

How to use M&V for Further Energy Saving

at Le Meridien, on 14-15th January 2010

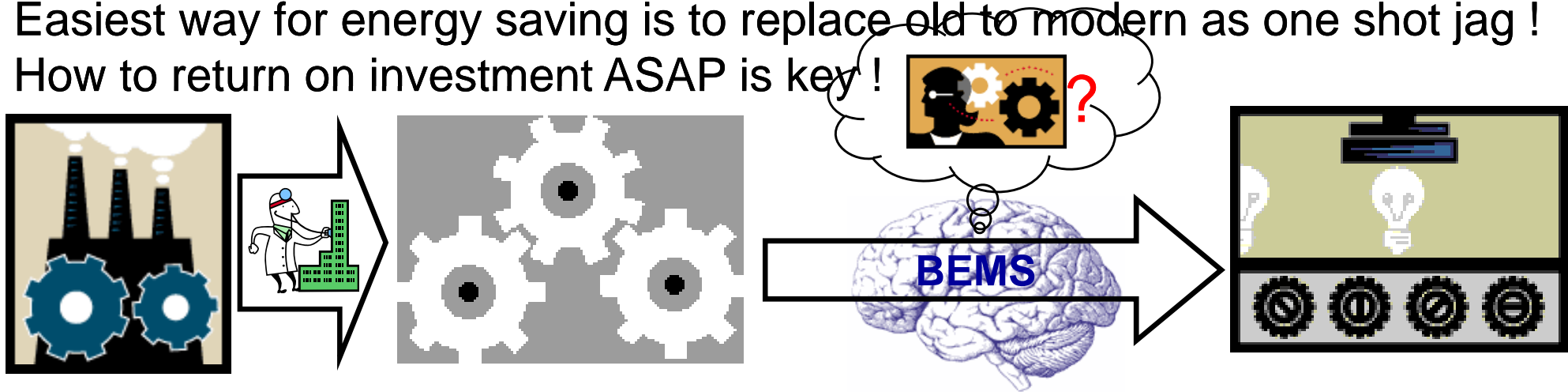
Asia ESCO Conference 2010 in India

Yamatake Corporation

Speaker : Takamitsu Shibata of Nippon Totor Co., Ltd.

azbil

Easiest way for energy saving is to replace old to modern as one shot jag !
How to return on investment ASAP is key !



- ✓ Screening existing HVAC system by data in order to find something failed which seem to cause energy waste = wasting money
- ✓ Don't forget, even new equipment and system are deteriorating every second as humankind = Performance shall be worse time to time
- ✓ Realize what a importance to achieve the energy saving more than expected through M&V by analysis of BEMS (Building Energy Management System) data is !
- ✓ This case study proofs how important daily efforts by using actual data analysis and fine tuning of BMS parameters under high quality expertise

Outline of Case Study Building

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- **Name** : ANA Intercontinental, Tokyo
- **Location** : Akasaka, Tokyo
(Part of ARK Hills Complex)
- **GFA** : 98,000 m² 3 BF + 37F
(No. of Guest Room = 901)
- **Completion**: April, 1987
- **ES Refurbishment**: March, 2002
- **Outline of Mechanical Facilities**
 - **Source of Chilled Water / Steam** supplied by District H&C Plant
 - (Exception)
FCU for 36,37F supplied by Chiller
 - **HVAC** : Guest Room FA-AHU + Water Loop Unitary Heat Pump
Banquet Hall FA-AHU + RC-AHU
Kitchen FA-AHU
Lobby & Shopping Arcade RC- AHU



No Chance to use High Eff. Chiller


Note :

FA-AHU = Fresh Air Treatment Air Handling Unit

RC-AHU = Re-Circulating Air Handling Unit

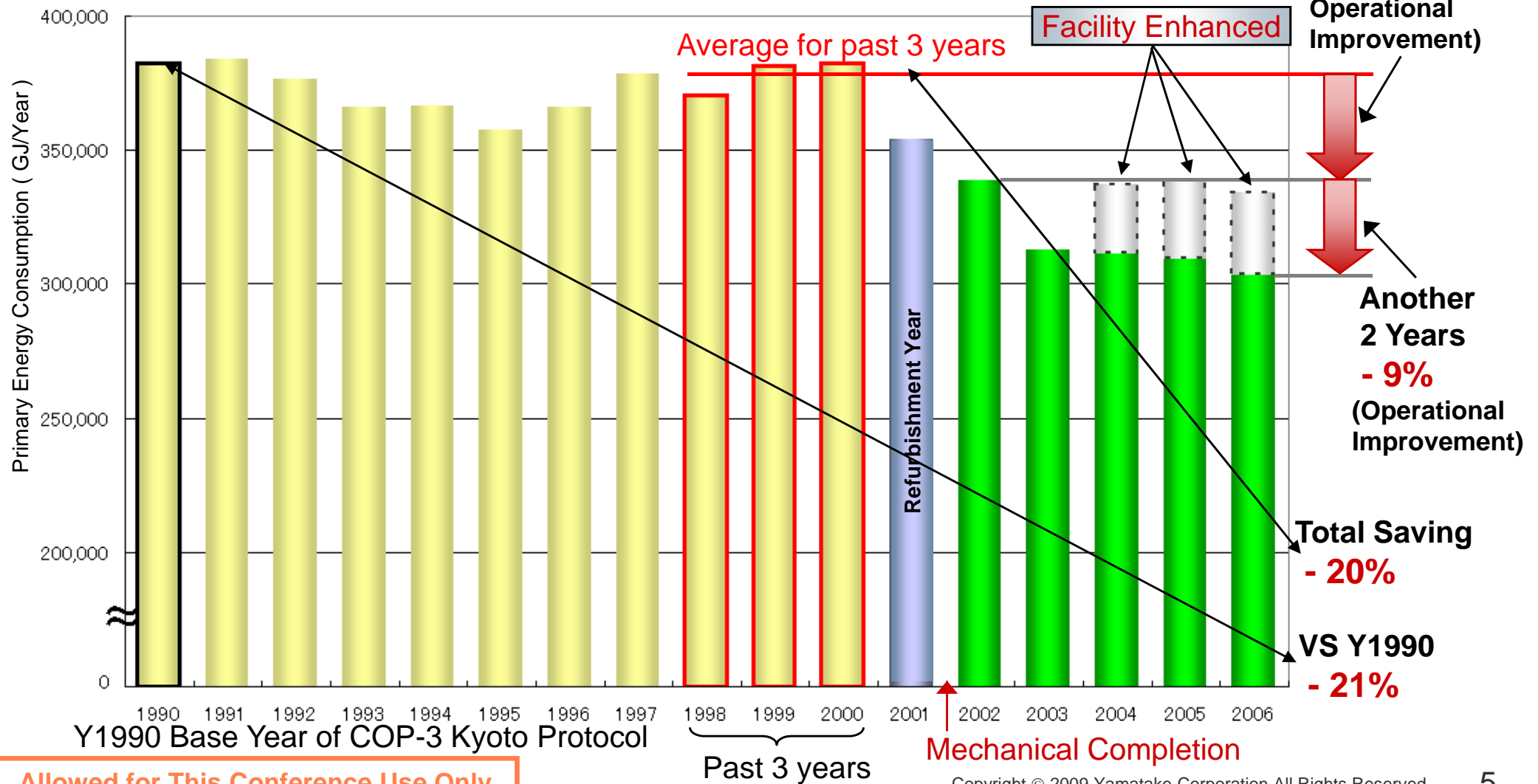
Initial Energy Saving Measures Planned

- Replacement with high performance equipment not essential for energy saving !

GOAL	APPLICATION
Minimize Fresh Air Load	<ul style="list-style-type: none"> ● Fresh air rate controlled by CO² density lower than building act (max. 1000ppm)
Minimize Forced Ventilation Rate	<ul style="list-style-type: none"> ● Ventilation in Kitchen by required combustion air and negative pressure ● Ventilation in Parking Lot controlled by CO (max. 10ppm) density
Minimize Conditioned Air Flow	<ul style="list-style-type: none"> ● Excess air and pressure at AHU controlled by VFD at lower frequency operation
Minimize HVAC Load	<ul style="list-style-type: none"> ● Zero Energy Band Control = Avoid Mixing Loss (Minimum Operation within Tolerance of Design Condition)  ● UV isolation film applying on grazing = Minimize Skin Load
Optimize Operation and Management	<ul style="list-style-type: none"> ● Correction and Improvement by using real data given by BEMS (Building Energy Management System)

Result of Energy Saving

- **Daily operator's effort based on real data given by BEMS achieved 20% saving !**

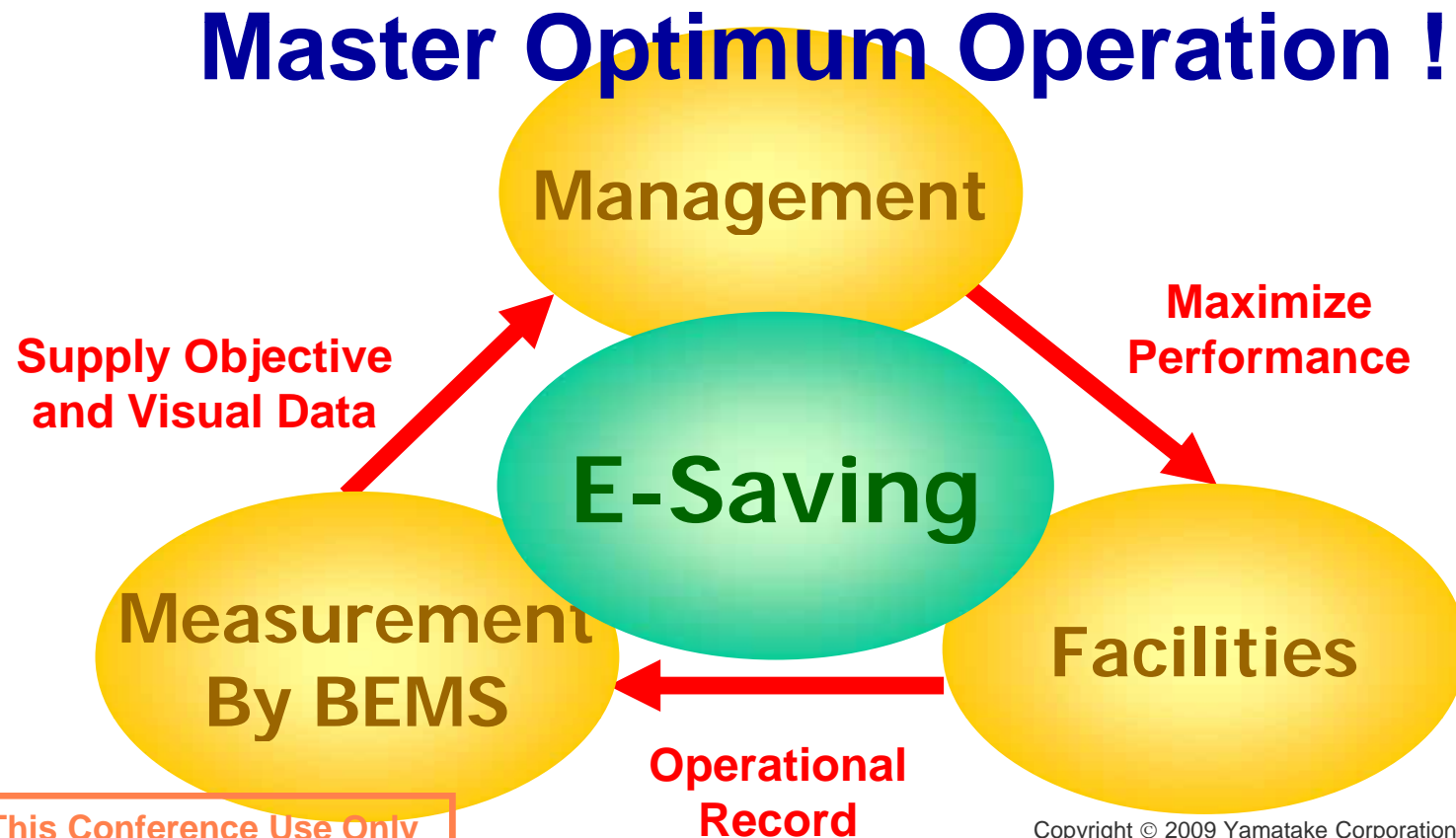


How to succeed E-Saving !

- **Minimum Requirements**

- High performance equipment and/or updated control system with proven energy saving application
- Data collection from proper points as supporting tool
- Proper management of operation based on objective data

Master Optimum Operation !



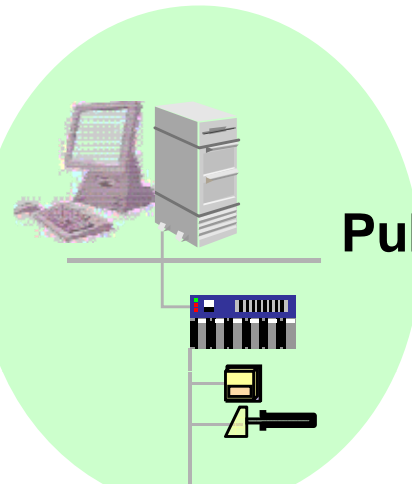
Work Flow by using M&V Data

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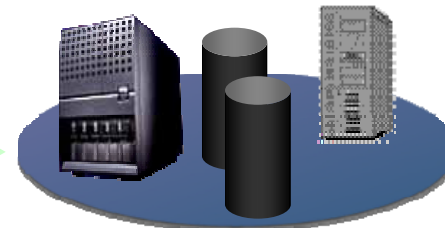
【ANA Intercontinental Hotel Tokyo】

【Yamatake】

Central Data Management Server



Public Network



【Yamatake】 Data Ware Centre

D.B Import

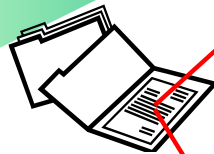


Data Analysis Server

CORRECTION
IMPROVEMENT

ON-SITE BEMS

Monthly E-Report



Observational Study

- Energy Analysis
- Operational Record
- Fault Record
- Function Test Record
- Suspicious Finding & Suggestion

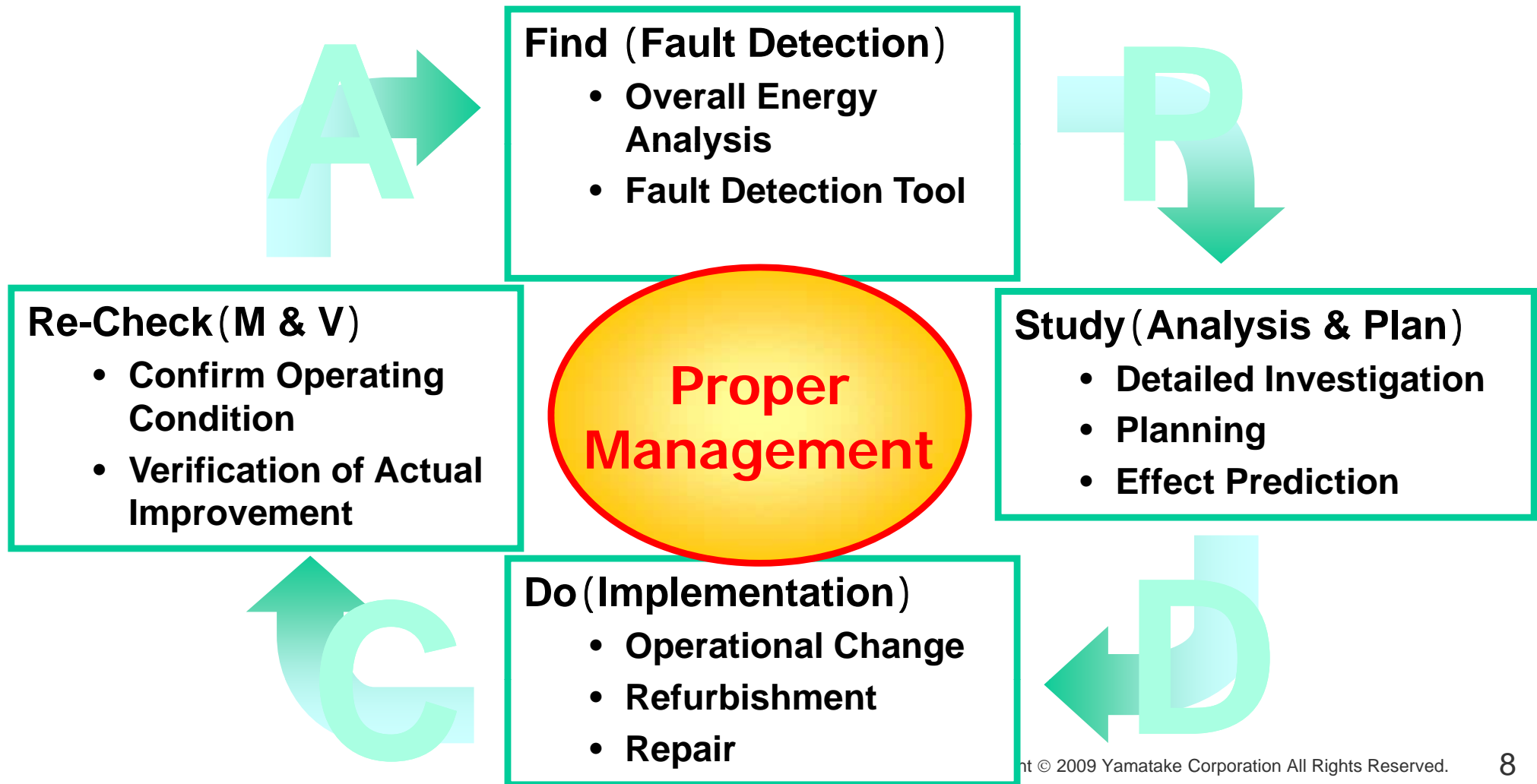


【Workshop】

What a proper management means !

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- “ Proper Energy Management “ can be disciplined through continuous effort for improvement by Objective Analysis as per real data given by BEMS !



Purpose of Round-Table Workshop

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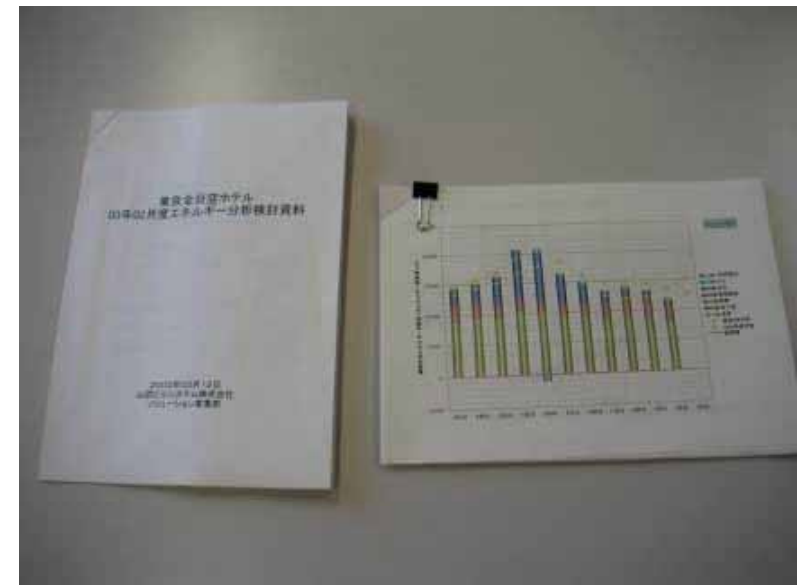
- In order to share the goal and objective data for encouraging the cooperative improvement, Periodic Round-Table Meeting was organized by concerned parties
- (Positive Thinking together) Brain Storming and Suggestion based on monthly energy report
- Precise Coordination between Hotel Operation and Implementation
- Making procedure and manual for on site training to operators

Round-Table Workshop organized by,

- Hotel Operation Manager
- Facility Manager
- Facility Chief Operator
- Specialists from ESCO

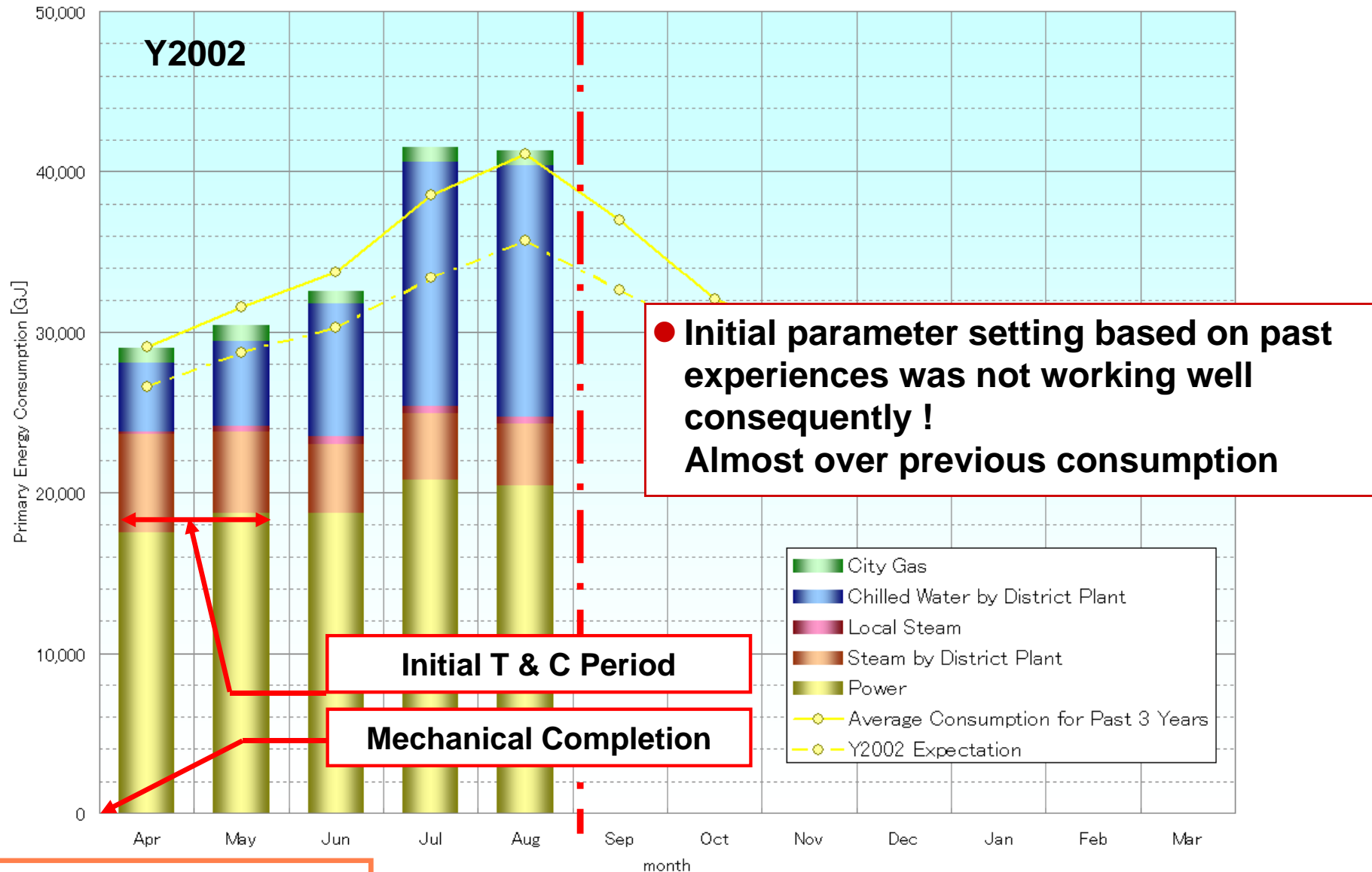


Monthly Energy Report



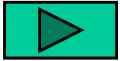
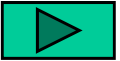


Disappointing Result after ES-RFB

- **Corrective action to be required !**



Countermeasures tried by Workshop **azbil**

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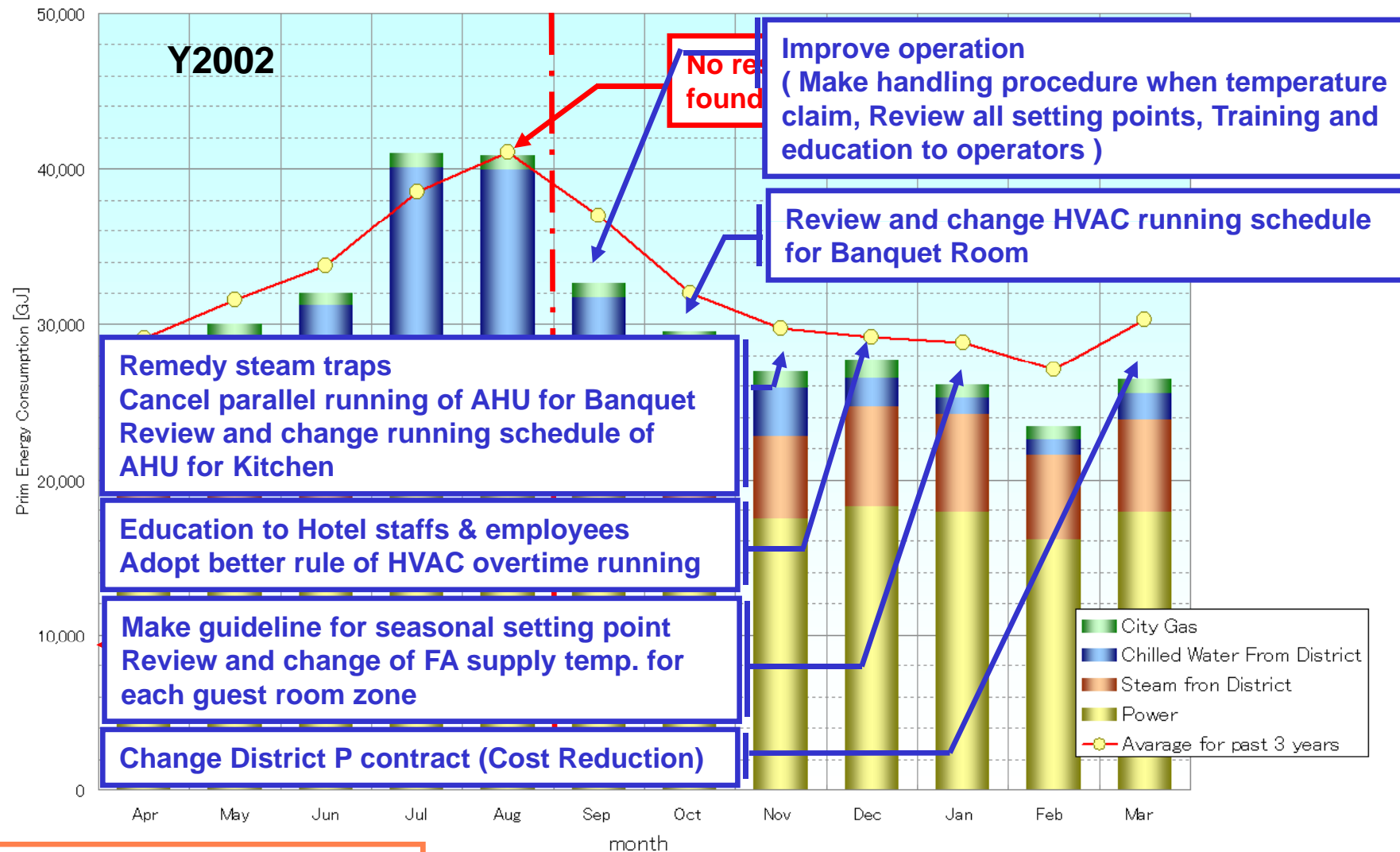
No.	Items	Description
1	Running Schedule	<ul style="list-style-type: none"> ● Optimize AHU Running Schedule ● Make Banquet Room Operation Manual
2	Proper Setting Points as per Room Condition	<ul style="list-style-type: none"> ● Make Seasonal Setting Point Guideline ● Analysis of Complaints by Guests ● SP Management Program (Custom Made SW) 
3	Fine Tuning of Control System	<ul style="list-style-type: none"> ● Intermittent Ventilating for Elec. Room ● Optimum HEX operation for Fresh Air Intake
4	Malfunction / Deterioration	<ul style="list-style-type: none"> ● Remedy / Replace Steam Trap and By-Pass Valve 
5	Elimination of Oblivious Wasting Energy	<ul style="list-style-type: none"> ● Minimize mixing loss by re-heating ● Main Steam Valve Shut Off while no demand ● Pump Shut Down where no demand zone  
6	Renewable Resource	<ul style="list-style-type: none"> ● Free Cooling
7	Contractual Negotiation	<ul style="list-style-type: none"> ● Reduction of Base Load (Peak Demand) Fee for District HC Plant & Grid Power Supply

Note : No. corresponds to the caption from next pages

Historical Challenges by Workshop

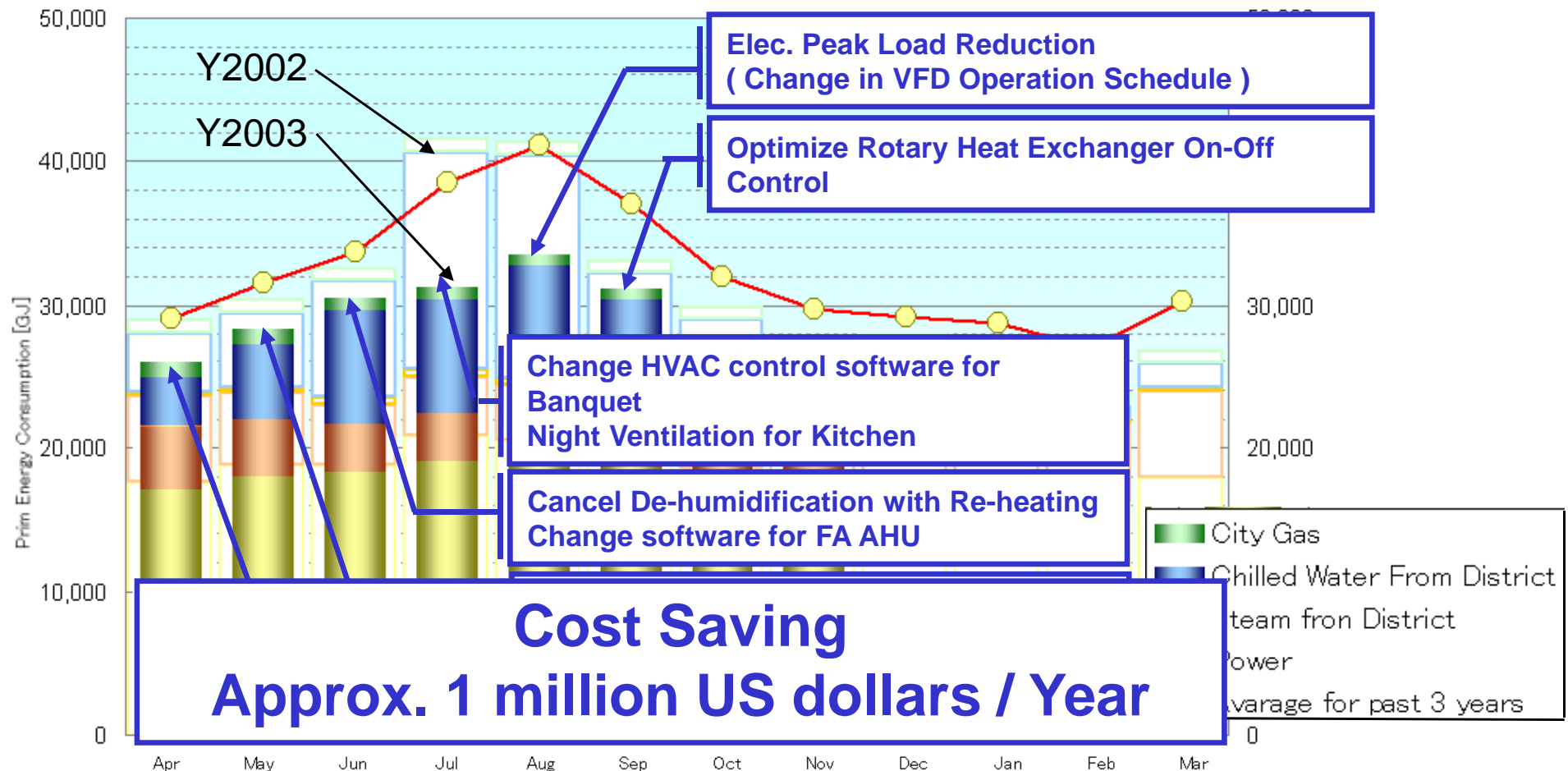


- Challenges not only by techniques, but also by education, accomplished outstanding result !



Continuous Efforts

- Continuous efforts gave more saving boss energy and expenses to client



Note: Because of baseline changed, result can be shown until Dec. 2003.

Summary of M&V Win-Win Merits



【User】

- **Secure and Improve Return On Investment**
- **Secure and Improve Corporate Social Responsibility**
- **Value Improvement of Real Estate including PR**
- **Discipline Operators by Expert**
- **Precise Report available as Open Source**

【ESCO】

- **Risk Avoidance from Customer's Claim by Tangible Data**
- **Through certain period of M&V activities, New Solution or Methodologies could be found out**
- **Building on Relations of Trust would continue to other business**

Thank you for your attention !!

Contact us.

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