Case Study of ESCO for General Hospital

at Le Meridien, on 14-15th January 2010

Asia ESCO Conference 2010 in India

Yamatake Corporation

Speaker : Shinsuke Okochi of Yamatake Corporation

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Outline of Case Study Building

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Name : Kyouritsu Kanbara General Hospital

Location : Shizuoka Prefecture

GFA : 22,086 m^2 5F + 1BF

Capacity : 330 Beds

Completion Date : April, 1983

Energy Consumption (Average for past 3 years before ESCO)

Electrical Power : 4,132,122 kWh / Year

City Natural Gas : 656,536 Nm^3 / Year

} Approx. : **58,600** [GJ/Year]

Serious Issues to be resolved

→ **ESCO**

Deterioration of Facilities	Negative Change in System of Medical Service Fee	Social Responsibility as Regional Hospital
Refurbishment	Cost Saving	Contribution to Environmental Issues

Proposal at Open Competition

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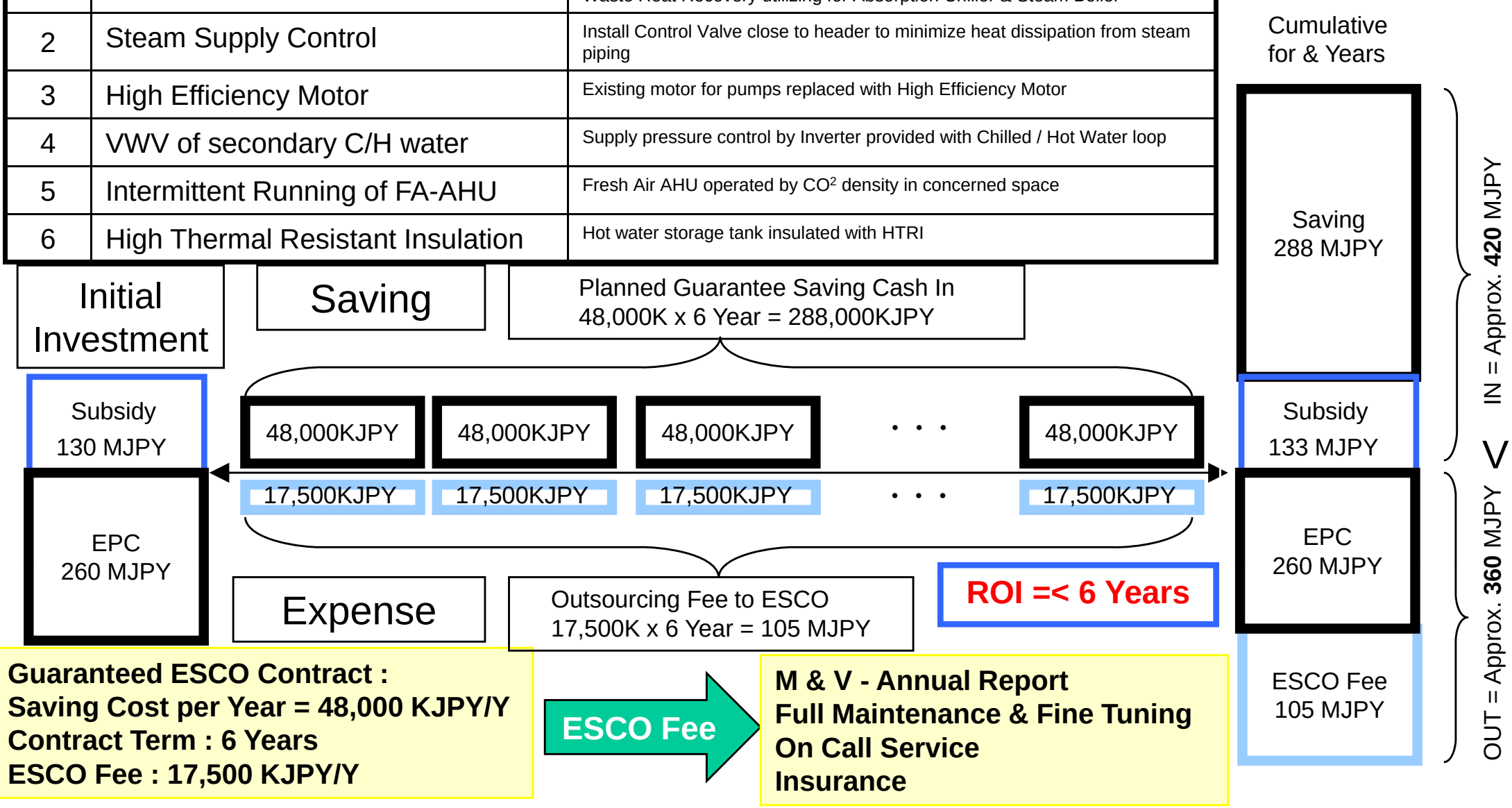
No.	Energy Saving Measures	Description
1	Co-Generation + Heat Recovery	Existing Gas Fired Boiler replaced with Gas Co-Generation. Waste Heat Recovery utilizing for Absorption Chiller & Steam Boiler
2	Steam Supply Control	Install Control Valve close to header to minimize heat dissipation from steam piping
3	High Efficiency Motor	Existing motor for pumps replaced with High Efficiency Motor
4	VWV of secondary C/H water	Supply pressure control by Inverter provided with Chilled / Hot Water loop
5	Intermittent Running of FA-AHU	Fresh Air AHU operated by CO^2 density in concerned space
6	High Thermal Resistant Insulation	Hot water storage tank insulated with HTRI



Guaranteed ESCO Contract :
Saving Cost per Year = 48,000 KJPY/Y
Contract Term : 6 Years
ESCO Fee : 17,500 KJPY/Y

ESCO Fee

M & V - Annual Report
Full Maintenance & Fine Tuning
On Call Service
Insurance

Planned Goal of Cost Saving

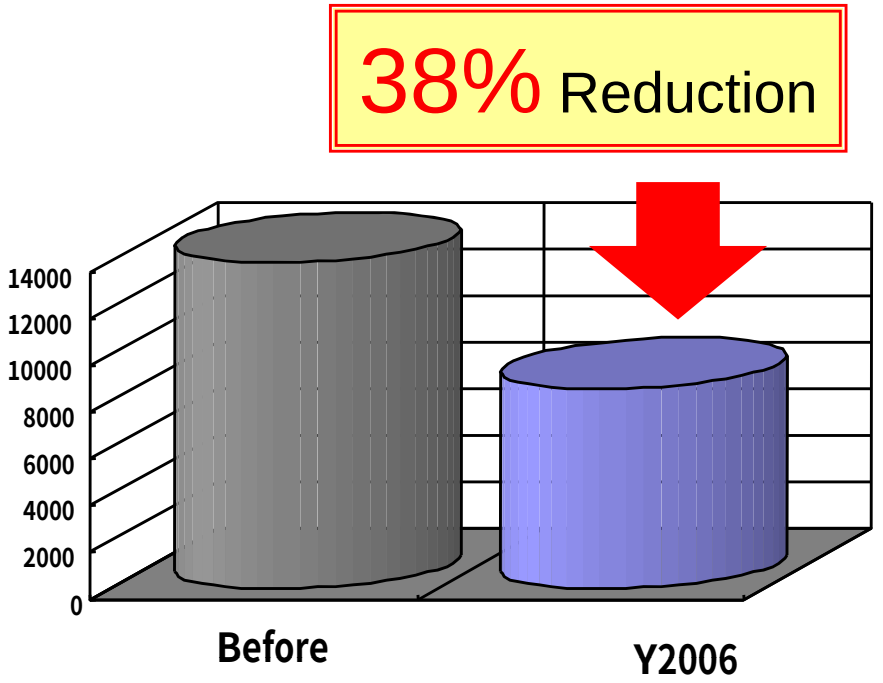
Grid Power + Natural Gas

= 1.56 million [US$/Year]

Average of Year 2001/2002/2003

38% Reduction

= Year 2006 0.96 million [YUS$/Year]



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Planned Goal of Energy Reduction

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Grid Power + **Natural Gas**

= 58,600 [GJ/Year]

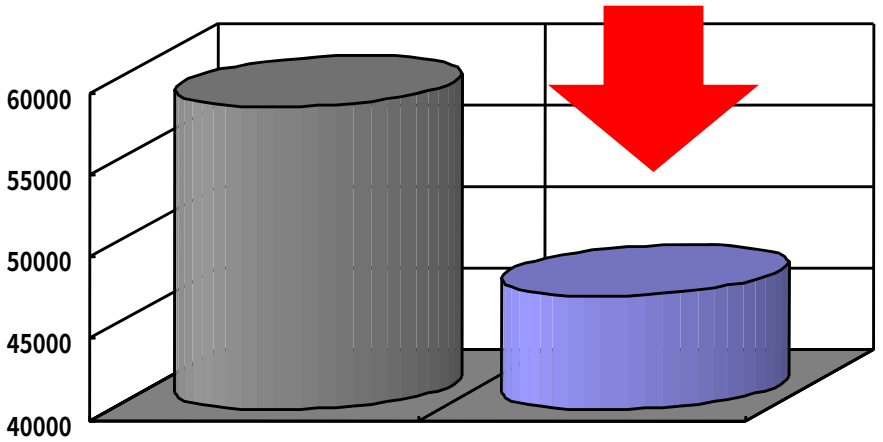
Average of Year 2001/2002/2003

20% Reduction

= Year 2006

47,000 [GJ/Year]

20% Reduction



CO_2 emission reduction

895 [t-CO^2/Year]

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Natural Gas Engine Co-generation

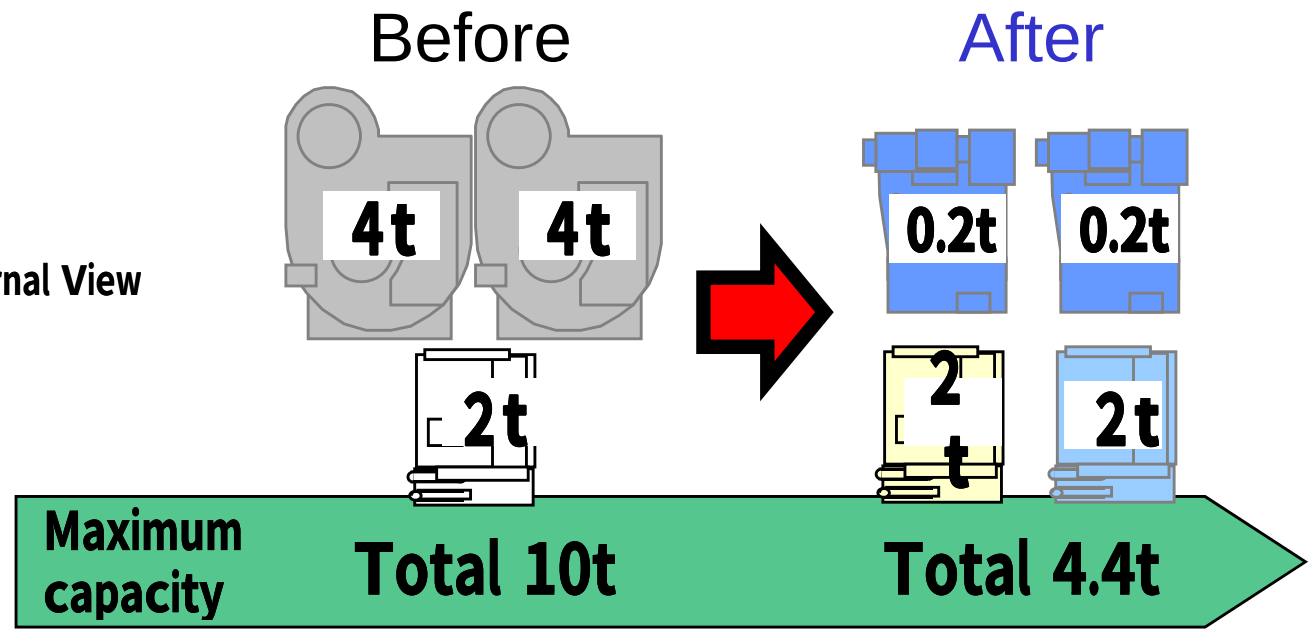
New Installation

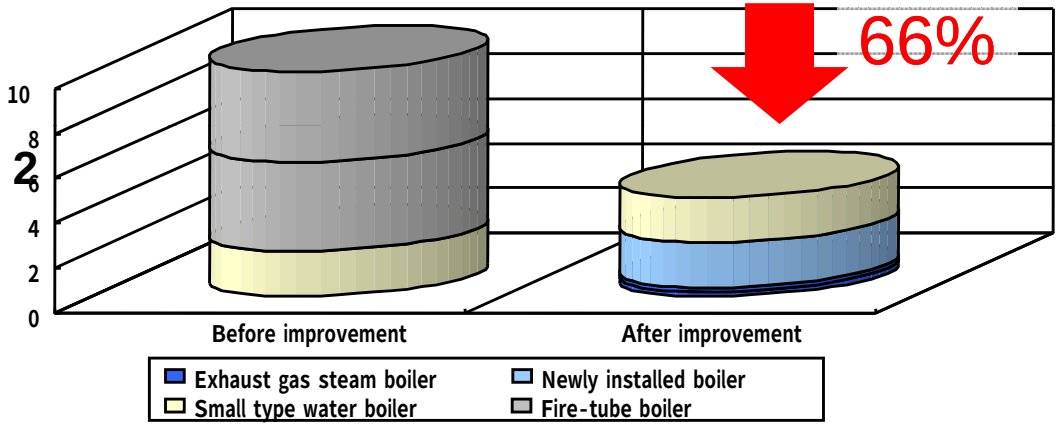
- Co-Generation Plant (Lean Burn Mirror Engine) 350kw x 2 units.
- Approximately 70% of peak demand covered as backup emergency generator when black out

Waste Heat Recovery Boiler

External View

Replacement with Improvement





- **Waste Heat Recovery Steam Boiler (0.2t) x 2**
- **Backup Gas Fired Boilers (2t) x 1**

Waste Heat Recovery Type Absorption Chiller

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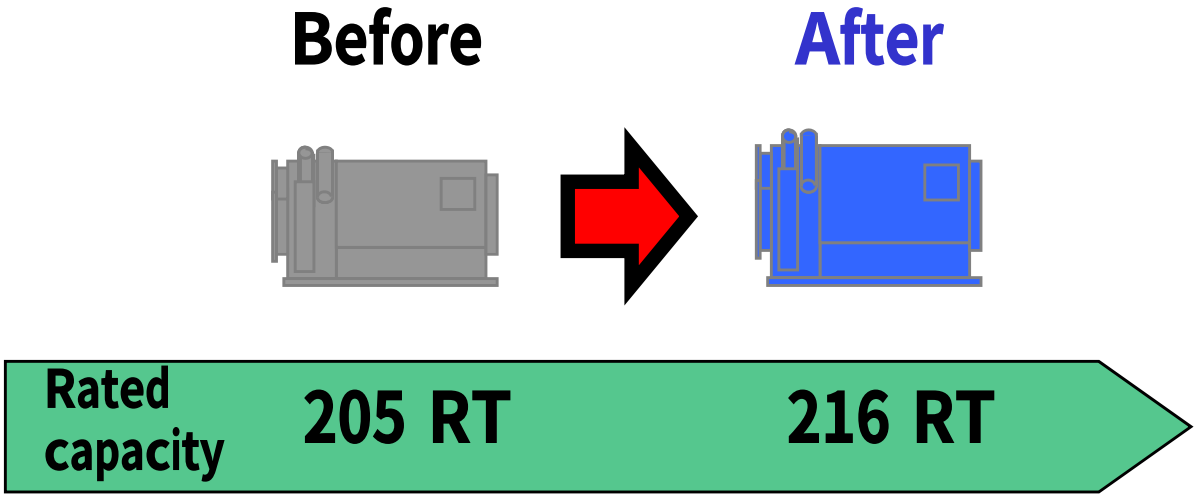
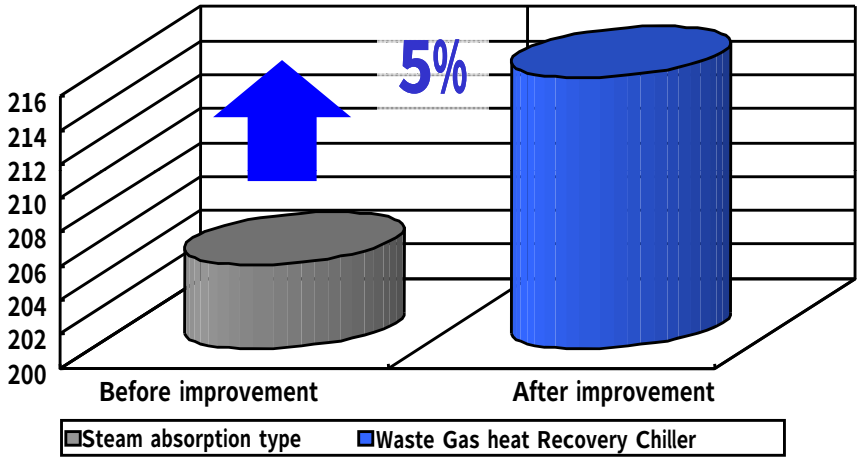
Replacement to High Efficiency Equipment

External View

Gas Fired Absorption Chiller with built-in waste heat recovery hot water used re-generator x 1 (Cooling capacity 216RT)





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High Efficiency Motors with VWV


External View

Improvement

- Replace with high efficiency motor pump
- Inverter control of chilled and hot water secondary pump

Relationship with Customer thru BEMS

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Kanbara Hospital

Building Energy Management System (BEMS)

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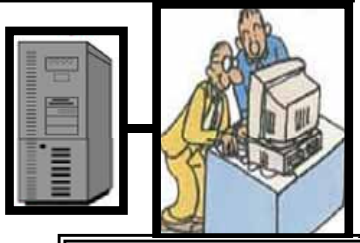
Remote Observation Center

24-7

Data Ware Center



Supporting Analysis

Periodic Visit

Service Depot

- Contents of ESCO Service Contract -

- ➢Intended Facilities : Connected to ESCO
- ➢Daily maintenance done by Hospital
- ➢Troubleshooting done by ESCO on call
- ➢Periodical Rough Inspection
- ➢Full Maintenance including Overhaul, if needed

BEMS Configuration

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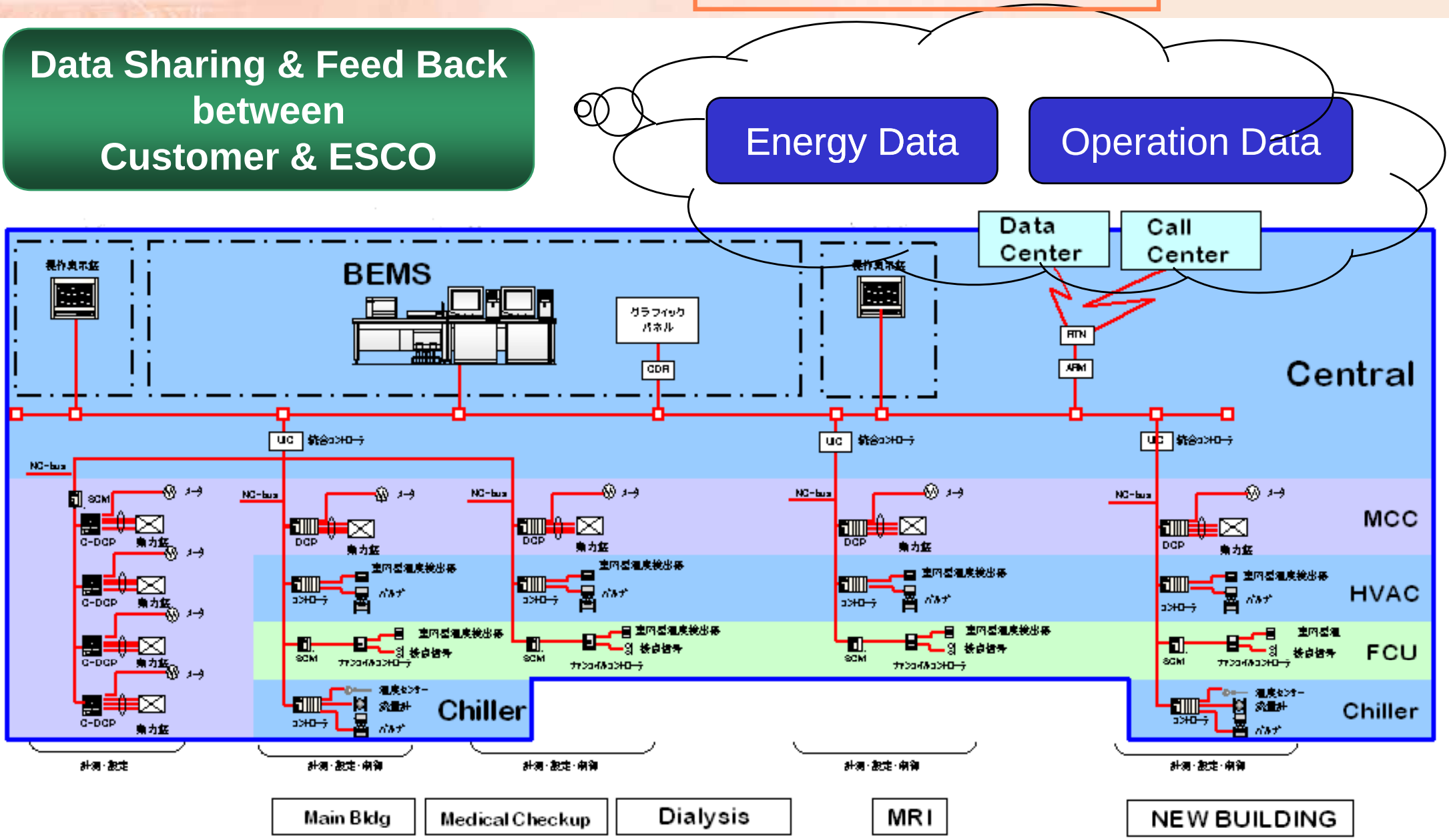
Data Sharing & Feed Back between Customer & ESCO



* BEMS introduced previous year before ESCO

Data Visualization thru BEMS

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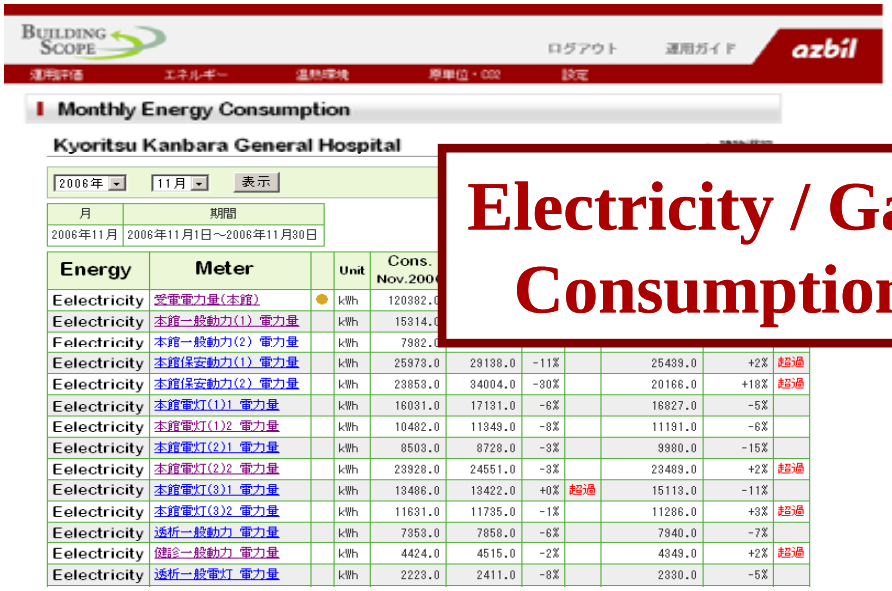
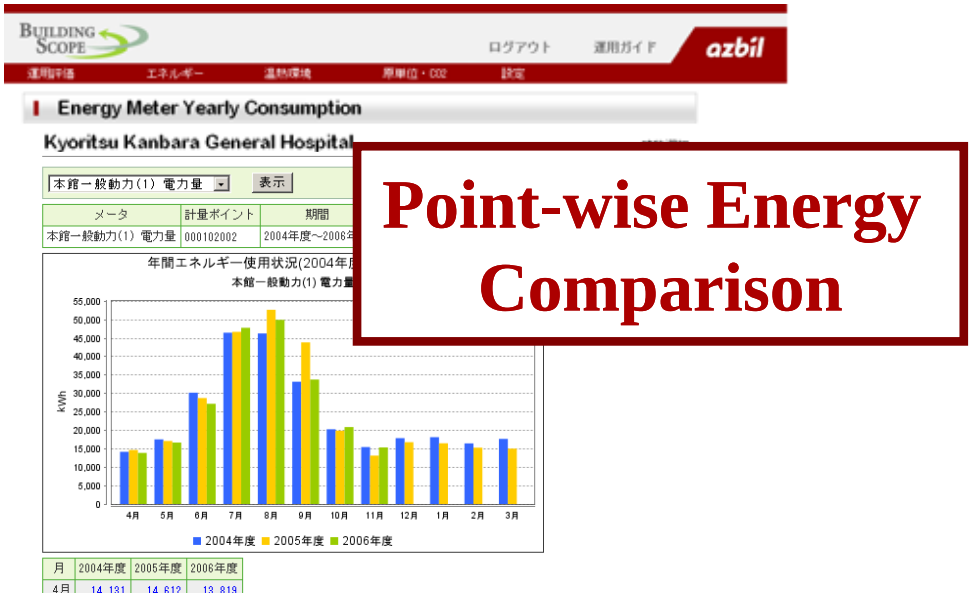
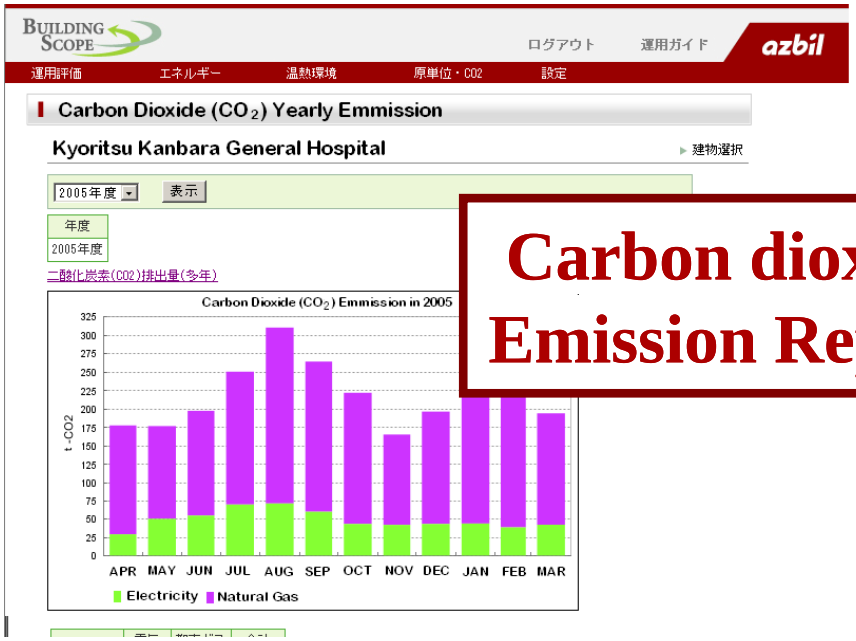


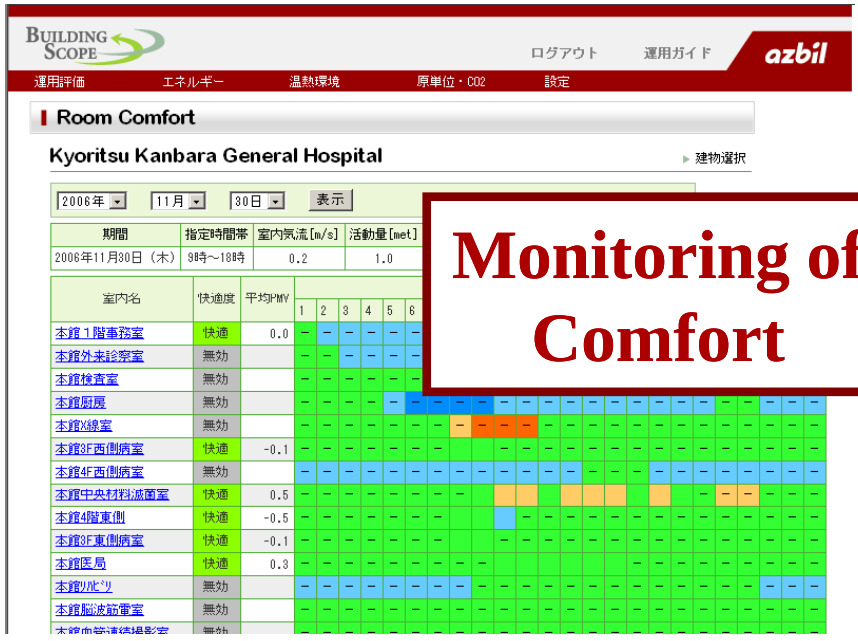
Electricity / Gas Consumption



Point-wise Energy Comparison



Carbon dioxide Emission Report



Monitoring of Comfort

Follow-UP by ESCO

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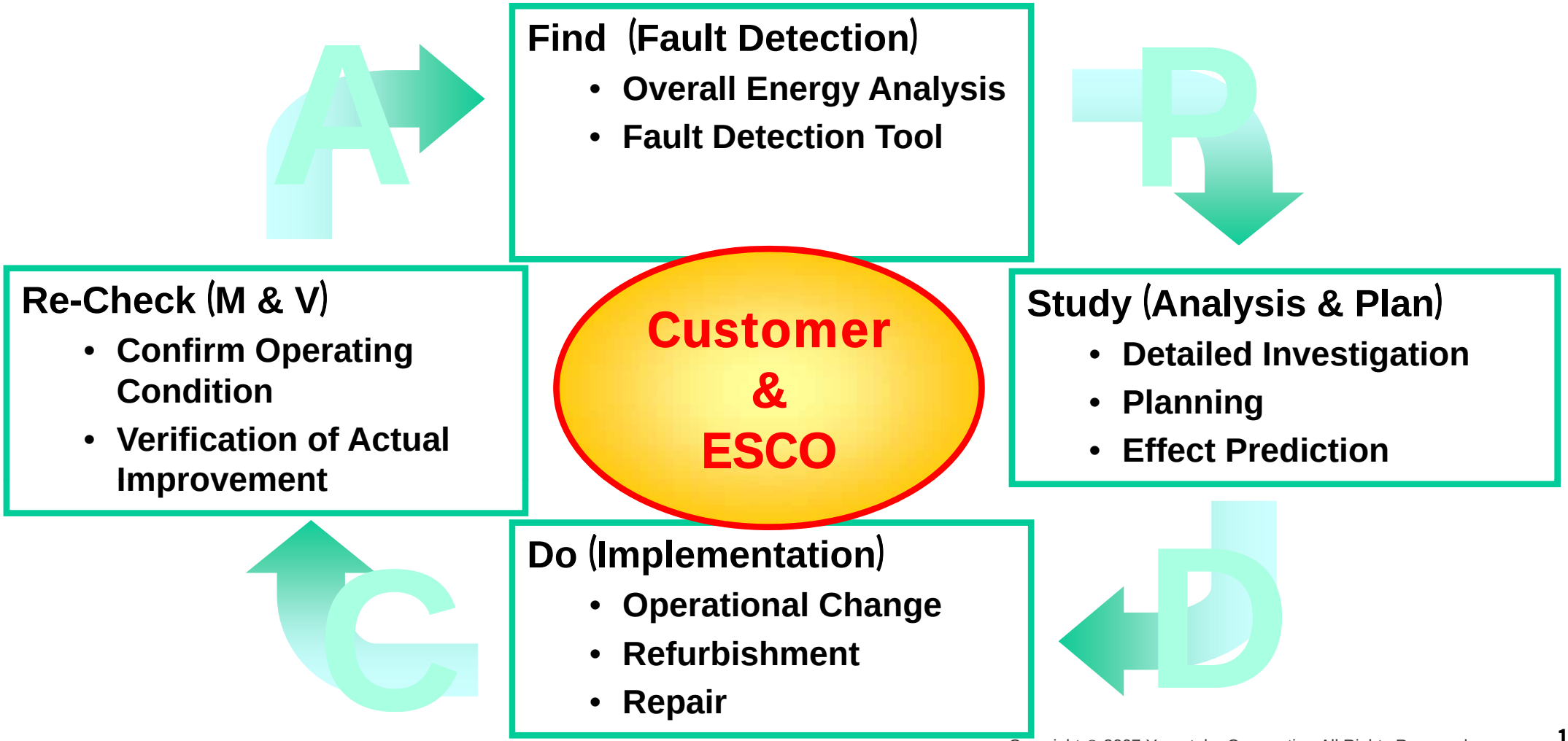
- **Continuous PDCA cycle as ISO9001 will enable further improvement based on Objective Analysis as per real data given by BEMS !**



Intermittent Result

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Financial Result for Last 3 Years

Year	Initial Investment				Base Line (D)		Actual (E)		Balance (F)=(D)-(E) = Saving		ESCO Service Fee		Actual Cost Saving	
	Investment	Subsidy (1/2)	Actual Investment (C)=(A)-(B)											
	(A)	(B)	Exchange Rate =	90 JPY/US$	Utility Cost		Utility Cost		Utility Cost					
	M-JPY	M-JPY	M-JPY	M-US$	M-JPY	M-US$	M-JPY	M-US$	M-JPY	M-US$	M-JPY	M-US$	M-JPY	M-US$
2005	260	130	130	1.4	128	1.426	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2006	N/A	N/A	N/A	N/A			68.3	0.759	60.1	0.667	17.5	0.194	42.6	0.47
2007	N/A	N/A	N/A	N/A			51.1	0.568	77.3	0.858	17.5	0.194	59.8	0.66
2008	N/A	N/A	N/A	N/A			49.7	0.552	78.7	0.874	17.5	0.194	61.2	0.68
Average Cost Saving													**54.5**	**0.61**
Pay Back Period													**2.4 Year**	

Result of CO^2 Reduction for Last 3 Years

Year	CO2 Emmission			
	Ton-CO2/Year			Reduction
	Base Line	Actual	Balanace	%
2005	3,475.4	N/A	N/A	N/A
2006		2528.4	947.0	27.2%
2007		2408.5	1,066.9	30.7%
2008		1776.4	1,699.0	48.9%

42inch LED Display at Waiting Room

As regional hospital, awareness campaign made to community

Exclusive User Website

Literature

1. Investment recovery has already done because unit price of city gas became almost half comparing with plan
2. CO2 reduction shall be reported when subsidy taken

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Thank you for your attention !!

Contact us.

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