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CHANG HWA

CHANG HWA

(주) 창화 에너지

CONTENTS

GREETING

The technology of CHANGHWA ENERGY is developed with utmost effort to create eco–friendly technology for the times of low–carbon era.
Our accumulated technology has been a source of new leaps and we have achieved higher customer satisfaction than ever before. As a result of excellent technology development and research, we have developed and manufactured eco–friendly multi–tube boiler and constructed the production system.
Based on this technology, we will be able to manufacture high–efficiency, high–quality products at low cost to provide a rich life for many people, and continue with research and develop technologies to contribute to the national energy and environment strategies.

All employees

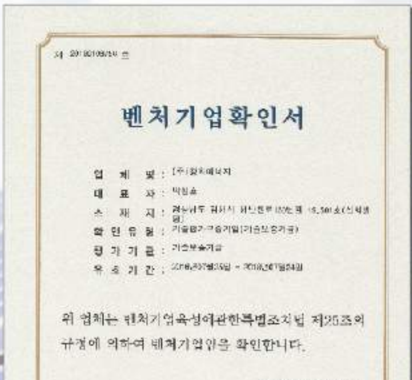
Quality Management System & Certificate of Venture


CERTIFICATE OF REGISTRATION

(주)창화에너지

KS Q ISO 9001:2009 / ISO 9001:2008

크레비즈인증원


벤처기업확인서

위 업체는 벤처기업육성에관한특별조치법 제25조의 규정에 의하여 벤처기업임을 확인합니다.

2016 년 07 월 25 일

KIBO 기술보증기금 이사장

Company History

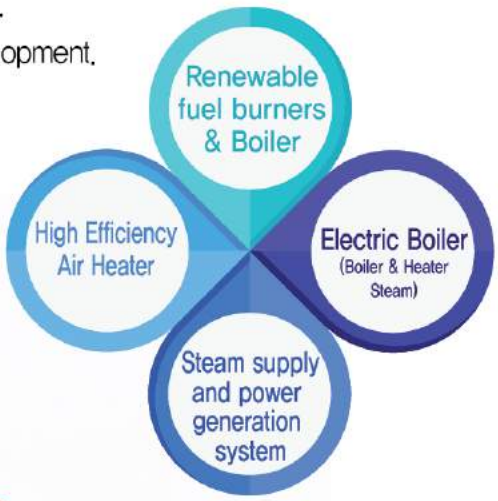
1975.05	EHWA BLOWER Establishment (Environmental Equipment And Blower)
1985.04	EHWA INDUSTRY MACHINE Name Change (Environmental Equipment And Blower, Boiler Production)
1995.06 / 2000.02	EHWA INDUSTRY MACHINE (Environmental Equipment, Power Sector Production) Complex Multi-Tube Boiler / Renewable fuel burners developmen
2006.05	SEENTEC CO.,LTD. (Power Plant, Boiler Sector Convention)
2010.01	Renewable Fuel Combustion System Renewable Fuel Air Heater Multi-tube electric boiler(Hot water ,Air, Steam) development
2015.06	CHANGHWA ENERGY CO.,LTD. Establishment

Business Areas

■ The planning and the production.

- Total engineering service based by special engineering.
- New techniques of a sustainable research and development.
- Infra-construction through specialists.

Complex Multi-Tube Boiler

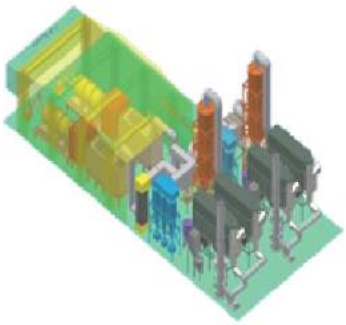


CHANGHWA ENERGY Co., LTD

Company owned technology

▶Industrial boiler

▶Rotary Kiln(Storker) Burner / Incinerator Boiler



▶Removable Efficiency Heater

▶High-Efficiency Heat System

▶Electric Boiler

▶Electric Heater

▶Complex Multi-Tube Electric Heating Medium Boiler

▶Industrial Wood Pellet Multi-Tube Boiler

Patent (PCT) – 13 patents, PCT 3EA, Trademarks 3EA




















Patent-pending

10-2017-0021688 (Heat exchange structure of heater) etc, 4ea In progress

Complex Multi-Tube Boiler

Division		Small Size Double Tube Boiler			Industrial Double Tube Boiler			
		0.5 ton/hr	1 ton/hr	3 ton/hr	5 ton/hr	10 ton/hr	15 ton/hr	20 ton/hr
Operating Pressure kg/㎠		General Specification : 1~10kg/㎠ (Special Specification 20~40kg/㎠)						
Evaporation kg/hr		500	1,000	3,000	5,000	10,000	15,000	20,000
Efficiency %		Over 93%						
Fossil Fuel (1,000℃) Heating Area ㎡		36	72	215	359	720	1,080	1,440
SRF RPF Fuel (850℃) Heating Area ㎡		41	81	243	405	810	1,213	1,620
Dimension (mm)	Width(W)	1,550	2,000	2,600	2,800	3,500	4,000	4,200
	Length(L)	2,500	3,500	4,500	5,000	9,500	11,000	12,500
	Height(H)	2,200	2,800	3,000	3,500	6,000	6,500	7,000

※The above specification can be changed according to improvement of performance and site condition.
※Efficiency and calorie may vary depending on measurement error and field conditions.

▶Small Size Double Tube Boiler

▶Industrial Double Tube Boiler

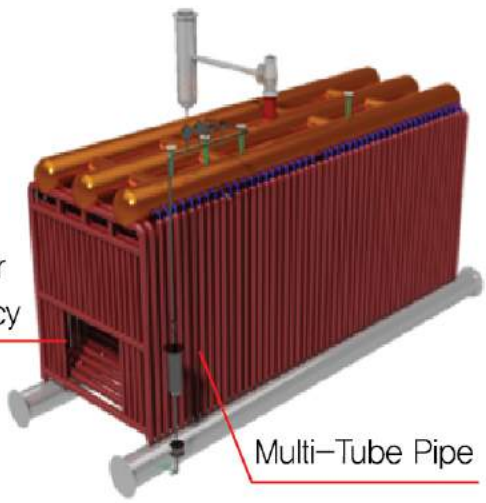
▶Industrial Wood Pellet Double Tube Boiler

■Structure & Featur

- Quick Steam : Within 5 minutes of ignition dry steam generated 98%
- Heating Surface Area Greater than 20%
- Boiler Combustion Chamber : Rectangle(Tunnel Structure)
- Suitable for renewable fuel burner
- The world's first front sides 5 pass combustion boiler
- Shape : Small High-Efficiency Boiler

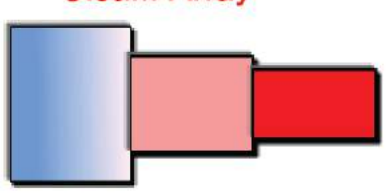
Complex Multi-Tube Boiler

▶Structure



Steam Drum

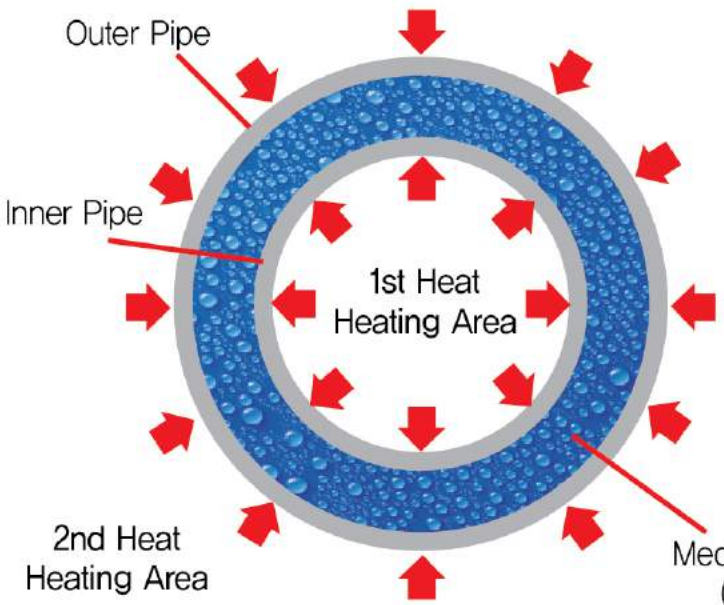
Steam Array



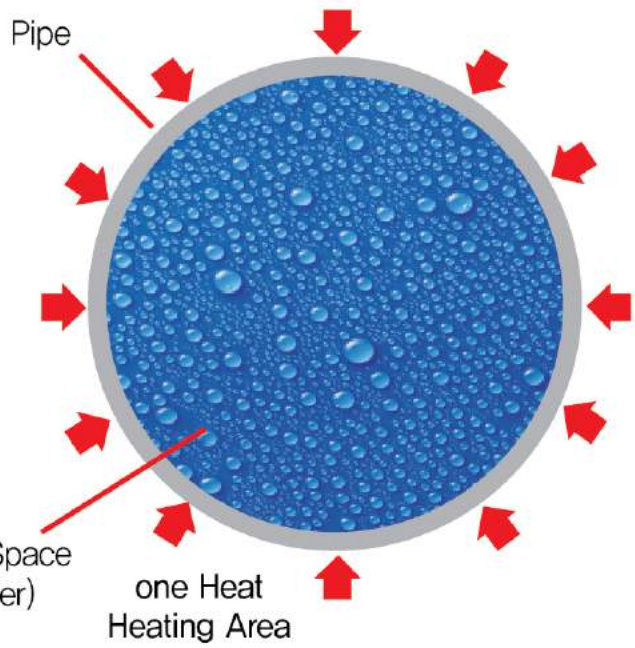
Suitable for Multi-Tube Method
high-temperature, high-pressure

Excellent Electric Power Generation and High Pressure

▶Double Tube Boiler Structure



▶General Water Pipe Boiler Structure

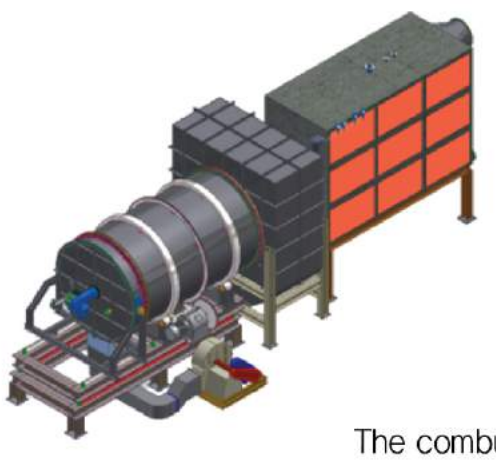


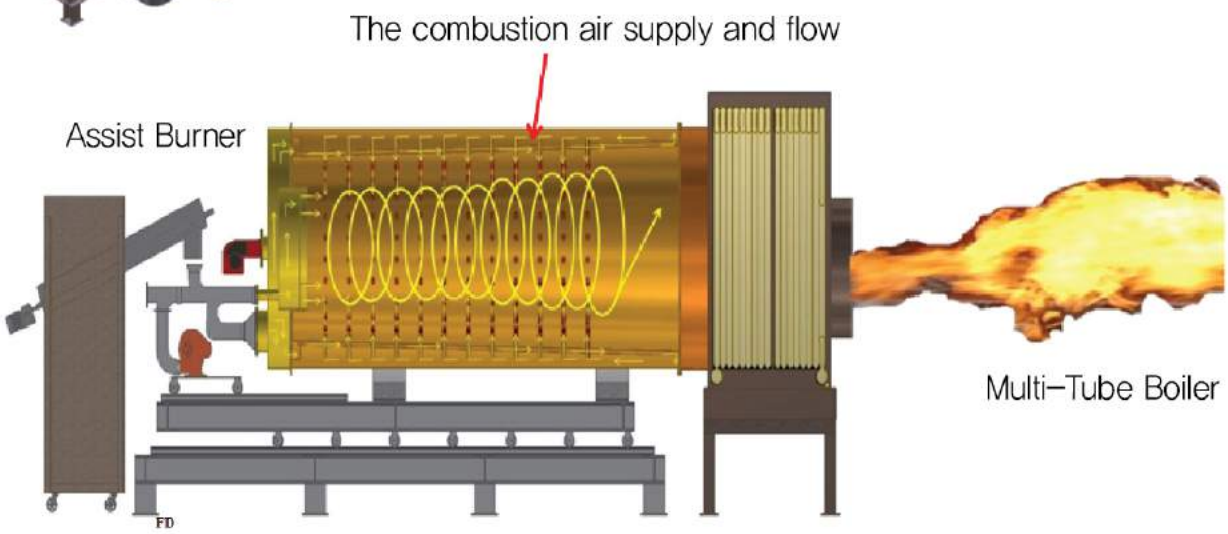
Renewable fuel burners only

▶Renewable Fuel Burner Only – Rotary Burner

Division	Unit	Performance (Standard)			Remark
		10ton/h Standard	15ton/h Standard	20ton/h Standard	
Volume	Kcal	6,000,000	9,000,000	12,000,000	
Fuel Consumption	kg/hr	About 1,000	About 1,500	About 2,000	7,000Kcal Standard
How To Put Fuel		Air System(Injection pipe : ∮200)	Air System(Injection pipe : ∮300)	Air System(Injection pipe : ∮350)	
Fuel Type	mm	Length : 50 / Diameter : 50	Length : 50 / Diameter : 50	Length : 50 / Diameter : 50	
Power Consumption	Kw	About 60	About 85	About 100	
Beginning Ignition System	Burner	150 Million kcal Burner	200 Million kcal Burner	250 Million kcal Burner	Assist Burner (LNG/Diesel)
Burner Installation Area	mm	L9000 X W3600 X H5000	L14000 X W3800 X H5400	L16000 X W4500 X H6000	

※The above specification can be changed according to improvement of performance and site condition.
※Efficiency and calorie may vary depending on measurement error and field conditions.
※Input can be changed according to calorific power of Fuel.



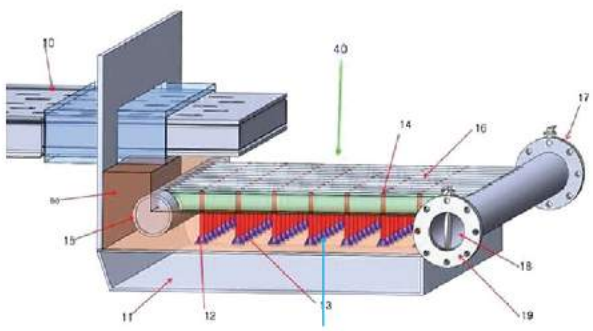


■Structure & Feature

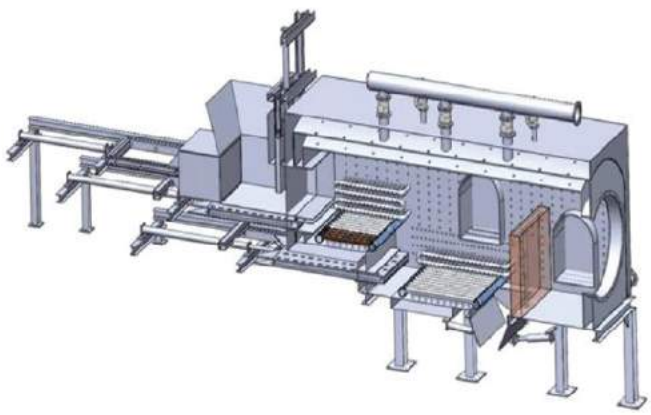
- Rotary kiln appearance is similar to the way but functionality, performance difference at all
- Facility size less than 50% facility fee reduction
- Heat energy can freely control

Renewable fuel burners only

▶Renewable Fuel Burner Only – Stoker Burner



Air Flotation Device

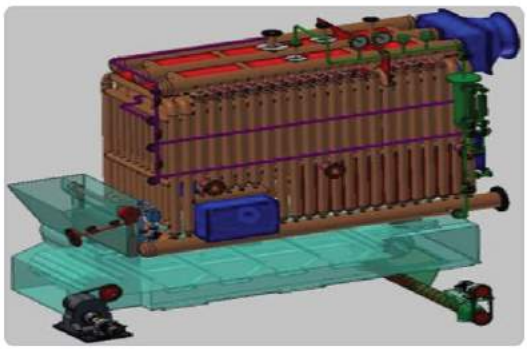


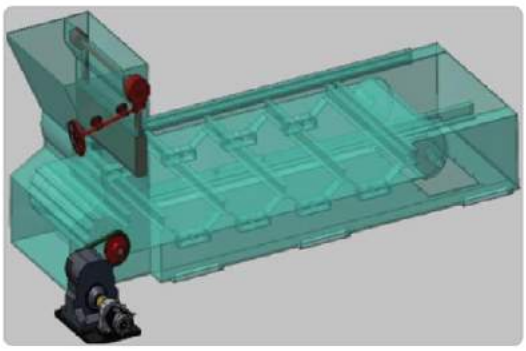
Fire Grate Way Burner

Used fuel : RPF, WOOD, Textile Waste, Synthetic Resins

■Key Feature
- Co-combustion of Various solid fuel just by one burner
- Clinker & Ash generated less
- Low maintenance cost & Excellent durability

▶Renewable Fuel Burner Only – Coal(Pellet) Feeder





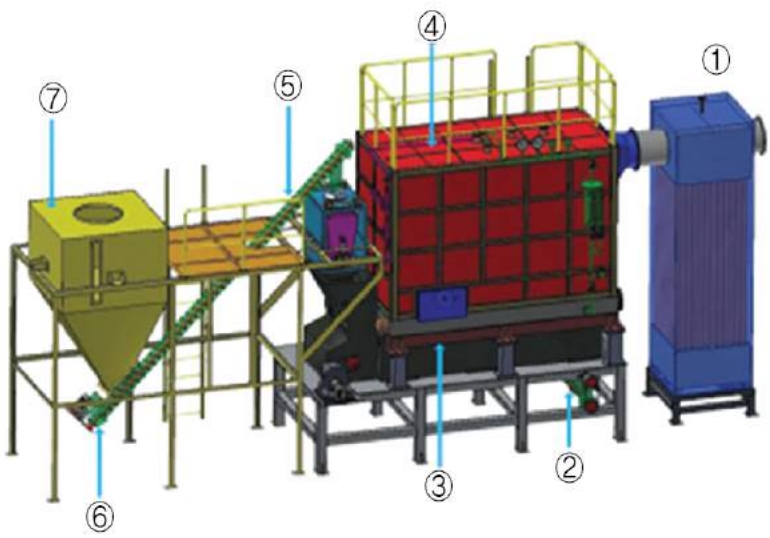
Coal(Pellet) Feeder(Chain Stoker)

■Key Feature
- Matching complete combustion condition
- Combustion gas residence time is long
- Pellet constant supply
- Automatic screw ash handling equipment
- Sludge debris and ash removal excellence

Division	Unit	Performance (Standard)	Remark
		2ton/standard	
Volume	Kcal	1,200,000	
Effective Area	㎡	3.1	
Fuel Input		FEEDER System	Chain Stoker
Fuel Consumption	kg/hr	About 350	4,000kcal Standard
Fuel Type	mm	Wood Pellet, Wood Chip	(COAL)
Beginning Ignition System	Burner	15 Million kcal Burner	Assist Burner (LNG/Diesel)
Standard Burner	mm	4400 X 1500 X 1400	

※ The above specification can be changed according to improvement of performance and site condition.
※ Efficiency and calorie may vary depending on measurement error and field conditions.
※ Input can be changed according to calorific power of Fuel.

Industrial Wood Pellet Multi-Tube Boiler



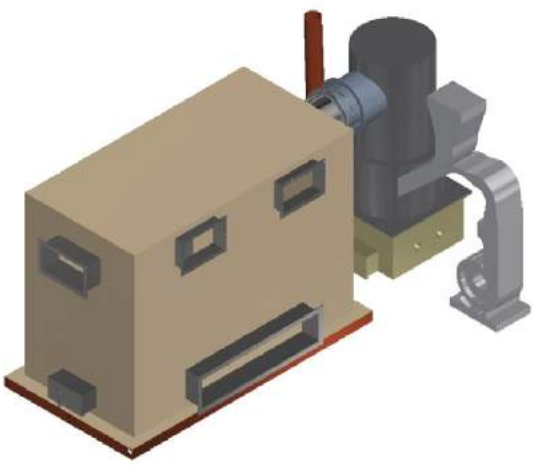
Wood Pellet Multi-Tube Boiler Configuration

① Air Preheater(Economizer)
② Ash Processing Equipment
③ Fuel(Pellet) Feed Unit
④ Double Tube Boiler
⑤ Fuel Supply Measuring Device(Load Cell)
⑥ Fuel Supply Device
⑦ Pellet Hooper

Industrial SRF Air Heater

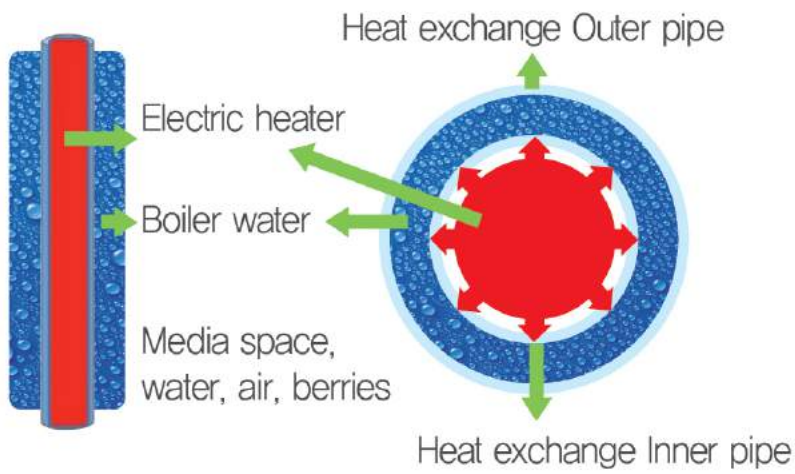
▶Industrial(Oil,Coal,Pellet) Air Heater

- High value-added Industry : Industrial (Farmhouse) Air Heater
- Stable heating energy supply
- Low Cost-high Effective energy savings
- Stable operation control
- Environmental-friendly Air Heater
- Convenient Repair & Simple usage



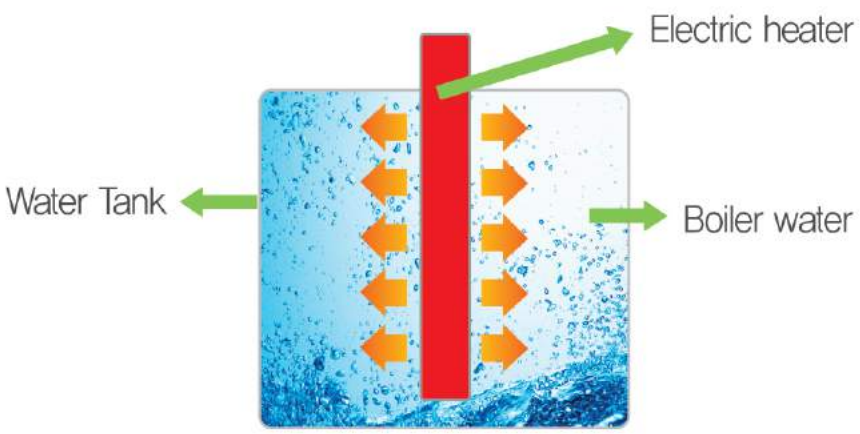
Electric boiler

▶Complex multi-tube electric boiler structure



■ Heat a large number of multi-tube structures using only utilize heat pipe indirect manner.
■ Rapidly heating the water to go through a multi-tube thin gap.

▶General Electric boilers structure



■ Many water bath within the electric heater insert a direct way.

▶Small electric boiler (Hot Water)

- Easy troubleshooting and simple operation with indirect heating method
- Free to use with small capacity
- Scales are not accumulated on the heater and boiler is made up of multiple heat change pipes only
- Short–To supply Heating (Hot water) at a short time
- To save energy with low cost and high efficiency
- Stable operational control without risk of short circuit
- Low tariff with 3kw solar boiler
- When hot water for heating is used as heating medium, approximately 15% of fuel can be saved free from risks of freeze and fire

Component	Complex multi-tube small electric boiler					
Heater Power consumption	3KW	4KW	5KW	6KW	7KW	8KW
Heater Calorific value (Kcal)	2,580	3,440	4,300	5,160	6,020	6,880
Heating area (㎡)	49.5	56.1	72.6	82.5	92.4	105.6
Power	220V				220V/380V	
Standard	580*320*600	620*320*620	650*380*640	660*450*660	660*450*680	660*450*680

▶적용분야

· 양평, 경기도 외 설치




· 기타 교회 외






· 기타 다수

Economic Analysis

Division		Usage				
		Our company	Other company A	Other company B	Kerosene boilers	LPG
Application			Heating		Heating criteria	Heating criteria
Capacity		6	15	12	150kcal / ㎡	150kcal / ㎡
Heating	Power Consumption/ Consumption	6KW	15KW	12KW		
	Calorific value	=6KW * 860	=15KW * 860	=12KW * 860	Kerosene net calorific value 8,350kcal	LPG net calorific value 9,800 kcal/N/㎡
		5,160 Kcal	12,900 Kcal	10,320 Kcal		
	Heating area	79.2㎡	80㎡	82㎡	79.2㎡	79.2㎡
	Heating 12 hours basis	=5,160 Kcal * 12hr	=12,900 Kcal * 12hr	=10,320 Kcal * 12hr	=150 Kcal * 79.2㎡ * 12hr	=150 Kcal * 79.2㎡ * 12hr
		61,920 Kcal	154,800 Kcal	123,840 Kcal	142,560 Kcal	142,560 Kcal
		=61,920 Kcal/860Kcal	=158,800 Kcal/860Kcal	=123,840 Kcal/860Kcal	=142,560 Kcal/8350Kcal	=142,560 Kcal/8350Kcal
		72 KW	180 KW	144 KW	17.1 ℓ	14.5 Nm³
	Capacity utilization rate of 70%(1 hour and 40 minutes running)	50 KW	126 KW	101 KW	12.0 ℓ	10.2 Nm³
1 day usage		50 KW	126 KW	101 KW	12.0 ℓ	10.2 Nm³
Unit price		110 won / KW	110 won / KW	110 won / KW	700 won / ℓ	576 won / Nm³
Spending days	Day	5,544 won	13,860 won	11,088 won	8,366 won	5,865 won
Monthly Price(30 days)	Month	166,320 won	415,800 won	332,640 won	250,974 won	175,960 won
Spending years	Year	1,995,840 won	4,989,600 won	3,991,680 won	3,011,687 won	2,111,517 won

※Domestic standard

▶Monthly Amount (30D)

1. Assumption: 22~24pyeng(72.6~79.2㎡) standard, 12 hours per 1day
2. Abiding by insulation regulations specified in Building Act regarding Heating Efficiency
3. For general Use (Accumulated tariff is applied to residential use)
4. Heating area can be varied according to external environmental factors such as installation status, region, insulation and structure of the building
5. When using for general residence, it is applied with progressive tax

Electric Boiler



Portable solar power small electric boiler

▶Small electric boiler (Steam)

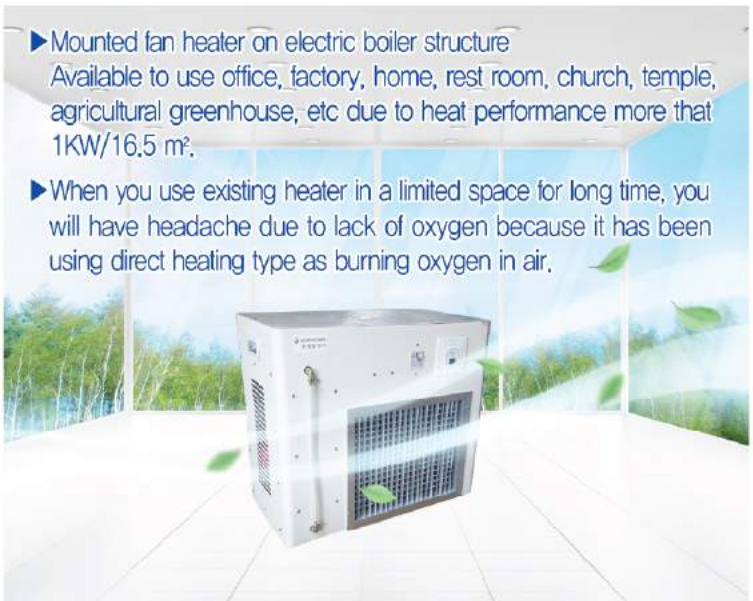
– 3KW electric Steam boiler

- Free to use with small capacity
- Scales are not accumulated on the heater and boiler is made up of multiple heat change pipes only
- To take short time to make steam. 98% of dry steam is made after 4 to 5 minutes from ignition
- To save energy with low cost and high efficiency
- Stable operational control without risk of short circuit
- High temperature and high pressure can be used
- Easy troubleshooting and simple operation with indirect heating method

Component	Complex multi-tube small electric boiler					
Heater Power consumption	3KW	5KW	8KW	12KW	15KW	20KW
Heater Calorific value (Kcal)	2,580	4,300	6,880	10,320	12,900	17,200
Rated evaporation (kh/hr)	5	7.5	12	18	22.5	30
Power	220/380V					
Standard	320* 500*500	320* 500*500	350* 600*600	350* 600*600	400* 650*700	400* 650*700

Electric Heater

Electric hot air fan with multi-tubular boile



■New concept of heater using indirect heating type using multi tube of Thermal Mediator boiler.
■Simply operation and management system with automatic room temperature controller.
■Unique energy saving system and totally different heater structure unlike general heater.
■Available over 70℃ indirect temperature for heating and drying
■No risk of fire due to use indirect heating system.
■No risk of electrical shorts, convenient repair and simple operation

※It has high air temperature and high thermal efficiency because it has hot air supplying structure because air can be heating up by heat exchanger in thermal mediator boiler which is supplying and swirling air from blower.

◆Competitiveness and effectiveness

▶In terms of effectiveness, conventional electric heat fans can cover less than 6m² at 3Kw but when you replace our product, it can cover over 49.6m² at 3Kw. It is indirect heating type unlike direct heat type so in terms of effectiveness is superior due to keep humidity and moisture without burning oxygen in atmosphere.

▶Specifications of system model

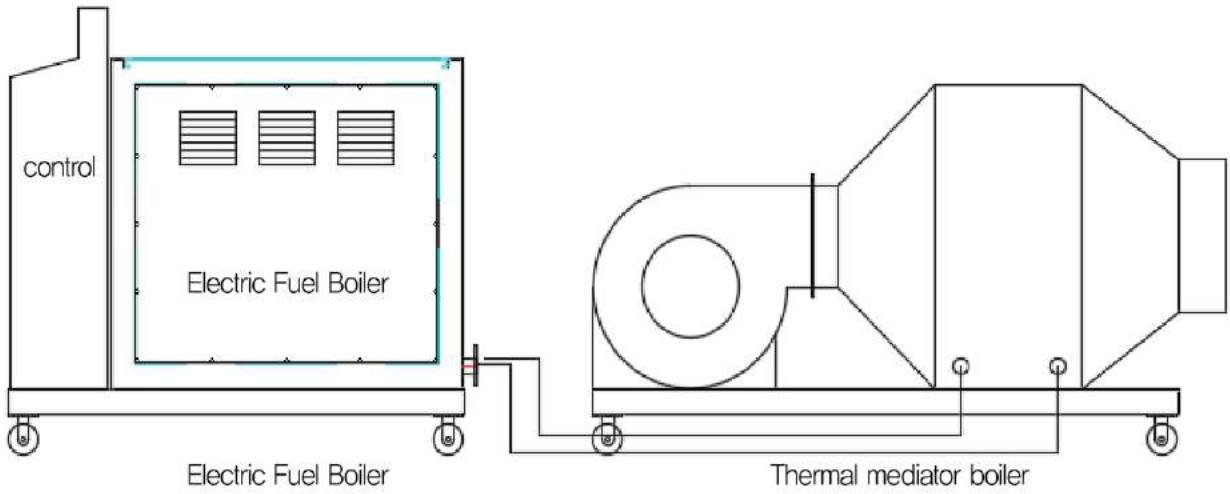
Model	Unit	EHA-3	EHA-5	EHA-7	EHA-10	EHA-12	EHA-15	EHA-20
Heating Area	m³	72.6	105.6	148.5	214.5	264	330	445.5
Power	V	220/380						
Electric Heater	Kw	3	5	7	10	12	15	20
Caloric Value	Kcal	2,580	4,300	6,020	8,600	10,320	12,900	17,200
Thermal Mediator Pump	Kw	0.2	0.2	0.3	0.75	1.5	2.2	3.5
Fan	m³/min	16	28	42	56	116	167	223
Motor	HP	1/2	1/2	1	2	5	7.5	10
Size	mm	W 350 L 700 H 700	W 350 L 800 H 700	W 400 L 900 H 800	W 400 L 900 H 900	W 450 L 1000 H 1000	W 500 L 1000 H 1100	W 600 L 1200 H 1200

※Dimensions may be subject to change without prior notice to improve performance.

■The electrical capacity may vary depending on the region.
■The heating area may vary slightly depending on external environment factors such as the installation condition and the insulation condition.
■Please contact us for electric boiler which is not in the satisfactory specification on the list.

▶Whenever using our new arrival product for long term operation, our new product does not burn out oxygen in atmosphere air but also warm up withing keeping room moisture as eco-friendly product. Moreover, it is suitable for use in agricultural greenhouses due to no influence on plants by heating up only using inside of air in an enclosed space.

Electric fan for industrial / farm household



- New concept of heater using indirect heating type using multi tube of Thermal Mediator boiler.
- Simply operation and management system with automatic room temperature controller.
- Unique energy saving system and totally different heater structure unlike general heater.
- Available at most 80℃ ~ 200℃ indirect temperature for heating and drying.
- Hot air can be carried along with duct type.
- No risk of fire due to use indirect heating system.
- No risk of electrical shorts, convenient repair and simple operation

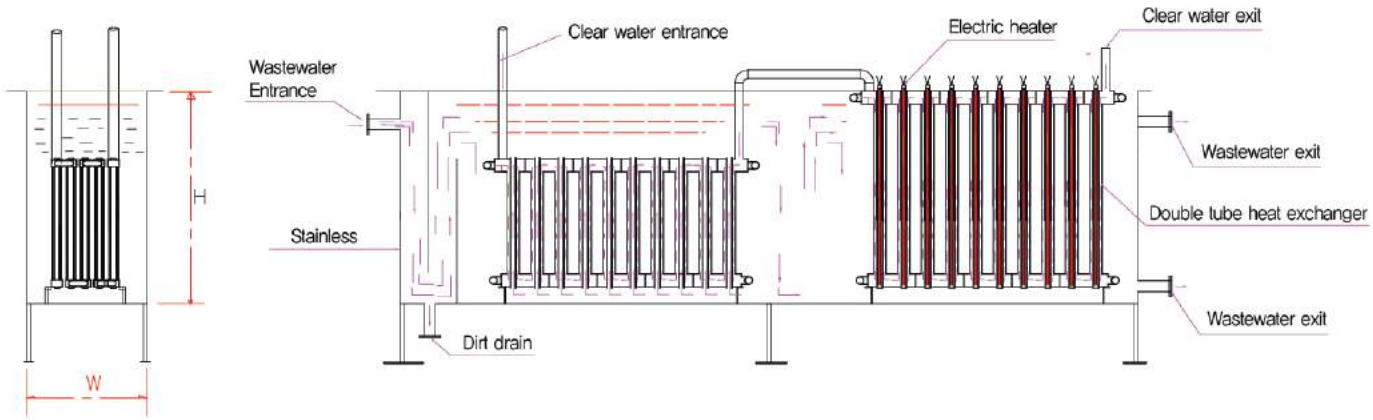
※Unlike ordinary heat fans, it warms the air without burning oxygen, so it can be used harmless to plants without any problem. The fan blows air into thermal mediator boiler in order to warming up the air temperature passing throw heat exchanger. It has high air temperature and high thermal efficiency because It has structure to supply hot air by making swirl .

▶System Spec

Division		Standard on 1650 m^2 Greenhouse
Power Consumption		120 KW
Working Area		1650 m^2
Caloric Value		103,200 kcal
Heat source method		Air heating by Thermal Mediator boiler
Capacity	Heater	120 KW
	Thermal Mediator Pump	5.5KW
	Moter	10HP
Air volume		280 m^3/min
Size		W 1,200mm x L 5,000mm x H 1,500
Other		A new concept of Electric heater breaking the existing heating system

Electric hot water boiler with waste heat recovery

▶Electric boiler using buried waste heat recovery machine



■It heats up the temperature fast (5~10 minutes after starting the operation). It can maintain 90°c for tank storage.

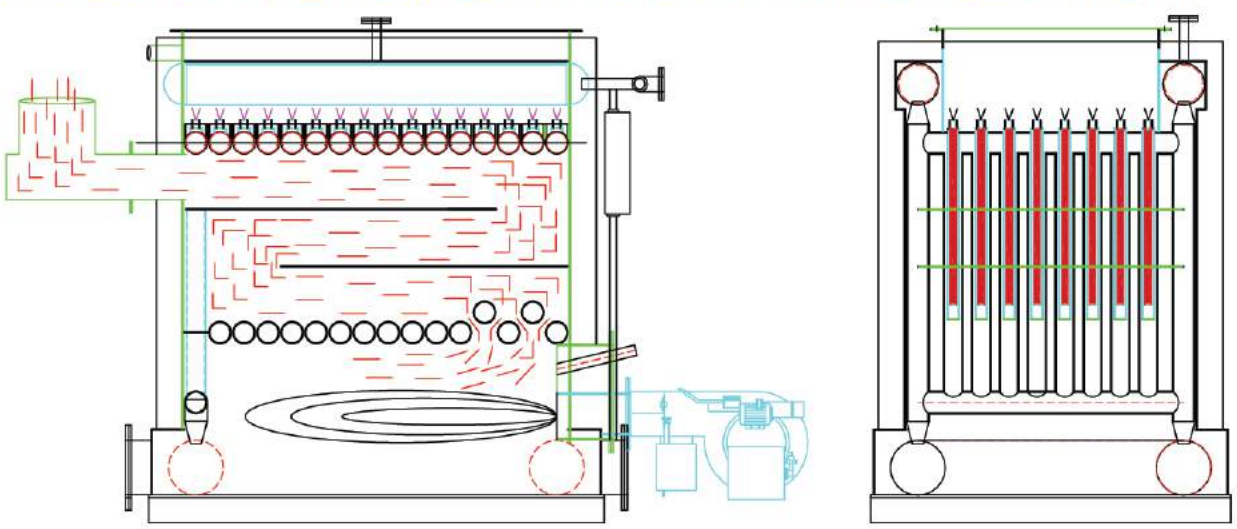
■Features

① Easy troubleshooting and simple operation with indirect heating method

② As it is assembled, it is easy to repair and easy to replace. It is smaller than the other heat exchangers. But it covers 1.5~2 times more heating size than the other heat exchangers.

③ It is an indirect heating method which is different from the direct heating method that puts the electric heater into the water. There is no danger from scale and electric short. It is easy to repair and easy to use.

▶Multi-tube Two Way (Electricity, Gas, Oil) (Steam, Hot water, Heating Medium) Boiler



■When electricity supply is not enough, gas (oil) burner can be used at the same time
It is a multi-tube type two way boiler which can use gas or oil burner together with electricity
(When 500,000kcal is used, electricity is used for 250,000kcal and gas (oil) burner is used for 250,000kcal)

Electric Heating Medium Boiler

▶Small ▶Compact ▶Medium





■ Features

- Easy troubleshooting and simple operation with indirect heating method
  Scales are not accumulated on the heater and boiler is made up of multiple heat change pipes only
  To save energy with low cost and high efficiency Stable operational control without risk of short circuit

Complex Multi-Tube Electric Heating Medium Boiler (10KW~300KW)


Application





Environmental Facility System

▶High Efficiency Environmental Equipment System

- Exhaust Protection Device Installation
- High Efficiency System
- High Stability, Durability
- Low Early Equipment cost, Operating cost
- Low maintenance cost

Type	Output
5ton	Standard Gas Quantity : 11,480 Nm³/hr
10ton	Standard Gas Quantity : 23,000 Nm³/hr
15ton	Standard Gas Quantity : 34,925 Nm³/hr

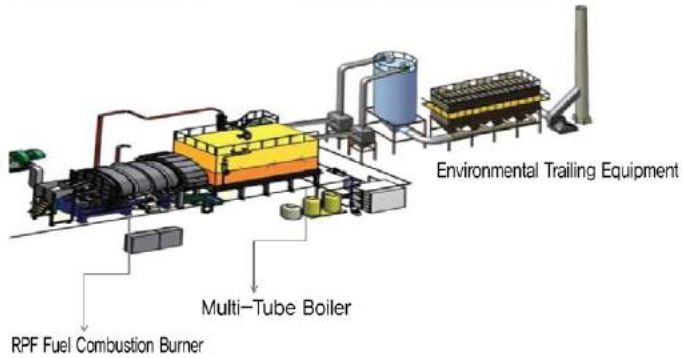
* Possible Customer Requirement Production Facility

Environmental Facility System Diagram

Steam Sale Business Service

▶Renewable Fuel(RPF) Combustion System Install & Operation Case

Division	Contents	Remark
Location(Steam User)	Textile dyeing plant(PaJu)	
Investment Approach	ESCO Fund & Steam Supply	
Installation Equipment	2012, 11.	
Start Operation	2012, 12 ~	Day & Night 24hr Operation
Steam Sale Service Quantity	10ton/hr	24hr/d
Used Fuel	RPF	LNG Replaced
Boiler	Multi-Tube Boiler	Patent Boiler
Burner	Renewable Fuel Combustion Burner	Patent Burner
Environmental Trailing Equipment	850mmAQ (RPF)	



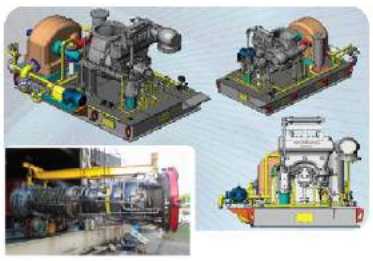
Cooperation Technology

▶Steam Turbine Generator

Steam Turbine – Condensing

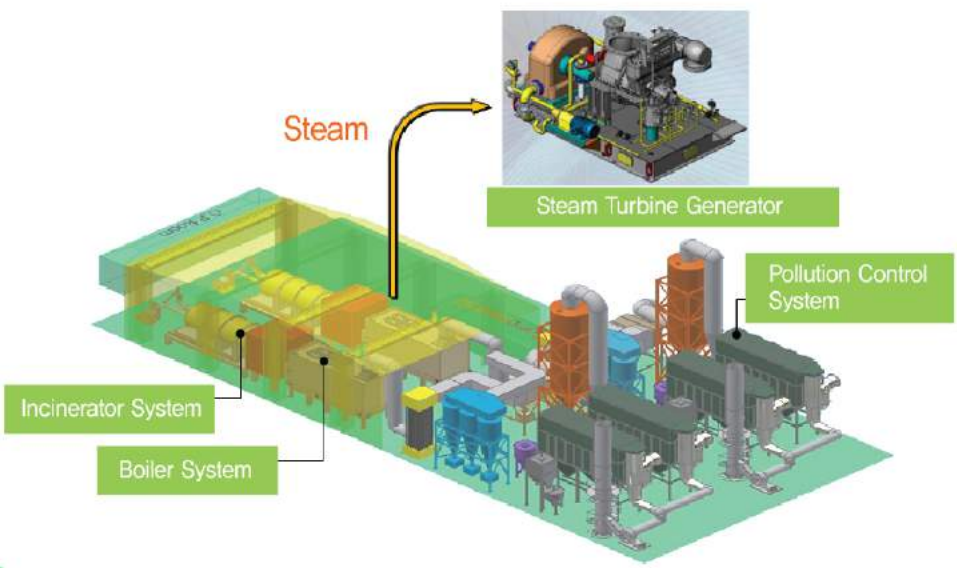
Steam Turbine–Back Pressure

Steam Turbine–Multistage/Back Pressure

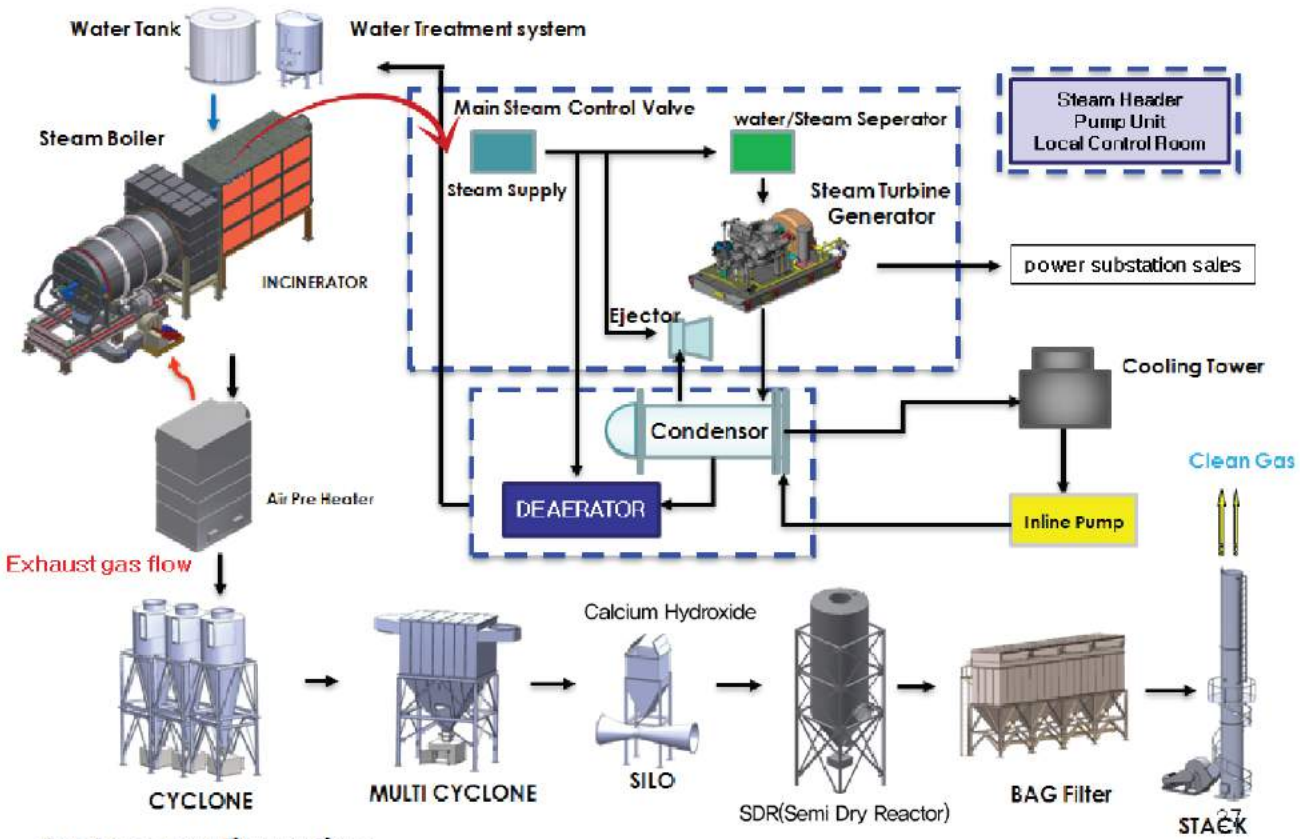


▶Control Panel

▶Steam Turbine Generator System



Flow Diagram



- System configuration -

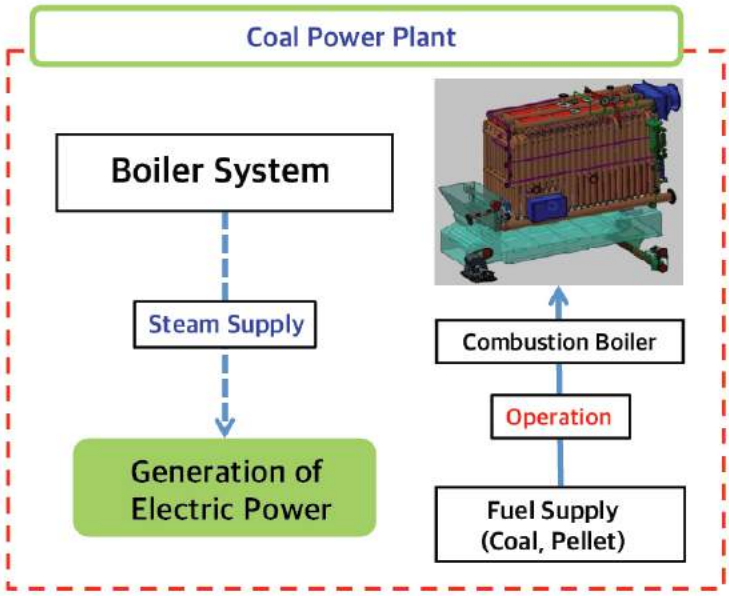
▶Cooperation Technology

Mini-Coal(Pellet) Fired Power Plant Relocatable Compact Type

■Content

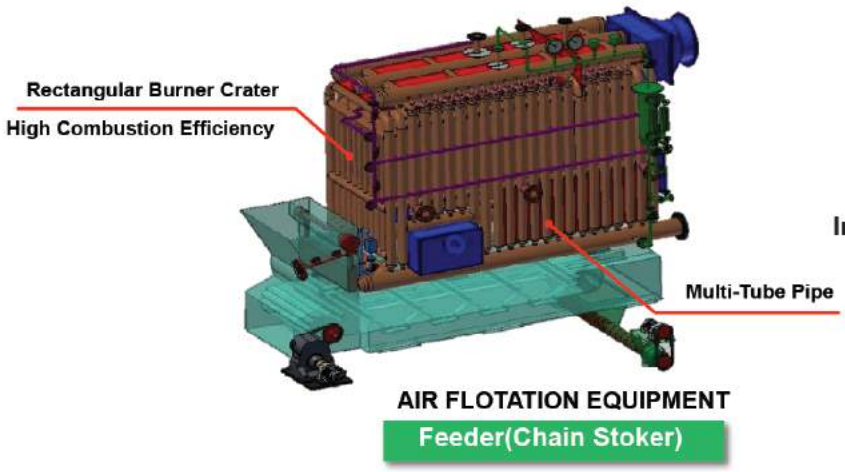
· Purpose : 1MVA Mini-Coal(Pellet) Power Plant Relocatable Compact Type

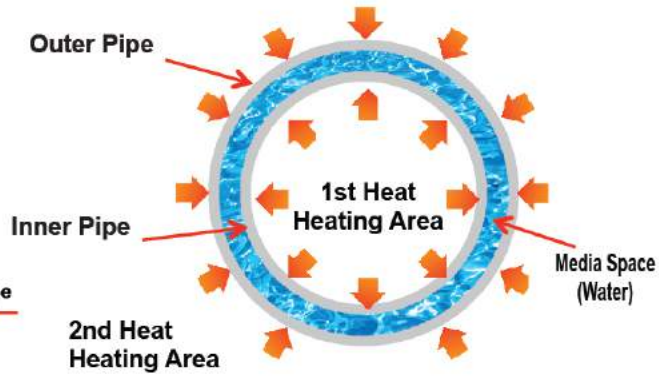
· Method Selection : To build a continuous supply steam supply system of 24 hours to reduce the existing energy cost in power generation, is a business-friendly environment to meet the low-carbon green growth national policy



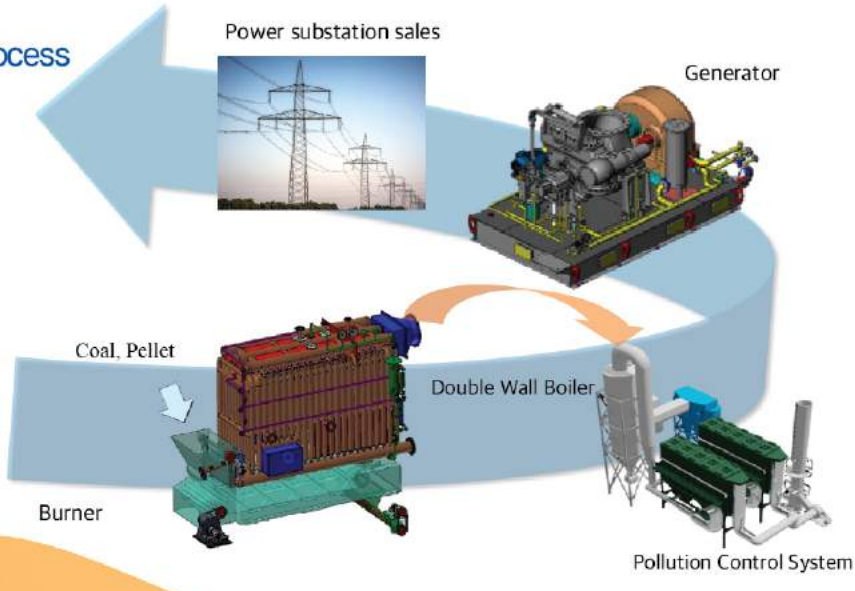
▶Multi-Tube Boiler

■Pipe in Pipe steam boiler & multiple steam boiler story NO5/ Technology introduce

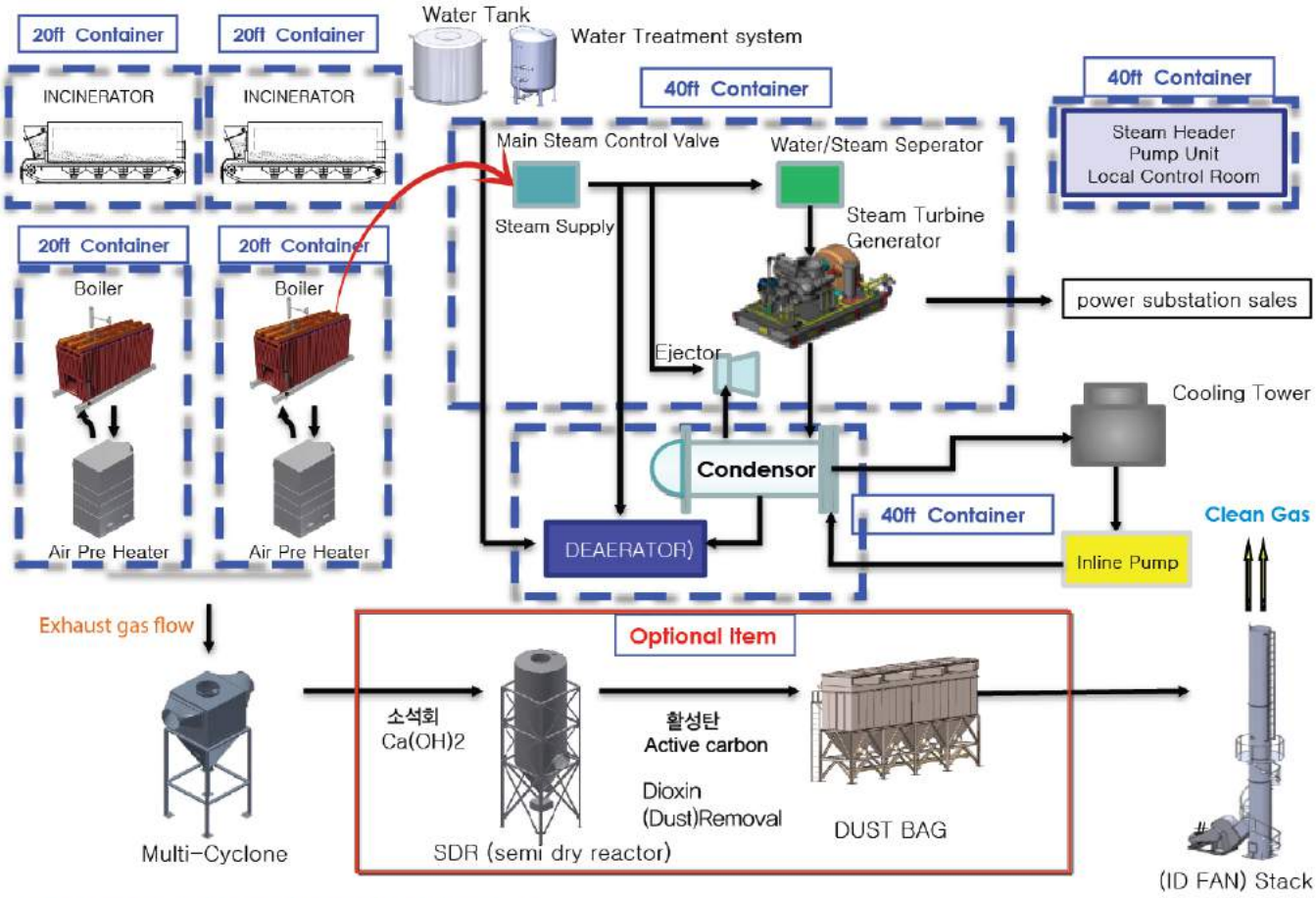




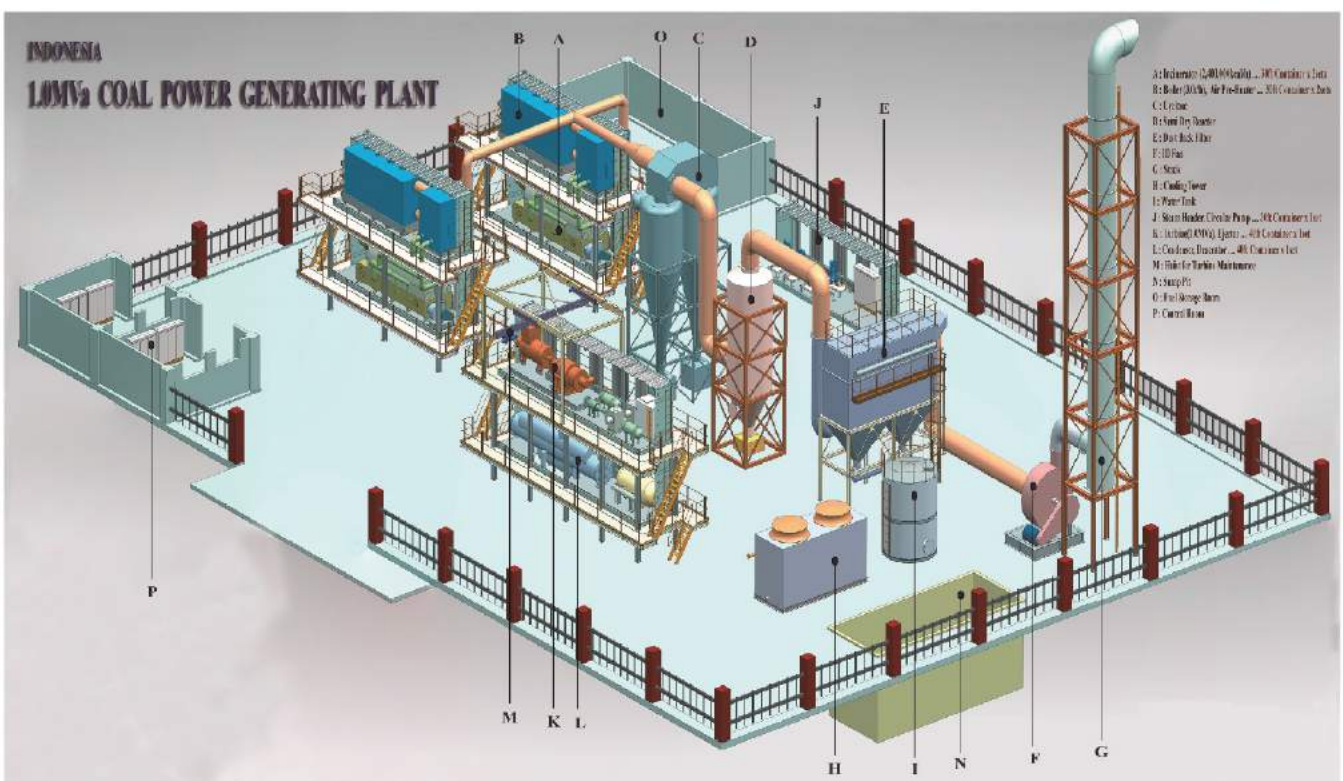
■Power Generation Process



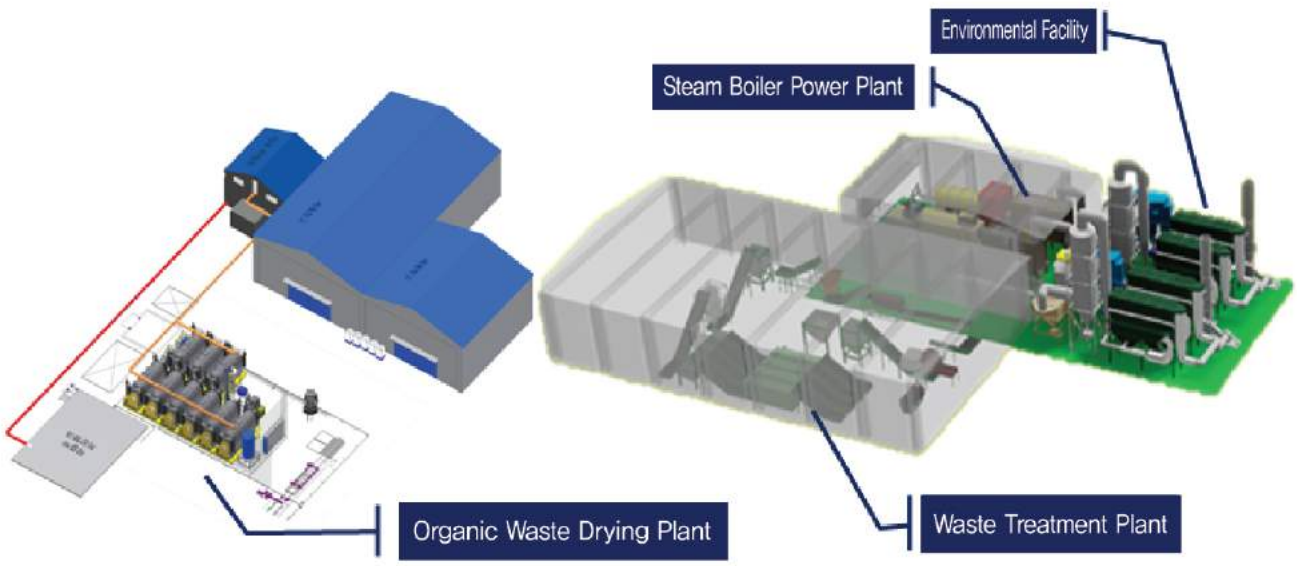
Mini-Coal(Pellet) Fired Power Plant
Relocatable Compact Type



※The design may be changed depending on site conditions



Combination System



■ Key Feature
- Dry Waste using Generated Incinerator Steam
- Blocking Leachate caused by Dry Waste
- Reusing Fuel caused by Dry Waste/Thermal Decomposition Disposal
- Thermal Efficiency improvement (More than 90%)
- Possible Various Waste Disposal : Cattle Manure, Livestock Mortality, Aliment, Sludge And so on

Facilities Air View

Technical Application

▶Facility Equipment Installation

▶Construction Site Production

▶Construction Site Installation

Washing Plant

HanGyeol Fiber

TEXSCO Fiber

Ship Block Paint Dry Product / High-Efficiency Heat System

Removable Efficiency Heater

SamSung Heavy Industries