Carbon Forum Asia

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Technology Survey and Environmental Technology Mission for NAMA

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Outline

Part I :
Technology Survey for NAMAs

Part II:
Environmental Technology Mission from Japan

1. Technology Survey for NAMA

Image of NAMAs in relation to Emission Levels

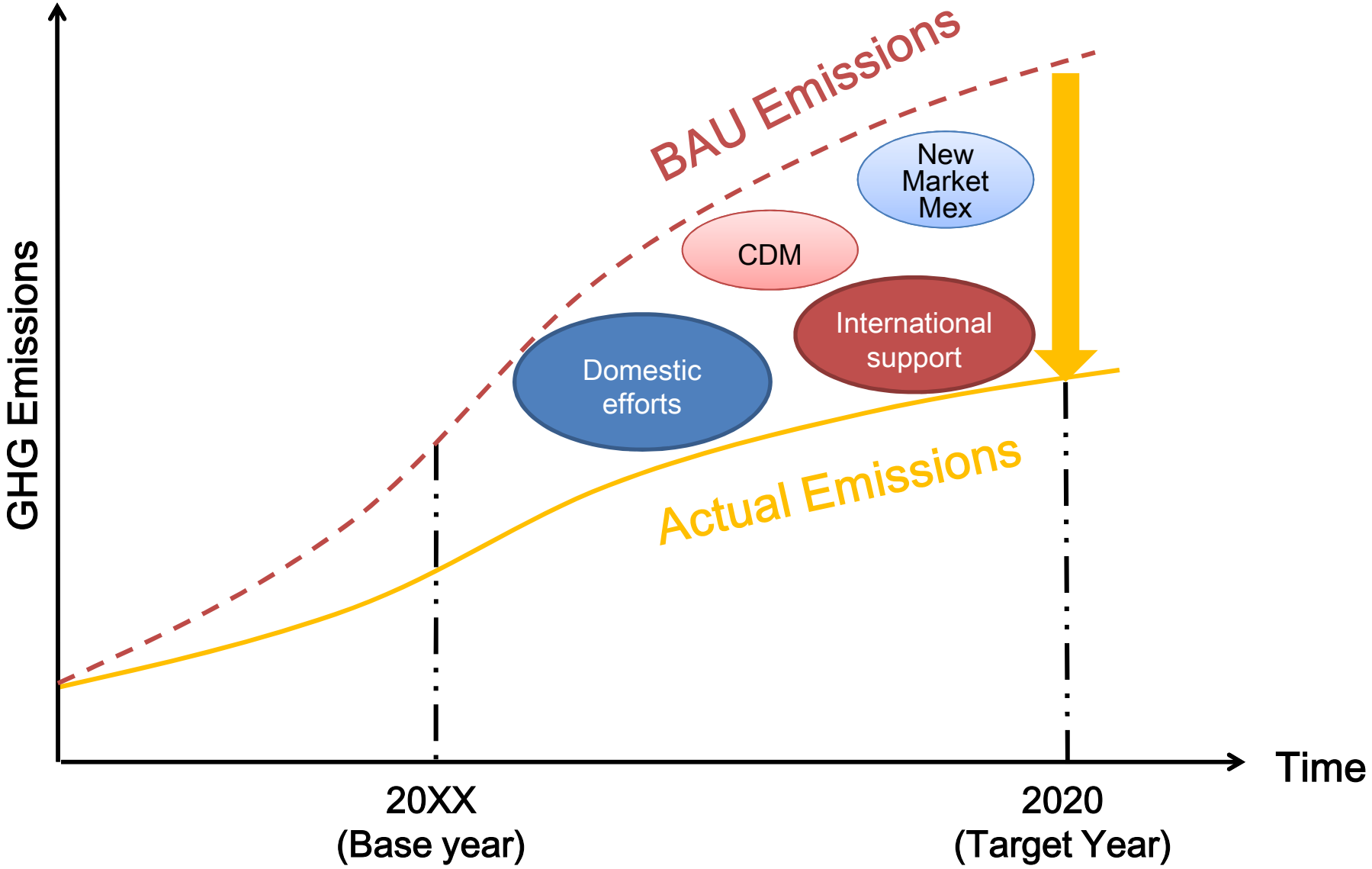
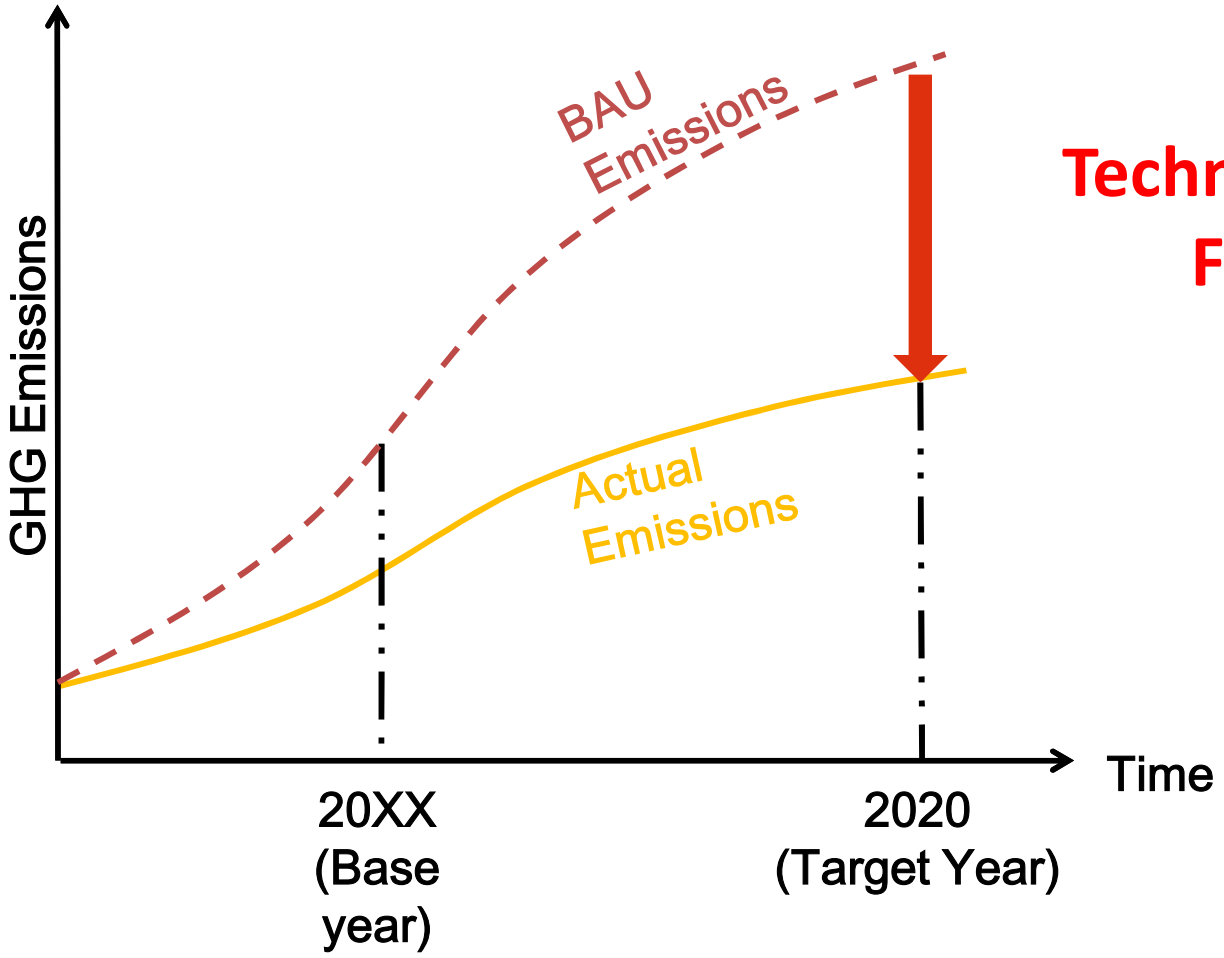
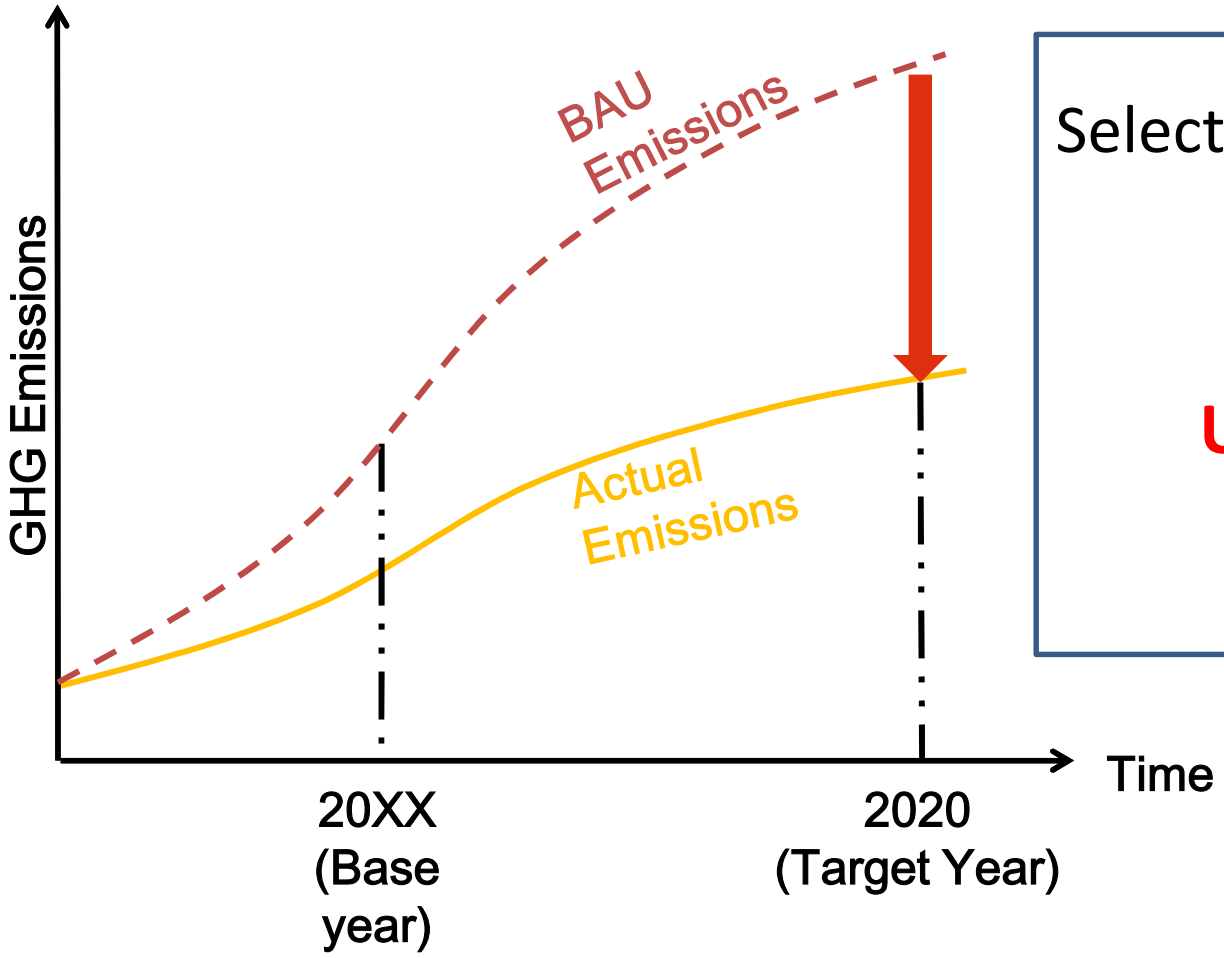


Image of NAMAs in relation to Emission Levels



Technology Support From Japan

Process of technology support from Japan



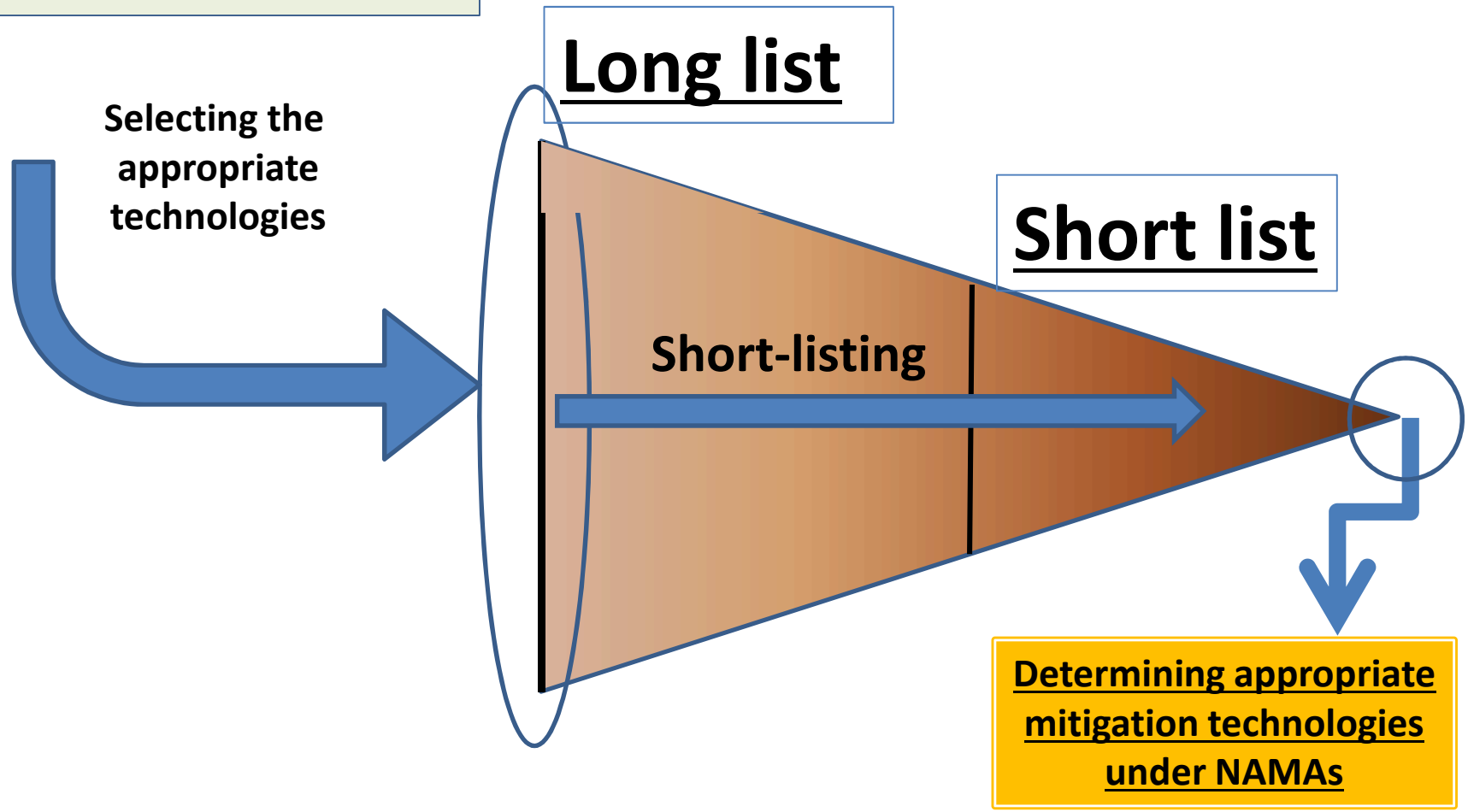
Technology Support From Japan

Selection of Appropriate Technology

Utilization of Technology

Collecting information of appropriate mitigation technologies

Information collection through trade fair, Interview/meeting with stakeholders, utilization of database, etc.



Collecting information of appropriate mitigation technologies

<1> Pick-up appropriate technologies from long-list and other source (an example)

Long list

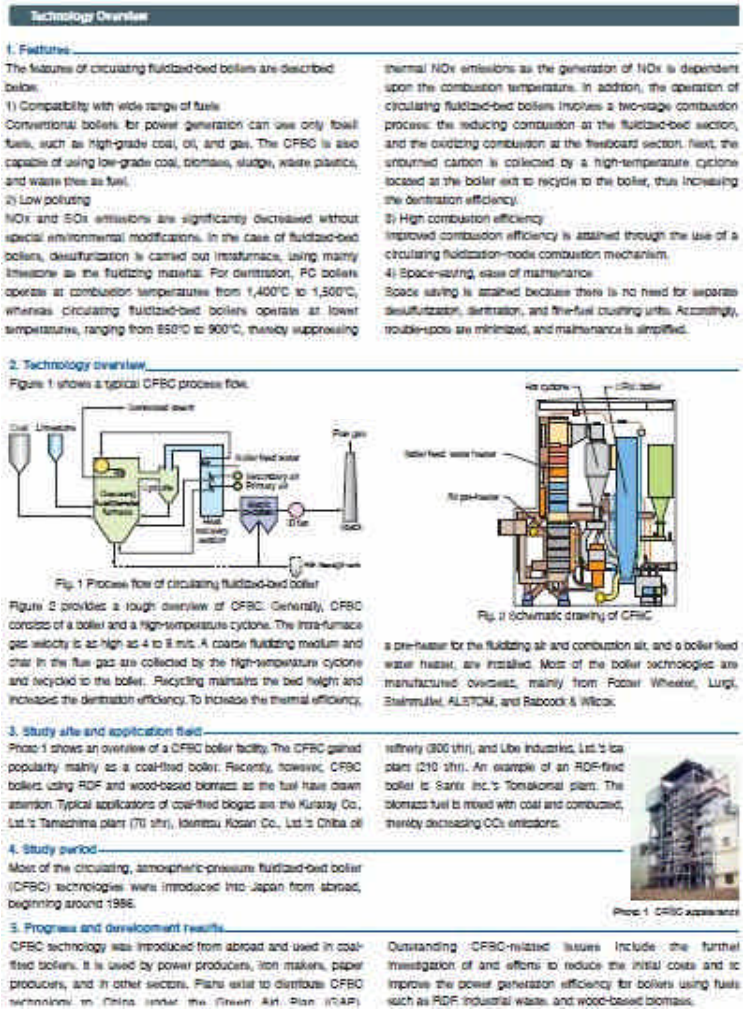
5. Energy Supply Improve CHP Plants

Energy Supply	classification (1)	classification (2)	classification (3)	classification (4)	Efficiency (Sending-
		coal combustion	pulverized coal firing	Highly-efficient Sub-critical Steam of Header System	around 36%
				Ultra Critical Steam Condition (SC)	around 38%
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Arranging the data, long-listing

Collecting information of appropriate mitigation technologies

Short list



Technology Overview

1. Features

The features of circulating fluidized-bed boilers are described below.

1) Compatibility with wide range of fuels

Conventional boilers for power generation can use only fossil fuels, such as high-grade coal, oil, and gas. The CFBC is also capable of using low-grade coal, biomass, sludge, waste plastics, and waste tires as fuel.

2) Low pollution

NOx and SOx emissions are significantly decreased without special environmental modifications. In the case of fluidized-bed boilers, desulfurization is carried out intrafurnace, using mainly limestone as the fluidizing material. For combustion, PC boilers operate at combustion temperatures from 1,400°C to 1,500°C, whereas circulating fluidized-bed boilers operate at lower temperatures, ranging from 850°C to 900°C, thereby suppressing thermal NOx emissions as the generation of NOx is dependent upon the combustion temperature. In addition, the operation of circulating fluidized-bed boilers involves a two-stage combustion process: the reducing combustion at the fluidized-bed section, and the oxidizing combustion at the freeboard section. Next, the unburned carbon is collected by a high-temperature cyclone located at the boiler exit to recycle to the boiler, thus increasing the combustion efficiency.

3) High combustion efficiency

Improved combustion efficiency is attained through the use of a circulating fluidization-mode combustion mechanism.

4) Space-saving, ease of maintenance

Space saving is attained because there is no need for separate desulfurization, denitration, and fine-fuel crushing units. Accordingly, trouble-spots are minimized, and maintenance is simplified.

2. Technology overview

Figure 1 shows a typical CFBC process flow.

Fig. 1 Process flow of circulating fluidized-bed boiler

Fig. 2 Schematic drawing of CFBC

Figure 2 provides a rough overview of CFBC. Generally, CFBC consists of a boiler and a high-temperature cyclone. The intra-furnace gas velocity is as high as 4 to 8 m/s. A coarse fluidizing medium and char in the flue gas are collected by the high-temperature cyclone and recycled to the boiler. Recycling maintains the bed height and increases the combustion efficiency. To increase the thermal efficiency, a pre-heater for the fluidizing air and combustion air, and a boiler feed water heater, are installed. Most of the boiler technologies are manufactured overseas, mainly from Foster Wheeler, Lurgi, Steinmuller, ALSTOM, and Babcock & Wilcox.

3. Study site and application field

Photo 1 shows an overview of a CFBC boiler facility. The CFBC gained popularity mainly as a coal-fired boiler. Recently, however, CFBC boilers using RDF and wood-based biomass as the fuel have drawn attention. Typical applications of coal-fired biogas are the Kuraray Co., Ltd.'s Tamashima plant (70 t/hr), Idemitsu Kosan Co., Ltd.'s Chiba oil refinery (300 t/hr), and Ube Industries, Ltd.'s Ica plant (210 t/hr). An example of an RDF-fired boiler is Sanix Inc.'s Tomakomai plant. The biomass fuel is mixed with coal and combusted, thereby decreasing CO_2 emissions.

Photo 1 CFBC appearance

4. Study period

Most of the circulating, atmospheric-pressure fluidized-bed boiler (CFBC) technologies were introduced into Japan from abroad, beginning around 1986.

5. Progress and development results

CFBC technology was introduced from abroad and used in coal-fired boilers. It is used by power producers, iron makers, paper producers, and in other sectors. Plans exist to distribute CFBC technology to China under the Green Art Plan (GAP).

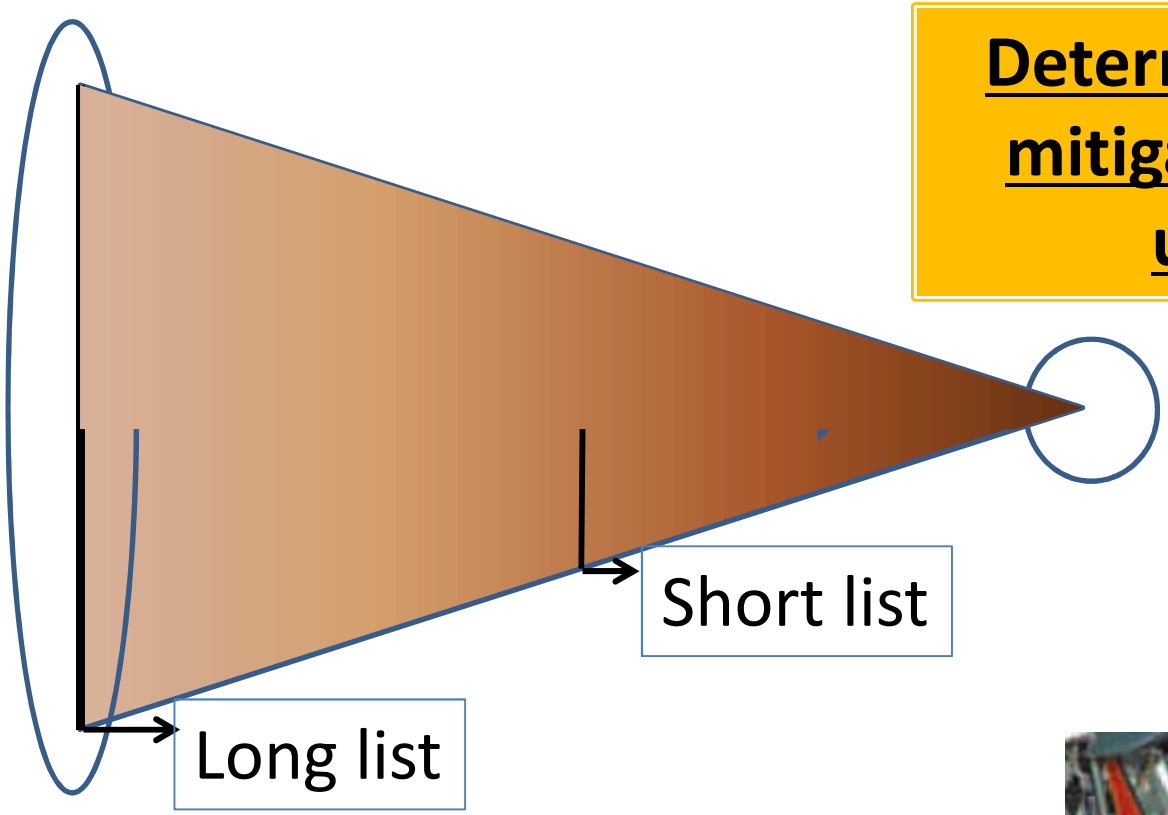
Outstanding CFBC-related issues include the further investigation of and efforts to reduce the initial costs and to improve the power generation efficiency for boilers using fuels such as RDF, industrial waste, and wood-based biomass.

Short-listing process

- ✓Surveying on needs and potentials of GHG mitigation technologies
- ✓Interview with certain stakeholders and collecting technology information.
- ✓Survey in the country
- ✓Revising the long list

Collecting information of appropriate mitigation technologies !!

Collecting information of appropriate mitigation technologies



Determining appropriate mitigation technologies under NAMAs

2. Environmental Technology Mission from Japan

Introduction of Japanese entities

Examples

Renewable Energy

Solar cooling with the absorption chiller

Biomass Utilization

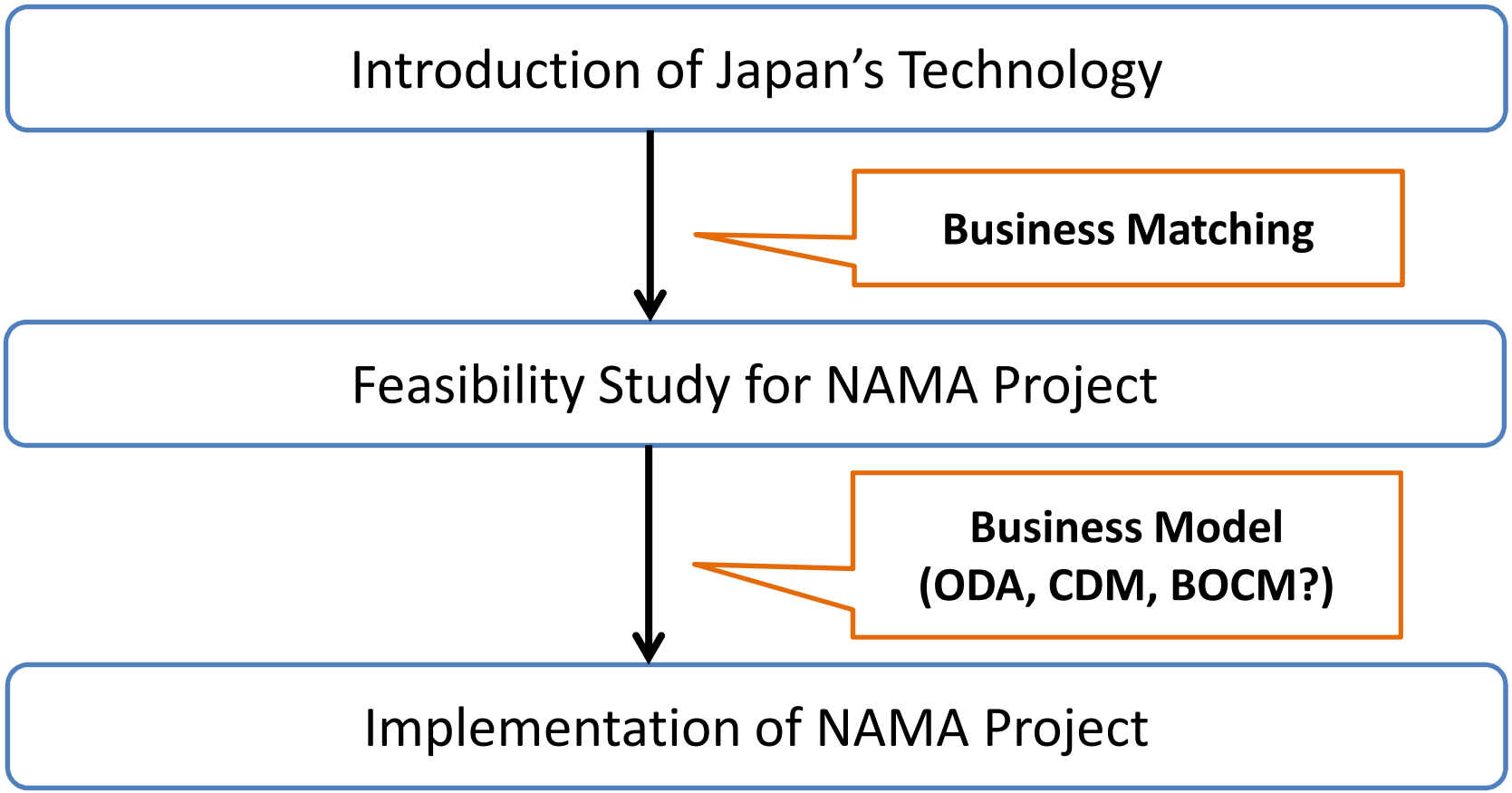
Small scale independent electric generator unit using biomass

Transportation

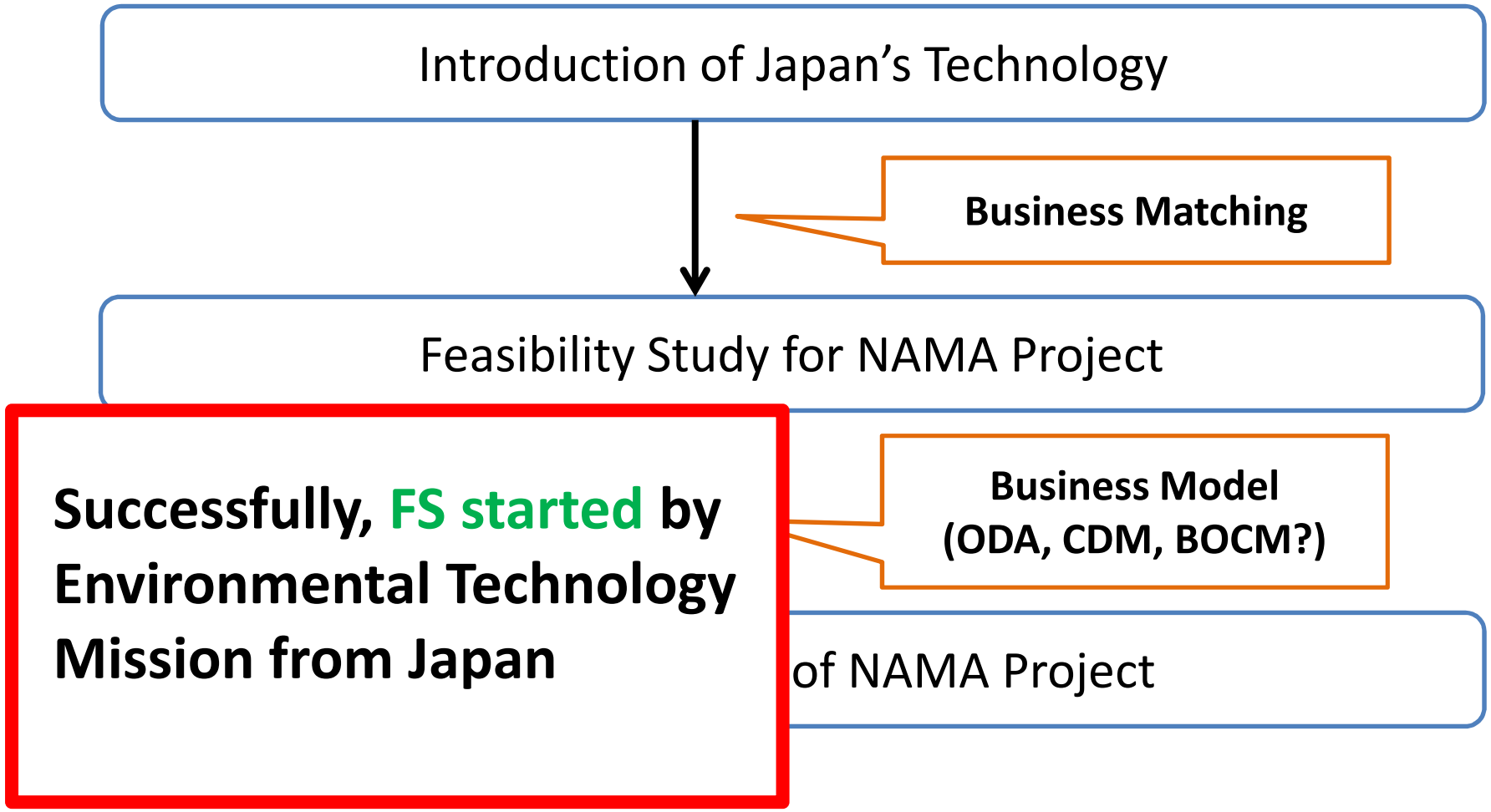
Vehicle systems, light rail vehicles and power supply system of railway transportation

2012 Environmental Technology Mission from Japan

Introduction of Japan's Technology for Low Carbon Society



Introduction of Japan's Technology for Low Carbon Society



Thank you for your attention…

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(New Mechanisms Information Platform)