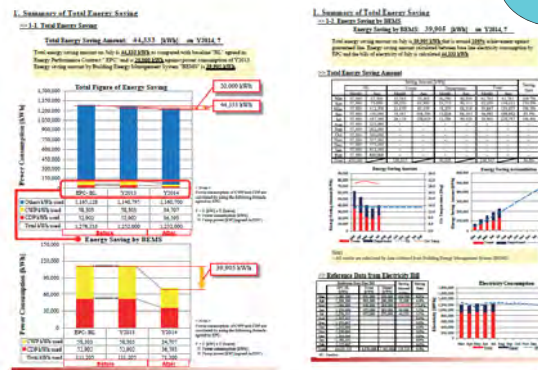
azbil



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# Analysis Report

Check



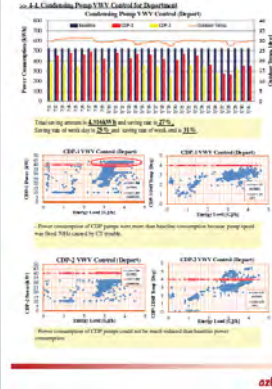
azbil

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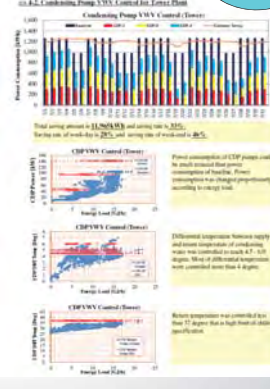
## Analysis Report

Check

### 4. Detail Analysis by Plant



### 4. Detail Analysis by Plant

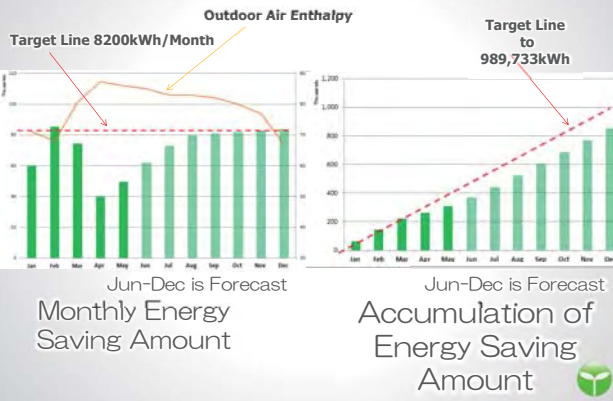


## Operation Advice

Action



## Result Jan-May



## Solution

Date of 26<sup>th</sup>, May.

PUMP RX-3				AHU RX-3			
ITEM	BASE LINE	ACTUAL USED	ENERGY SAVING	ITEM	BASE LINE	ACTUAL USED	ENERGY SAVING
CHW01	3200 kWh	2373 kWh	826 kWh	CHW01	3630 kWh	1589 kWh	2249 kWh
CHW02	2500 kWh	1183 kWh	1417 kWh	CHW02	1600 kWh	1489 kWh	1114 kWh
CHW03	0 kWh	0 kWh	0 kWh	CHW03	3520 kWh	2064 kWh	864 kWh
CHW04	2680 kWh	2282 kWh	618 kWh	CHW04	4637 kWh	4804 kWh	233 kWh
CHW05	3040 kWh	2090 kWh	950 kWh	CHW05	3690 kWh	2016 kWh	1665 kWh
CHW06	2960 kWh	2278 kWh	618 kWh	CHW06	2660 kWh	2551 kWh	331 kWh
CHW07	3040 kWh	2634 kWh	737 kWh	CHW07	2720 kWh	1262 kWh	1458 kWh
TOTAL	17540 kWh	13079 kWh	4461 kWh	CHW08	1440 kWh	638 kWh	803 kWh
				CHW09	1440 kWh	1191 kWh	249 kWh
				TOTAL	25755 kWh	17798 kWh	7956 kWh

SYSTEM RX-3 (AHU & PUMP)			
ITEM	BASE LINE	ACTUAL USED	ENERGY SAVING
AHU & CHW	43264 kWh	30879 kWh	12416 kWh

RECORD INPUT: 150000 kWh  
 ENERGY SAVING RATE: 0.0 %  
 ENERGY SAVING RATE IS CALCULATED BY 25 % OF BILLING AMOUNT

## Solution

Data of 26<sup>th</sup>, May.

ITEM	BASE LINE	ACTUAL USED	ENERGY SAVING
AHU1/2	1600 kWh	1480 kWh	118 kWh
AHU1/4	3520 kWh	2964 kWh	554 kWh
AHU1/4-1,4-2	4637 kWh	4404 kWh	233 kWh
AHU2/2	3690 kWh	2016 kWh	1665 kWh
AHU2/2-1	2690 kWh	2551 kWh	139 kWh
AHU2/2-2	2120 kWh	1262 kWh	1458 kWh
SPHCA-1	1440 kWh	638 kWh	803 kWh
SPHCA-2	1440 kWh	1191 kWh	249 kWh
TOTAL	25755 kWh	17798 kWh	7956 kWh

**AHU1/2=7%**  
**AHU1/4-1,4-2=5%**  
**AHU2/2=11%**

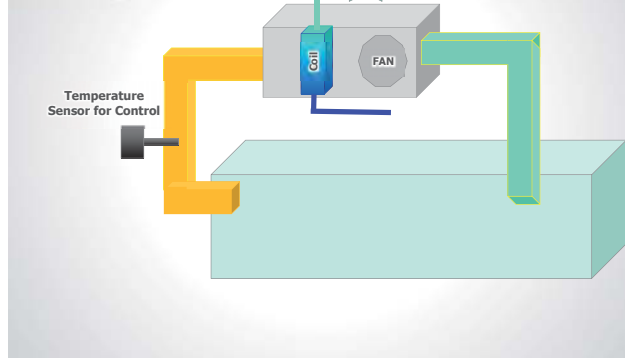
## Solution

Data of 11<sup>th</sup>, Jun.



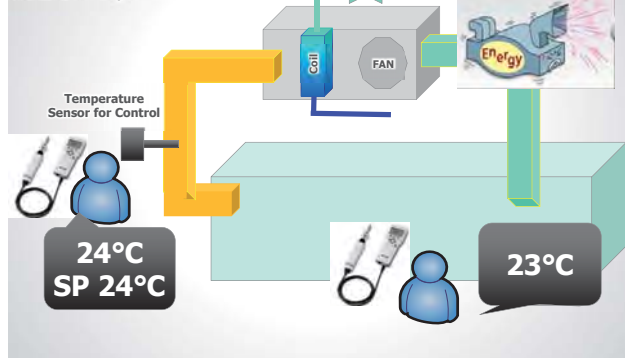
## Solution

Data of 11<sup>th</sup>, Jun.

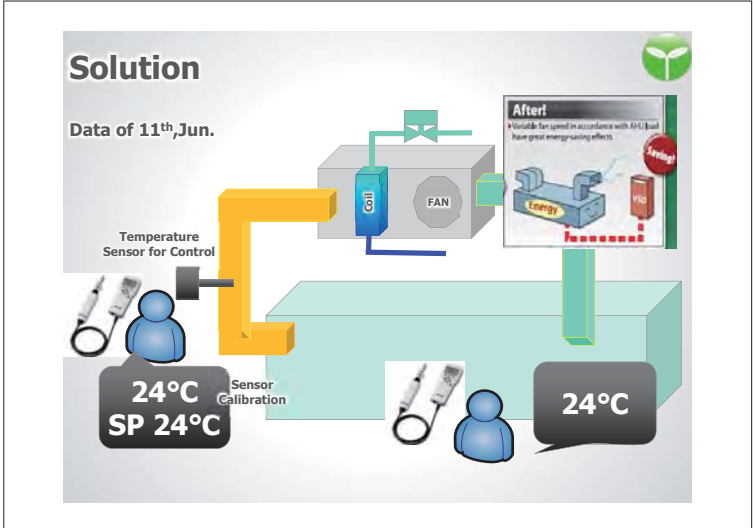
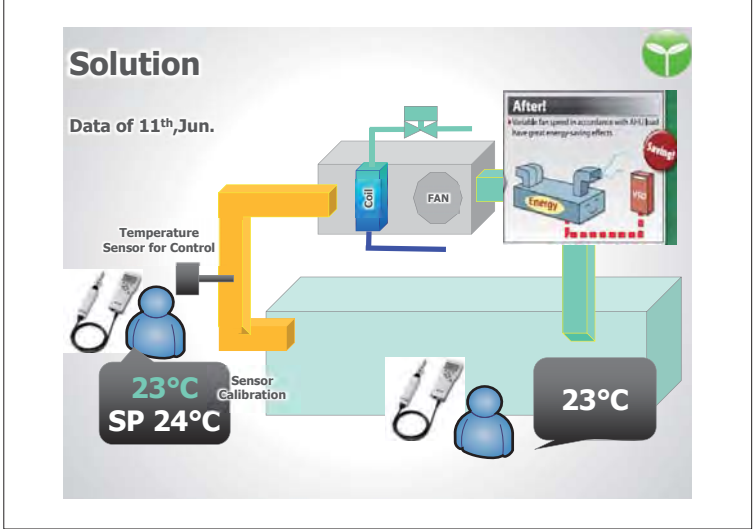
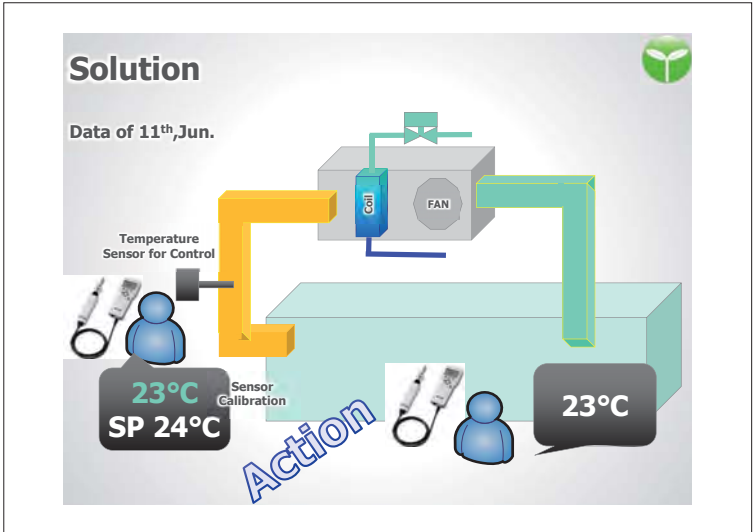


## Solution

Data of 11<sup>th</sup>, Jun.







### Solution

Data of 30<sup>th</sup>, Jun.

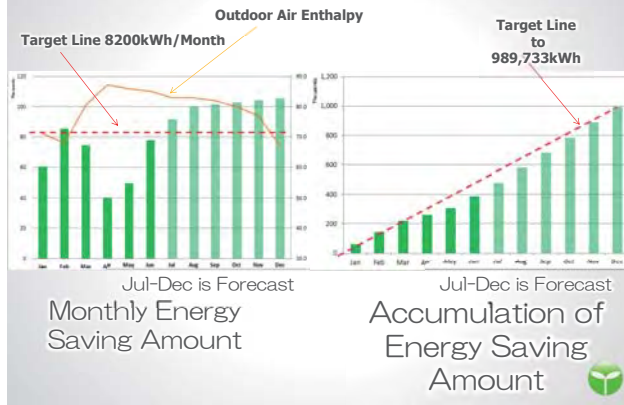
ITEM	BASE LINE	ACTUAL USED	ENERGY SAVING
AHU1/2	17611 kWh	8958 kWh	4794 kWh
AHU1/3	7090 kWh	4920 kWh	2100 kWh
AHU1/4	15590 kWh	11220 kWh	4378 kWh
AHU2/1	20560 kWh	14363 kWh	6170 kWh
AHU2/2	16302 kWh	8354 kWh	7949 kWh
AHU2/3	12759 kWh	10242 kWh	2417 kWh
AHU2/4	12053 kWh	4700 kWh	7355 kWh
AHU2/5	6381 kWh	2783 kWh	3598 kWh
AHU2/6	6381 kWh	4570 kWh	1811 kWh
TOTAL	114128 kWh	68303 kWh	45825 kWh

$AHU1/2 = 29\%$   
 $AHU1/4 - 1, 4 - 2 = 30\%$   
 $AHU2/2 = 18\%$

ITEM	BASE LINE	ACTUAL USED	ENERGY SAVING
PUMP RX-3	4587 kWh	3387 kWh	1199 kWh
DISINFECTION UNIT	5906 kWh	0 kWh	5906 kWh
DISINFECTION UNIT	0 kWh	0 kWh	0 kWh
DISINFECTION UNIT	19762 kWh	7907 kWh	11855 kWh
DISINFECTION UNIT	13471 kWh	3018 kWh	10453 kWh
TOTAL	80084 kWh	48098 kWh	31987 kWh
ENERGY SAVING RATE	194212 kWh	116389 kWh	77812 kWh

ENERGY SAVING RATE: 5.4%  
 ENERGY SAVING RATE IS CALCULATED BY kWh BY BILLING UNIT

# Summary Energy Saving



## Recent Trend for Building

### WELL Standard need

Monitoring Air Quality :CO, CO2, VOC,PM2.5, PM10 etc



Azbil have sensor & monitoring system.

### Control

- \* Demand Control Ventilation
- \* Temperature Control
- \* Humidity Control

Azbil have DDC & Control method



### Evaluation

- \* Comfortableness

Azbil have Radiation Temperature Sensor & PMV analysis



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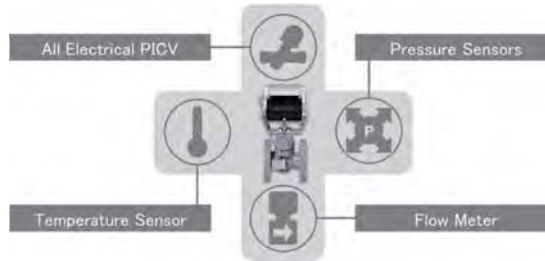
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## Recent Trend for Building

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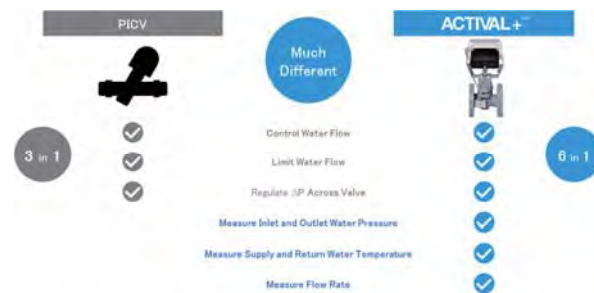


“ACTIVAL +” is combination of PICV, sensors, and flow meter. So “ACTIVAL +” is far beyond the PICV.

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## Recent Trend for Building

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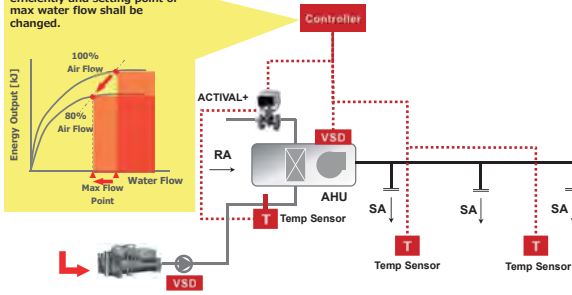
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## Recent Trend for Building Improvement of a differential temperature

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Max water flow volume shall be decided to control water flow volume of cooling coil efficiently and setting point of max water flow shall be changed.

### Max flow limit control



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"Can building comfort be maintained over the long term?"

## Concerns of Owners and Developers

"Running cost reduction and saving energy are big issues."

We provide advanced solutions with 110 years of Japan Quality >>>

azbil

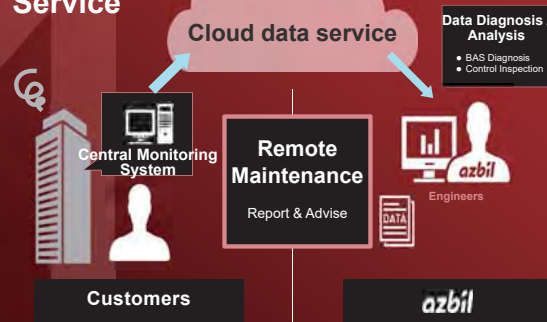
Our Answer

# Use of IoT

We provide advanced solutions with 110 years of Japan Quality >>>

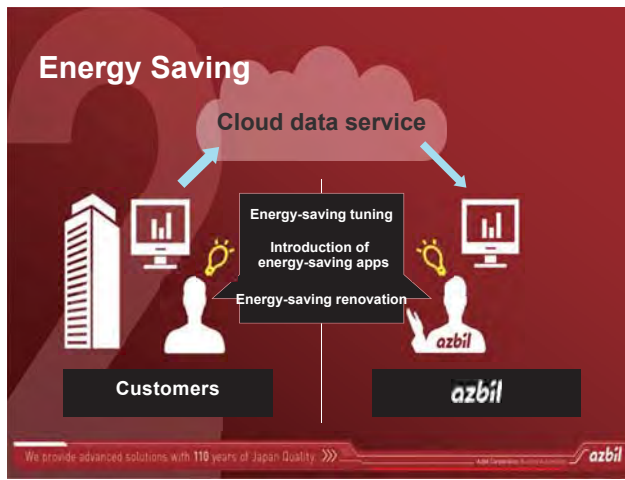
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## Maintenance Service



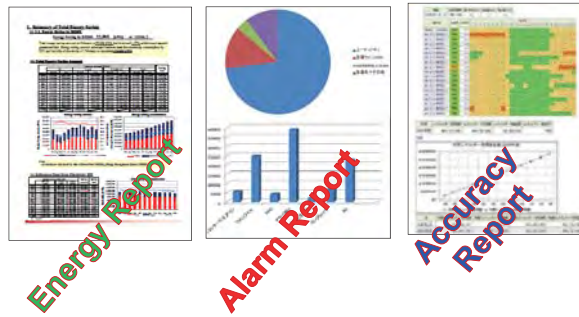
We provide advanced solutions with 110 years of Japan Quality >>>

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## Azbil Support

### Data Service



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## Azbil Support

### Data Service



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anytime.**

**Make  
Your  
PAGE**

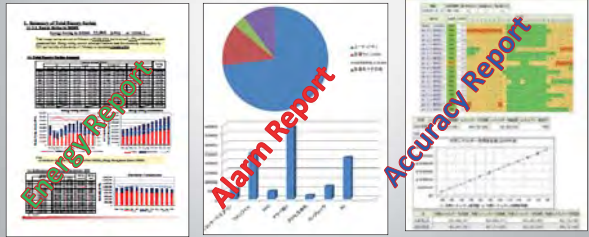
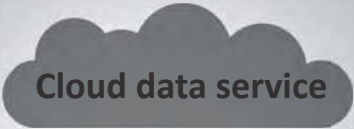
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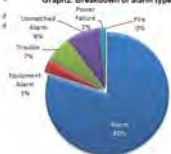
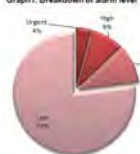
azbil



# IoT



## 2-1-2) Breakdown of alarms in 8-2016



## Alarm Report

Table2. Total number of alarms in this month

Alarm Level	Urgent	High	Low	Alarm Type
Urgent	1	1	1	Power Failure
High	1	1	1	FTA
Abnormal	1	1	1	Equipment Alarm
Low	1	1	1	Normal

Room temperature weekly color chart upon FCU operation  
Period : 1/8/2016(Mon) ~ 7/8/2016(Sun)

Room Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
FCU-1-1-1-1-1 TEMP	25.1	25.2	25.3	25.4	25.5	25.6	25.7	25.8	25.9	26.0	26.1	26.2	26.3	26.4	26.5	26.6	26.7	26.8	26.9	27.0	27.1	27.2	27.3	27.4	27.5	27.6	27.7	27.8	27.9	28.0	
FCU-1-1-1-1-2 TEMP	25.1	25.2	25.3	25.4	25.5	25.6	25.7	25.8	25.9	26.0	26.1	26.2	26.3	26.4	26.5	26.6	26.7	26.8	26.9	27.0	27.1	27.2	27.3	27.4	27.5	27.6	27.7	27.8	27.9	28.0	
FCU-1-1-1-1-3 TEMP	25.1	25.2	25.3	25.4	25.5	25.6	25.7	25.8	25.9	26.0	26.1	26.2	26.3	26.4	26.5	26.6	26.7	26.8	26.9	27.0	27.1	27.2	27.3	27.4	27.5	27.6	27.7	27.8	27.9	28.0	
FCU-1-1-1-1-4 TEMP	25.1	25.2	25.3	25.4	25.5	25.6	25.7	25.8	25.9	26.0	26.1	26.2	26.3	26.4	26.5	26.6	26.7	26.8	26.9	27.0	27.1	27.2	27.3	27.4	27.5	27.6	27.7	27.8	27.9	28.0	
FCU-1-1-1-1-5 TEMP	25.1	25.2	25.3	25.4	25.5	25.6	25.7	25.8	25.9	26.0	26.1	26.2	26.3	26.4	26.5	26.6	26.7	26.8	26.9	27.0	27.1	27.2	27.3	27.4	27.5	27.6	27.7	27.8	27.9	28.0	

## Accuracy Report Room Temperature

## Recent Trend Digital Signage Connection



Gaysorn Tower

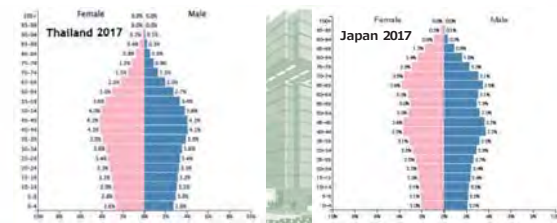


Gaysorn Tower G5 Connected Digital signage

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Proposal

## Common Issue for Thailand and Japan

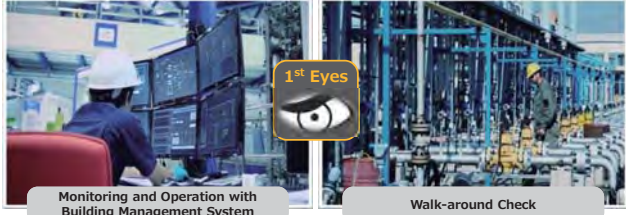


- Issue.1 Different levels of ability → Decrease level of situation awareness
- Issue.2 Retirement of experts Working population decrease → Fear of technical tradition Fear of operational safety/productivity
- Issue.3 Aging Building equipment → Equipment malfunction, incident



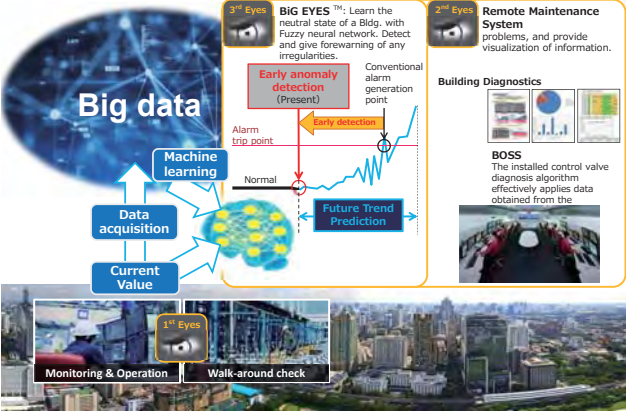
### Common Issue for Japan and Thailand

e.g.: Building operation management



- Issue.1 Different levels of ability → Decrease level of situation awareness
- Issue.2 Retirement of experts Working population decrease → Fear of technical tradition  
→ Fear of operational safety/productivity
- Issue.3 Aging plant equipment (refinery) → Equipment malfunction, incident

### The 2nd & 3rd Eyes inherit/transcend wisdom of experts



### Contribution to Sustainable Growth of Thailand

• The 2nd/3rd Eyes work as powerful engines make the "Thailand 4.0" a won.

**Efficiency & Safety for Chemical manufacturing facilities**  
Provide with Integrated Production Excellence  
Utilizing Industrial IoT for manufacturing facilities

**Efficiency & Environment for Factory groups**  
Supply energy saving technology to factory groups integrated as Clusters to optimize energy use

**Efficiency & Environment for Buildings**  
Azbil Thailand will provide area management utilizing IoT through our savic automation network. Factory and commercial building can keep high skilled operation with experienced efficiency.

### Contribution to Sustainable Growth of Thailand

**WANT to USE IoT**

**Bldg. Owner or Facility Manager**

**But**

**Waste Energy**

**Bldg. Should be Healthy**

**Should Stop**

## Contribution to Sustainable Growth of Thailand

Bldg. Owner  
or  
Facility Manager

# How to explain?

Azbil Energy Saving Proposal

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Thank you  
for your attention