



Efficiency Improvement of Co-generation System by Installation of Heat Exchanger in Fiber Factory (2019)

NS-OG Energy Solutions (Thailand) Ltd. (“NSET”)
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1. Introduction

Who is NSET?

Company	NS-OG Energy Solutions (Thailand) Ltd. “NSET”
Establishment	June 2012
# of employees	79 (as of Aug 2021)
Core business	Production and supply of heat and power
	O&M ^{*1} of CHP ^{*2} , boiler, chiller and other utility facilities
Shareholders	Nippon Steel Engineering (70%)
	Osaka Gas Singapore (30%)

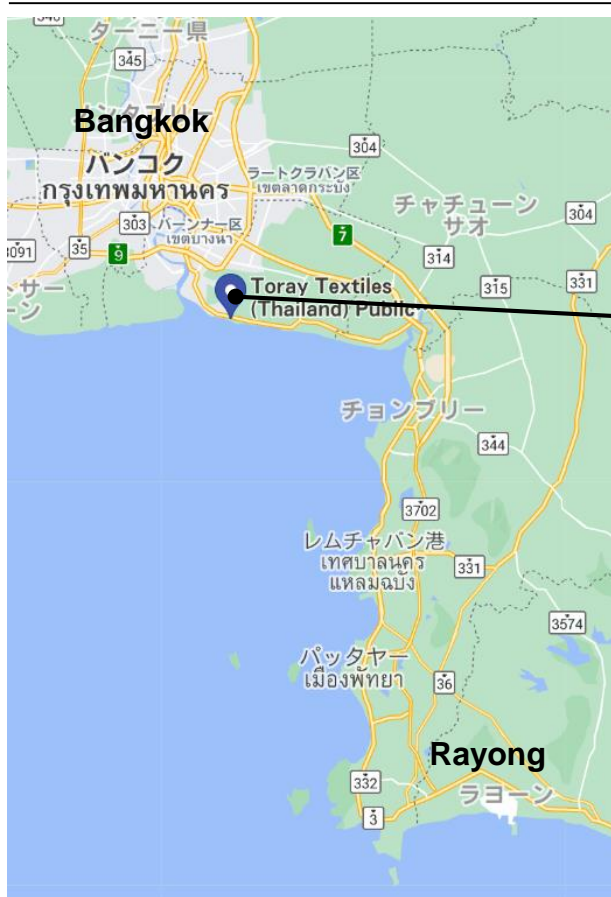
	Customer	Main equipment			COD
		Generator	Boiler	Chiller	
HATC	Honda Automobile (Thailand)	-	4 t/h	3,000RT	2015
TTT	Toray Textiles (Thailand)	7 MW GT	41 t/h	-	2016
YRT	Yokohama Tire Manufacturing (Thailand)	7 MW GT	25 t/h	600RT	2017
HATC2	Honda Automobile (Thailand)	7 MW GE	4 t/h	800RT	2017
THM	Thai Honda Manufacturing	7 MW GE	4 t/h	1,500RT	2018
SPT	Spiber (Thailand)	-	12 t/h	2,000RT	2020

1. Introduction

Project description

NSET installed heat exchanger in order to improve efficiency of gas turbine co-generation in Thai fiber factory.

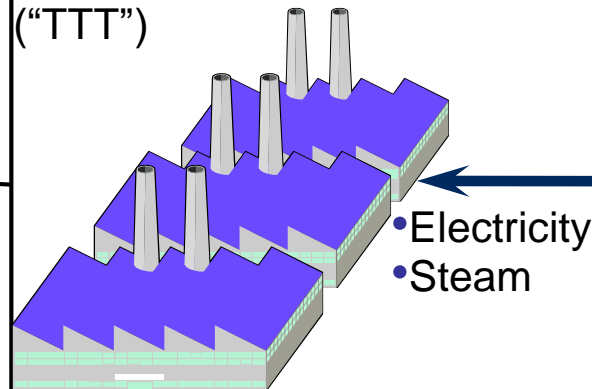
Location



Implementation structure

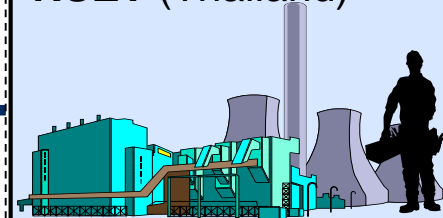
Fiber Factory

Toray Textiles (Thailand) Ltd. ("TTT")



JCM project consortium

NSET (Thailand)



Install Heat Exchanger in 7 MW gas turbine co-generation

Basic design & technical support

NSE*1 (Japan)

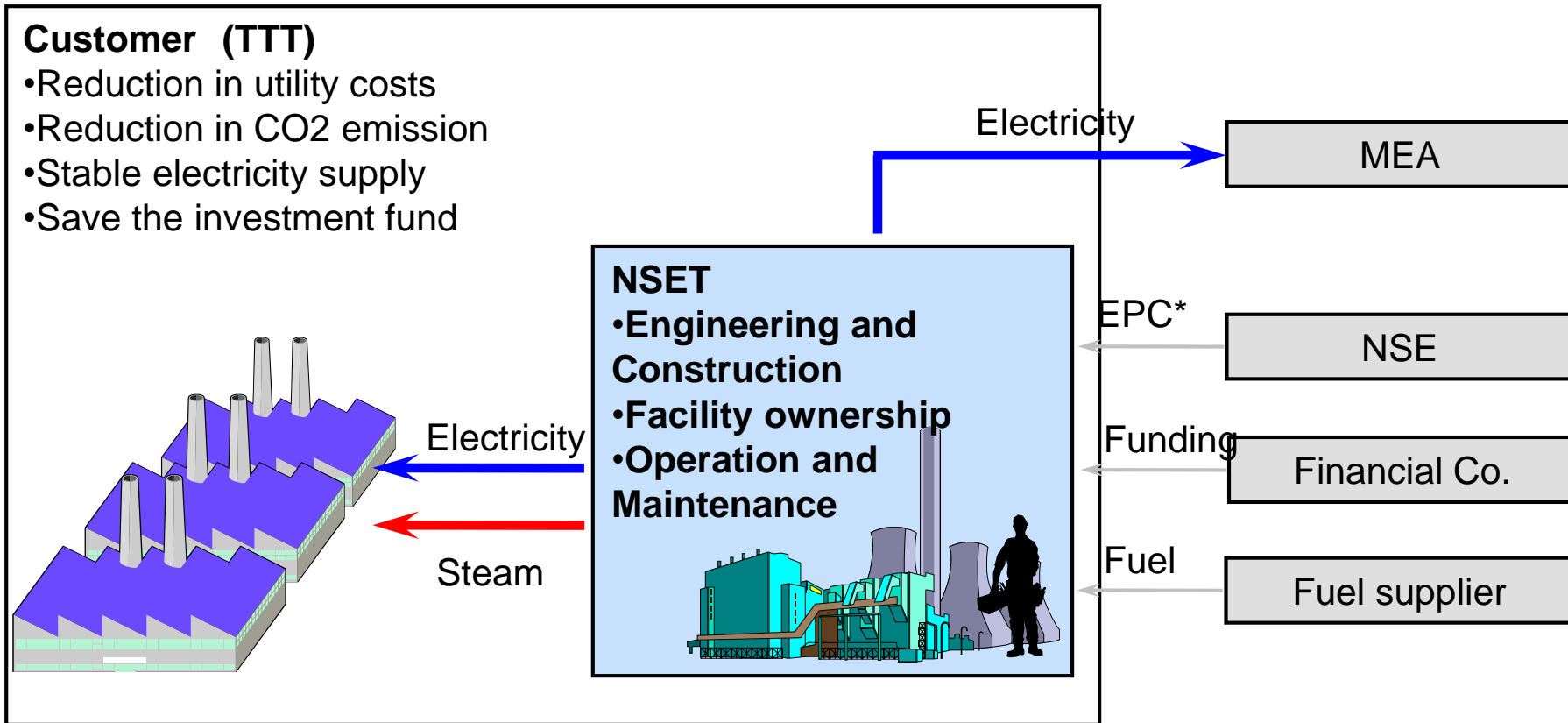
*1 NSE: **N**ippon **S**teel **E**ngineering Co., Ltd.

1. Introduction

On-site energy service business

NSET offers on-site energy service, where CHP facilities are designed, constructed, owned, operated and maintained, and Customers enjoys benefits without any significant investment burden.

On-site energy service business model



* EPC: Engineering, Prourement and Construction

2. Existing co-generation

7MW gas turbine co-generation for TTT

NSET is operating 7 MW gas turbine co-generation plant in TTT mill2 factory.

Plant overview



Characteristic features

- Approx. 900m² (within the premise of TTT Mill2 factory)
- Supply electricity and steam to TTT Mill2 factory and sell surplus power to MEA
 - Power: 6,700 kW (Intake air temperature: 30 degree C)
 - Steam: 41t/h (Steam pressure: 0.5 MPaG)
 - Overall efficiency: 91%

2. Existing co-generation

(1/3) High efficiency contributing to CO2 reduction

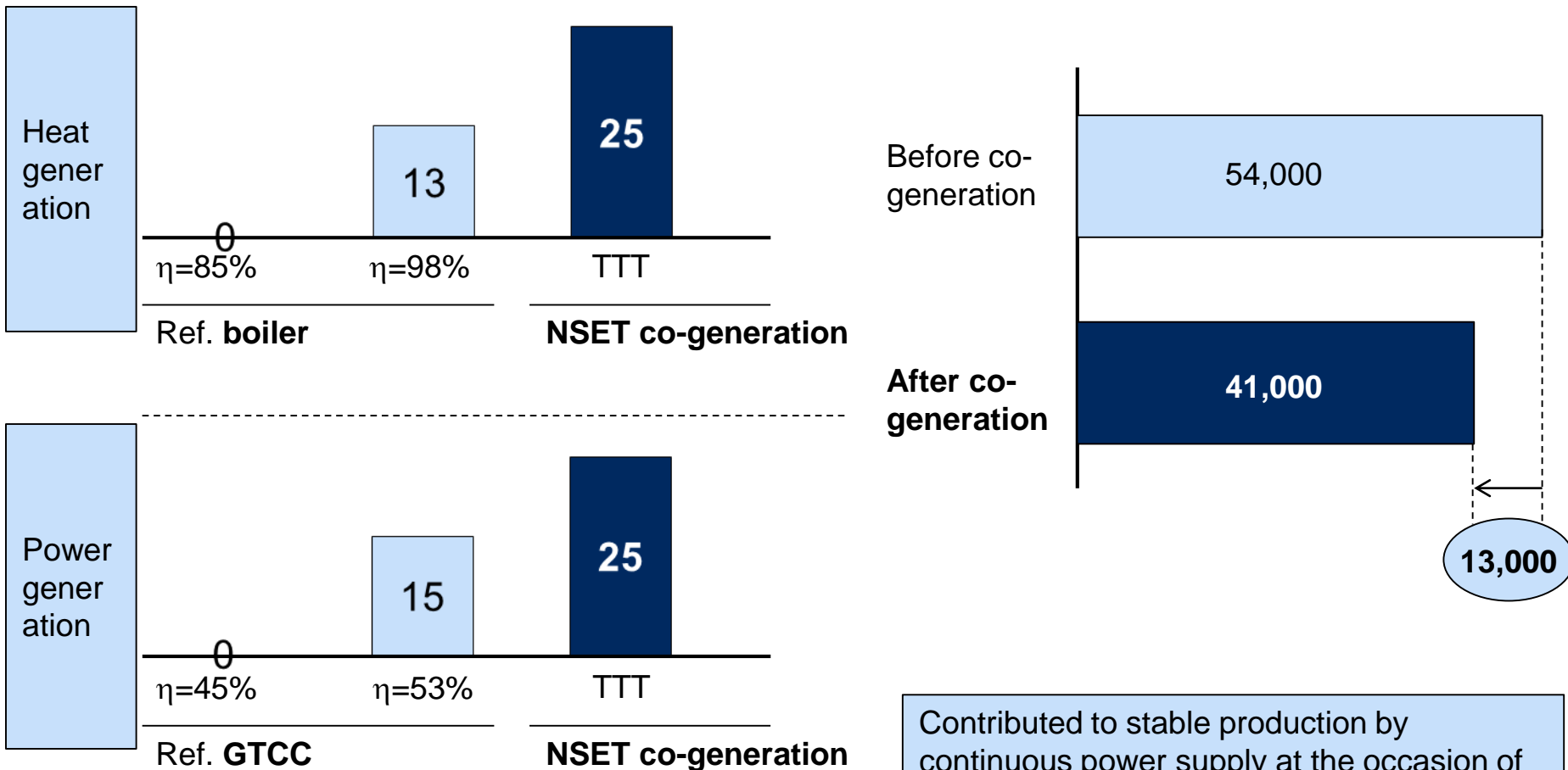
NSET co-generation achieved PES of 25% and reduced CO2 emission of approx. 13,000t/y.

Primary Energy Saving (PES)

%

CO2 emission reduction

T-CO2/Y

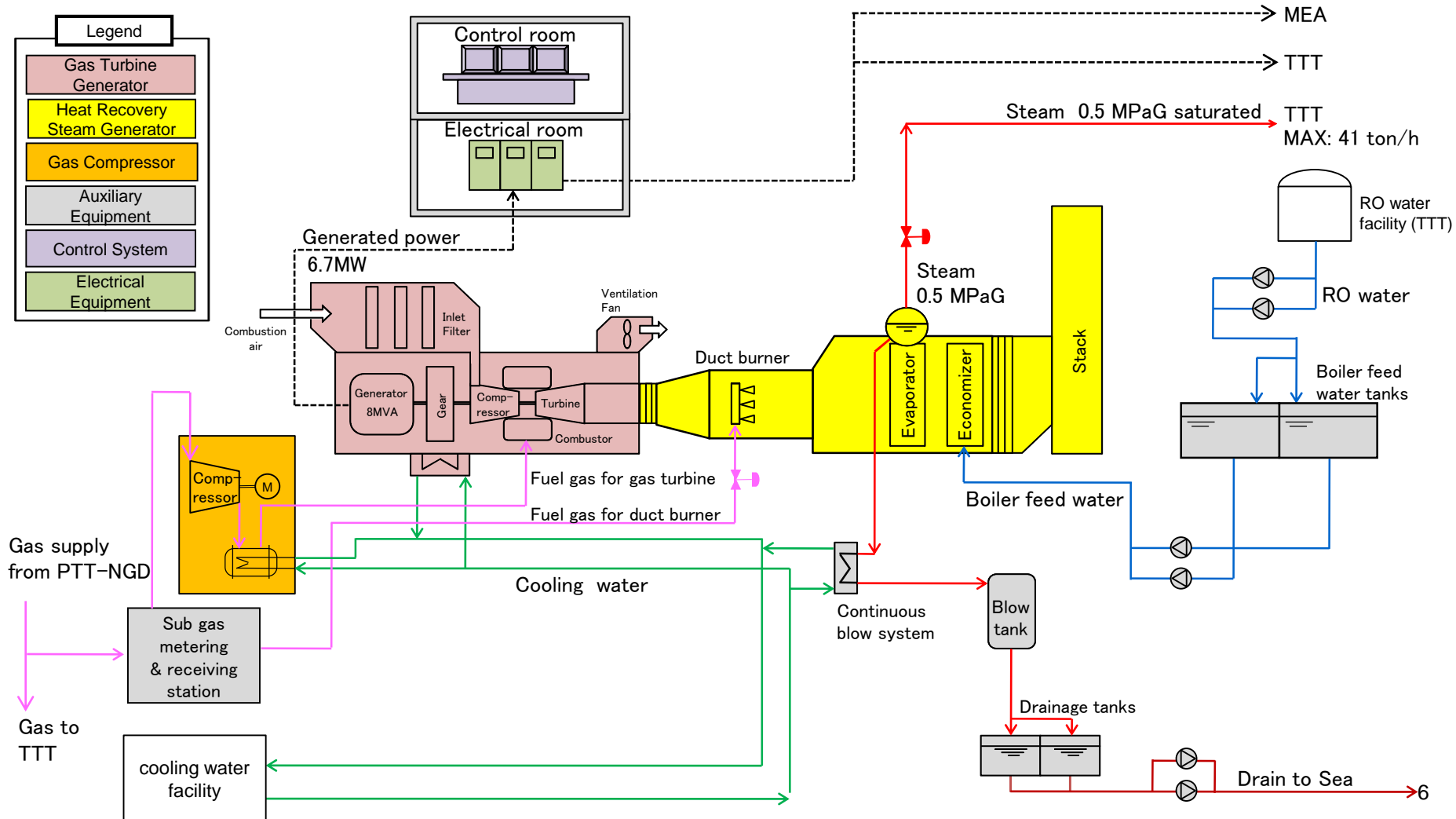


Contributed to stable production by continuous power supply at the occasion of power grid trouble.

2. Existing co-generation

Process flow

NSE designed heat recovery steam generator (HRSG) in order to fulfil high steam demand of 41t/h and achieve high boiler efficiency.

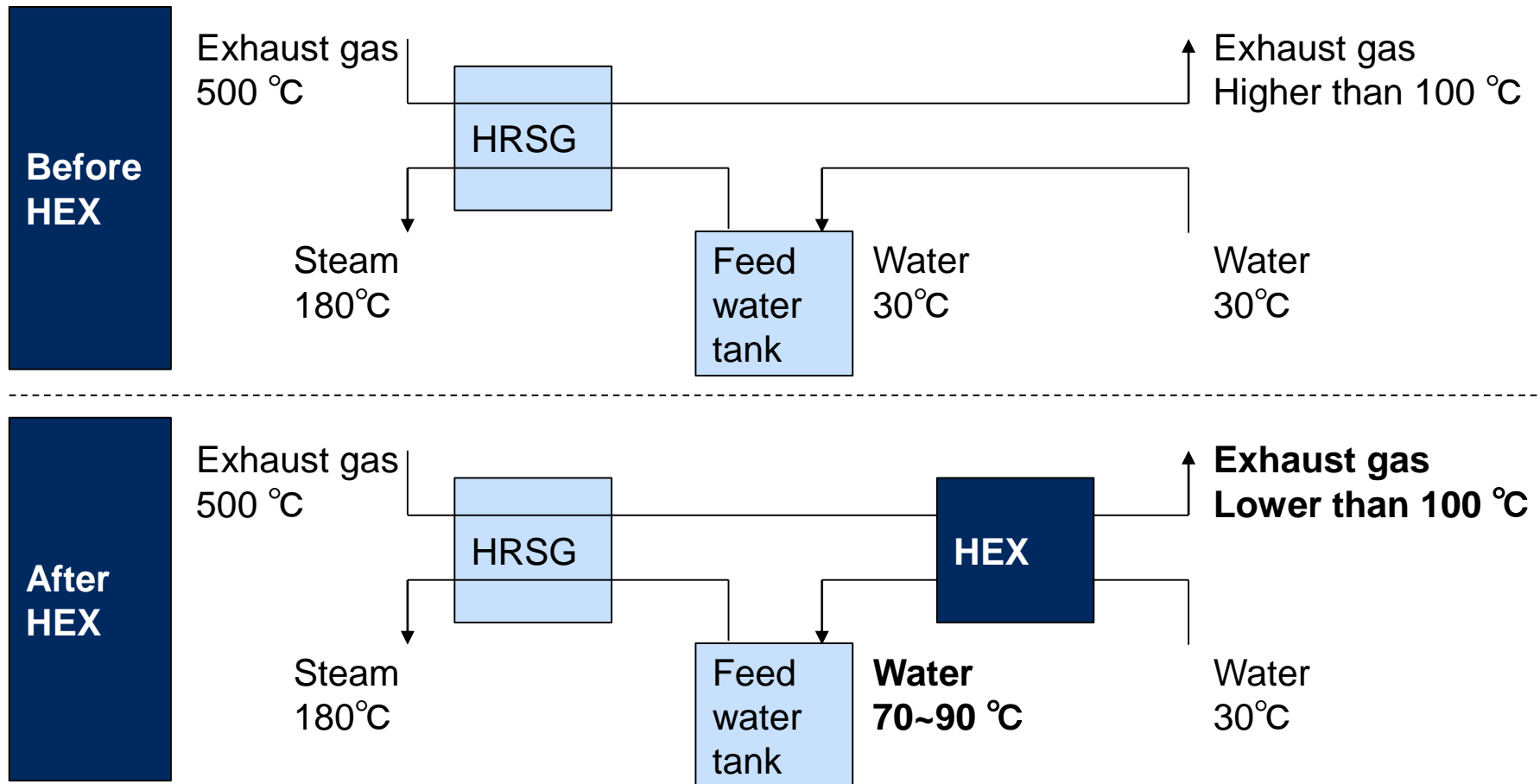


3. HEX project

Project concept of HEX installation

In this JCM project, NSET additionally installs heat exchanger in order to make the efficient use of waste heat in exhaust gas of gas turbine.

Schematic illustration (Values are conceptual)



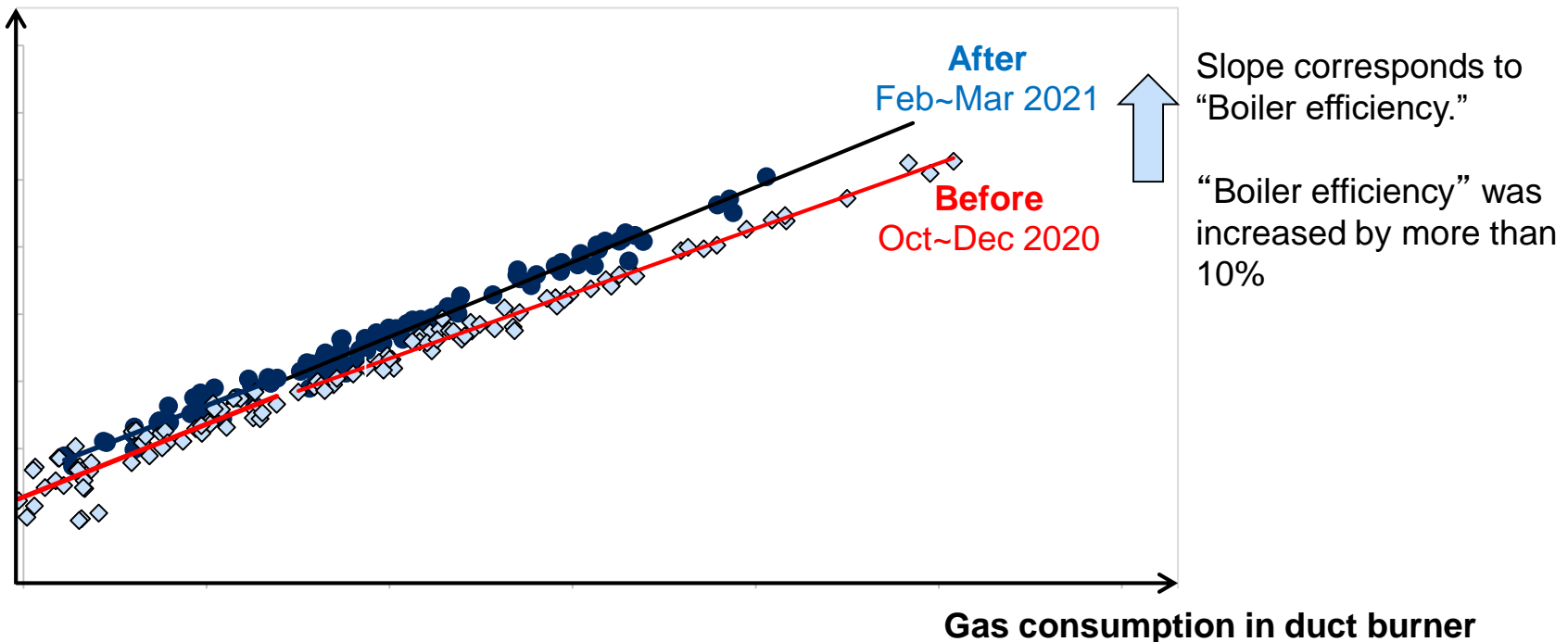
3. HEX project

Evaluation of HEX installation

By analyzing the operational data before and after HEX installation, we proved that boiler efficiency was improved.

DB gas consumption vs. steam production amount

Steam amount



3. HEX project

Implication of HEX project

This plant has become probably most efficient co-generation plant in Thailand.

