

Medium-Term Management Plan 2019 (Energy & Environment Group)

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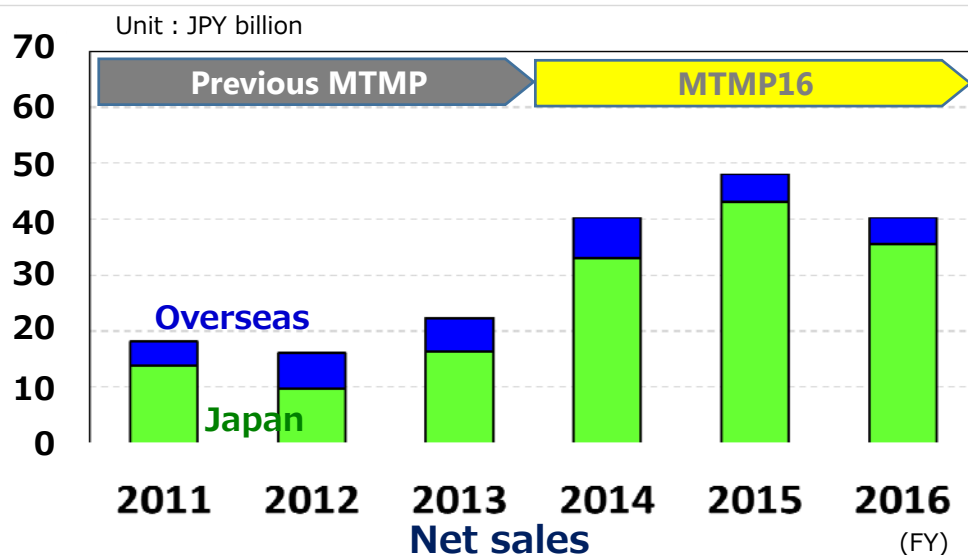
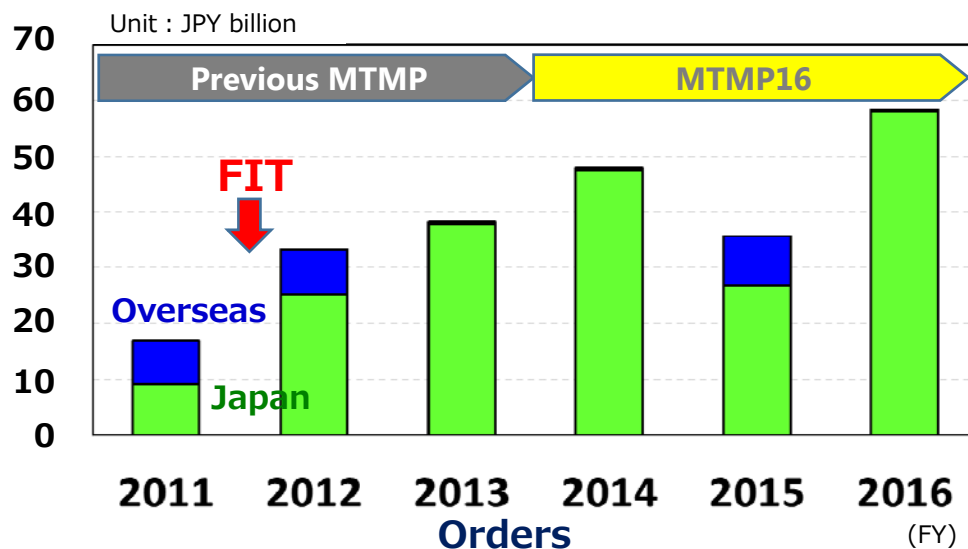
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01

Summary of “Medium-Term Management Plan 2016”

01

Summary of "Medium-Term Management Plan 2016" (MTMP16)

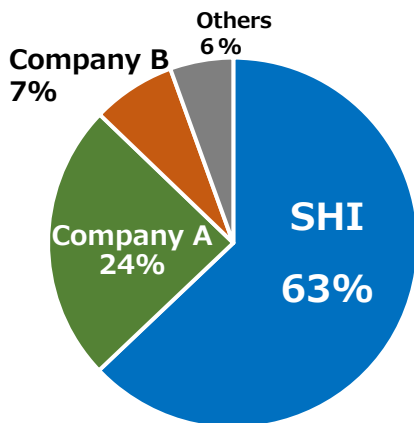
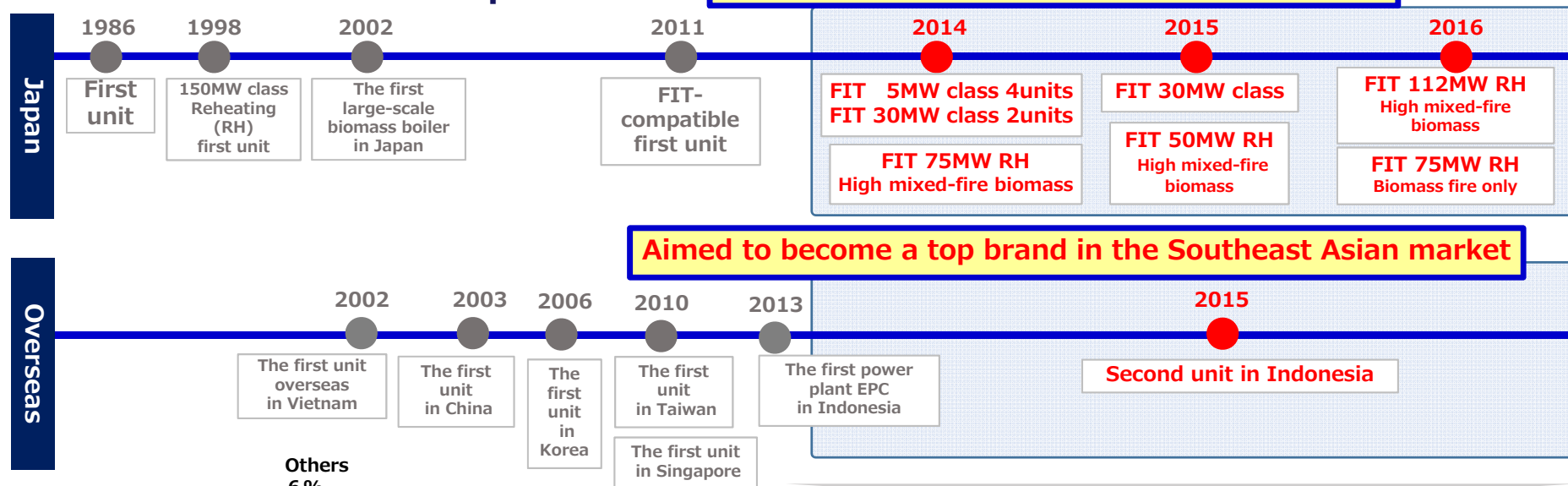


- During MTMP16, the business grew to approximately two times the size it was during the previous MTMP.
- Domestically, the introduction of the renewable energy feed-in tariff (FIT) system in 2012 led to an increase in demand for biomass-fueled power plants.
- Due to prioritizing the response to domestic demand, overseas business development was put on hold.

01

Result of "Medium-Term Management Plan 2016"

CFB boiler market development



CFB market share in Japan/2006-2016

Source

- 1) Developed by the company using data from the Directory of Thermal Power Plants (2011), McCoy Boiler Order Data, and information collected at seminars
- 2) Share calculated on an ordered MW basis during the period from 2006 to 2016

Result of "MTMP 16"

- Japan** – Standardized the 50/75/112MW RH-type biomass-fueled power generation facility.
- Overseas** – Delivered power generation EPC projects.

Main priorities during the next MTMP

- Japan** – Improve quality and reliability / Enhance after-sales service capabilities.
- Overseas** – Deepen relationships in the Southeast Asian market.

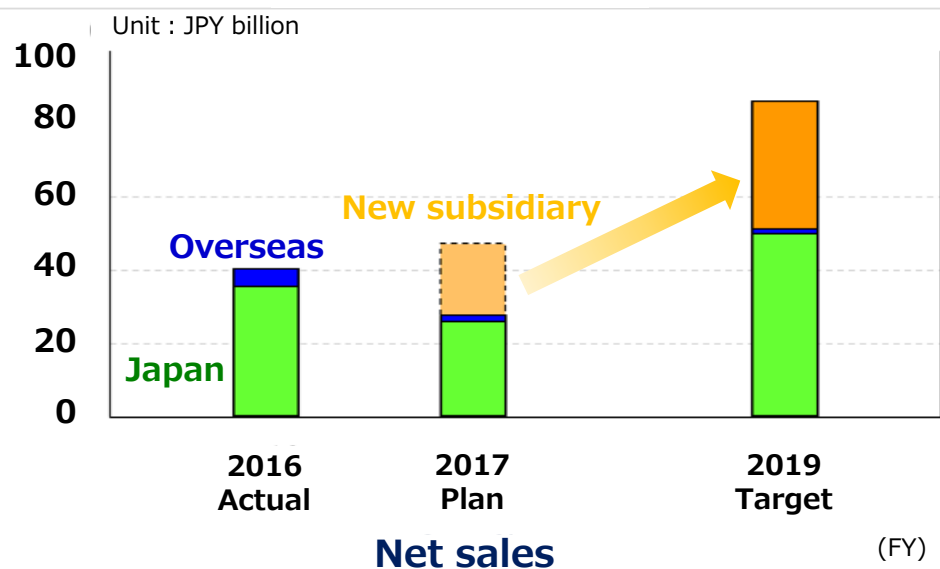
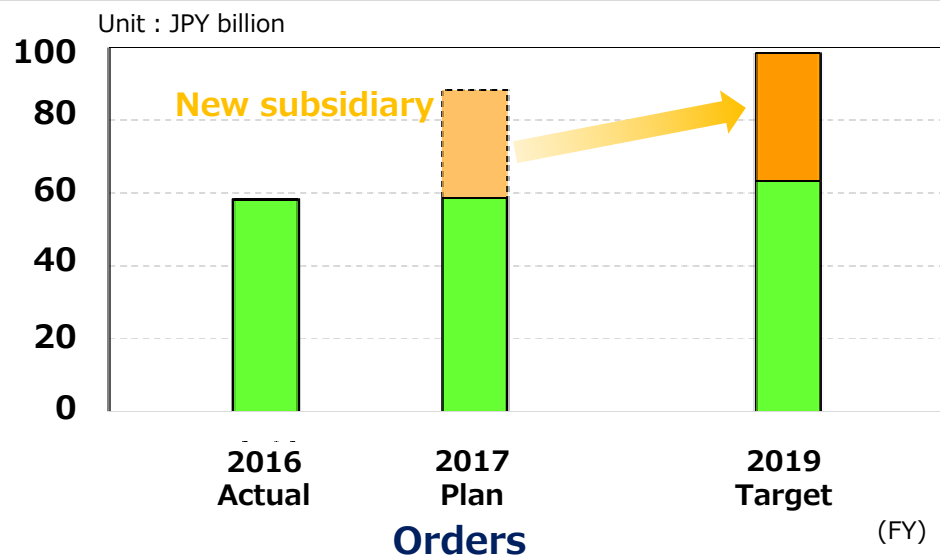


02

Overview of “Medium-Term Management Plan 2019”

02

"Medium-Term Management Plan 2019"



- Although there has been a negative impact from the decline in FIT prices domestically, underlying demand remains strong and, as such, we expect the business to continue to trend positively.

- Demand will shift to larger units (greater than 75MW).

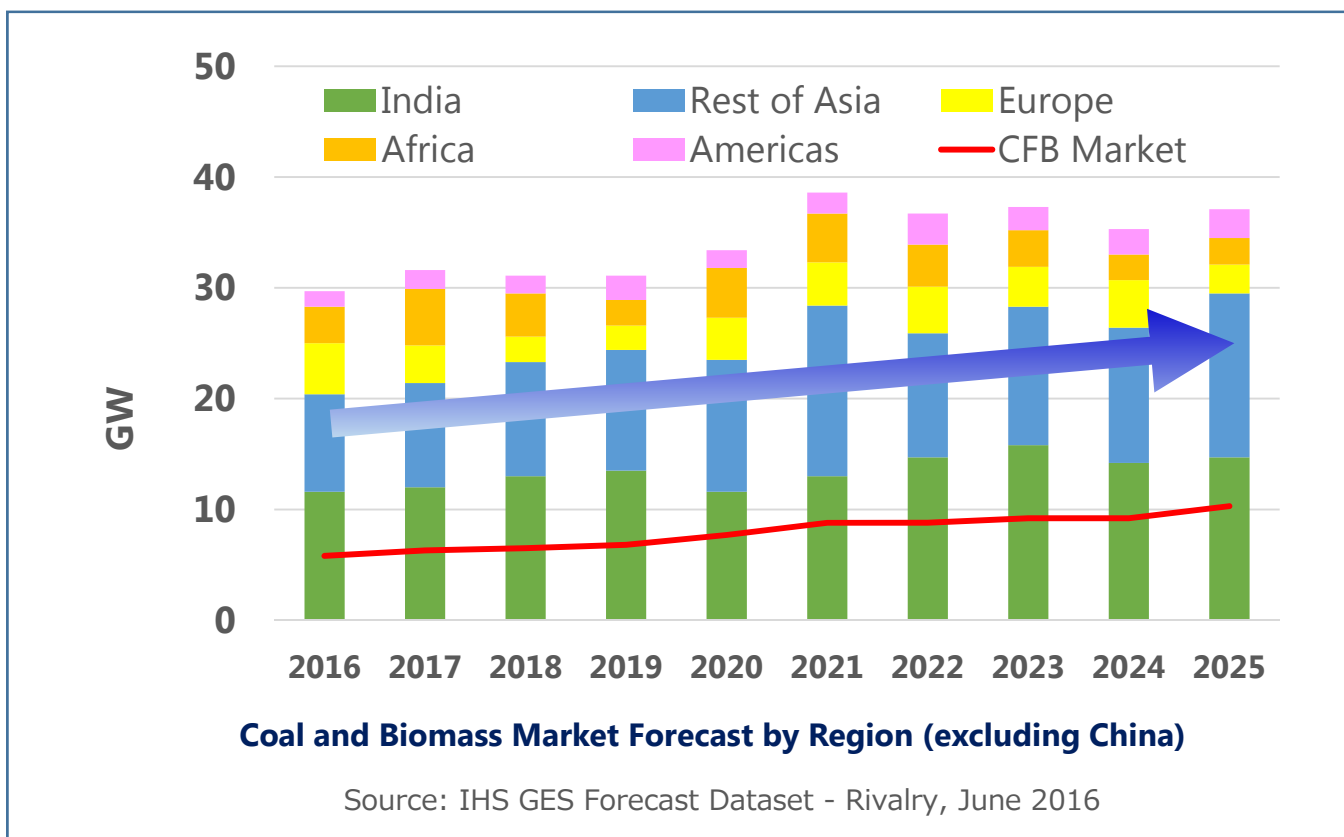
- Acquisition agreement signed to purchase the CFB business of Amec Foster Wheeler (AFW). Will operate as a new subsidiary that is the subject of consolidation, and expand business scale during MTMP19.

- The overseas business development activities that were put on hold during MTMP16 will be restarted using the new subsidiary.

Note – Orders and Net sales figures associated with the new company are converted using a USD1 = JPY110 exchange rate

02

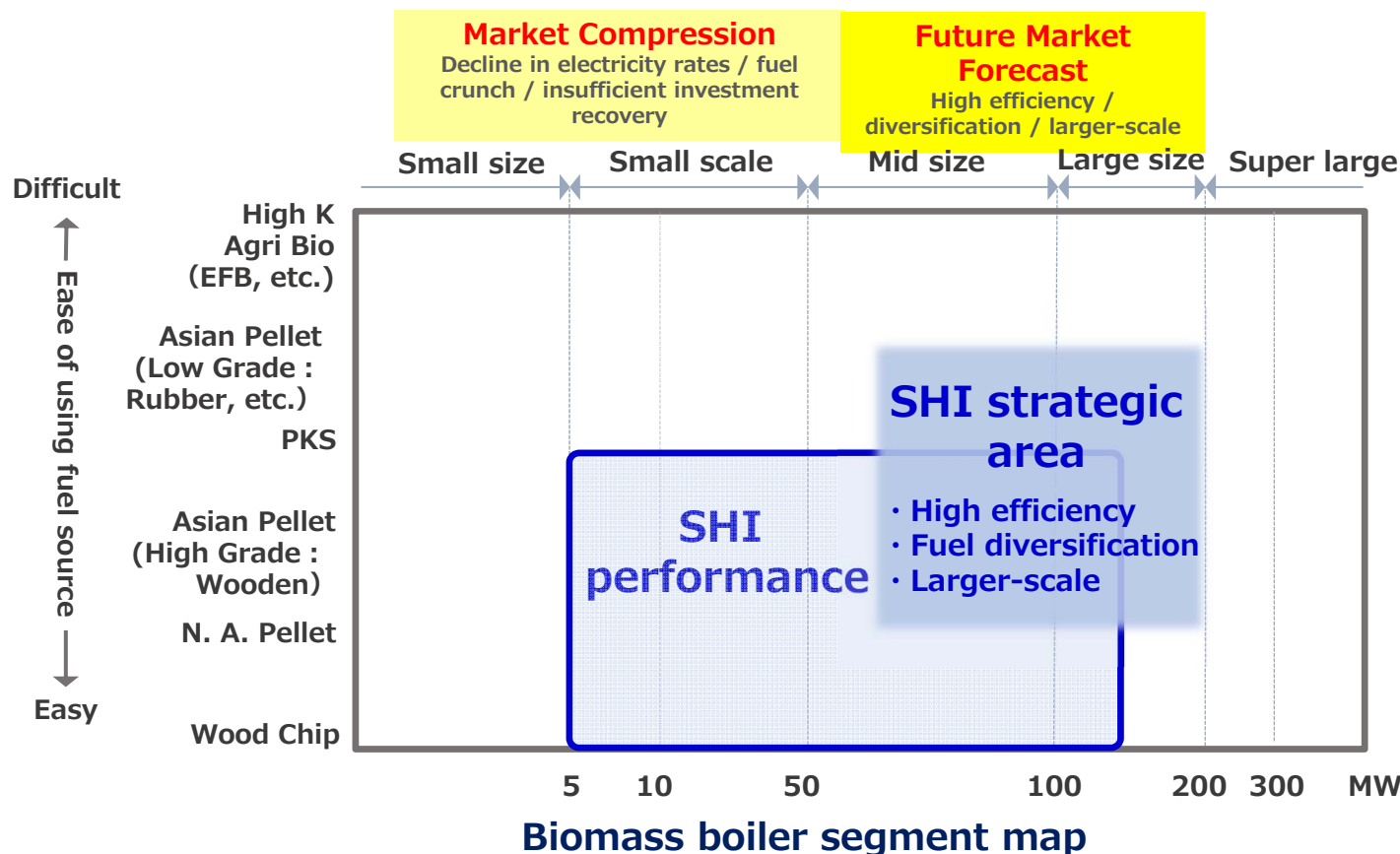
Global Market Trends



- Underlying demand for solid fuel boilers around the world remains strong. The main market for such boilers is in Asia.
- The demand for CFB boilers is forecasted to be around 30% of overall demand – 6 to 10GW annually.

02

Domestic Developments



Future Direction of Domestic Business

- 1) Decline in FIT prices → Improved facility profitability → Higher efficiency
↳ Larger-scale units
- 2) Shortfall in availability of traditional bio-fuels → More diversification in fuels, expansion in use of cheaper fuels

02

Overseas Developments

Purpose and Meaning behind the Acquisition of AFW's CFB Division

Growth in energy field of the SHI Group

Make it possible to tender for projects using the diverse experience of AFW

- Biomass-fueled large-scale power plants aimed at electricity companies
- Asia-manufactured biomass-fuel boilers

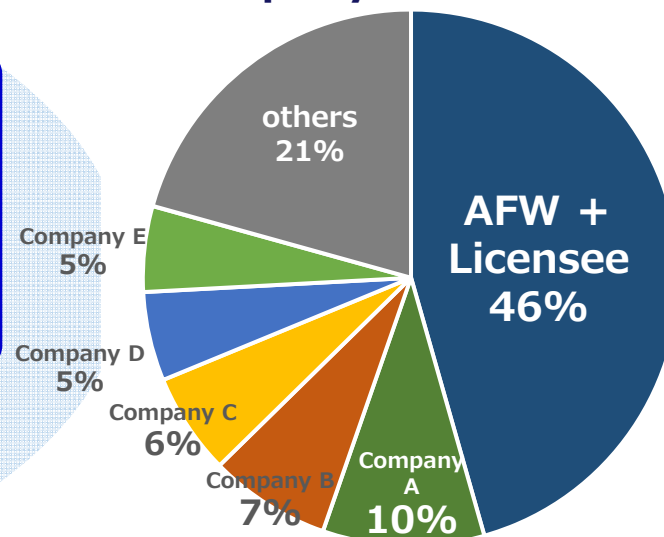
Strengthen the number of overseas locations

- Expand business area
- Global development of SHI biomass-fueled boilers

Regionally expand after-sales service capabilities

- Ability to propose large-scale refurbishments and renewals

Become the No. 1 CFB Boiler Company in the World



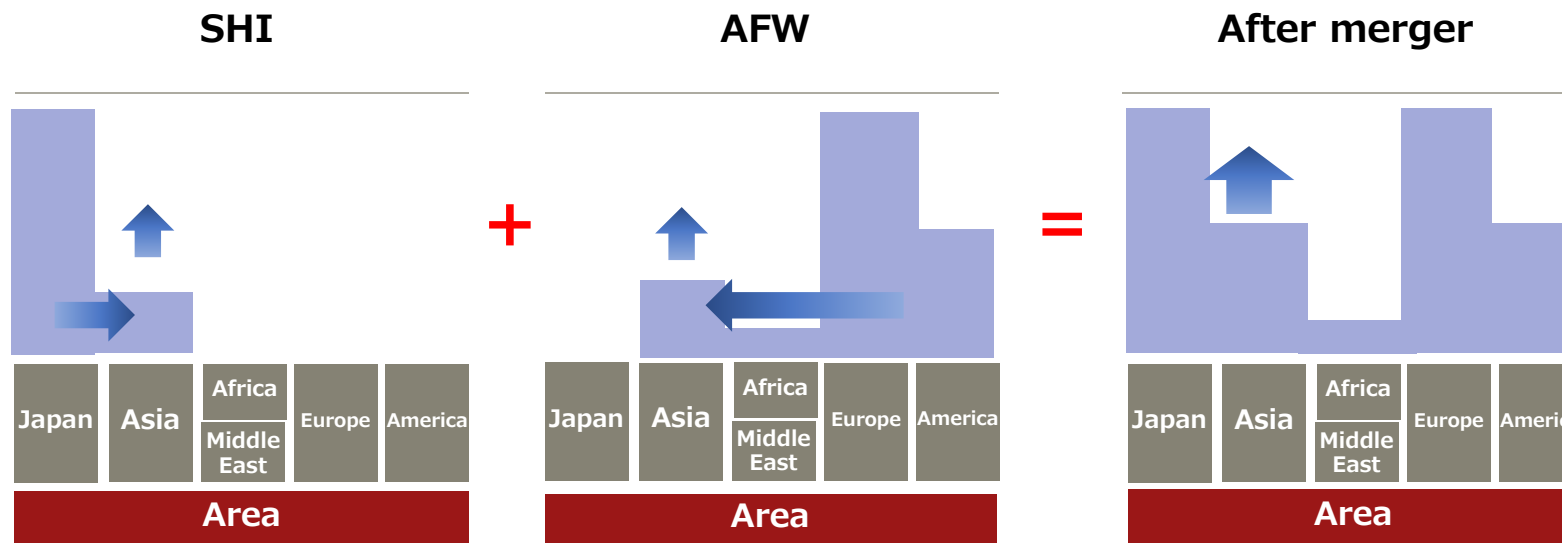
CFB boiler global share /2006-2016

Source
 1) Developed by the company using McCoy Boiler Order Data and the Company's operating information
 2) Share calculated on an ordered MW basis during the period from 2006 to 2016.
 However, information excludes supply from local suppliers in India and China.

02

Deployment and Overseas Strategy after AFW Acquisition

Business performance



Area	<ul style="list-style-type: none"> • Japan is the main battleground • East Asia → Develop the Southeast Asia region
Product	<ul style="list-style-type: none"> • 5-165MW capacity
After-sales service	<ul style="list-style-type: none"> • Mainly periodic inspections

	<ul style="list-style-type: none"> • Europe and Asia (Korea, Philippines, Vietnam) are the main battlegrounds • Act as a licensor in areas where there are local peculiarities. SHI, ISGEC and Essar to develop
	<ul style="list-style-type: none"> • 10-200MW basis but have products that are more than 200MW including supercritical units up to 550MW
	<ul style="list-style-type: none"> • Periodic inspections as well as refurbishments and renewals in Europe

	<ul style="list-style-type: none"> • Main battlegrounds are Japan, Europe and Asia • Supplement each other's business in the various regions
	<ul style="list-style-type: none"> • Design capabilities up to 800MW • Supplement each other's size
	<ul style="list-style-type: none"> • Further expand business areas

02

Strengthen Product, Sales and Service Capabilities

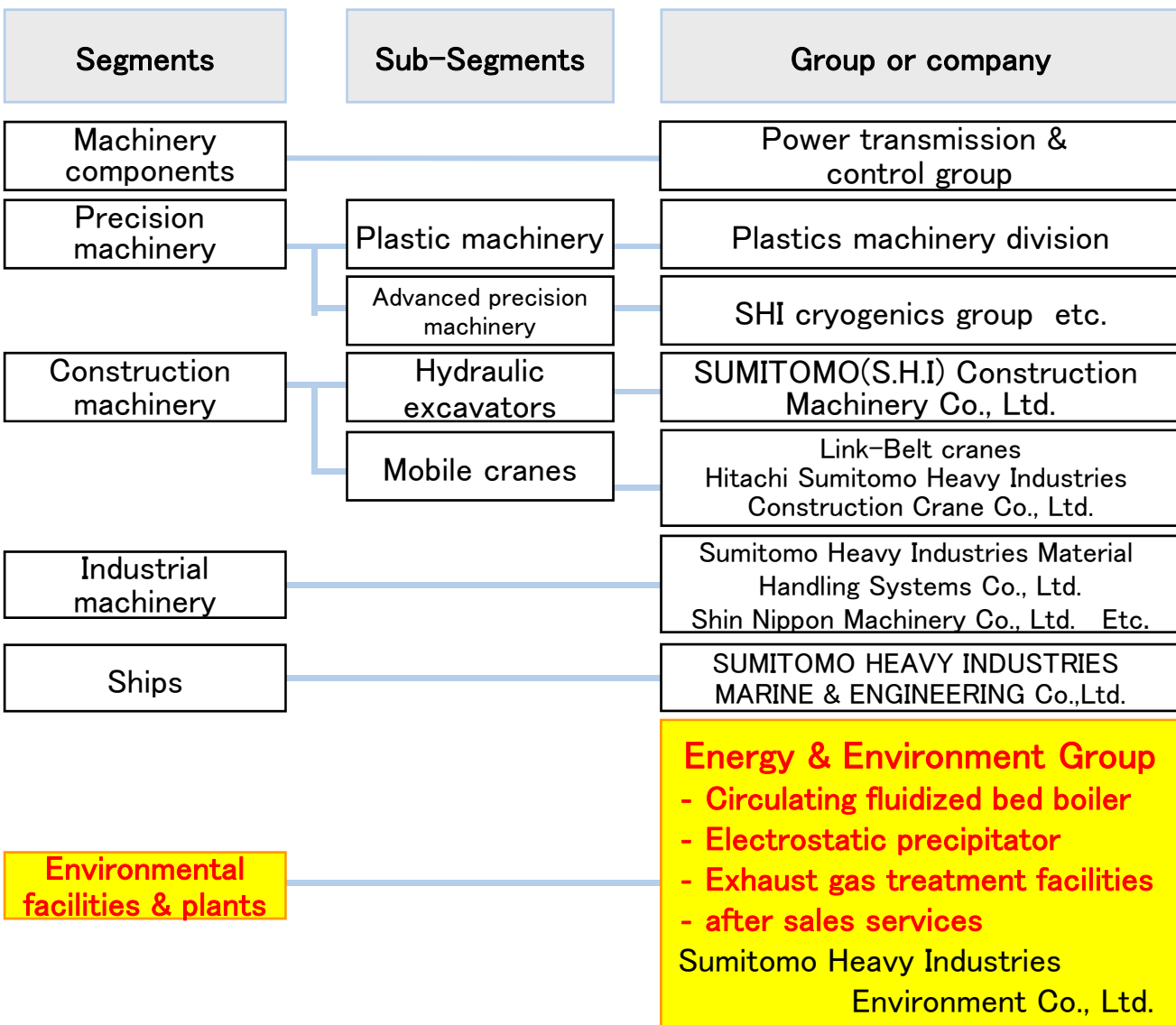
Synergies arising from AFW acquisition

	Anticipated Benefit
1. Expansion of business areas	<ul style="list-style-type: none"> • Globally expand SHI's domestic experience in biomass-fueled boilers • Use AFW's experience as a basis to respond to new biomass demand in Japan • Expand business opportunities in SHI's energy-related divisions (e.g., new tie-ups with Shin Nippon Machinery Co., Ltd. in the field of steam turbines)
2. Enhanced product capabilities	<ul style="list-style-type: none"> • Develop line-up of large-scale CFB boilers in anticipation of greater demand for larger-scale units in the future • Utilize SHI's pilot plant to expand verification of various fuel sources
3. Enhanced after-sales service capabilities	<ul style="list-style-type: none"> • Mutual support service network • Expand areas of service, expand opportunities for large-scale refurbishments and renewals

Ref.

About Energy & Environment Group

Ref. About Energy & Environment Group

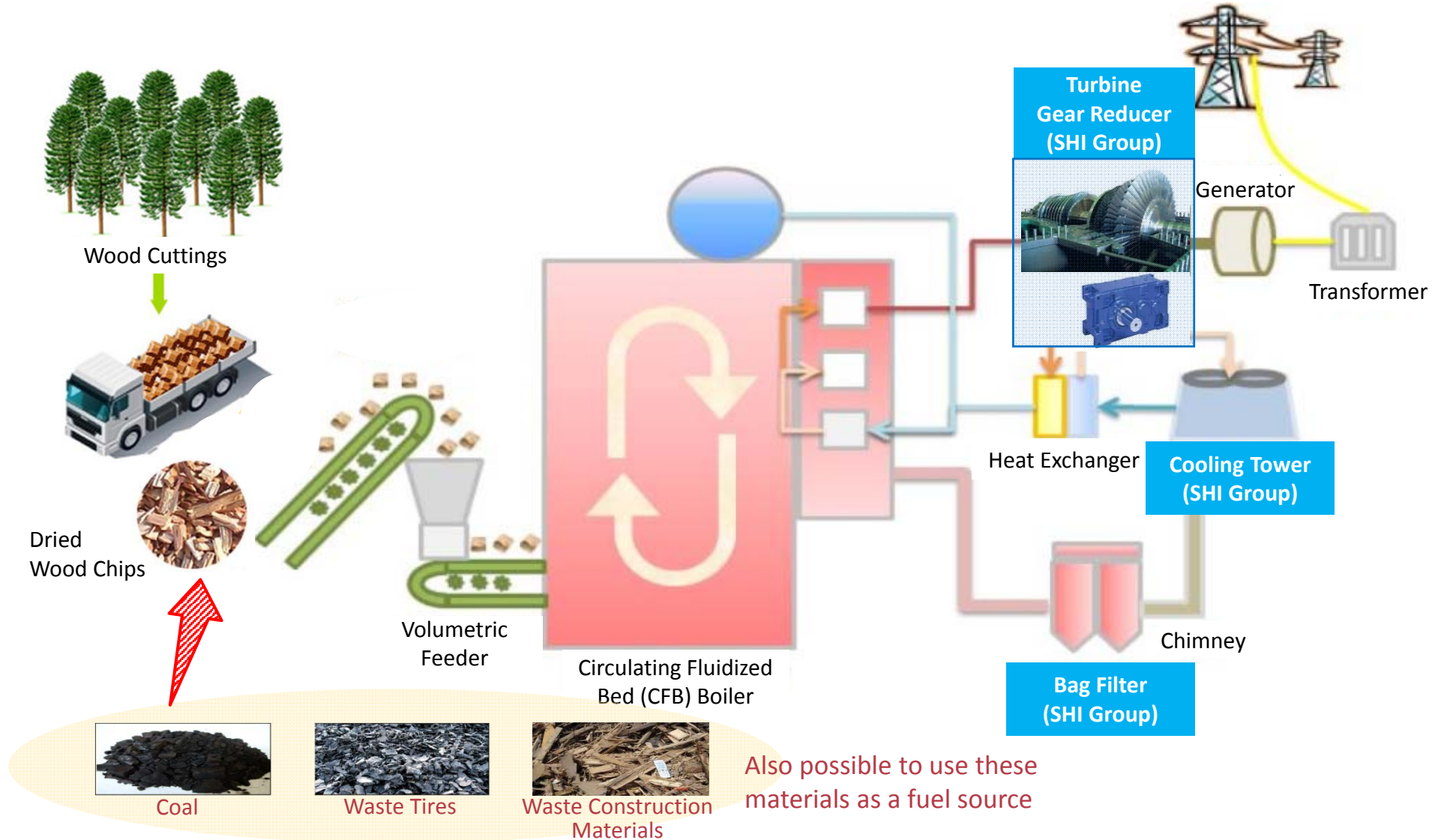


CFB boiler energy plants



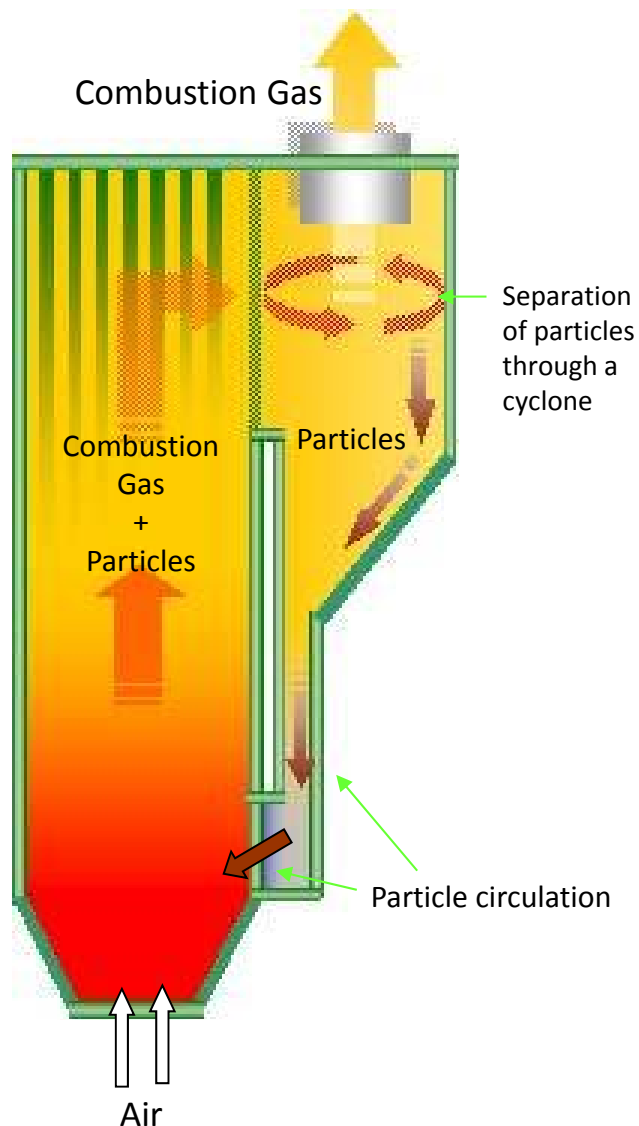
Ref.

Flow Diagram of Power Generation Utilizing the CFB Boiler



Ref.

Features of the CFB Boiler



■ Combustion Mechanism

Air is injected into the bottom of the boiler chamber and the heated particles and fuel are mixed in a suspended manner. Through this, various fuels are burned efficiently. The combustion particles and gas that rise together are separated using a cyclone, and returned to the bottom of the boiler, further improving the combustion efficiency.

■ Features

1. Compatible with various fuel sources

⇒ Compatible with more difficult fuel sources such as biomass, low-grade coal, construction waste, waste tires, waste plastic, coal refuse, and paper sludge.

2. No need for the fuel source to be ground finely

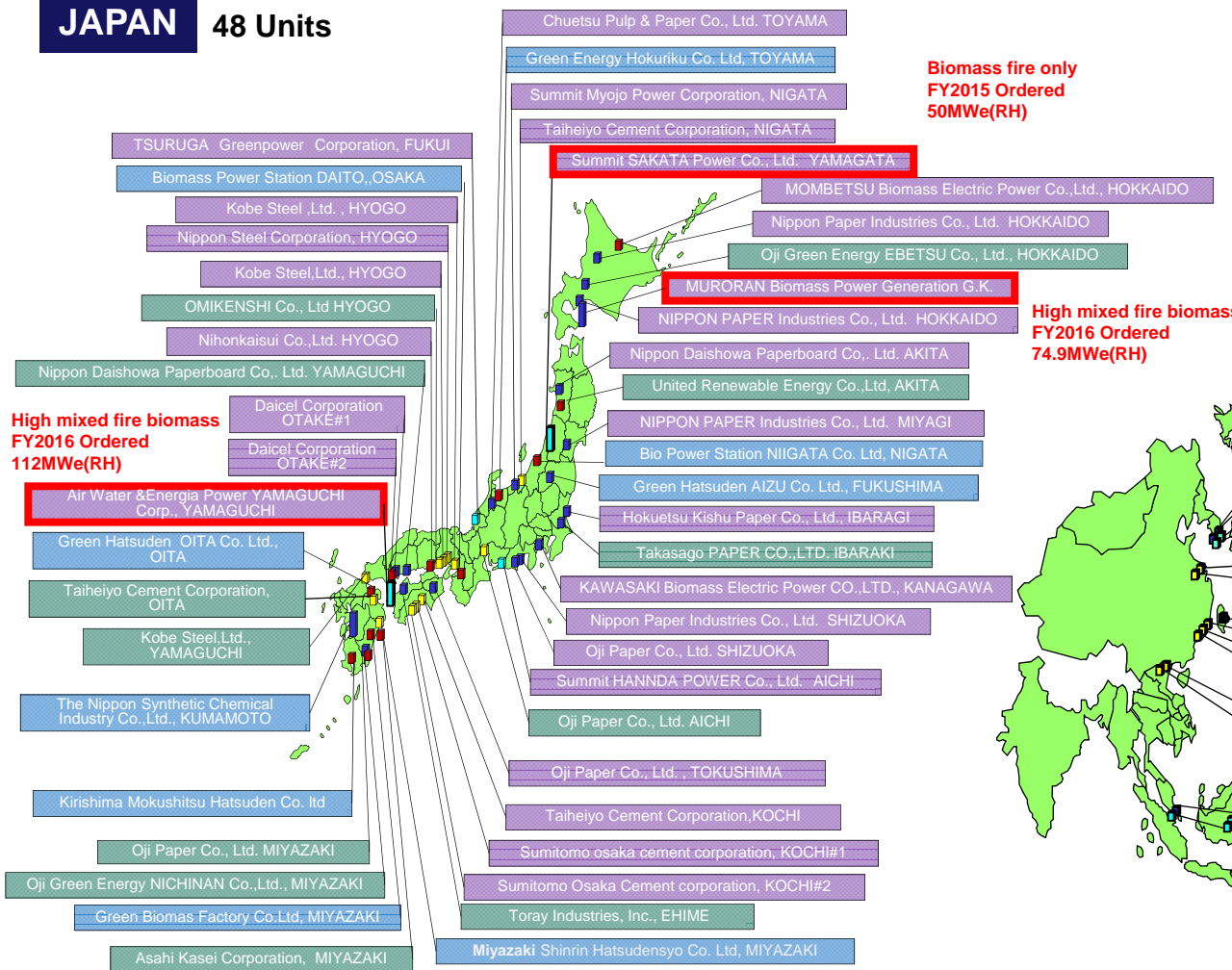
⇒ Wires and other materials inside waste tires can be removed smoothly (no need for prior separation).

3. Controls the generation of NO_x

⇒ Due to the high combustion efficiency, temperatures are comparatively lower than other methods, controlling the amount of NO_x emissions that are generated.

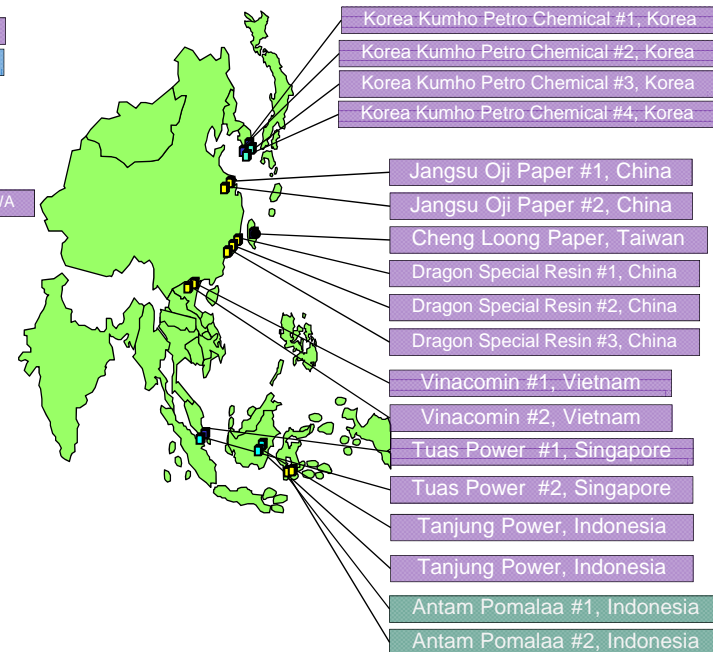
Ref. CFB Boilers Energy Plants Delivered Units / Japan & Overseas

JAPAN 48 Units



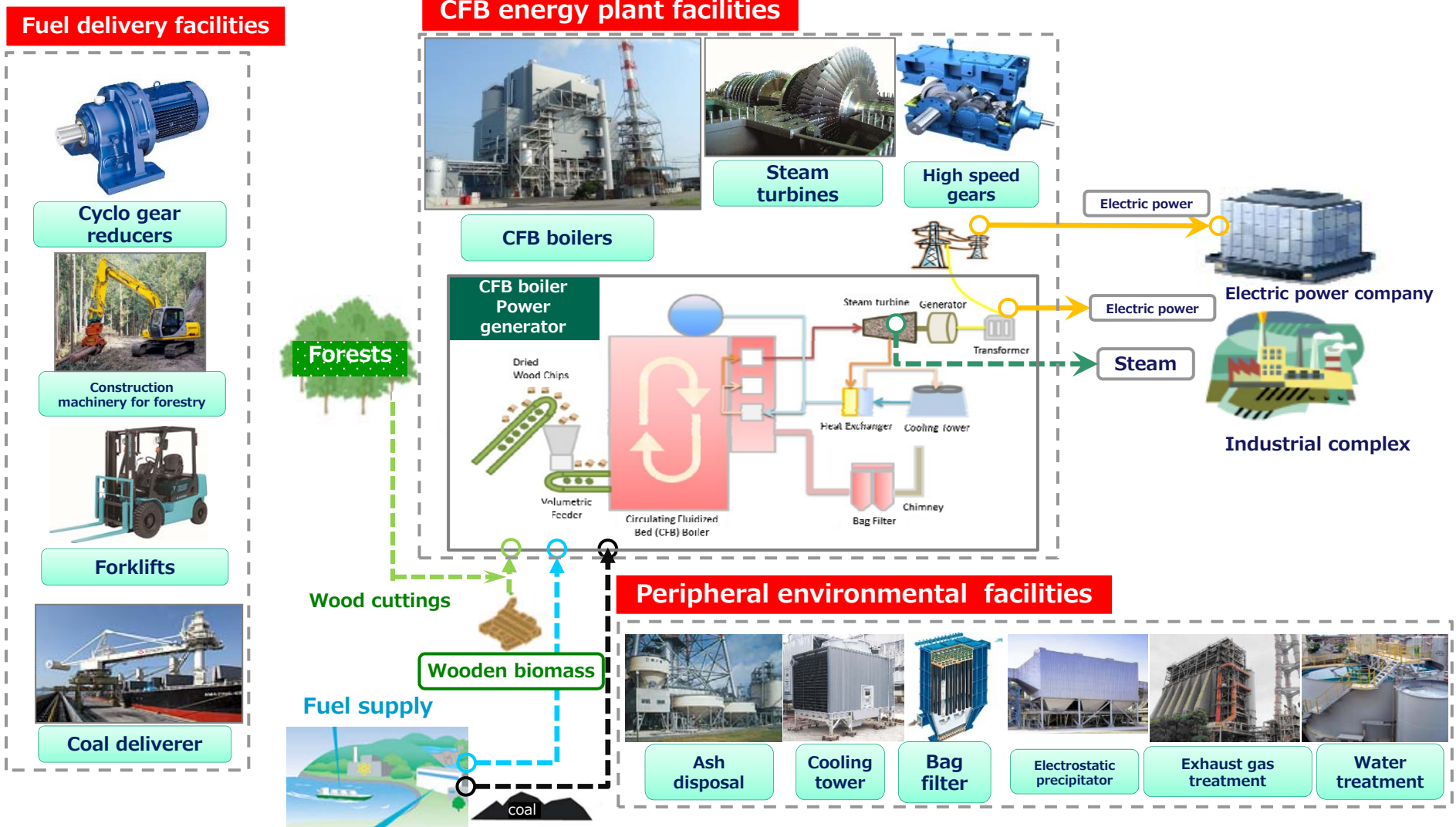
- Under Construction or Design
- Coal Only
- Biomass/Renewable Fuel
- Mid Scale: 30 - 200MW
- Small Scale: 6 - 30MW
- Small Size: - 5MW

East and Southerneast Asia 18 Units



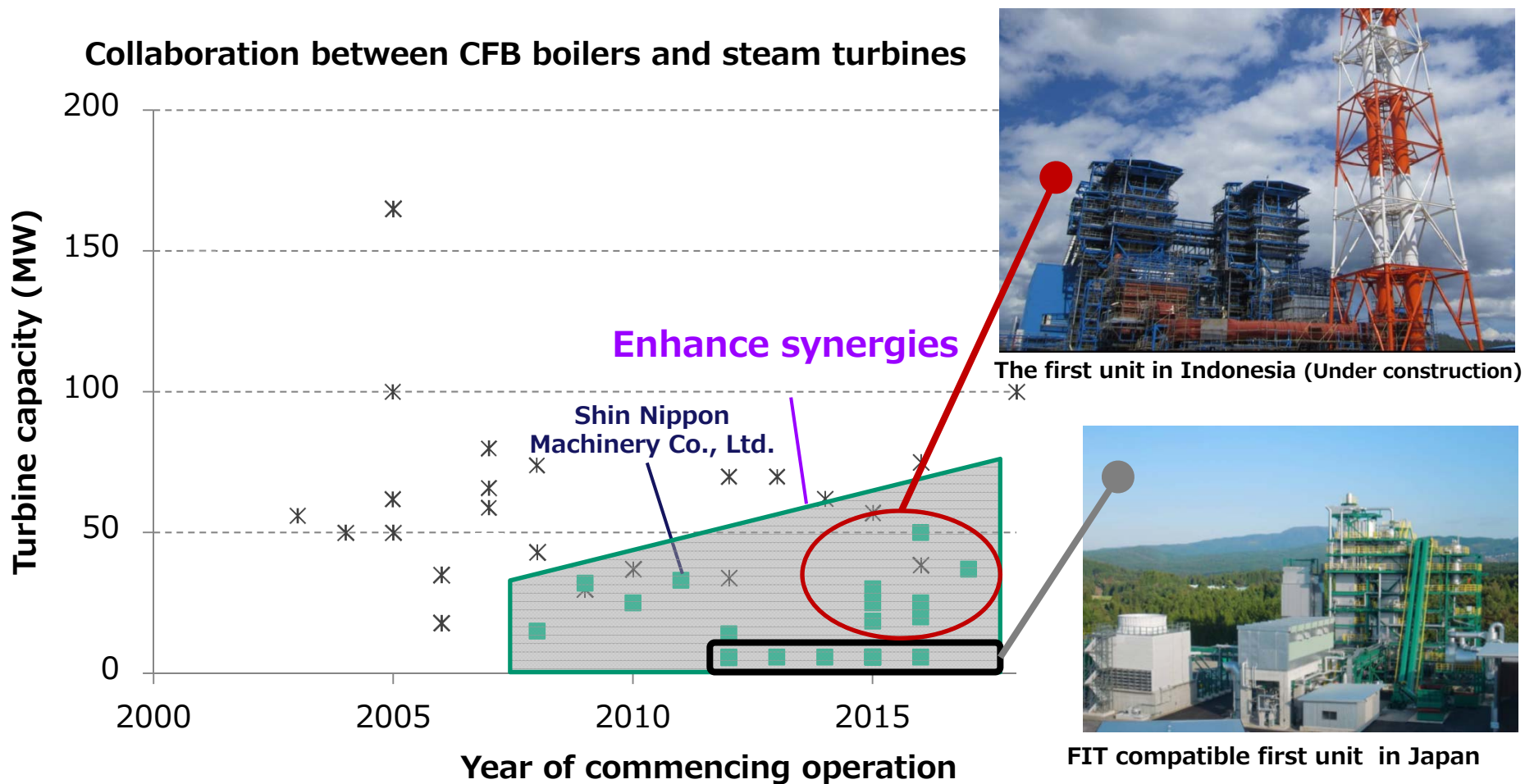
Ref. Establish the One-SHI network that encompasses CFB power plants

Through One-SHI activities, provide customers with the most optimum CFB power plants



Ref. History of Synergies Established with Shin Nippon Machinery Co., Ltd.

In the area of CFB power plants, steam turbines manufactured by Shin Nippon Machinery Co., Ltd. for plants less than 50MW are being utilized





All forward-looking statements regarding the company's future performance are based on information currently available to Sumitomo Heavy Industries and determined subjectively. Future performance is not guaranteed and all information related to future performance contained herein is subject to changes in business environments.