DENSO

Crafting the Core

Aggresive Carbon Reduction Program Toward *Energy Half* at 2025 by *CGS (Co-Generation System)*

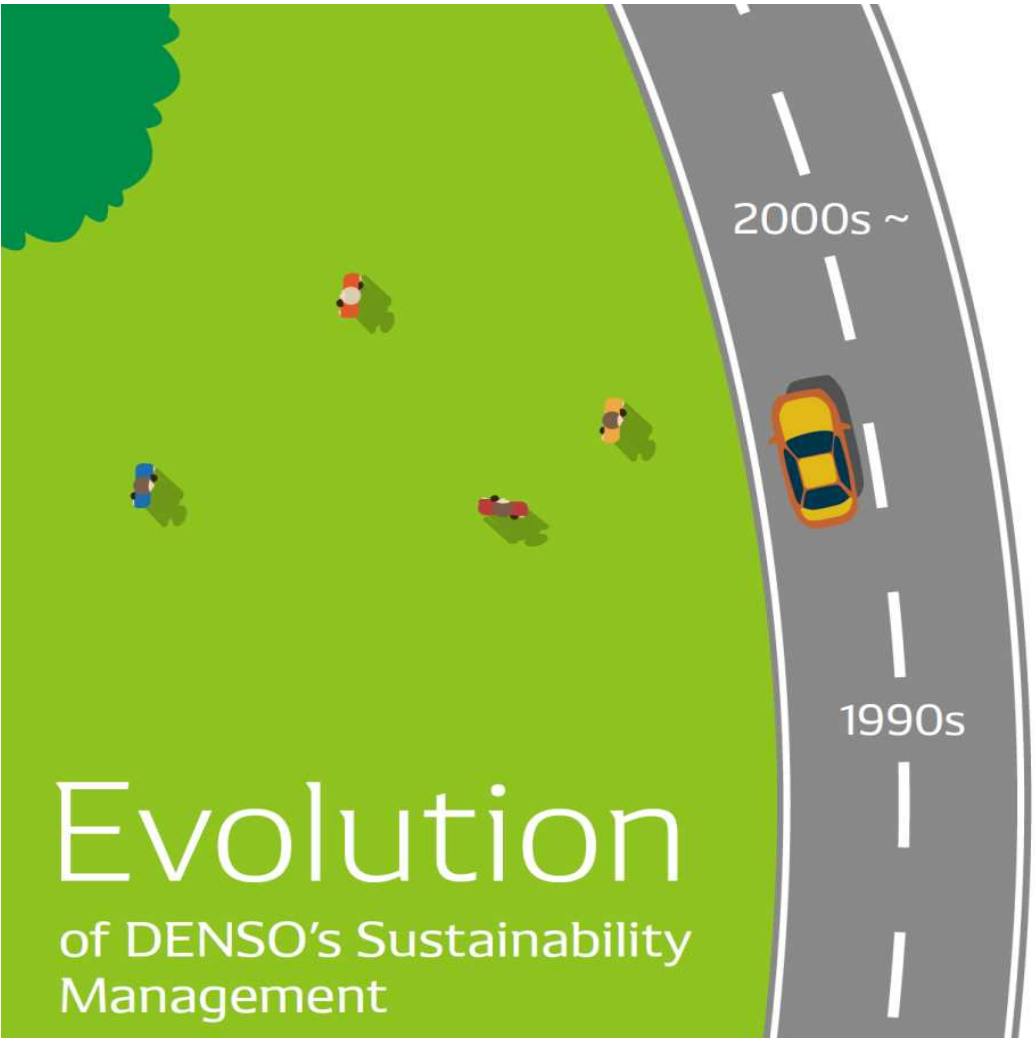
By PT Denso Indonesia

30th September, 2020

Irvan JP Elliika

JCM Webinar – via Zoom Meeting

Outline

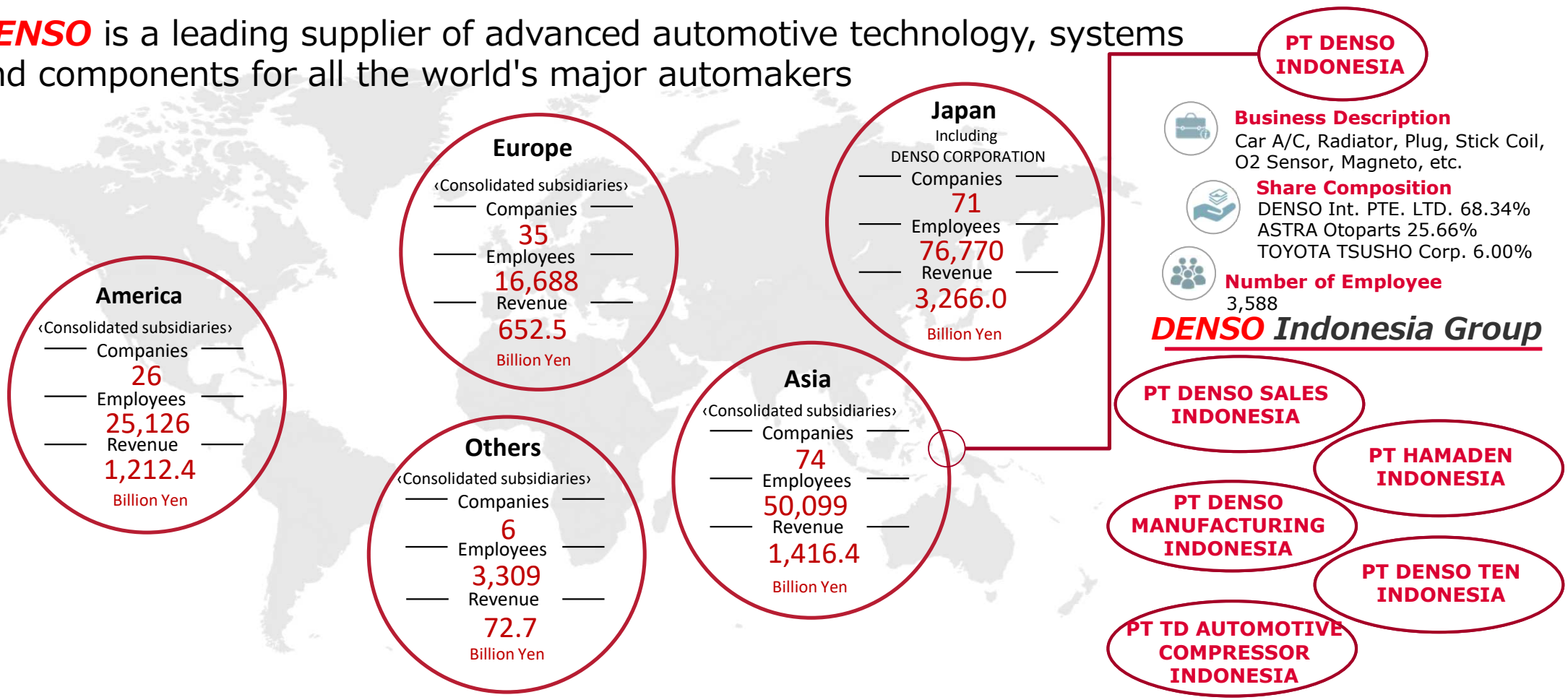


1. *DENSO* Outline
2. *DENSO* ESA* Policy
3. Emission Reduction Activity
   - DNIA** CGS Project
   - Pandemic Issue Counter Activity
4. Next Action

* ESA : Energy Saving Activity
** DNIA : Denso Indonesia

1.1 *DENSO* Outline

DENSO is a leading supplier of advanced automotive technology, systems and components for all the world's major automakers



DENSO Produce the *Core* of Automotive & Technology

1.2 DNIA Local Network

A. Outline

Company name	PT. DENSO INDONESIA [DNIA]
Established	May. 12, 1975
Capital	US $ 5,65 Mil.
Employees	3,588

B. Location

C. DNIA Factories Image

Sunter Plant

Bekasi Plant

Fajar Plant

Plant Relocation at 2021

Prod. start	Jan., 1978 (39.5years)	Prod. start	July, 1996 (21years)	Prod. start	February, 2014 (3.5years)
Land area	38,000m²	Land area	100,000m²	Land area	200,040m²
Plant area	19,000m²	Plant area	49,050m²	Plant area	39,700m²
Employee	804 Man Power [Aug'20]	Employee	2,061 Man Power [Aug'20]	Employee	964 Man Power [Aug'20]
Products	Spark plug, O2 sensor, Cu Radiator	Products	HVAC, Radiator, Condenser, Hose,Tube, Bus A/C, Magneto	Products	Ni Plug, SIFS, ECU2W, VCT, Alt, Starter, Meter, ECU4W, Sonar, WSS, AISS, O2 Sensor

Project Established

With all these factories, ***DENSO*** supplies to almost all automakers in **Indonesia**

2.1 Denso Global Policy Related to Environment

Background : Denso not only produce things, but also create the core of technology to make global citizen long life & happy

Theme : Denso Ecovision

SAVE

THE EARTH

And Deliver Bright Future To The Next Generation

Half Energy

- **Automobile Fuel efficiency ½**
- **Monozukuri CO_2 ½**
- **Life transfer energy**

Double Green

- **Double green environmental technology**
- **Double Rich greenery Nature**
- **Double Protection of nature**

Double Clean

- **Double Confidence of customer**
- **Double Security of regional society**
- **Double Environment consciousness**

Sustain the core business with preservation is the key of the *DENSO* Management

2.2 DNIA Energy Policy & Road Map

❖ Thingking Way

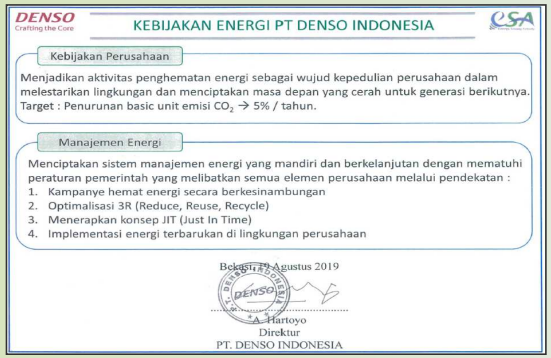
Need of Business sustainability with enviroment preservation

Energy Ministry + Denso Indonesia (Energy Saving Activity)	As Direction
ECO VISION 2025 Denso Global	As Platform

❖ Final Goal

DNIA Reduce Carbon Unit by 50% at 2025

❖ DNIA Energy Policy



DENSO Crafting the Core — KEBIJAKAN ENERGI PT DENSO INDONESIA — ESA

Kebijakan Perusahaan

Menjadikan aktivitas penghematan energi sebagai wujud kepedulian perusahaan dalam melestarikan lingkungan dan menciptakan masa depan yang cerah untuk generasi berikutnya.
Target : Penurunan basic unit emisi CO_2 → 5% / tahun.

Manajemen Energi

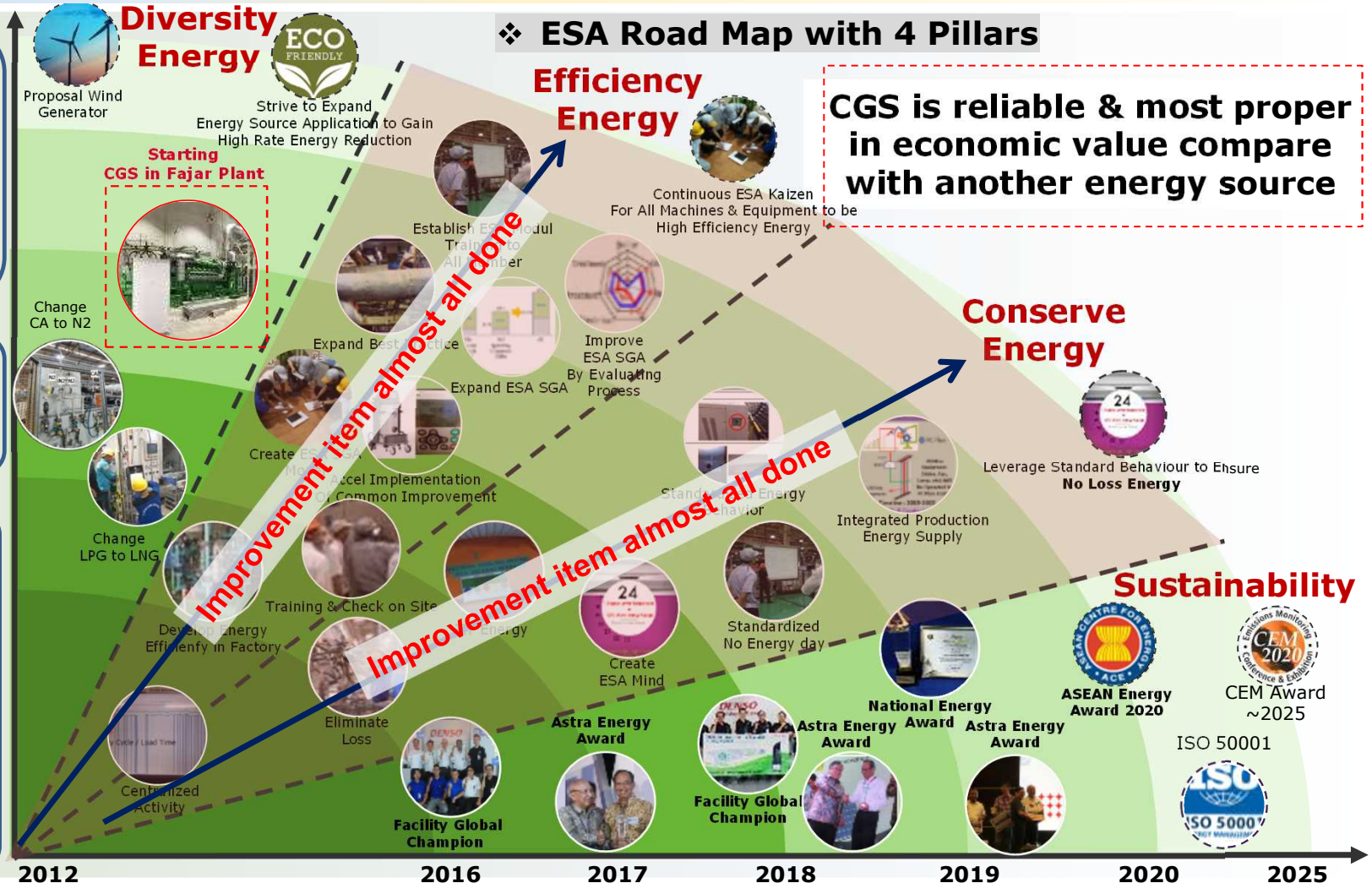
Menciptakan sistem manajemen energi yang mandiri dan berkelanjutan dengan mematuhi peraturan pemerintah yang melibatkan semua elemen perusahaan melalui pendekatan :
1. Kampanye hemat energi secara berkesinambungan
2. Optimalisasi 3R (Reduce, Reuse, Recycle)
3. Menerapkan konsep JIT (Just In Time)
4. Implementasi energi terbarukan di lingkungan perusahaan

Bekasi, 29 Agustus 2019

A. Hartoyo
Direktur
PT. DENSO INDONESIA

❖ ESA Road Map with 4 Pillars

CGS is reliable & most proper in economic value compare with another energy source



3.1 DNIA Carbon Emission Reduction Activity

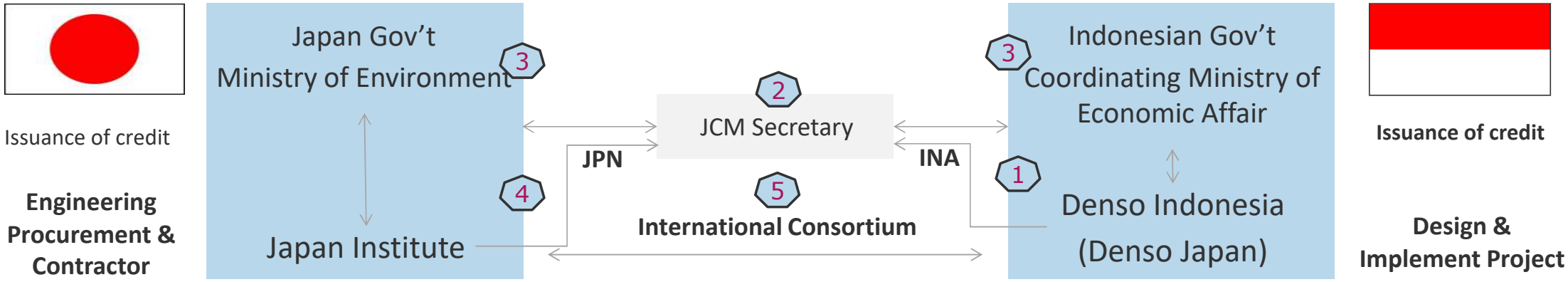
A. General Direction of Long Term Action Plan

ECO List			Action	DNIA Target		PIC
				Rate	kt-CO_2	
Conserved & Efficiency Energy	Genba Kaizen		EnergyJIT, Air･Steam-less,PEF dsb	13%	90	All Area (User & Facility)
	High Efficiency Machine		Mengganti dengan mesin yang lebih tinggi efisiensinya (Air-Conditioner, Compressor, Boiler, lighting)	6%	42	All Area (User & Facility)
	Tech Innovation	R&D	1/ N･DANTOTSU Line	10%	70	Focus at User Area
		Development	Concept of high efficiency energy machine after 2020	8%	56	
Diversity Energi	High Efficiency CGS		Implement at high basic energy to ensure very high performance	15%	105	Facility
	Renewable Energi		Solar (PV), Windmill, etc	4%	28	Facility

CGS use low carbon energy to produce electricity at the same rate as BAU

B. Project Structural : JCM Carbon Reduction Project

Utilize JCM subsidy to make the project become favorable.



3.2 CGS Overview

Was

Electric company

Electric Supply

Electric Chiller

3 x 300 RT

Ventilated Supply

Factory

Now

CGS is the power plant that generate electricity and useful heat (and cooling) at the same time

Natural gas company

~ 10 Bar

Meter Gas Station

4 – 6 Bar

Gas engine 2.0 MW

Exhaust air 384 °C

Silencer

Hot water

Exchanger

Sample valve

Stack

Hot Water Boiler

Hot water 1,848 kW

ABS (Absorption) chiller

385.5 RT

Chiller	Before	After	Status
Electric #1	ON	ON	-
Electric #2	ON	Standby OFF	Saving
Electric #3	Standby OFF	Standby OFF	-
ABS	-	ON	-

Existing Electric Chiller

300.0 RT 300.0 RT 300.0 RT

Sync at 11 kV

Step up/down 11kV-> 20kV

Ventilated Supply

Electric Supply

Factory

Electric company

Start Operation Sep 2019 and The Project supported by JCM

ESA Energy Saving Activity

3.3 CGS Monitoring Result

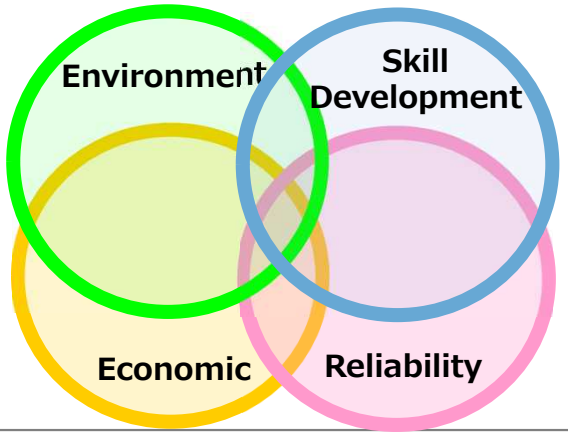
A. CGS Project Benefit Result

Carbon Reduction ▲34%

Reduce Carbon Emission volume by 780 ton-CO2 per month

Optimize heat recovery system to gain most benefit of CGS

Energy Cost ▲14%



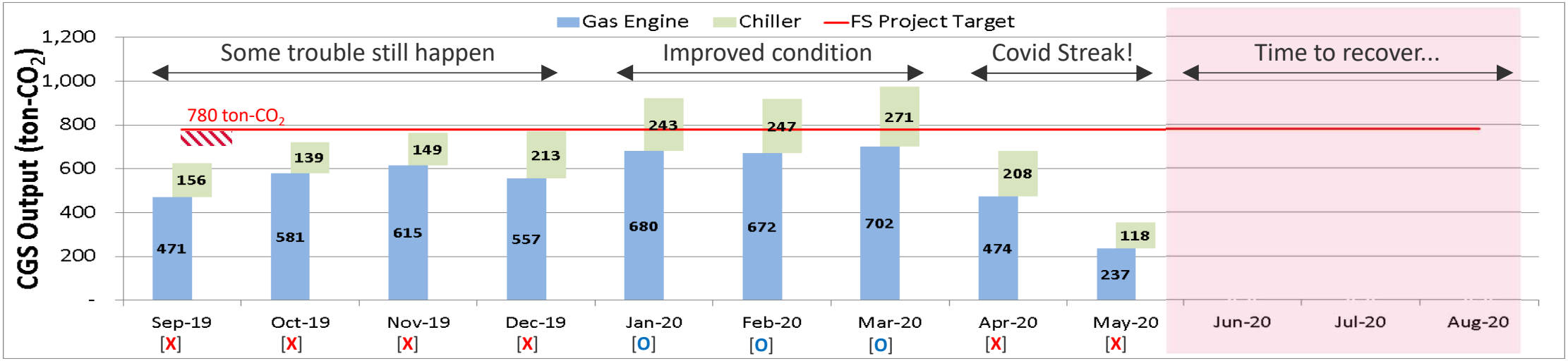
Skill Up +30%

Necessary skill to ensure self Operation & Maintenance

Increase self-suffiency power up by 2 Mega Watt

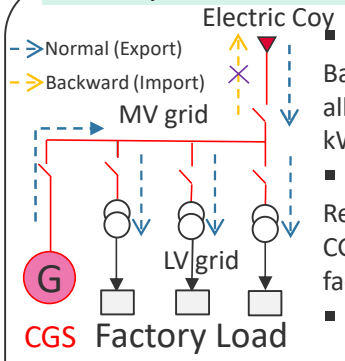
Self-Power ▲57%

B. CGS Project Carbon Output Result

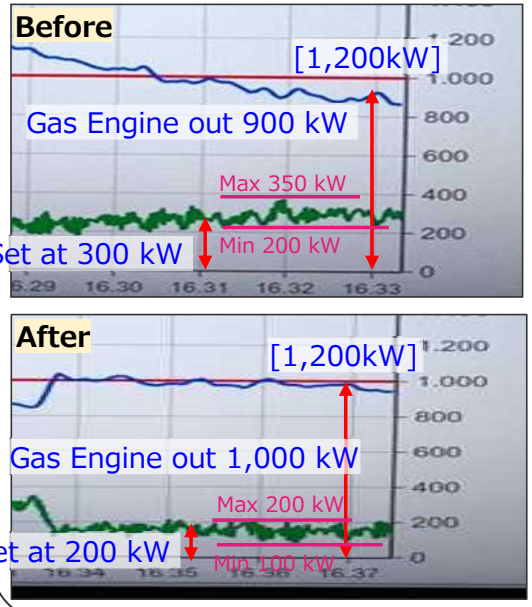


3.4 CGS Pandemic Counter Improvement

#1 : Gap Power Reduction



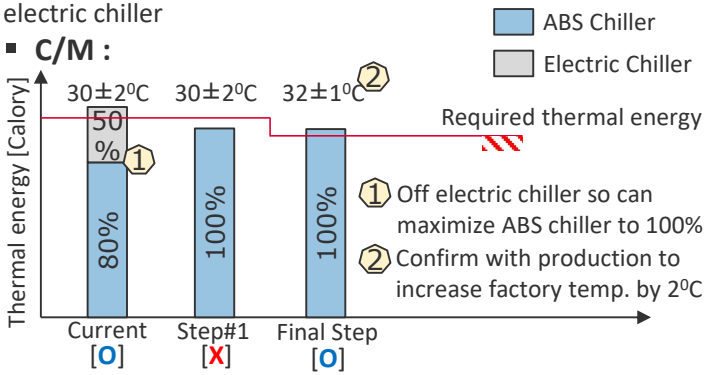
- **Background :**
  Backward power from CGS is not allowed by setting min supply 300 kW for electric coy.
- **Purpose :**
  Reduce min supply to increase CGS output during same low factory load
- **C/M :**

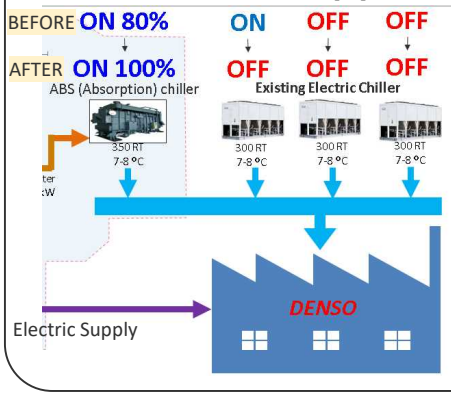


- **Impact**
  Increase CGS output 100 kW during low factory load (<2MW)
- **Carbon**
  Add. Carbon reduction 0.21 ton-CO_2/hour

#2 : Chiller Capacity Optimization

- **Background :**
  ABS Chiller performance is 80% & not able to improve since electric chiller operation can't be reduce (non-inverter type)
- **Purpose :**
  Maximize chiller supply rate to 100% & switch off the electric chiller
- **C/M :**

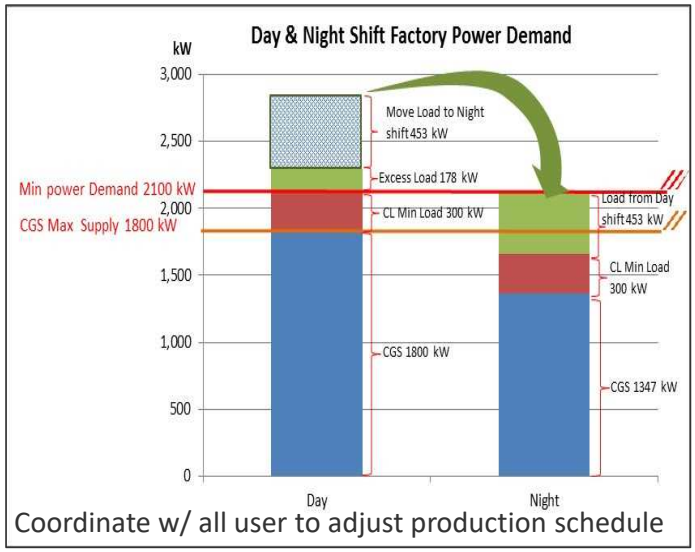




- **Impact**
  OFF total electric chiller by utilizing ABS chiller
- **Carbon**
  Add. Carbon reduction 0.27 ton-CO_2/hour

#3 : Production Load Switch Balance

- **Background :**
  Pandemic issue lead to extremely low sales. DNIA case, production load is lower than 2MW especially in night shift
- **Purpose :**
  Balancing production load between day shift and night shift to get optimal CGS output
- **C/M :**

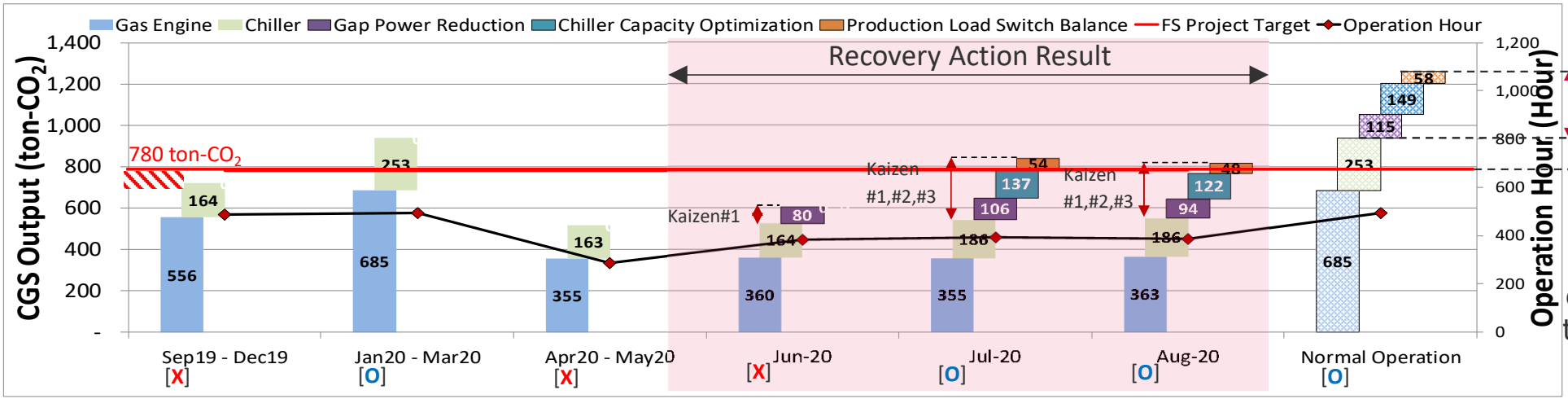


Coordinate w/ all user to adjust production schedule

- **Impact**
  Output CGS at night shift improve 75% → 100%
- **Carbon**
  Add. Carbon reduction 0.11 ton-CO_2/hour

3.5 CGS Result & Pandemic Issue Counter Activity

A. CGS Project Benefit Result After Kaizen

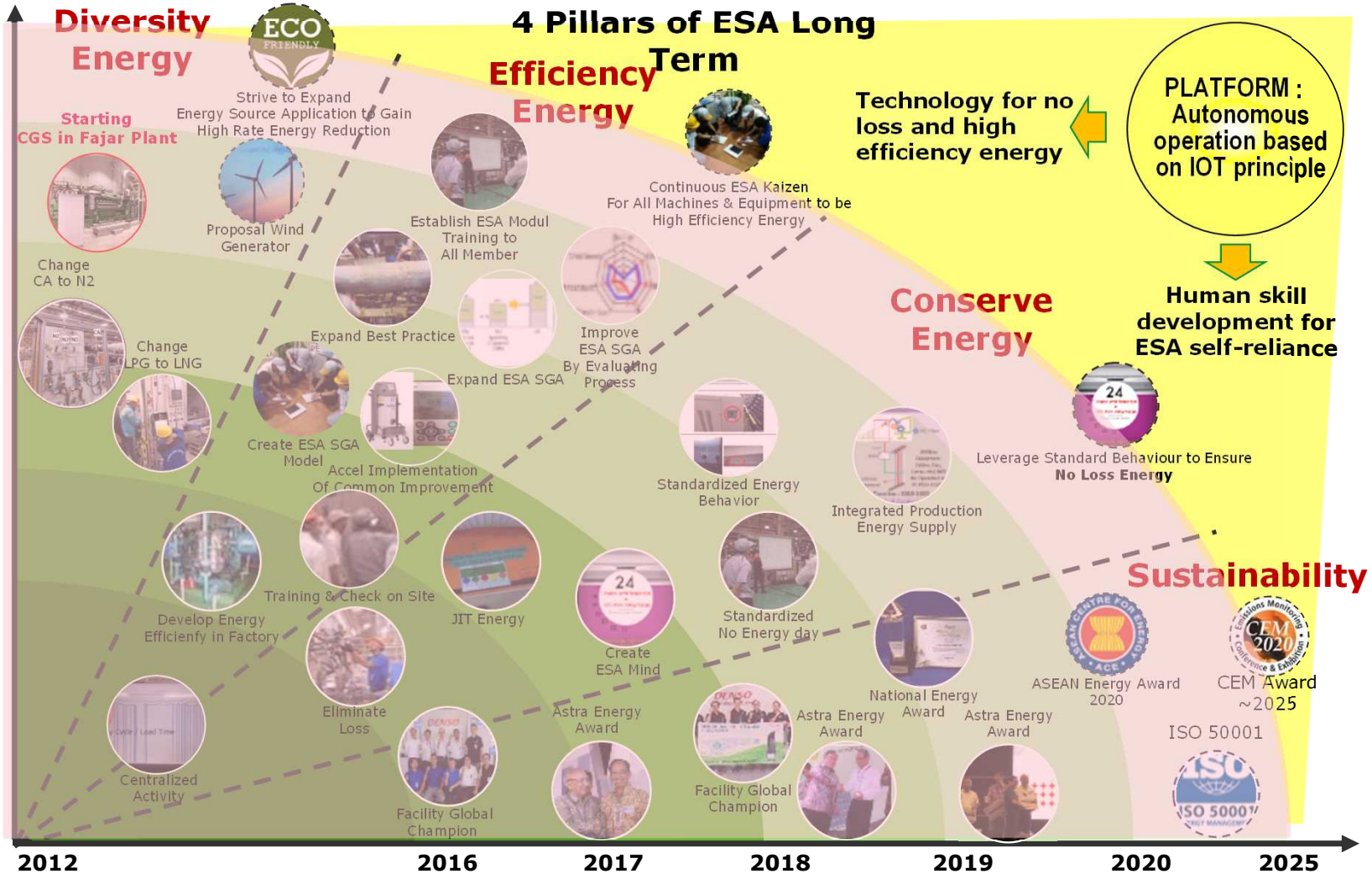


B. KPI of EnPI [Energy Performance Index] : Carbon Basic Unit = Carbon emission / Revenue

Normal Target : Annual ▲5% Carbon Unit Reduction

Even exceeding the current target, DNIA will still commit to reduce %5 annually to provision the future

4. Next Action : Future ESA Development



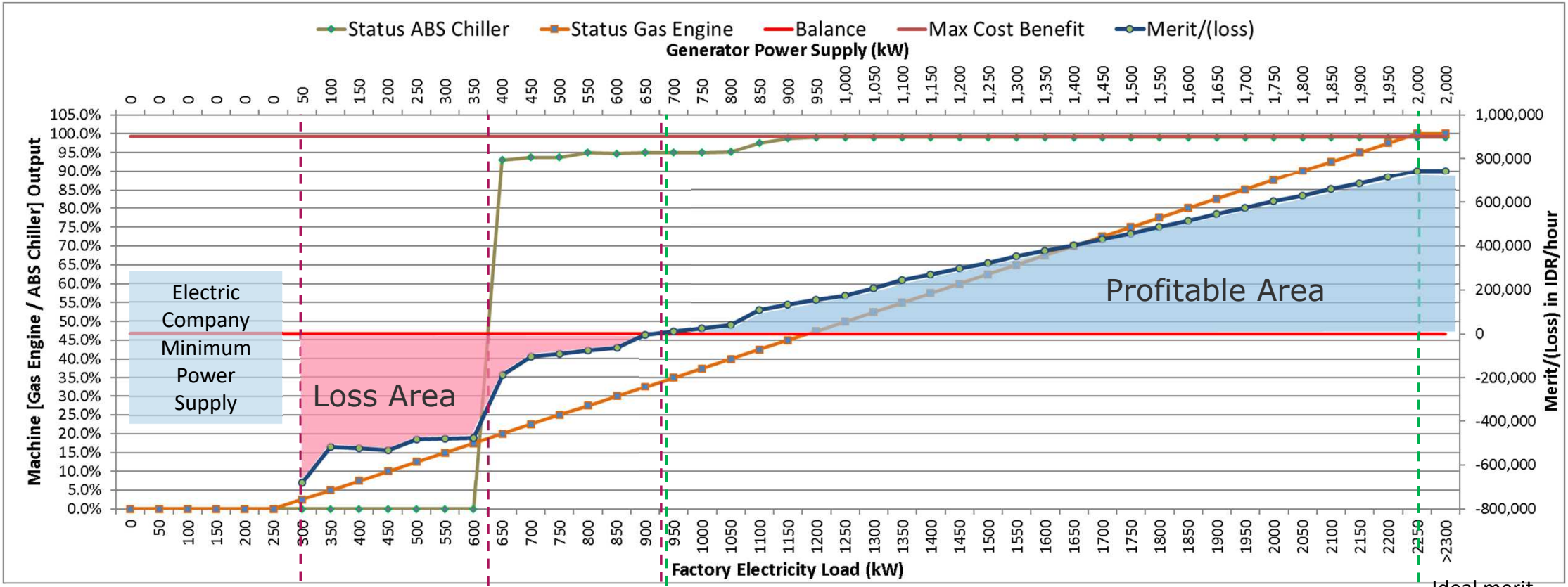
Implementing ESA Not Only Contribute to Sustain Company Life, But Also Sustain The Clean & Green Environment Where We Live

THANK YOU

DENSO

Crafting the Core

CGS Operation



CGS will start after factory load > 300 kW

ABS Chiller ON for min CGS operation at 400 kW

Generator minimum operation at 700 kW for total balance cost

Working area of CGS Operation at 700 kW – 2000 kW

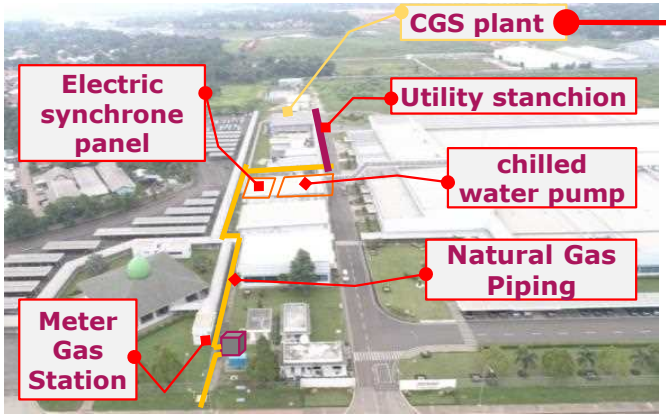
Ideal merit CGS operation at factory load > 2300kW

Minimum merit CGS operation at 700 kW

ESA Energy Saving Activity

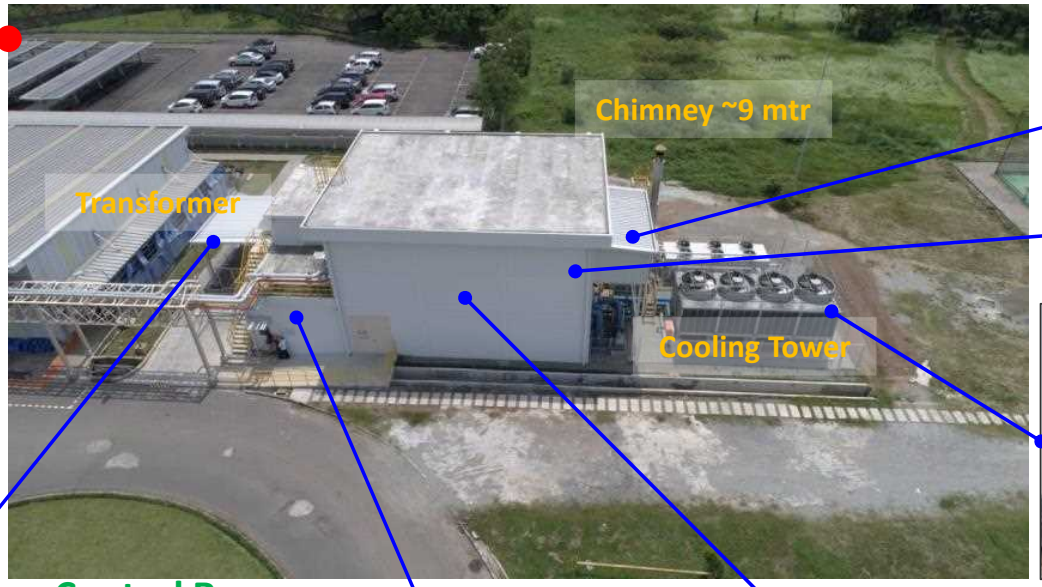
CGS Documentation

➢ Project Layout



Transformer

➢ CGS Plant Image



Heat Exchanger Boiler

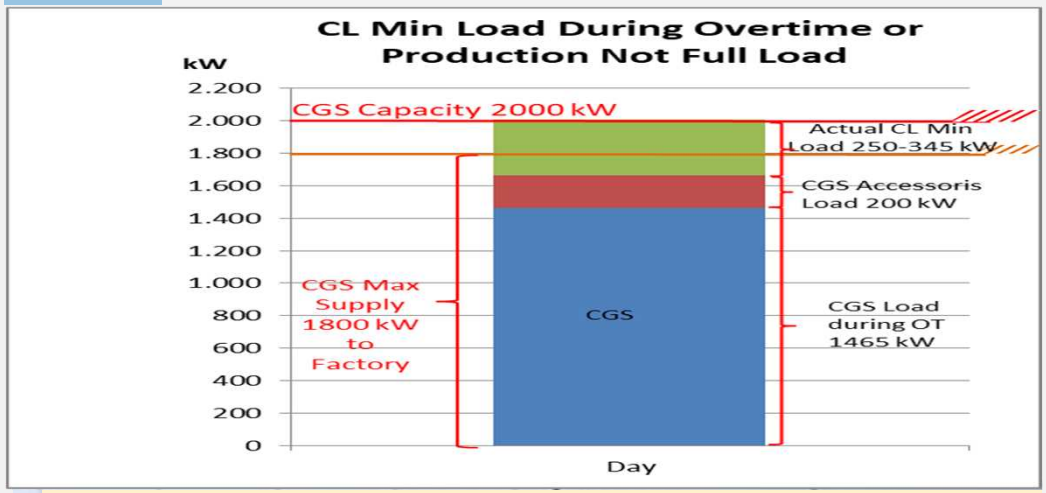
Cooling Tower + Radiator

Control Room

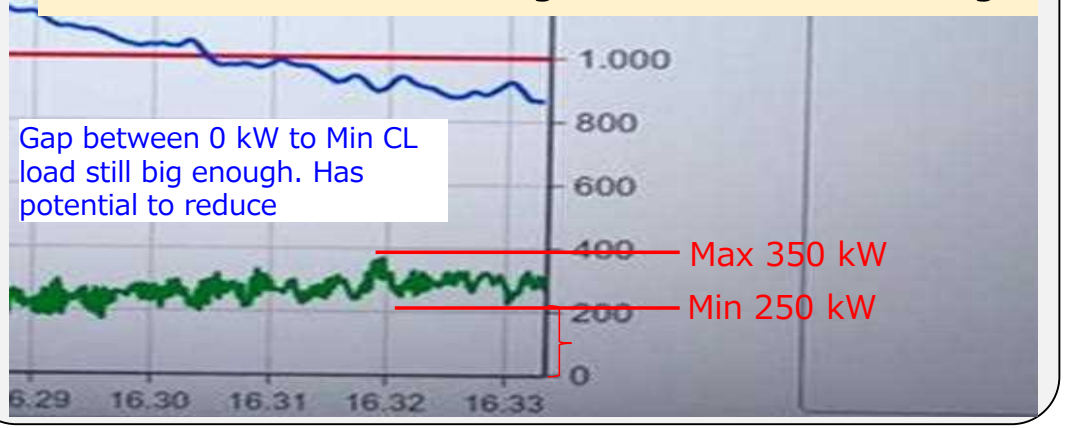
Gas Engine (+Chiller) Room

3.4.1 CGS Kaizen #1 : Optimizing Minimum Power Load

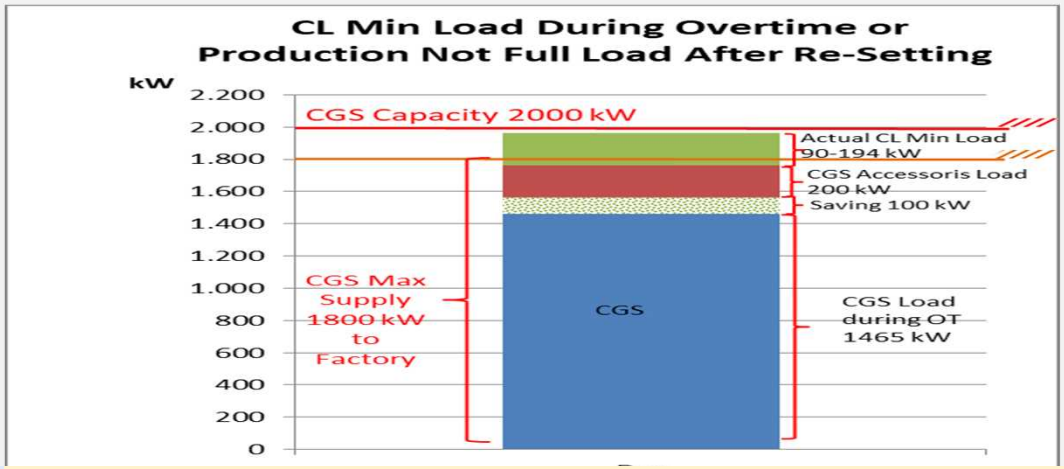
Current



CL Power trend load during overtime before reseting



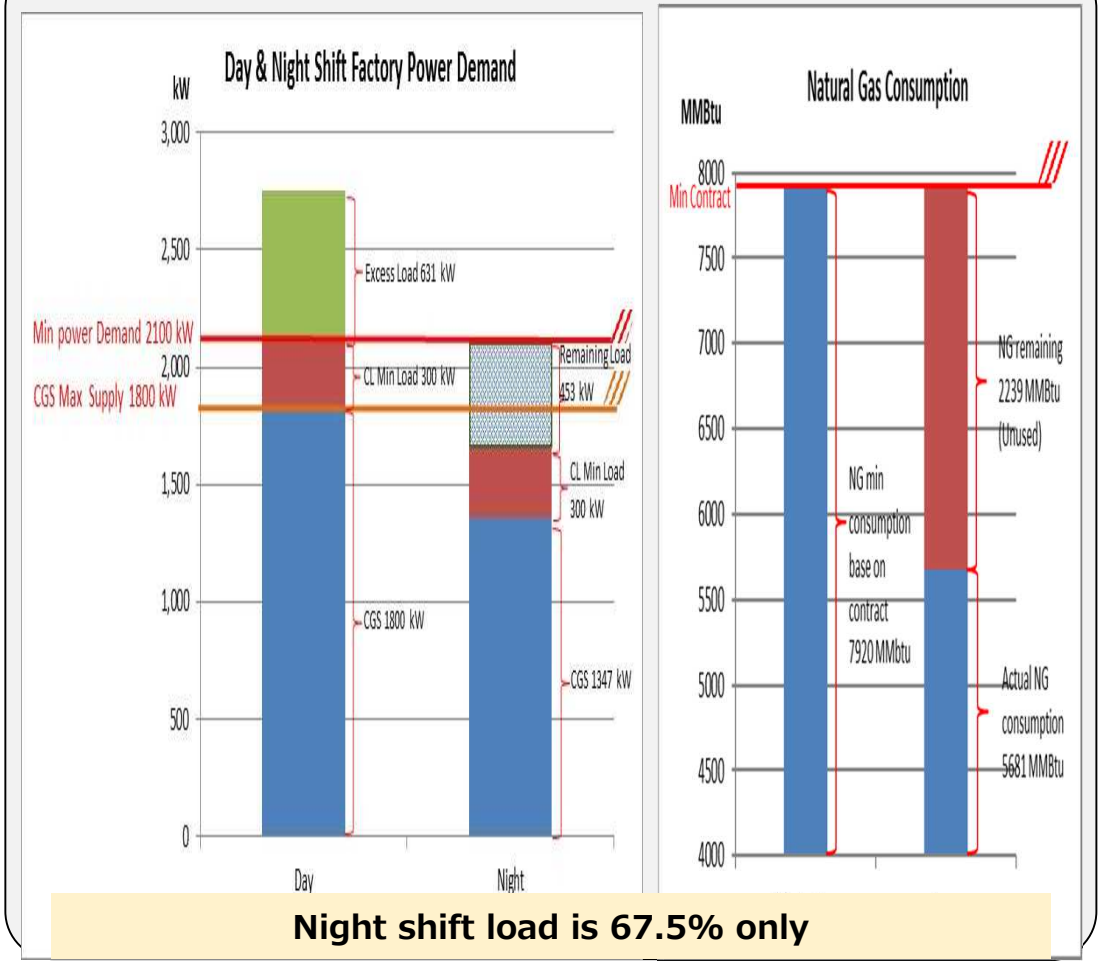
Improvement



CL Power trend load during overtime after re-setting

3.4.2 CGS Kaizen #2 : Balancing Production Load

Current



Night shift load is 67.5% only

Improvement

Night shift load become 100.0%.