

Jera



# FUTTSU

## THERMAL POWER STATION

WELCOME TO FUTTSU THERMAL POWER STATION!

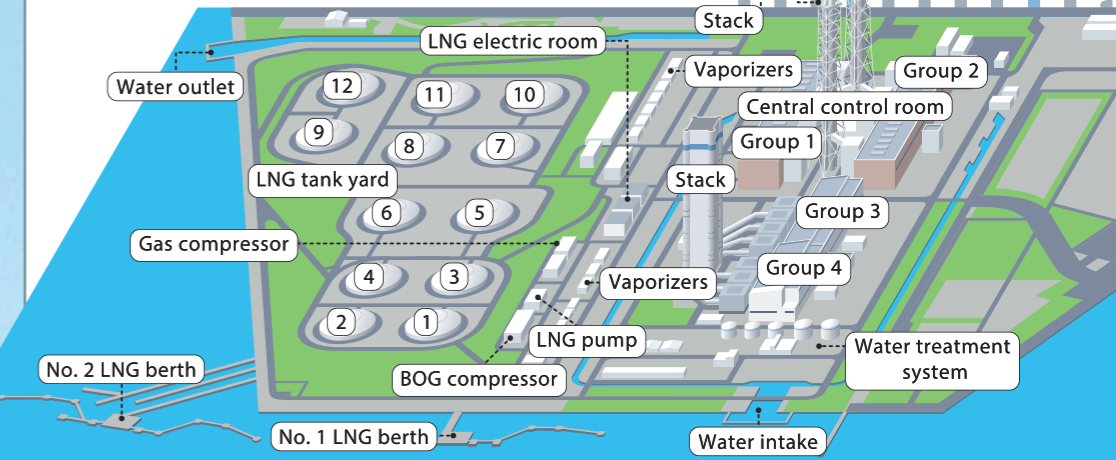
The full lineup of our combined-cycle  
power stations



# The full lineup of our combined-cycle power stations

The Futtsu Power Station is situated on the west coast of the Boso Peninsula, just north of Futtsu Cape which faces Tokyo Bay. Group 1 went into full operation in 1986. It is now one of the largest power stations in Japan, with four groups and 21 generators. It plays a wide range of roles, from supplying baseload power to responding to peaks in demand. It also has two berths for LNG tankers as well as an on-site LNG terminals comprising 12 underground tanks. Gas pipelines supply gas to other thermal power stations in Chiba Prefecture, while the East-West Connecting Gas Pipeline supplies gas to thermal power stations in Kanagawa Prefecture.

## Overall layout of the power station



## Outline of facilities

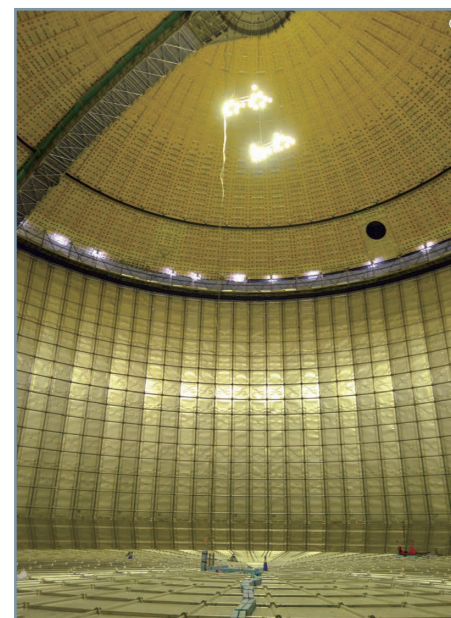
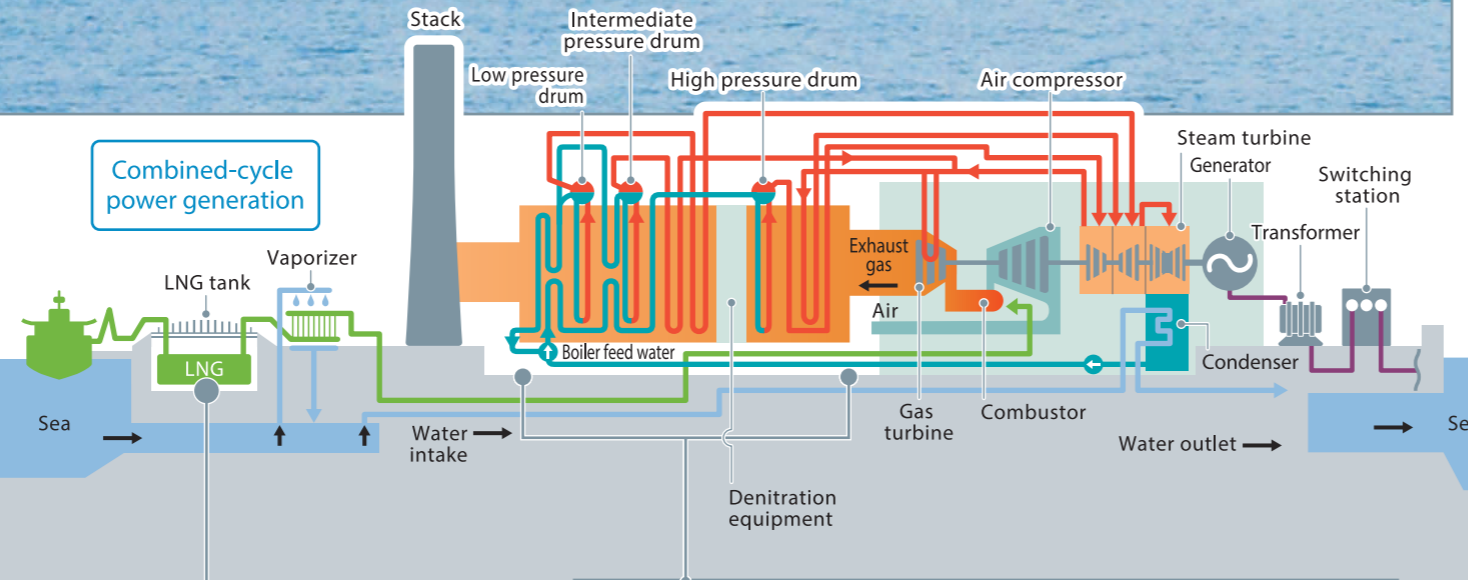
Unit No.	Output (MW)	Fuel	COD	GT combustion temperature (°C)	Power generation type
Group 1	1-1	LNG	December 1985	1,150	Combined cycle
	1-2		February 1986	1,150	
	1-3		May 1986	1,150	
	1-4		May 1986	1,150	
	1-5		July 1986	1,150	
	1-6		September 1986	1,150	
	1-7		November 1986	1,100	
Group 2	2-1	LNG	December 1987	1,300	Combined cycle
	2-2		February 1988	1,300	
	2-3		April 1988	1,300	
	2-4		May 1988	1,300	
	2-5		September 1988	1,300	
	2-6		September 1988	1,300	
	2-7		November 1988	1,300	
Group 3	3-1	LNG	November 2003	1,300	Combined cycle
	3-2		July 2003	1,300	
	3-3		December 2001	1,300	
	3-4		July 2001	1,300	
Group 4	4-1	LNG	July 2008	1,500	Combined cycle
	4-2		November 2009	1,500	
	4-3		October 2010	1,500	

Name: Futtsu Thermal Power Station Location: Futtsu City, Chiba Prefecture Site area: Approx. 1,160,000 m<sup>2</sup>

### CHECK! Features

## One of the largest power stations and LNG terminals in Japan

The Futtsu Power Station is one of the largest power stations in Japan with a full lineup of combined-cycle power generation (1,100°C, 1,150°C, 1,300°C, and 1,500°C classes). It also has an LNG terminal which is one of the largest in Japan and receives approx. 11 million tons of LNG annually.

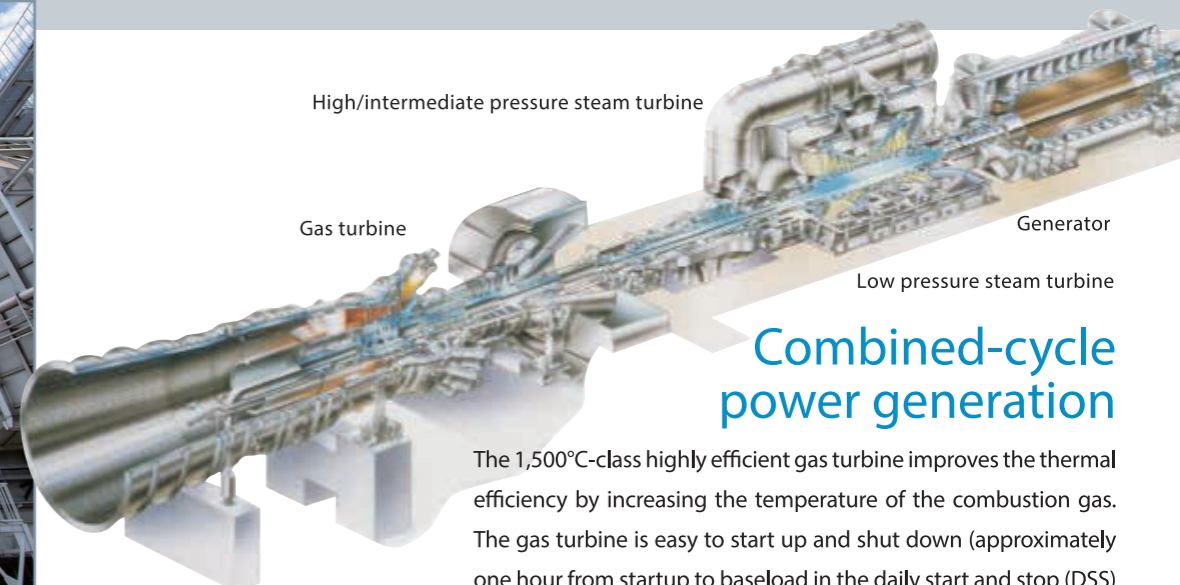


## LNG underground tank

Underground tanks ensure high levels of safety in the event of an earthquake, and can handle a various type of LNG, from rich to lean. In 2019, two tanks were added to further improve the operation capacity of the overall facility.

## Heat recovery steam generator

The heat recovery steam generator plays a key role in utilizing the waste heat of the exhaust gas from the gas turbine to generate steam for driving the steam turbine.



## Combined-cycle power generation

The 1,500°C-class highly efficient gas turbine improves the thermal efficiency by increasing the temperature of the combustion gas. The gas turbine is easy to start up and shut down (approximately one hour from startup to baseload in the daily start and stop (DSS) operation), and can thus respond quickly and appropriately to fluctuations in electricity demand.

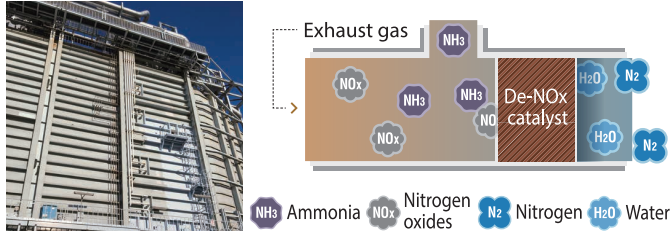


# Environmental Initiatives

## Preventing air pollution

The power station is fueled with LNG and therefore does not discharge SOx which are the cause of particulate matter and acid rain. The use of low-NOx burners and exhaust gas denitration equipment has also reduced the discharge of nitrogen oxides. The white smoke rising from the plant stacks on cool days is steam.

Exhaust gas denitration equipment (removal of NOx)



Ammonia is injected into the exhaust gas. The de-NOx catalyst stimulates a chemical reaction that turns the nitrogen oxides into harmless nitrogen and water.

## Keeping the oceans clean

The equipment cleaning water and general waste water generated at the power station undergoes pre-processing such as oil separation and neutralization. It is then purified by means of condensation, sedimentation, filtration and neutralization, and the water quality is checked before it is discharged.

## Protecting the global environment

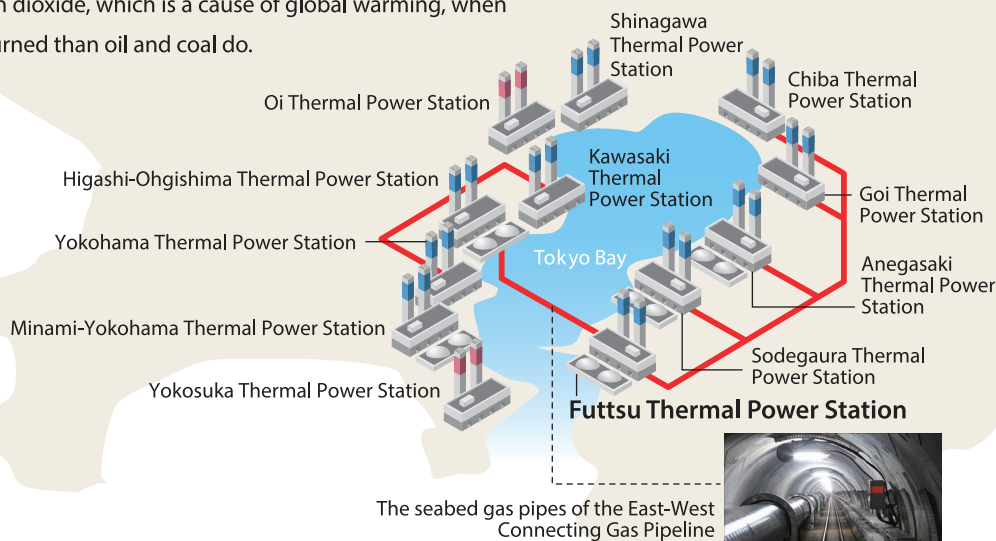
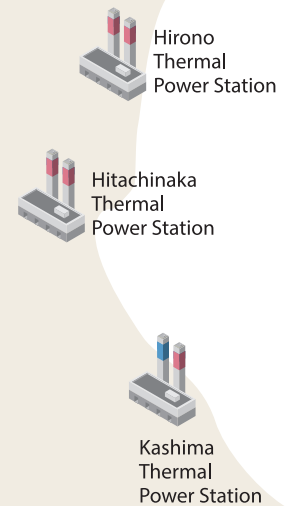
Since power stations make use of the earth's enriched resources, it is important to achieve high level of thermal efficiency when generating electricity due to preservation of the global environment. In addition, greater generating efficiency means that less carbon dioxide, which causes global warming, is produced. We are committed to conserve the earth's finite resources and curb global warming by leveraging the technical capabilities we have accumulated over the years and by introducing highly efficient power generating equipment.

## What is LNG?

LNG stands for Liquefied Natural Gas (predominantly methane), that has been cooled to around -162°C to be liquefied. Cooling and liquefaction reduce the volume of natural gas to approximately 1/600th, allowing it to be transported and stored in large quantities. So the gas is converted into LNG in the countries where it is produced before being transported to Japan. During the process of liquefaction, dust, moisture, sulfur are removed. Moreover, SOx is not generated during combustion, so LNG is a clean form of energy. Another advantage is that it produces less carbon dioxide, which is a cause of global warming, when it is burned than oil and coal do.

## Gas pipelines

The LNG facility at the power station supplies gas to power stations in Chiba Prefecture via a gas pipeline. The East-West Connecting Gas Pipeline is buried under the seabed of Tokyo Bay, links the power station with the Higashi-Ohgishima Power Station on the other side of the bay. This means that gas can be supplied from the eastern side to the western side, giving us flexibility in how we use LNG.



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