

Reference: APT-ER-24AS-0046

CO2 Reduction Solutions for Factory

IHI

26 September 2024

IHI ASIA PACIFIC (Thailand) Co., Ltd.
Asia Solution Center Department

STEP 1 Situation Understanding

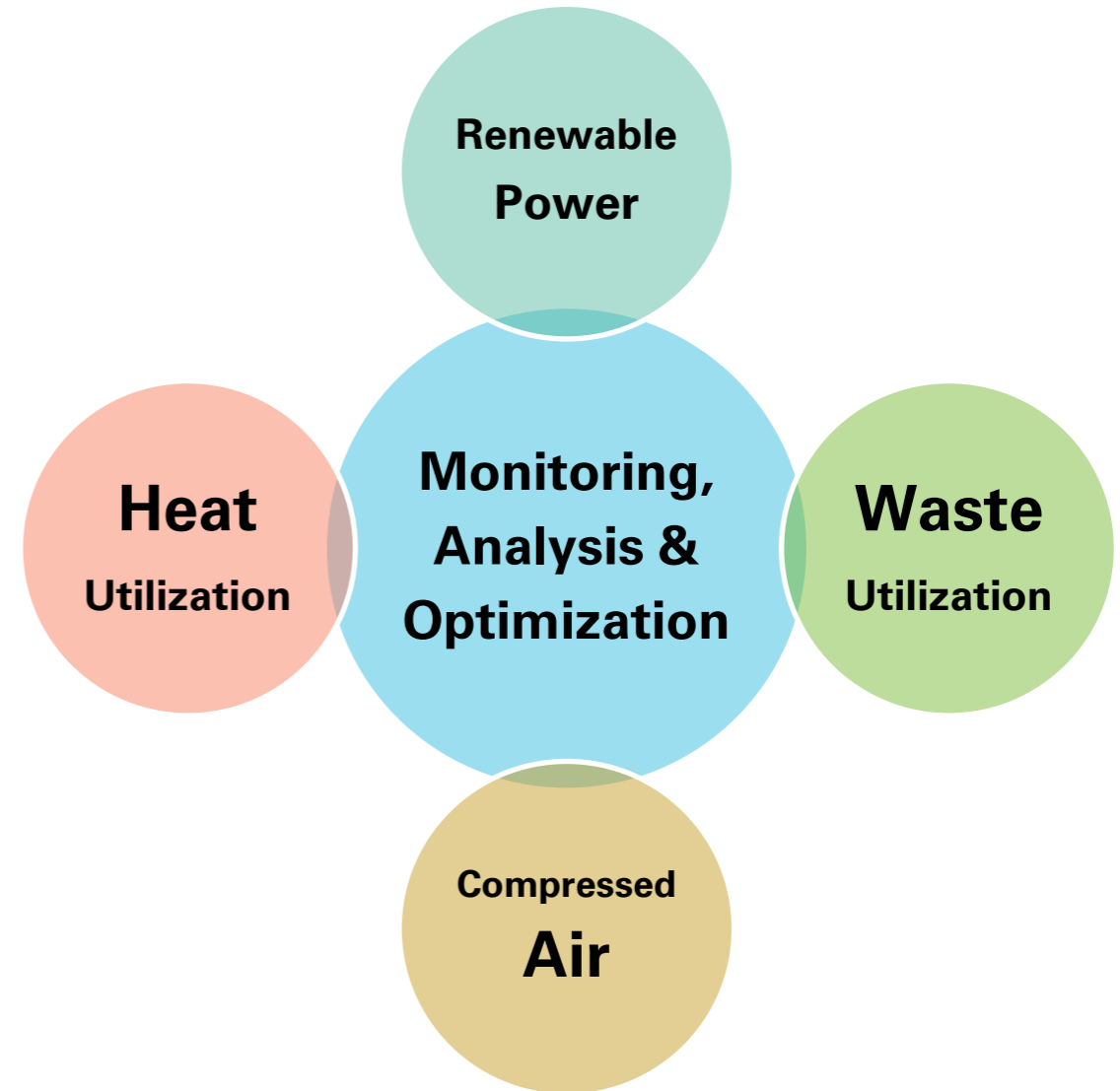
0. Energy Audit for the Entire Factory
1. Air Audit around the Air Compressor
2. Heat Audit around the Packaged Boiler
3. Monitoring System for Compressor and Boiler
4. Electricity Visualization for the Entire Factory

STEP 2 CO₂ Reduction Proposals

0. Energy Saving Menu for the Entire factory
1. Compressed Air Solutions
2. Boiler & Heat Solutions
3. Waste Utilization Solutions

STEP 3 Profit Return

0. Environmental Value Management Platform



STEP 1 Situation Understanding _ Air Audit around the Air Compressor

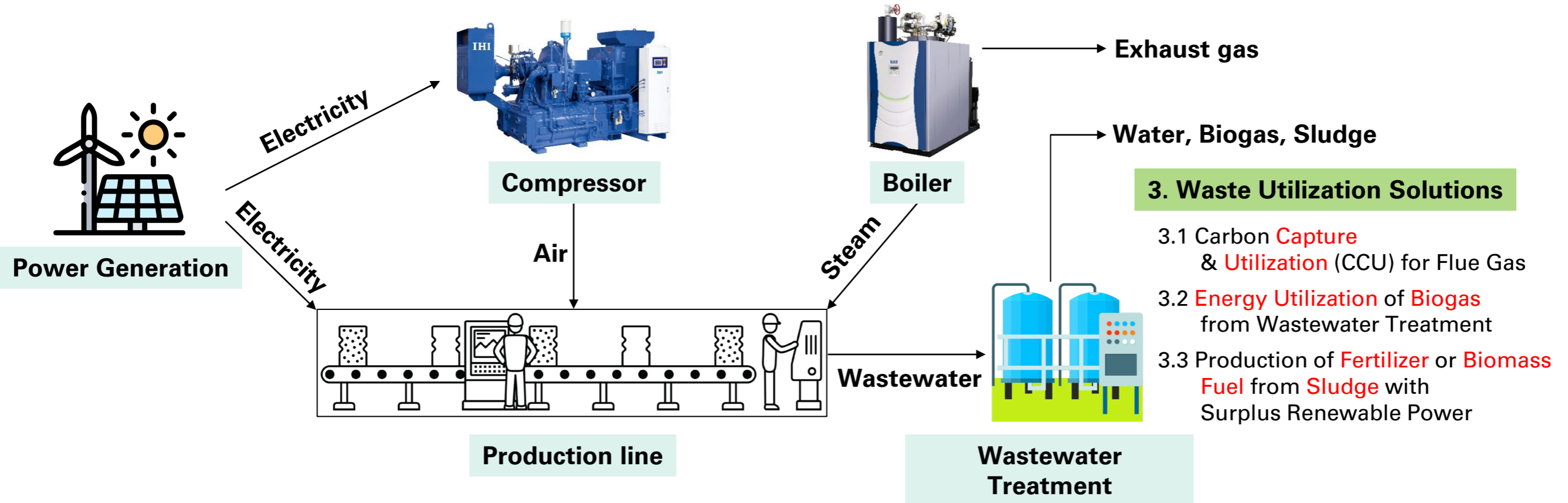
	Audit Menu 1	Audit Menu 2	Audit Menu 3	Audit Menu 4	Audit Menu 5*
Name	Simple Proposal	Air Leak Check	Optimizing Compressor Operation (with customer data)	Optimizing Compressor Operation (with measurement data)	Audit for All Equipment
Overview	<ul style="list-style-type: none"> A simple audit without data measurement or analysis. IHI collect the info such as existing compressor and make a replacement proposal. 	<ul style="list-style-type: none"> IHI conducts the air leak check from piping by using Air Leak Detector IHI organizes air leak points and make a brief report. 	<ul style="list-style-type: none"> Analyzing customer's hourly data of compressor power consumption. Based on actual operating conditions. 	<ul style="list-style-type: none"> IHI conducts measurement and data analysis by using logger. Based on actual operating conditions. 	<p>A total equipment audit that aims to improve not only the compressor area (compressor performance, control, operating status, etc.), but also the ancillary equipment (piping, equipment, environment, etc.).</p>
Recommended points	<ul style="list-style-type: none"> Recommended for initial planning 	<ul style="list-style-type: none"> Checking and repairing leak points is significant role in energy saving in factory. 	<ul style="list-style-type: none"> Eliminate the hassle and time of measuring data. Make optimal proposals throughout the year, including busy and mid-season periods. 	<ul style="list-style-type: none"> Accurate proposals can be made based on actual operating conditions. IHI can make trend graph so that customer can understand the load status of each compressor. 	<ul style="list-style-type: none"> Effective when supply conditions such as air amount and pressure have changed significantly. You can expect an additional energy saving effect, by checking all the equipment as a whole system.
Proposal lead time	About 1 week after the first meeting	About 2~3 weeks after obtain measurement data	About 2~3 weeks after data acquisition	About 2~3 weeks after obtain measurement data	Case by case (up to 1 month)

1. Compressed Air Solutions

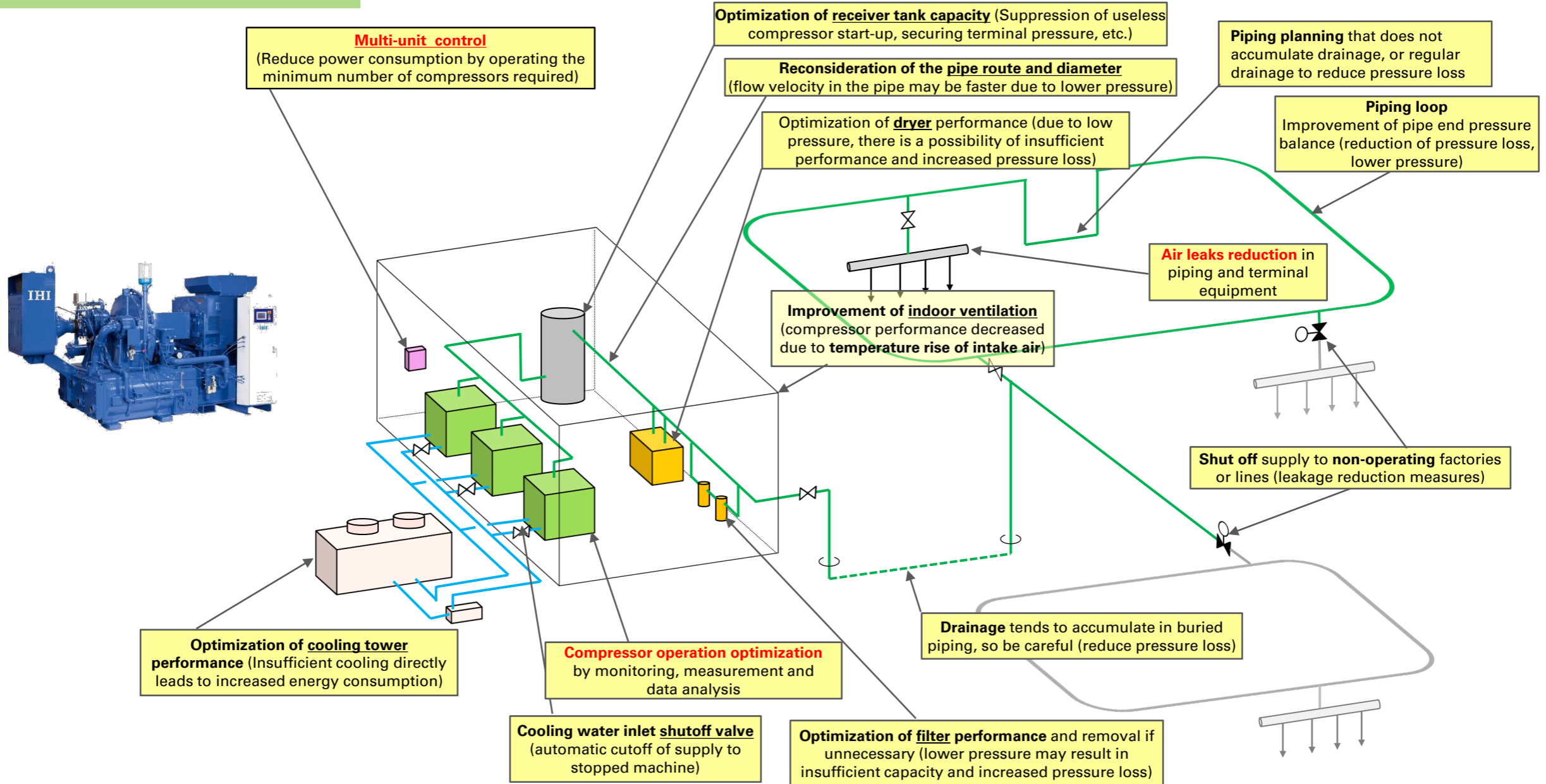
- 1.1 Energy Saving Menu for Compressor
- 1.2 Compressed Air Leak Reduction
- 1.3 High Efficiency Turbo Compressors
- 1.4 Multi-unit Control for Compressors
- 1.5 Steam Turbine Assisted Compressor

2. Boiler & Heat Solutions

- 2.1 Waste Heat Recovery
- 2.2 Thermal Energy Storage (TES)
- 2.3 High Efficiency Packaged Boiler
- 2.4 Multi-unit Control for IHI Boilers
- 2.5 Hydrogen Co-firing Boiler



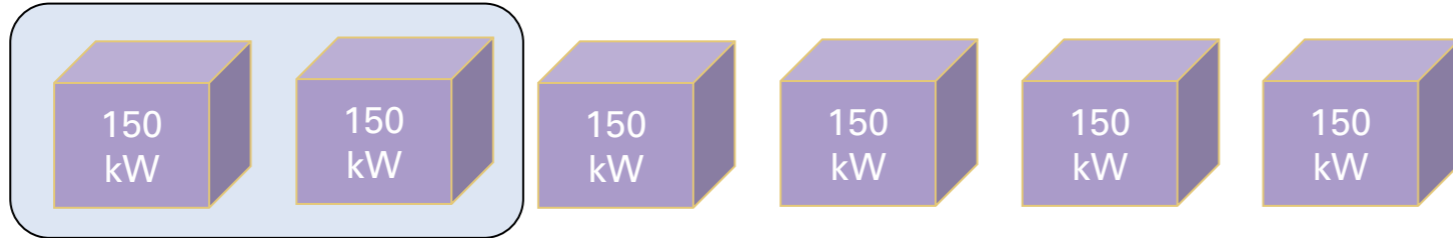
Compressed Air Solutions



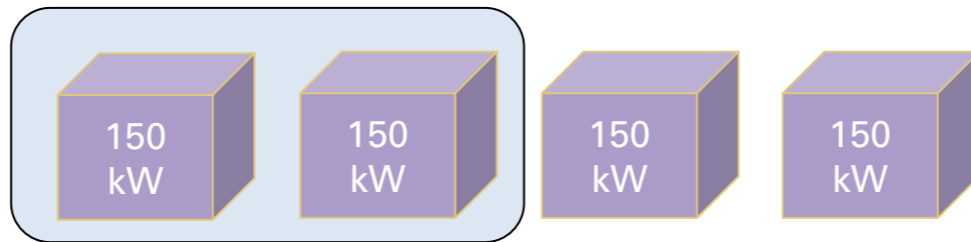
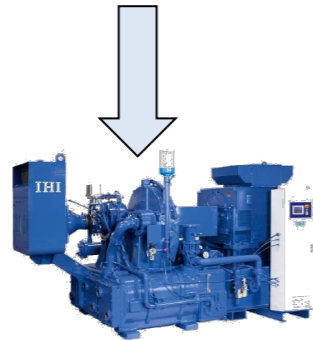
Compressed Air Solutions

Example of the benefits of aggregation by using **IHI Turbo Compressor**

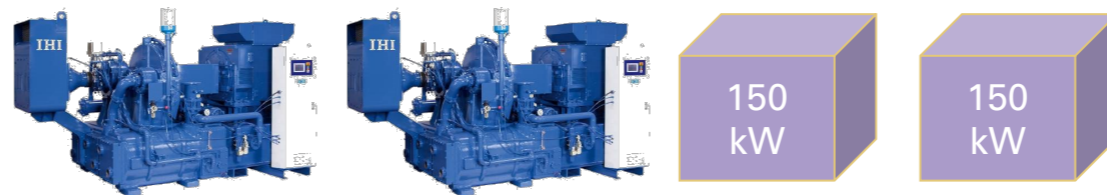
Base case: 6 screw compressors (150 kW)



Replace 2 screw compressors with 1 turbo compressor (300 kW).
-> ***Save energy by about 8%**



Replace 4 screw compressors with 2 turbo compressors (300 kW).
-> ***Save energy by about 16%**



*The energy reduction rate differs depending on the installation and operating conditions.

Boiler & Heat Solutions

Waste heat temperature ranges

High Temperature
(>400°C)

Medium Temperature
(100~400°C)

Low Temperature
(room temp. ~100°C)

Sub-zero Temperature
(<0°C)

Waste heat recovery technologies

Waste Heat Boiler

Heat exchanger
(Economizer)

Heat exchanger
(Air Preheater)

Heat exchanger +
Thermal Energy
Storage

Heat Pump

Organic Rankine
Cycle

Absorption
Refrigeration

End use for Waste heat

Heating the liquids
(boiler feed water,
washing tank water)

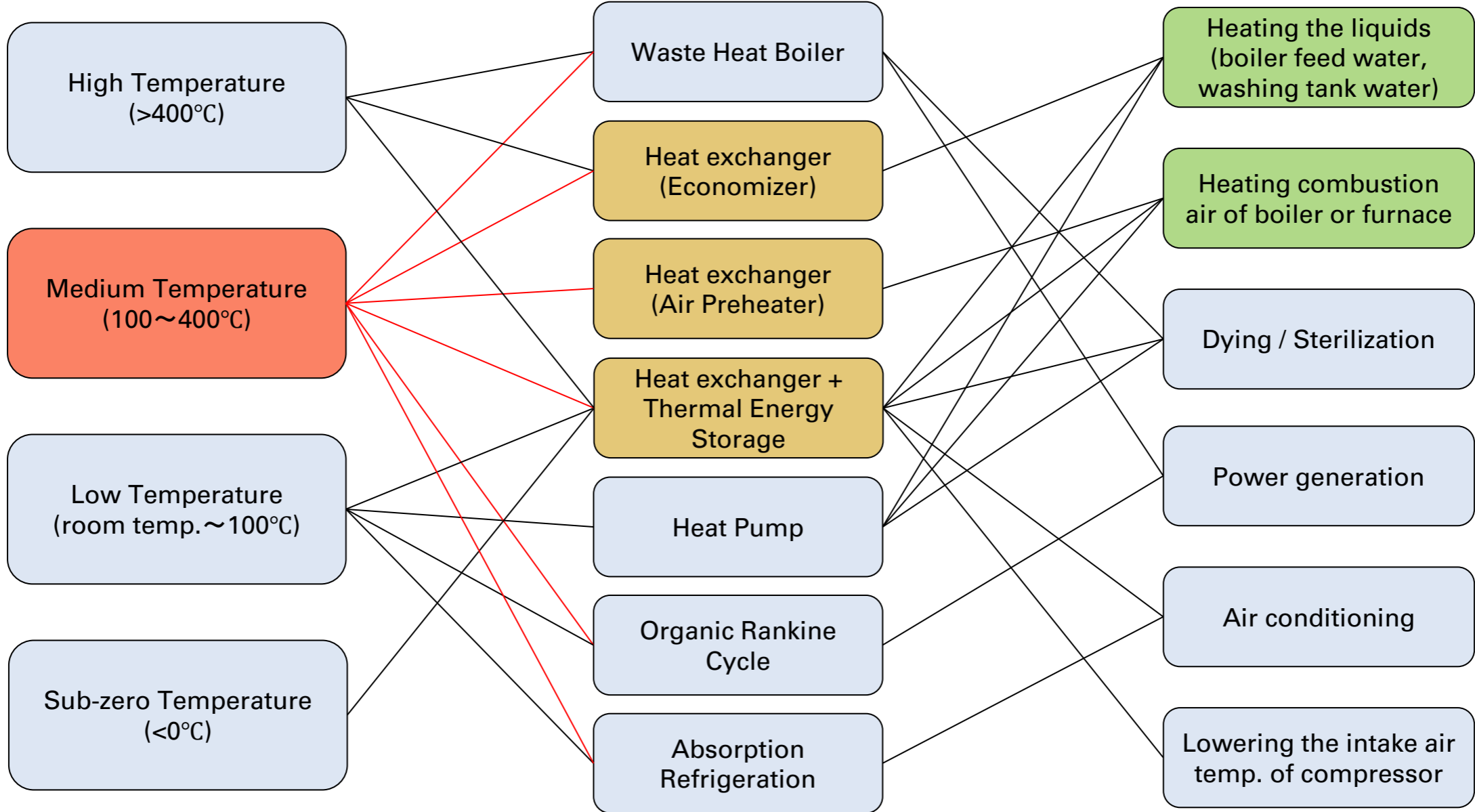
Heating combustion
air of boiler or furnace

Dying / Sterilization

Power generation

Air conditioning

Lowering the intake air
temp. of compressor



IHI

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