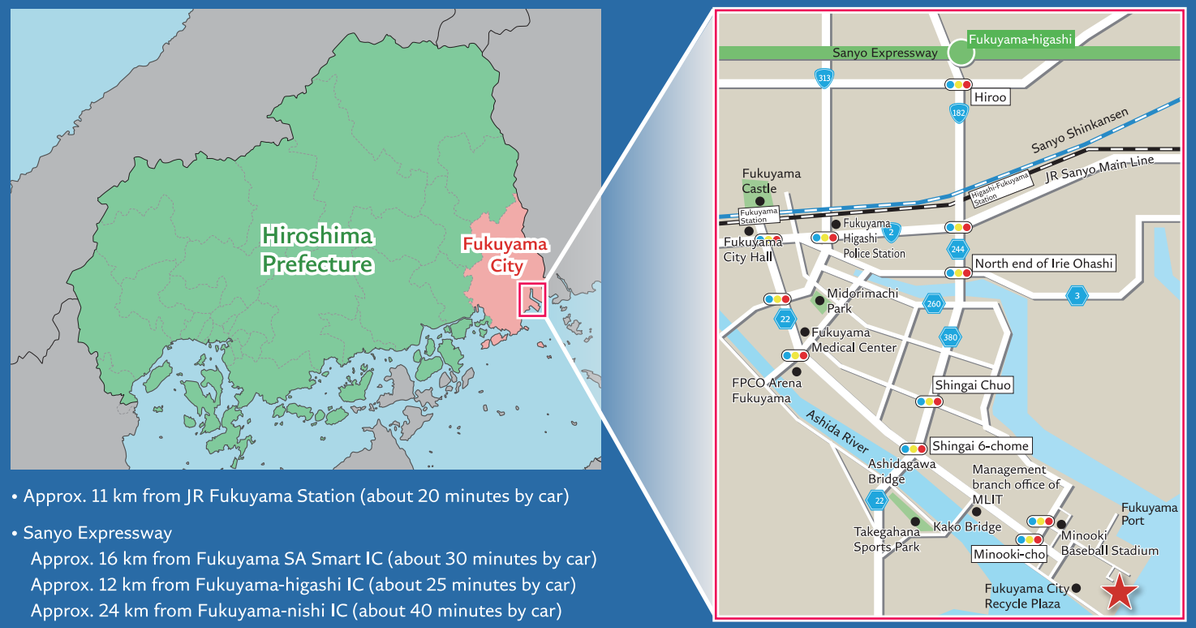
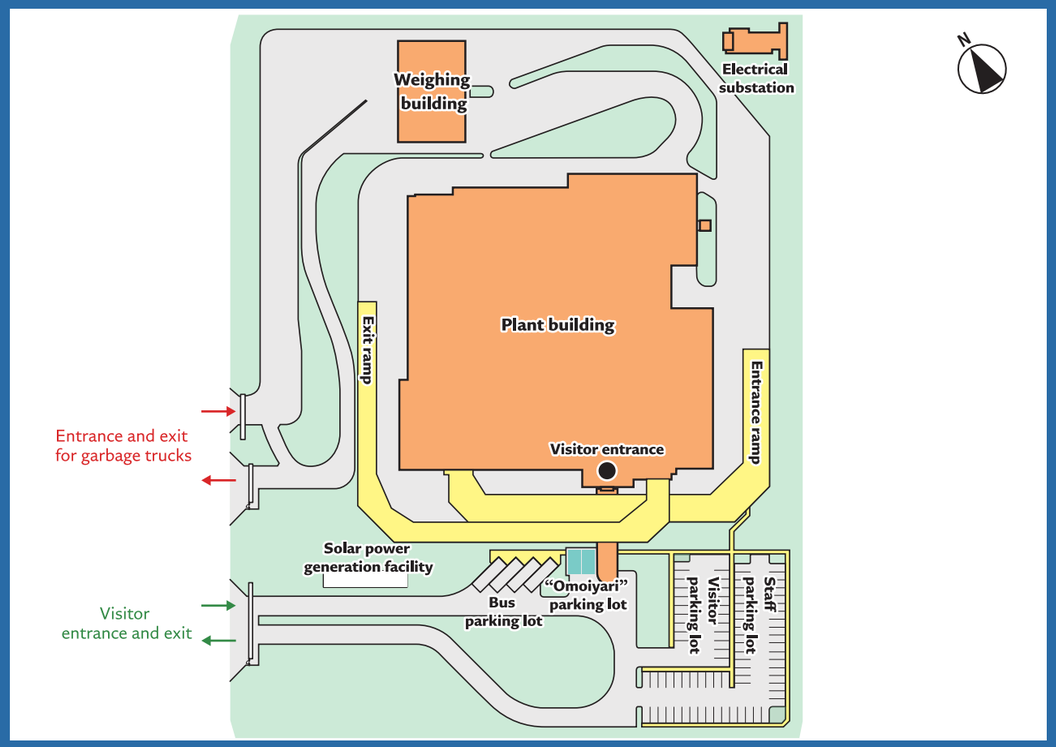
Facility Information and Access



- Approx. 11 km from JR Fukuyama Station (about 20 minutes by car)
- Sanyo Expressway
  Approx. 16 km from Fukuyama SA Smart IC (about 30 minutes by car)
  Approx. 12 km from Fukuyama-higashi IC (about 25 minutes by car)
  Approx. 24 km from Fukuyama-nishi IC (about 40 minutes by car)

Facility Layout



Operating Entity: 福山市 Fukuyama City
Design and construction supervision: 復建調査設計株式会社 FUKKEN CO.,LTD.
Design and construction: JFE Engineering Corporation
Operation: Eco Service Fukuyama Co., Ltd.

Fukuyama Rose Energy Center
107-14 Minooki-cho, Fukuyama City, Hiroshima +81-84-981-2020

First edition: July 2024

福山市 Fukuyama City

Fukuyama Rose Energy Center

Fukuyama Environmental Improvement Center

The Fukuyama Rose Energy Center utilizes energy and resources well to everyone's benefit!

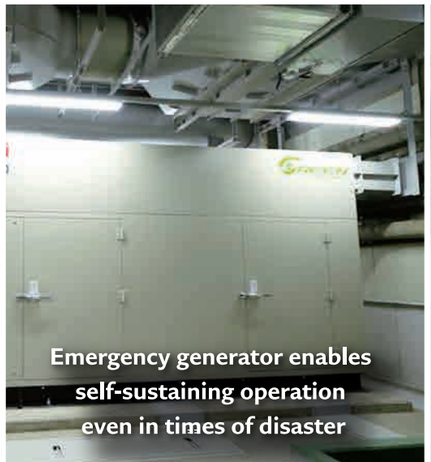
- The center processes burnable waste and other waste from Fukuyama City, Fuchu City, and Jinsekikogen Town
- It is a waste-to-energy facility that combusts waste to produce electricity while reducing greenhouse gas emissions by promoting local energy production for local consumption in conjunction with Fukuyama Mirai Energy Corporation, a regional new electric power company
- All incinerator bottom ash and fly ash is recycled to extend the life of final disposal sites

Operating entity	Fukuyama City	Design and construction	JFE Engineering Corporation
Project type	DBO (Design, Build, Operate)		September 29, 2020 to July 31, 2024
		Operation	Eco Service Fukuyama Co., Ltd.
			August 1, 2024 to March 31, 2044


Among the highest capacities in the Chugoku/Shikoku region to process waste


Waste crane grabs up to 6 tons of waste


Stable waste incineration


Emergency generator enables self-sustaining operation even in times of disaster


High-efficiency waste power generation

Waste Processing Flow | Safe waste treatment using the latest technology and equipment

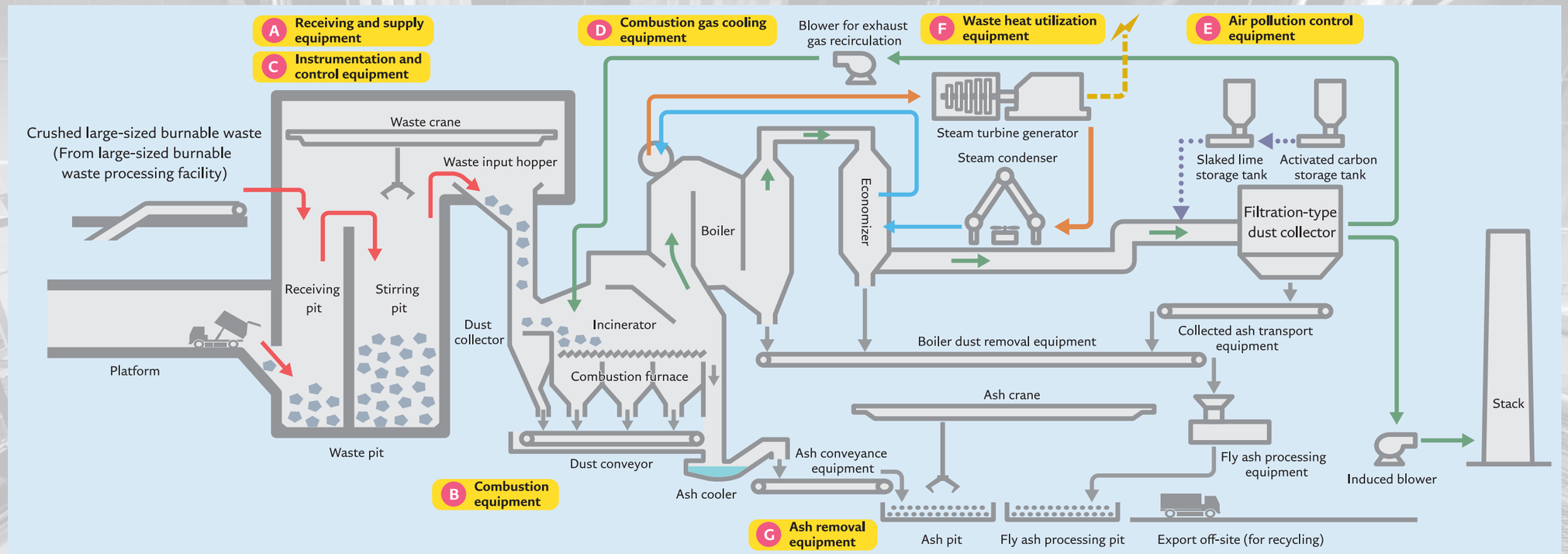
Facility Overview

Nickname	Fukuyama Rose Energy Center
Official name	Fukuyama Environmental Improvement Center
Location	107-14 Minooki-cho, Fukuyama City, Hiroshima
Processing method	Stoker incineration system
Processing capacity	Incineration facility: 600 tons/day (200 tons/day x 3 furnaces) Large-sized waste treatment facility: 16 tons/5 hours
Waste processed	Burnable waste, large-sized burnable waste, etc.
Structure	Reinforced concrete construction Steel-framed reinforced concrete and steel-framed structure (in part)
Number of floors	6 overground floors, 1 underground floor
Building height	39 m
Stack height	59 m
Site area	Approx. 40,500 m²
Building footprint	Approx. 11,800 m²
Total floor area	Approx. 18,200 m²

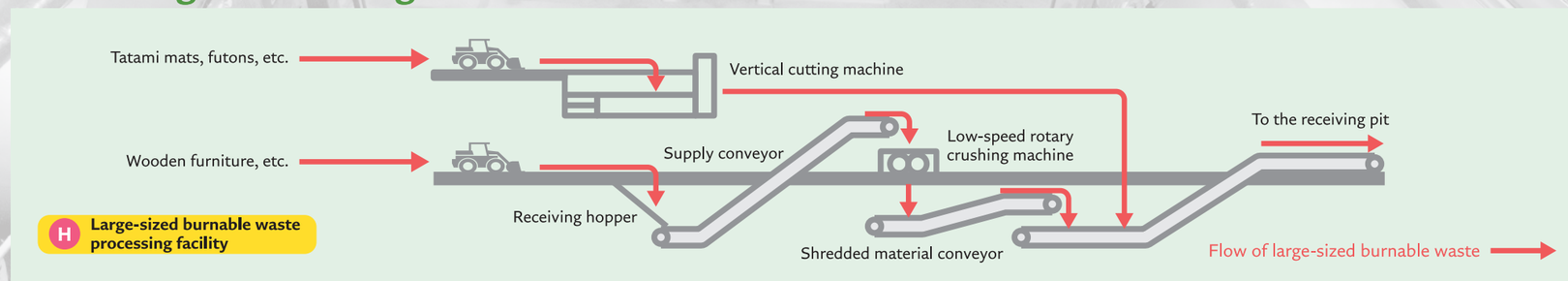
Equipment Overview

Receiving and supply equipment	Pit & crane system
Combustion equipment	Fully-continuous-combustion stoker incinerator
Combustion gas cooling equipment	Waste heat boiler system (6.0 MPa, 450°C)
Air pollution control equipment	Filtration-type dust collector Dry scrubbing toxic gas removal
Waste heat utilization equipment	Steam turbine generator Rated output: 14,500 kW (max. power generation efficiency: 27.6%)
Ventilation equipment	Balanced ventilation system
Ash removal equipment	Pit system
Fly ash processing equipment	Chemical treatment system
Water supply equipment	Drinking water, industrial water
Wastewater treatment equipment	Reuse within facility, discharge into public sewage system
Electrical equipment	Special high-voltage power supply

Burnable waste processing flow



Processing flow for large-sized burnable waste



Waste flow
Steam flow
Water flow
Ash flow
Exhaust gas flow
Chemicals flow
Electricity

Waste flow

The waste pit for storing waste is divided into a receiving pit and a stirring pit. Garbage trucks dump waste from the platform into the receiving pit. A remotely controlled waste crane then transfers the waste to the stirring pit, stir it, and feed it into the waste input hopper.

Exhaust gas flow and chemicals flow

The high-temperature exhaust gas produced from incinerating waste is cooled down below 200°C using a boiler and economizer. Slaked lime and activated carbon are sprayed into the cooled exhaust gas to neutralize and adsorb harmful substances (sulfur oxides, chlorides, dioxins, etc.), after which they are removed by a filtration-type dust collector.

Water flow and steam flow

Heat from the high-temperature exhaust gas produced from incinerating waste is used to generate high-temperature, high-pressure steam in a boiler. This steam is sent to a steam turbine generator to generate electricity. It is then cooled in a steam condenser and converted back into water. The water is then sent to the boiler and used again in the same process.

Ash flow

The incinerator bottom ash that remains after incinerating waste is stored in the ash pit. Fly ash collected by the boiler and filtration-type dust collector is processed by the fly ash processing equipment and stored in the fly ash processing pit. All stored ash is transported to a recycling facility, where it is completely recycled.

Flow of large-sized burnable waste

Among the large-sized burnable waste collected and brought to the facility, soft items such as tatami mats and futons are shredded by a vertical cutting machine, while other items (such as wooden furniture) are broken down into small pieces using a low-speed rotary crushing machine before being transported to the receiving pit.

We process waste safely and use the thermal energy and leftover ash effectively!

A Receiving and supply equipment

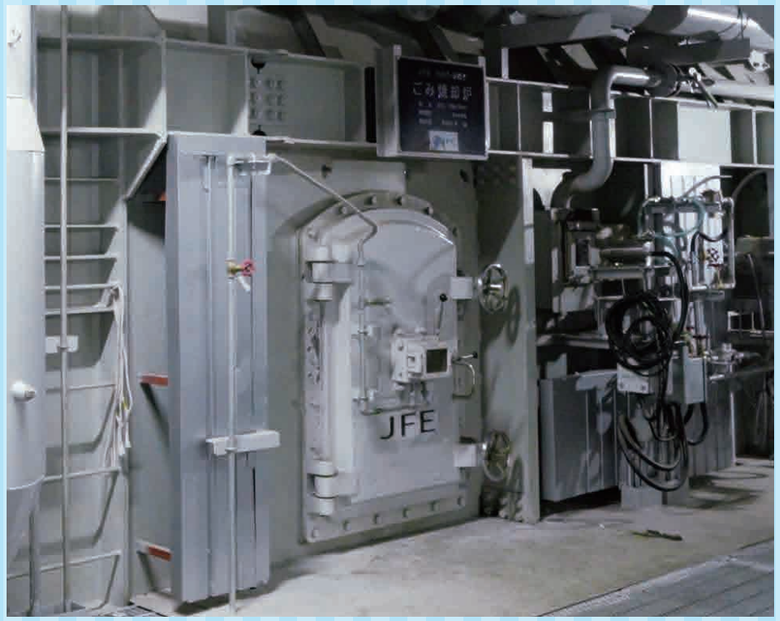
Truck scale
Each vehicle is weighed on a truck scale to total the amount of waste collected.

Platform
After the garbage trucks are weighed, they dump their contents into the waste pit through one of eight loading gates. A double gate system and controlled air pressure are employed to prevent odors from leaking out.

Waste pit
Waste dumped into the receiving pit is transferred by waste crane into the stirring pit, where it is stirred so that it burns well. The capacity of the waste pit is 26,000 m³ (equivalent to about fifty 25-meter swimming pools).

B Combustion equipment

Incinerator
Combustion in the incinerator is controlled automatically to burn waste completely. The combustion takes place at temperatures over 850°C to reduce the production of harmful substances, including dioxins. High-temperature air combustion technology enables stable combustion using less air for greater energy efficiency.



Inside the incinerator

Inside the incinerator (during combustion)

C Instrumentation and control equipment

Central control room
From this room, the operational status of the entire facility is monitored (including the temperature inside the incinerator and the concentration of harmful substances in the exhaust gas) and equipment is operated remotely. Remote monitoring and remote operation from outside the facility is also used to ensure the safe, stable treatment of waste.

D Combustion gas cooling equipment

Boiler
Heat from the exhaust gas produced from incinerating waste is used to generate high-temperature, high-pressure steam, which is then sent to the turbine.

E Air pollution control equipment

Filtration-type dust collector
This system uses rows of tubular filters to filter exhaust gas treated with slaked lime and activated carbon, removing harmful substances such as sulfur oxides and hydrogen chloride as well as dust.

Exhaust gas under stricter control than legal standards

	Voluntary standard values	Legal and regulatory standards
Soot and dust	0.008 g/m³N	0.04 g/m³N
Sulfur oxides	20 ppm	K value of 2.34 (approx. 200 ppm)
Nitrogen oxides	50 ppm	250 ppm
Hydrogen chloride	80 mg/m³N	700 mg/m³N
Mercury	30 μg/m³N	30 μg/m³N
Dioxins	0.05 ng-TEQ/m³N	0.1 ng-TEQ/m³N

F Waste heat utilization equipment

Steam turbine generator
High-temperature, high-pressure steam sent from the boiler turns turbines to generate power from waste with high efficiency.

G Ash removal equipment

Ash pit and fly ash processing pit
Incinerator bottom ash, generated from burning waste in the incinerator, and the fly ash collected from the boiler and filtration-type dust collector are stored here.

H Large-sized burnable waste processing facility

Inside the cutting machine

Vertical cutting machine
Soft, large-sized burnable waste such as tatami mats and futons are cut into fixed lengths with powerful blades.

Low-speed rotary crushing machine
Wooden furniture and other items are crushed into small pieces by two blades that rotate in opposite directions.