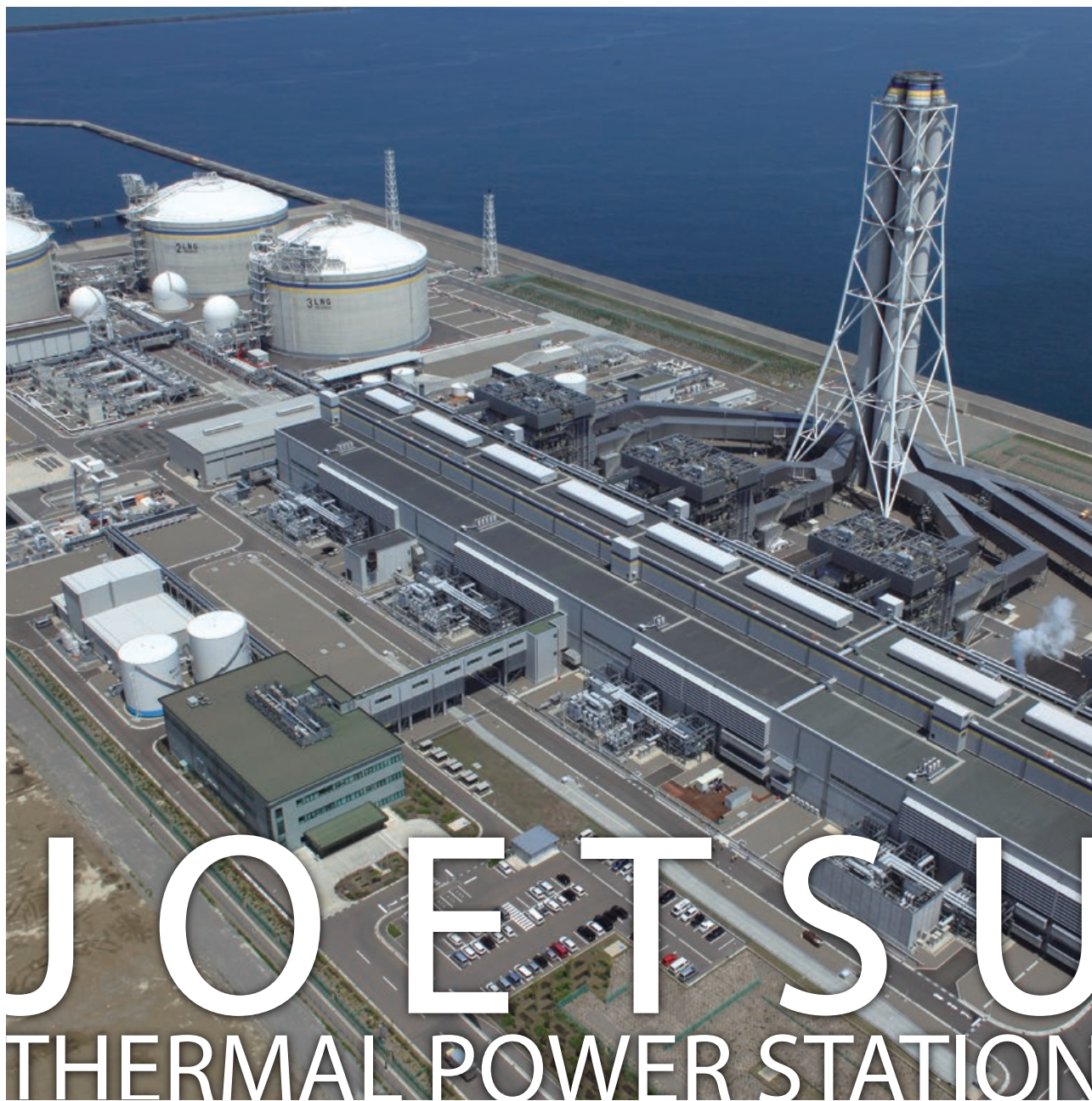


Jera



JOETSU

THERMAL POWER STATION

WELCOME TO JOETSU THERMAL POWER STATION!

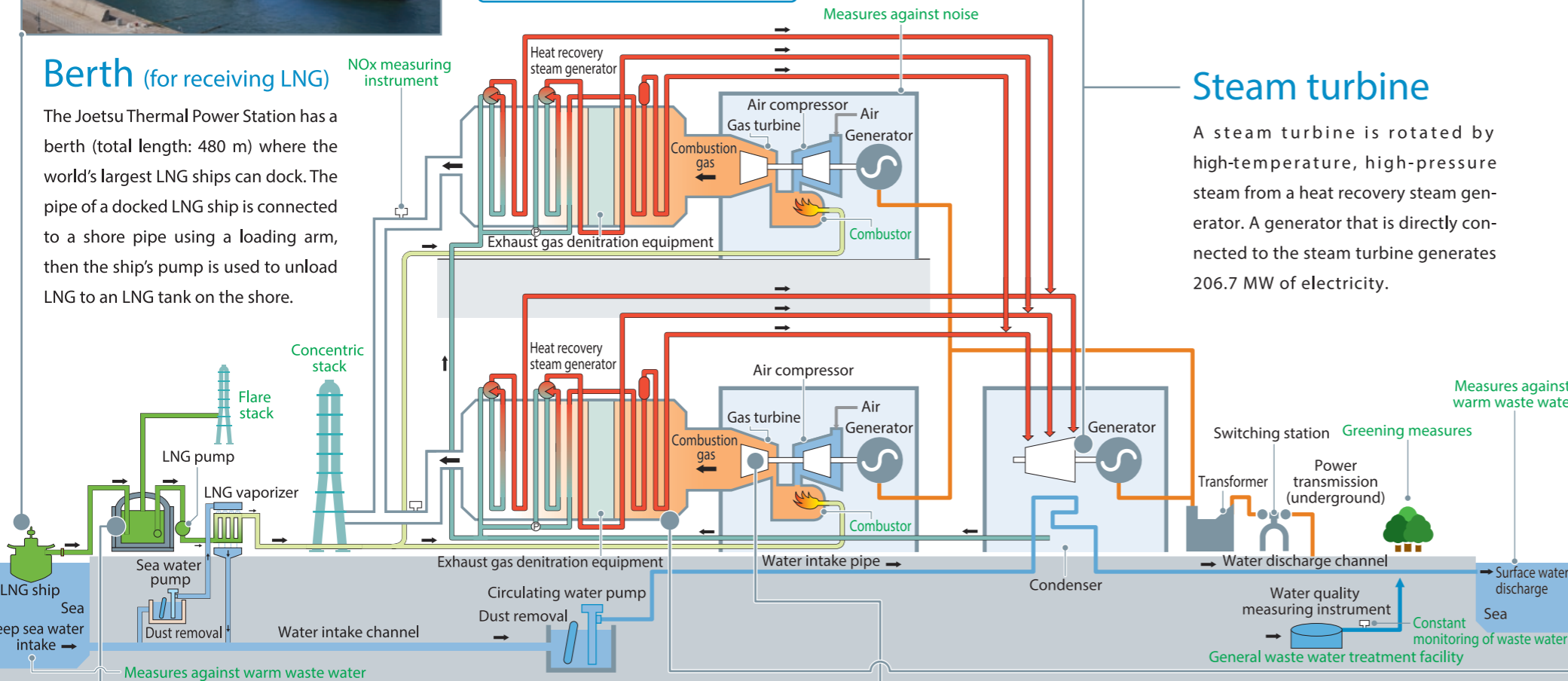
The Joetsu Thermal Power Station is located on the coast facing the Sea of Japan. Constructed on reclaimed land on the east side of Naoetsu Port in Joetsu City, Niigata Prefecture. Since the first unit began operating in 2012, the power station has provided Nagano Prefecture and other areas with a stable supply of electricity. It went into full operation in May 2014 with the entire two groups (four generators) beginning operations. The power station employs a multi-shaft combined-cycle power generation system that consists of two 1,300°C-class gas turbines and one steam turbine, with a total output of 2,380 MW. The 460,000 m² site has a berth and LNG tanks for receiving LNG.



Berth (for receiving LNG)

The Joetsu Thermal Power Station has a berth (total length: 480 m) where the world's largest LNG ships can dock. The pipe of a docked LNG ship is connected to a shore pipe using a loading arm, then the ship's pump is used to unload LNG to an LNG tank on the shore.

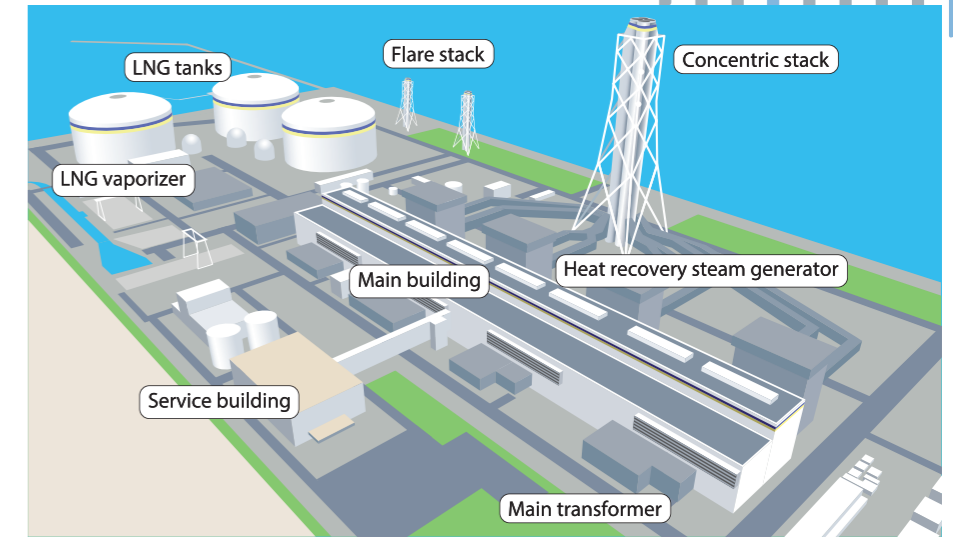
Combined-cycle power generation



Steam turbine

A steam turbine is rotated by high-temperature, high-pressure steam from a heat recovery steam generator. A generator that is directly connected to the steam turbine generates 206.7 MW of electricity.

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	July 2012	1,300	Combined cycle
	1-2		January 2013	1,300	
Group 2	2-1		July 2013	1,300	
	2-2		May 2014	1,300	

Name: Joetsu Thermal Power Station Location: Joetsu City, Niigata Prefecture Site area: Approx. 460,000 m²



Central control room which allows operation by a small number of operators

The equipment control has been fully automated, enabling operation and control by using a mouse. The data of power generation and LNG receiving equipment can be checked in real time, achieving integrated monitoring and operation of the entire power station.

LNG tanks

LNG transported by LNG ships from abroad is stored in three LNG tanks on the site and is used as fuel for power generation. At the Joetsu Thermal Power Station, the dikes are integrated with the tanks for effective utilization of the site.

- Height: 54.0 m, outer tank diameter: 83.2 m, inner tank diameter: 81.0 m, capacity: 180,000 m³



Gas turbine

Fuel is burnt in the compressed air, and the high-temperature combustion gas (at approximately 1,300°C) is used to drive a gas turbine. A generator that is directly connected to the gas turbine generates 194.15 MW of electricity.



Heat recovery steam generator

The heat recovery steam generator generates steam by heat exchange of exhaust gas (approximately 600°C) from a gas turbine and sends the steam to a steam turbine. An exhaust gas denitration equipment is built into this steam generator.



Environmental Initiatives

Preventing air pollution

The power station is fueled with LNG and therefore does not discharge the sulfur oxides 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.

Keeping the oceans clean

The 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.



Flare stack

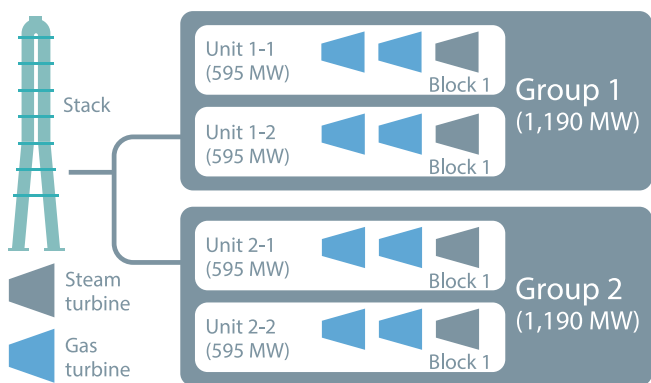
LNG is in a liquid state at about -160°C , but the heat influx from the surroundings increases the temperature inside the tank and causes the liquid to evaporate. LNG is a liquid at about -160°C and returned to its gaseous state when it is warmed by the outside temperature. In normal operation, the gas is used as a fuel for power generation. When the generated gas cannot be treated due to equipment maintenance etc., waste combustible gas is formed. The main component of the gas is methane, which has a significant environmental impact when released into the atmosphere without being treated, so a flare stack is used to burn the gas and thus reducing its environmental impact.



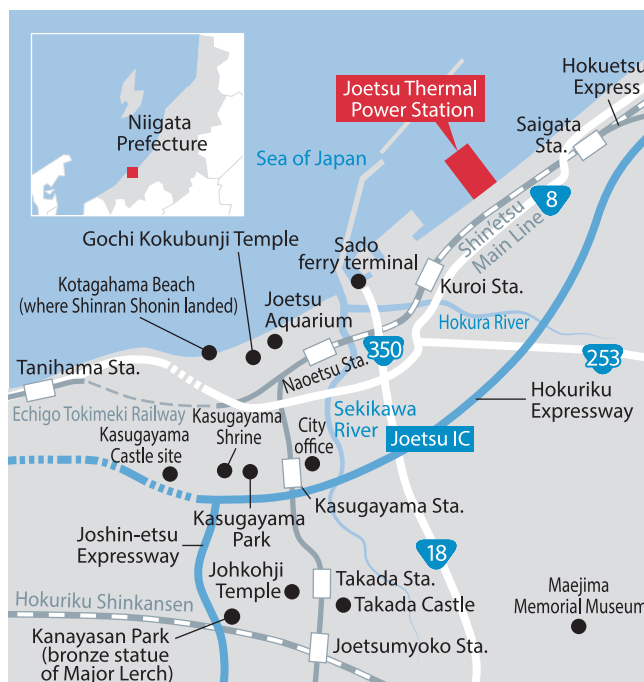
Exhaust gas denitrizer

An exhaust gas denitrizer that uses the dry ammonia catalytic reduction method is installed to reduce nitrogen oxides in the exhaust gas. Ammonia gas is fed into the flue gas converting the nitrogen oxides into harmless nitrogen and water.

Group configuration



Group symbol



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