



**EENP AWARDS 2020**

INDUSTRIAL ENERGY EFFICIENCY  
SHARING SESSION

# Boiler Controls Upgrade

Noel Sogueco





**EENP AWARDS 2020**

INDUSTRIAL ENERGY EFFICIENCY  
SHARING SESSION

# CONTENT PAGE

- **Introduction**
- **The Journey**
- **The Outcome**



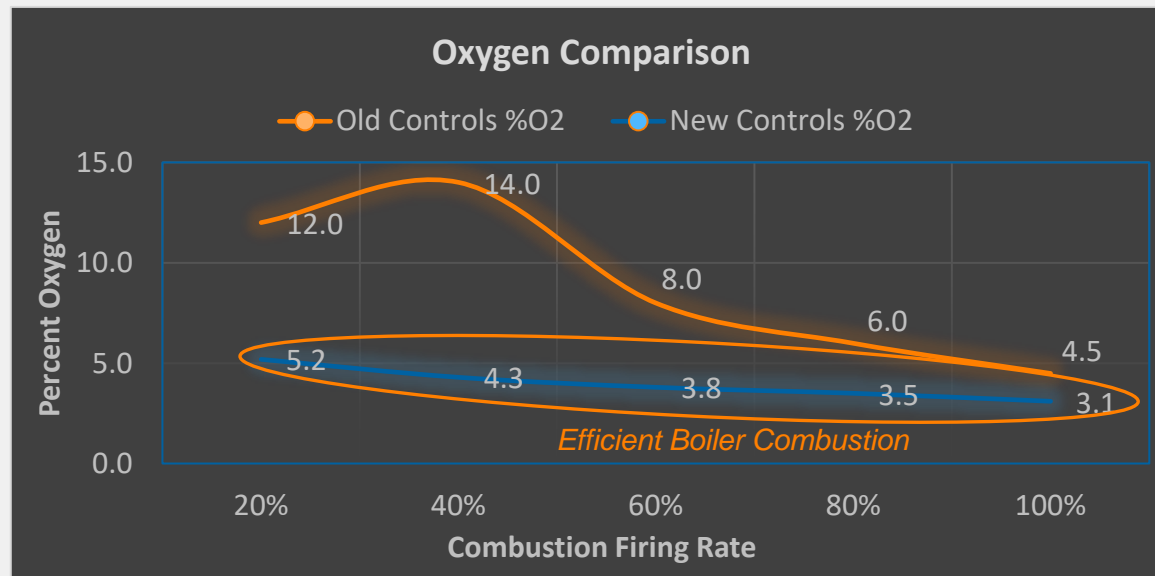
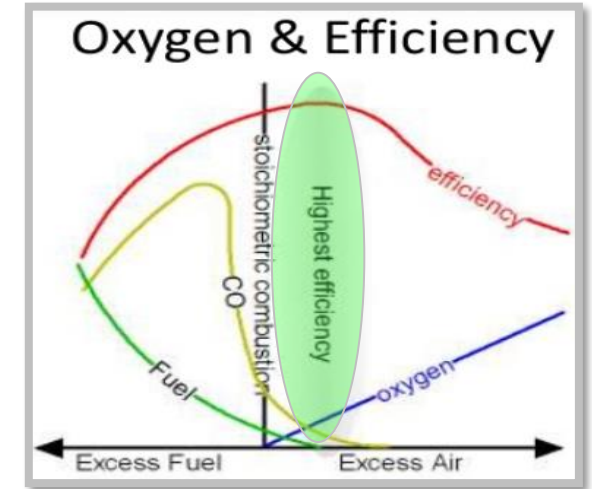
## EENP AWARDS 2020

INDUSTRIAL ENERGY EFFICIENCY  
SHARING SESSION

**Combustion efficiency** is an indication of the burner's ability to burn fuel. The amount of unburned fuel and excess air in the exhaust are used to assess a burner's combustion efficiency.

An Efficient Boiler Combustion is at minimum excess air levels of 15% (3% as Oxygen) for a conventional burner and 25% (5% as Oxygen) for low emissions burner.

Hence, the **lower the O<sub>2</sub>** the **higher the efficiency**, **lesser Fuel used**, and **lower CO emissions**.



The old B1 Boiler Controls use **Mechanical single point Linkage system** to control both the air and fuel supply opening.

The New B1 Boiler Controls Uses **Parallel Positioning Servo Motors** which independently controls the air and fuel supply opening.

Servo Motors have linearity of +/- 1% this provides a better repeatability and accuracy than the linkage system.



# EENP AWARDS 2020

## INDUSTRIAL ENERGY EFFICIENCY SHARING SESSION



### What

Boiler Controls System  
Boiler Combustion



### How

Consultation & Benchmarking  
Feasibility Study  
Courage



### When and Where

Jul 2019 to Jan 2020  
B1 Boilers



### Why

Ageing Controls System:  
Combustion Efficiency  
System Reliability

### Challenges

- Gaps on current system – High O<sub>2</sub> readings with hysteresis creating low Efficiency and High NG Consumption, ageing and complicated controls system that impacts MTBF and MTTR.
- Overseas Support – Logistics on Parts Delivery and Manpower needs to be properly planned and coordinated.
- Knowledge & Experience – Insufficient In-house knowledge and experience on Boiler Controls System, Annual PM Inspections, and Air Fuel Curve Tuning.

### Learnings

- Developed In-house Annual PM Inspection Checklist and Job-Aid.
- Acquired In-house Air Fuel Curve Tuning Capability.





# EENP AWARDS 2020

INDUSTRIAL ENERGY EFFICIENCY SHARING SESSION



- Knowledge and Capability
- Increased Reliability
- Increased Efficiency



Month	Boiler Efficiency
Nov 2019	72 % Eff
Jan 2020	75 % Eff
Mar 2020	83 % Eff
May 2020	86 % Eff

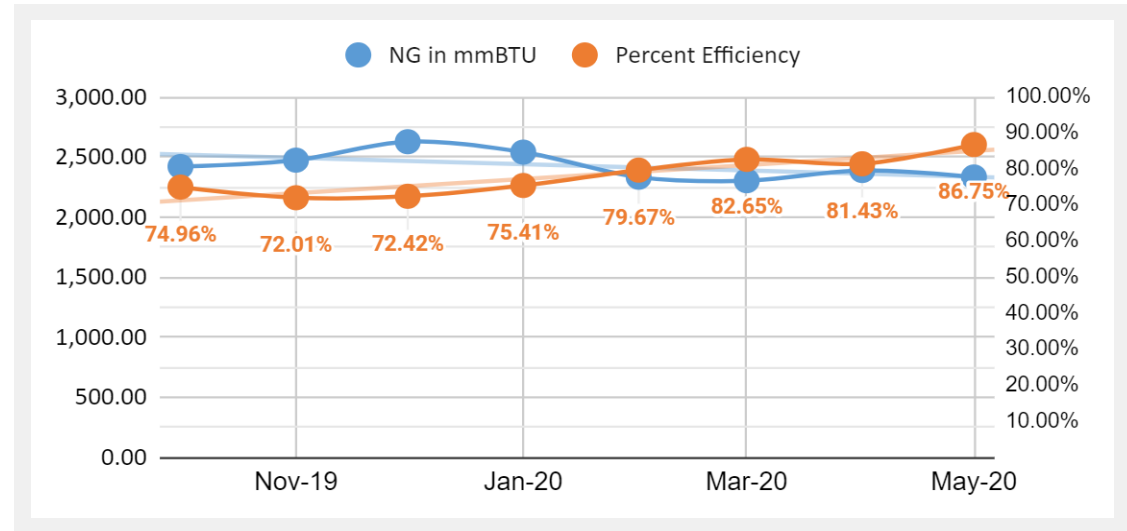


- Eco points
- 2020 EENP Awards
- Annualized NG Savings → 30k USD
- Indirect Savings → 15k USD

## Increased Efficiency

Parallel Positioning  
Lag Boiler Start-Stop cycle  
Air Fuel Curve Tuning

# 8%





**EENP AWARDS 2020**

INDUSTRIAL ENERGY EFFICIENCY  
SHARING SESSION

An Initiative by:



# THANK YOU

Noel Sogueco  
Facilities & Engineering / Utilities  
Roche Singapore Technical Operations Pte Ltd  
T: +65 6491 4069 | M: +65 9003 9615 |  
E: [noel\\_jr\\_dalisay.sogueco@roche.com](mailto:noel_jr_dalisay.sogueco@roche.com)

