



# **The Paradigm shift of Real time boiler maintenance for zero breakdown and Energy management of low carbon emission Steam Systems**

The Best Partner of  
Energy, Water and Environment

**MIURA**

# Presentation Overview ;

- **Company Business Principle**
- **MIURA Boiler in Global impact**
- **MIURA Boiler in Thailand market**
- **Environmental Technology of Small Once-Through Boilers**
- **Maintenance Online real time boiler system**
- **The Paradigm shift of Real time boiler maintenance for zero breakdown and Energy management of low carbon emission Steam Systems**

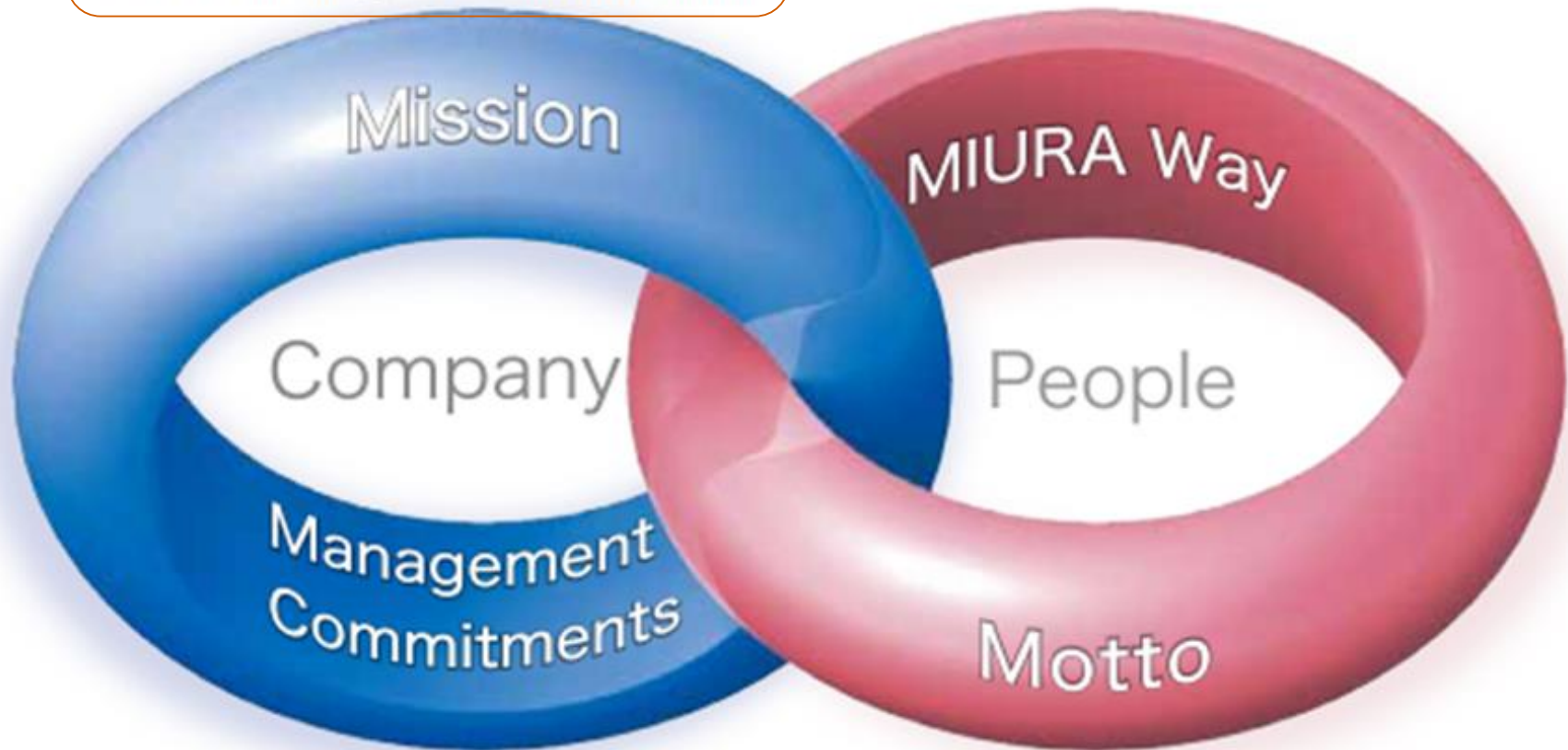


Technology of Miura in which it contributes to environmental preservation

# Company Sustainable Business Principles;

We will contribute to creating a society that is environmentally friendly and ways of living that are clean and comfortable through our work in the field of the Energy, Water, and Environment.

1. Create and Challenge
2. Trust and Communication
3. Fairness and Justice



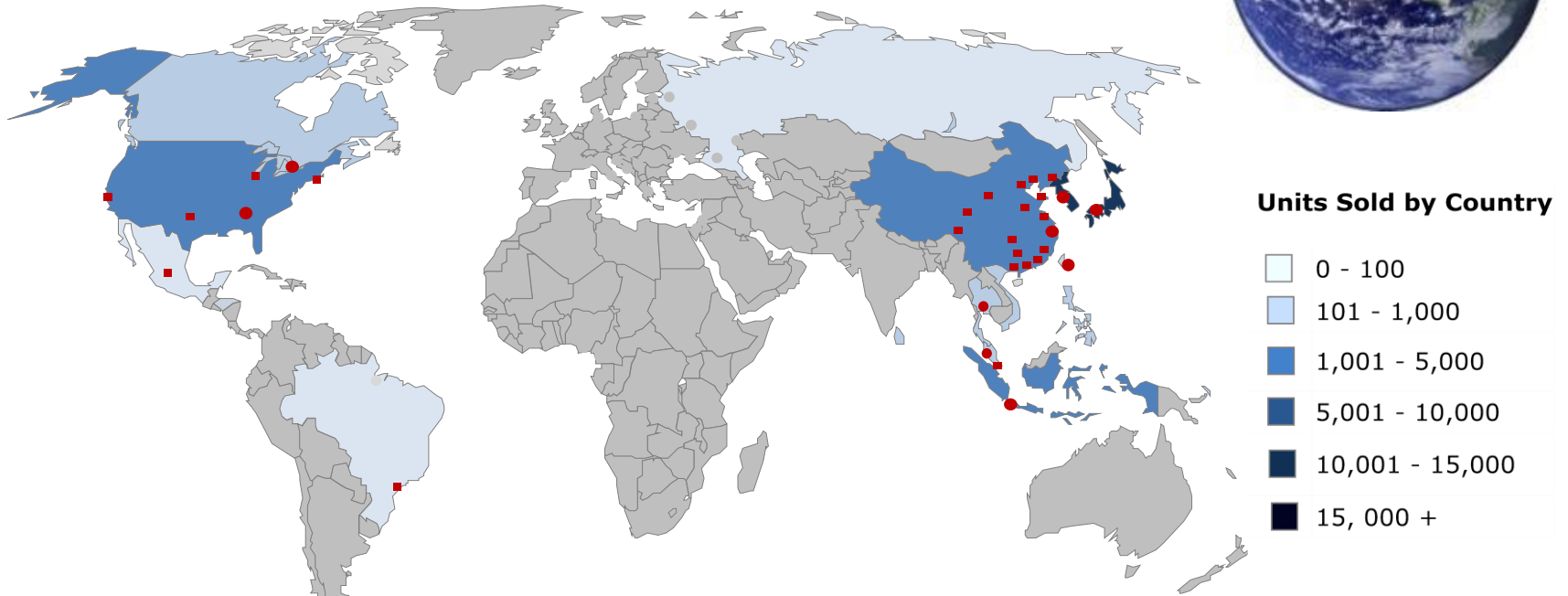
1. Encourage globalization with the Group's total strength.
2. Create "Best Partner" relationships with customers all over the world through "Technoservices" .
3. Create a workplace where employees can maximize their abilities.

To create an inspiring workplace where we can take pride in our work.

# MIURA boiler in Global impact

## ■ Global Boiler Sales : 143,000 Units (~ 12,000,000 BHP)

- Asia ~ 140,500
- North America ~ 2,500

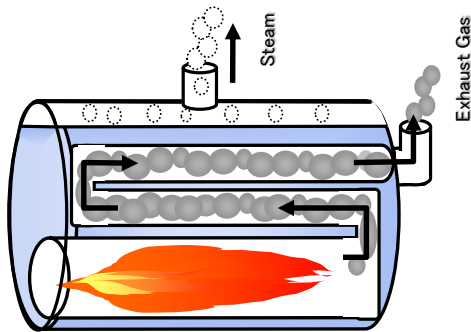
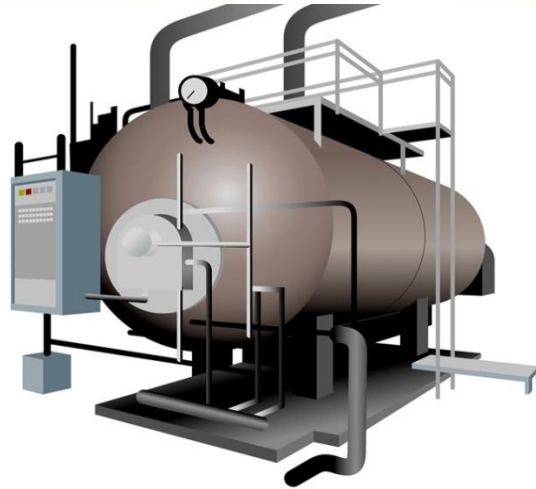


**180 Million Metric Tons of Annual CO2 Reductions**

**500 Trillion Btu Annual Energy Savings Worldwide**

# Features of each boiler

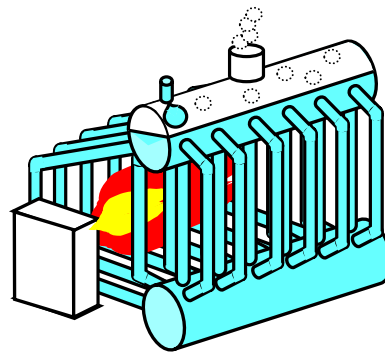
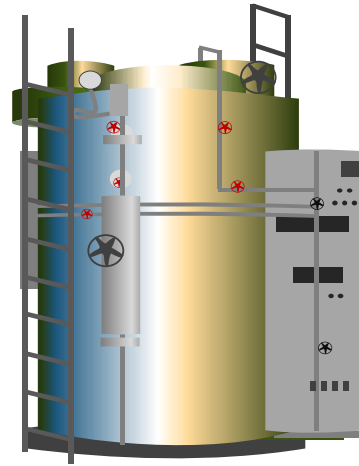
## Fire tube boiler



Efficiency 85–92%

Able to generate a large amount of steam at once.

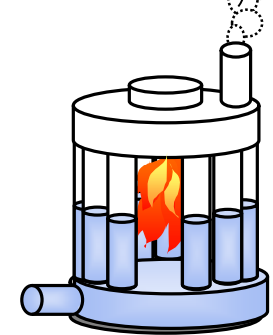
## Water tube boiler



88–92%

Able to generate a large amount of high pressure steam.

## Once-through boiler



95–98%

It can correspond in various industries by multiple installation system.

# MIURA Boiler in Thailand Market impact

## Feasibility study for the Project carbon reduce for promote Once-Through Boiler in Thailand Market

### Emission reduction effect updating to small once-through boiler system

CO2 emissions

#### Estimated Reduction Amount • Measurement Method

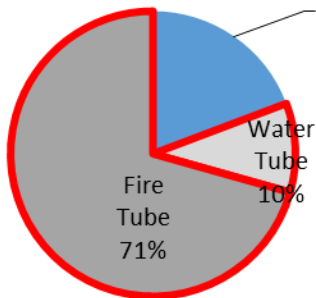
● Industrial Sector : 12,481 Units

(Department of industrial work)

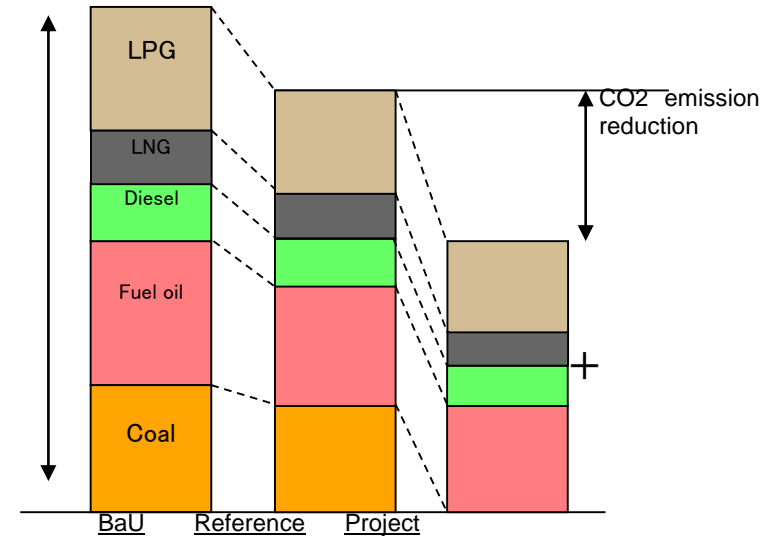
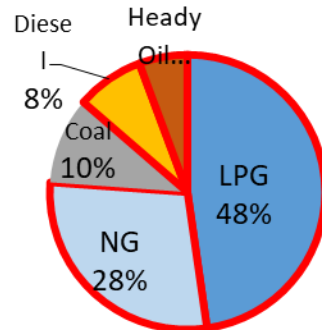
● hotel, Hospital sector : 4,126 Units

(Estimate from number of hospital and hotel )

**Boiler Type (n=109)**



**Fuel Type (n=109)**



#### Estimated Reduction Amount

Estimated Reduction Amount about 44%,  
Reduction Volume: 975 ton-CO<sub>2</sub>/year

(Switching of fuel from Coal to LNG, per project site)

Reduction Volume: 475,526 ton-CO<sub>2</sub> (Dissemination of 1075 boilers by 2019)

# Features of MIURA Once-Through Boiler


## <Boiler microcomputer control>



**Flue gas temperature**


- ◆ Self-diagnosis function
- ◆ Notice function
- ◆ Heat data management function
- ◆ Communications function

Green




Normal

Red



Error

Green & Yellow




Notice


**Prevent boilers from stopping**

**Notice function**

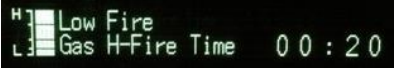
All 39 items including:  
flame sensor degradation, insufficient feed water, scale buildup, blow timing, pump capacity loss, fault of water level electrode(s), insufficient air volume, backflow




Scale monitor  
Measures water tube temperature and monitors scale buildup.




Boiler overheat thermostat  
Backs up the boiler in the event of an abnormally high temperature.




Boiler operation hour  
Low fire time and high fire time are added together to check load condition. This data can be used for heat management.



Boiler efficiency  
Average daily efficiency is displayed. This data can be used for heat management.



Flue gas temperature  
Average daily temperature of flue gas is displayed. This data can be used for heat management.



Evaporation amount  
Daily evaporation amount is displayed. This data can be used for heat management.

# NOx reduction with low-temperature combustion system and energy saving by low air ratio combustion (gas fired boiler)

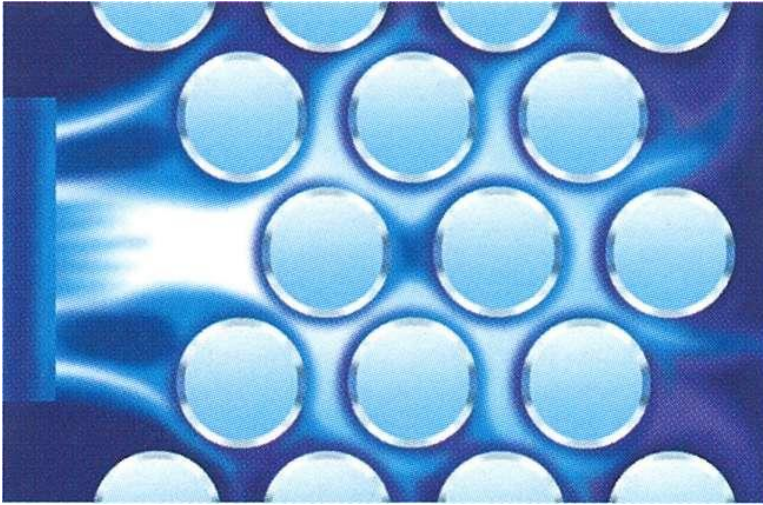
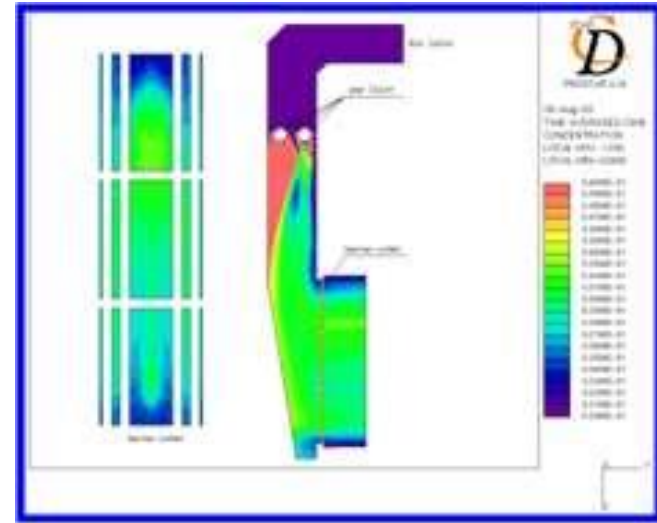


Image of flame from "non-furnace pressure vessel"



Analysis of gas and air mixing analysis in wind box

**Maximum boiler efficiency of 98%\***

High efficiency is realized by the unique structure of non-furnace boiler.

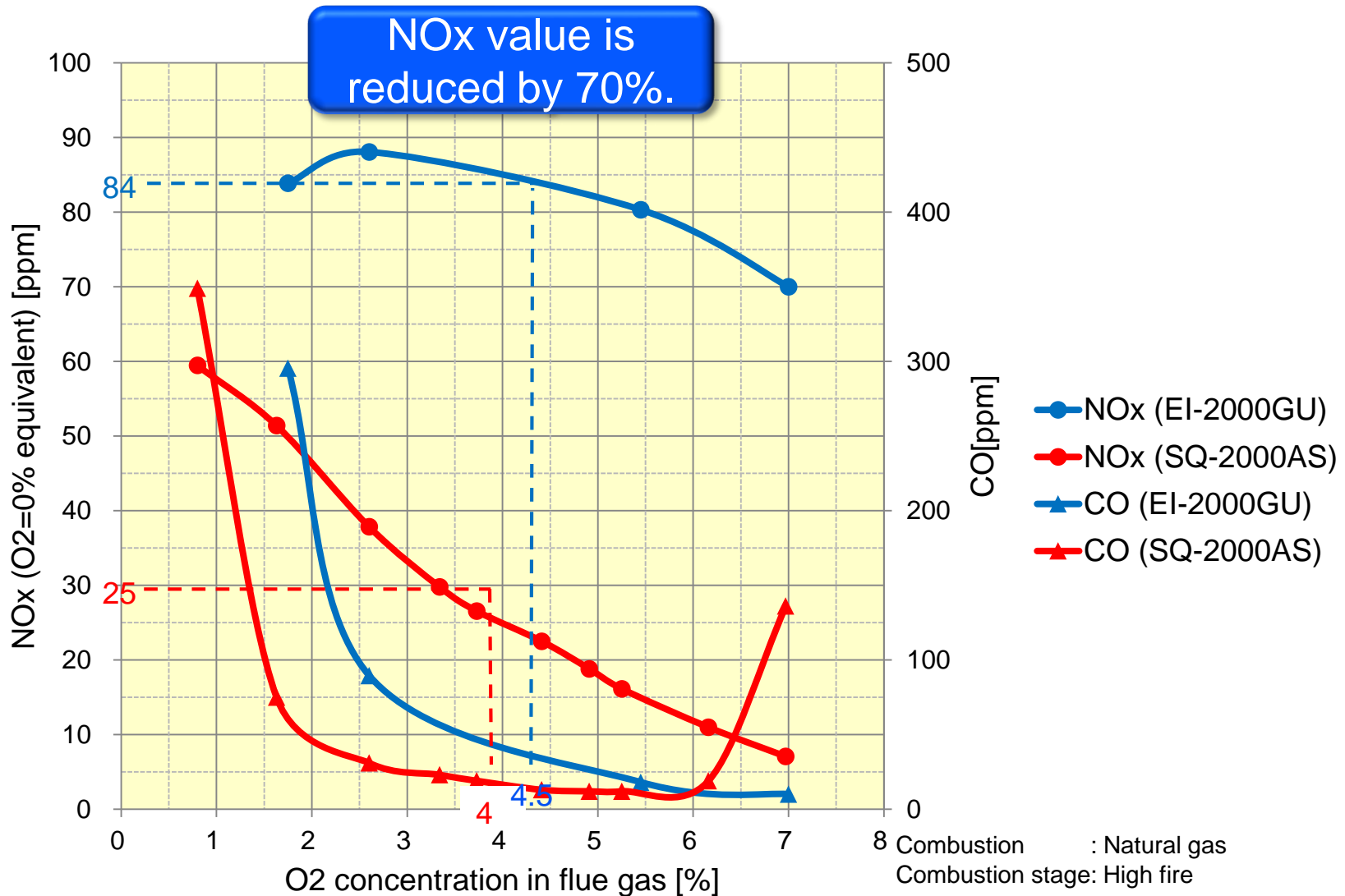
Efficiency increased up to 98% by adopting the economizer which has excellent corrosion resistance.

**Hyper-low NOx emissions of 25 ppm\***

The boiler is realized to the high-level low-NOx by using the unique system of low temperature combustion and combustion technique.

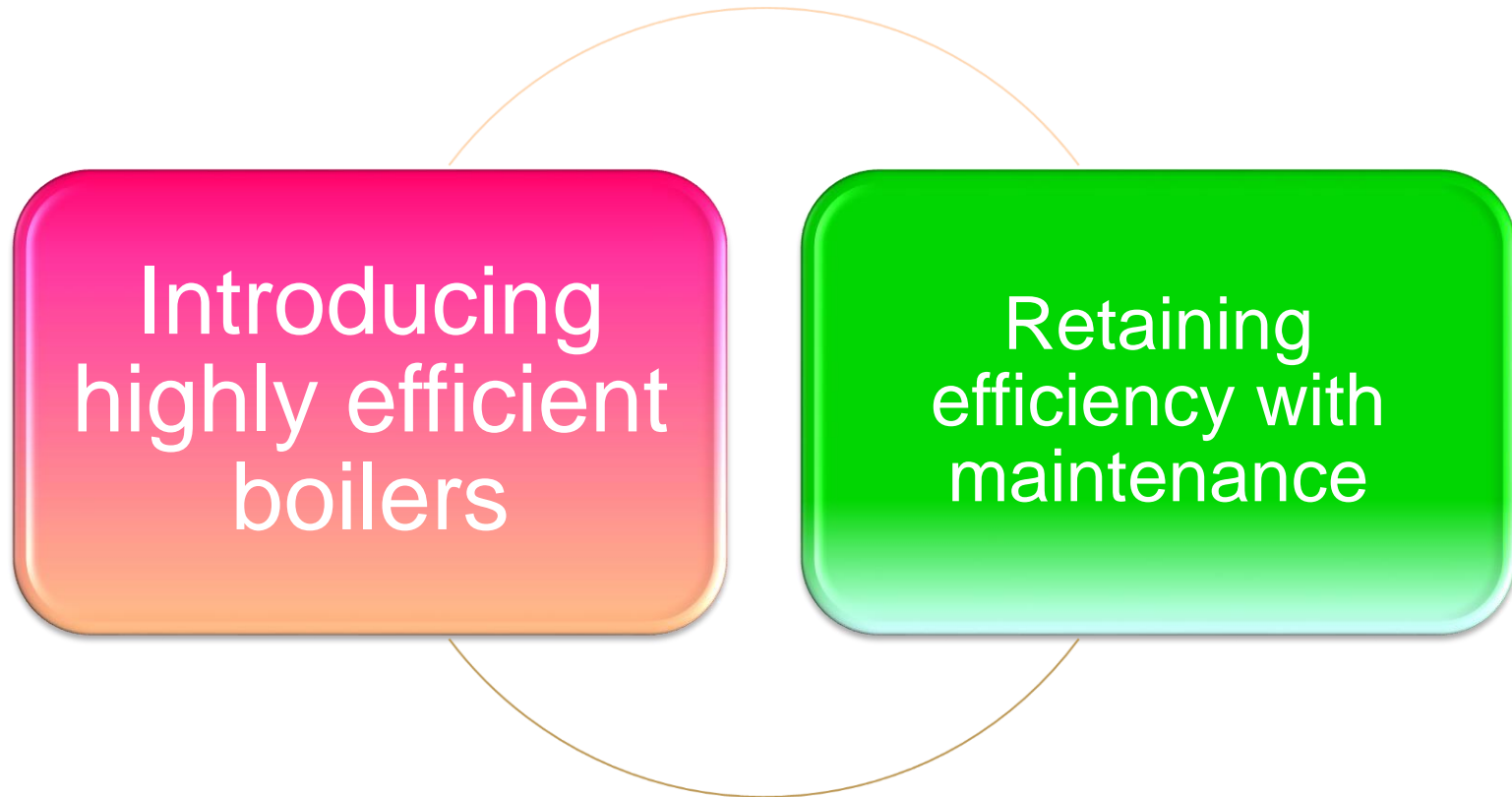


# NOx reduction with low-temperature combustion system and energy savings by low air ratio combustion (gas fired boiler)



# Communications-Based online Maintenance

**What is required for energy savings of a steam system?**



# Non-efficiency Maintenance effect with cost expense and Emission

- 20°C rise in flue gas temperature reduces efficiency by 1%.

**With a soot buildup of 0.1 mm,**

100°C rise in flue gas temp.

Annual fuel cost  
Up **1.35 million THB**

**With a scale buildup of 1 mm,**

20°C rise in flue gas temp.

Annual fuel cost  
Up **270,000 THB**

- Reduced efficiency due to increased blowdown amount

**If blowdown rate increases by 5%,**

about 1% reduction in efficiency

Annual fuel cost  
Up **270,000 THB**

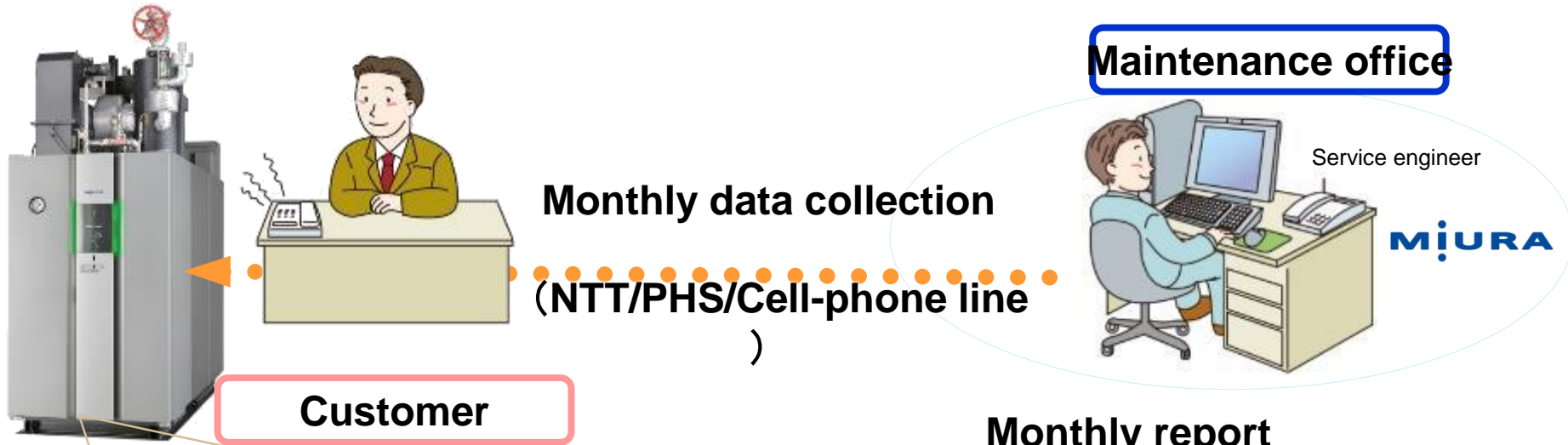
★Calculation condition

Steam consumption: 5 tons/hour (15,000 t/year)

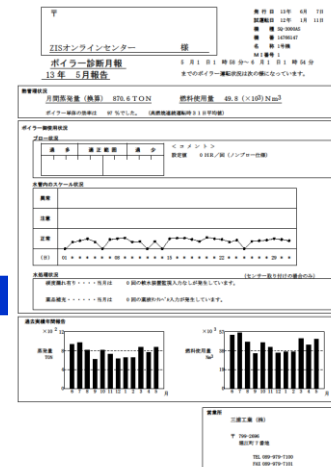
Operation hours and days: 10 hours/day, 300 days/year

Fuel used: Japanese A-type fuel oil (80 yen/L), Fuel cost: 90 million yen/year

# Online-Maintenance Overview

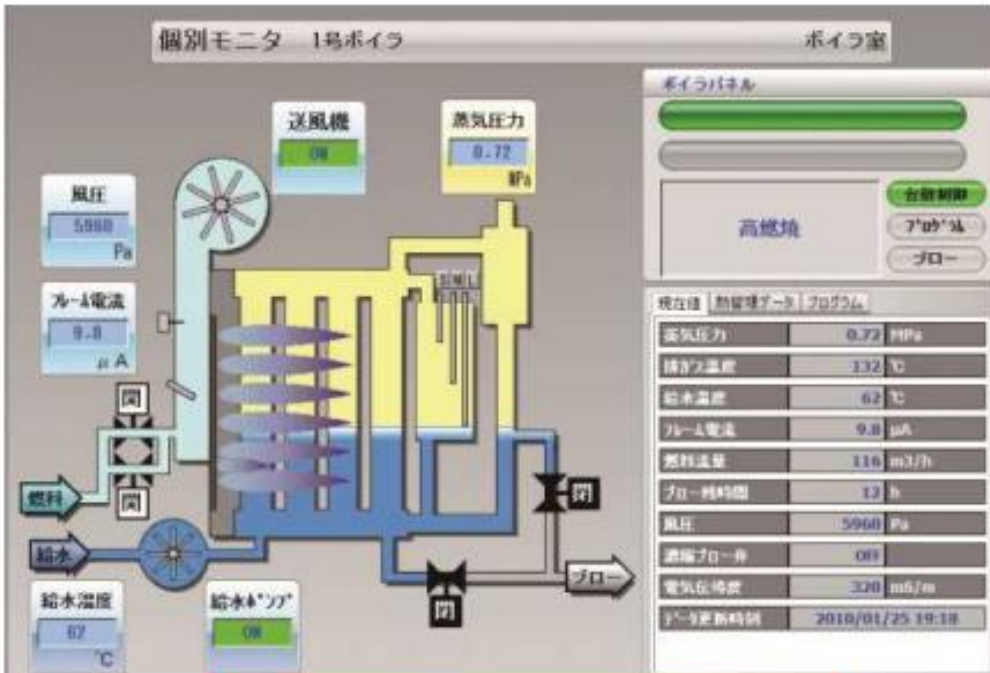


## Monthly report



Steam output  
Fuel  
Consumption  
Scale buildup

# Implement “IoT” for Maintenance for 29 years



Monitoring

Troubleshooting via Telephone (Data collection/analysis)

Approx. 65,000 units under contract \*including equipment other than boiler (As of March 2020)



Remote monitoring



Much more effective, easier maintenance work

# Boiler Maintenance Revaluation concept

## ZMP contract

### History

1972: Fee-based maintenance contract started  
 1989: Online maintenance started  
 1997: In-house qualification system introduced  
 2002: BP (best partner) strategy  
 2009: Second ZIS Online Center established  
 2010: ICT-Utilization Year One (strategic data utilization)  
 2014: Unique disaster assistance tool developed  
 2018: More than 60,000 units in communication

Our preventive maintenance transformed conventional after-sale service!

Contract period

Update every 3 years

5 terms (15 years)

3 time inspections per year  
Free parts replacement

Remedy for sudden troubles  
Free parts replacement

Anomaly perception

Trouble factor check in advance

Water analysis

Online maintenance

User

Safety & Swift recovery

Added value



### Maintenance revolution

Preventive maintenance based on operation conditions saves energy and labor costs, and increases products' life, enabling low-carbon emission.

Utilizing ICT, we have been rationalizing maintenance work and anticipating countermeasures against disasters.

Solution business development

# MEIS CLUD\*

■ Energy information management function using cloud  
Low cost energy management system to establish and improve factory total solution business model, without other management unit



# Wearable Camera Service

## MR (Mixed Reality) Technology Utilization

IoT/AR/Remote service

MIURA

To remove the cause of the alarm, check that part!

Maintenance support



Senior worker



Wearable camera

I see!



New worker



Knowledge and technique inheritance

User





# Summary

1. Once-through boiler is high efficiency, eco-friendly, and high level of safety. It is used as the standard boiler in Japan.
2. MIURA Eco-friendly impact to reduce 180 million Metric Tons of Annual CO2 and 500 Trillion Btu Annual Energy Saving worldwide
3. Feasibility study for switching convention boiler to MIURA Once-through and switching of fuel from coal to LNG, estimated reduce amount about 44% reduction volume 975 ton CO2 per year
4. We highly recommend to install the once-through boiler for environmental improvement in Thailand. We would appreciate it if you could support a preferential treatment policies of clean fuel use of LNG or light oil.



**MIURA**

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