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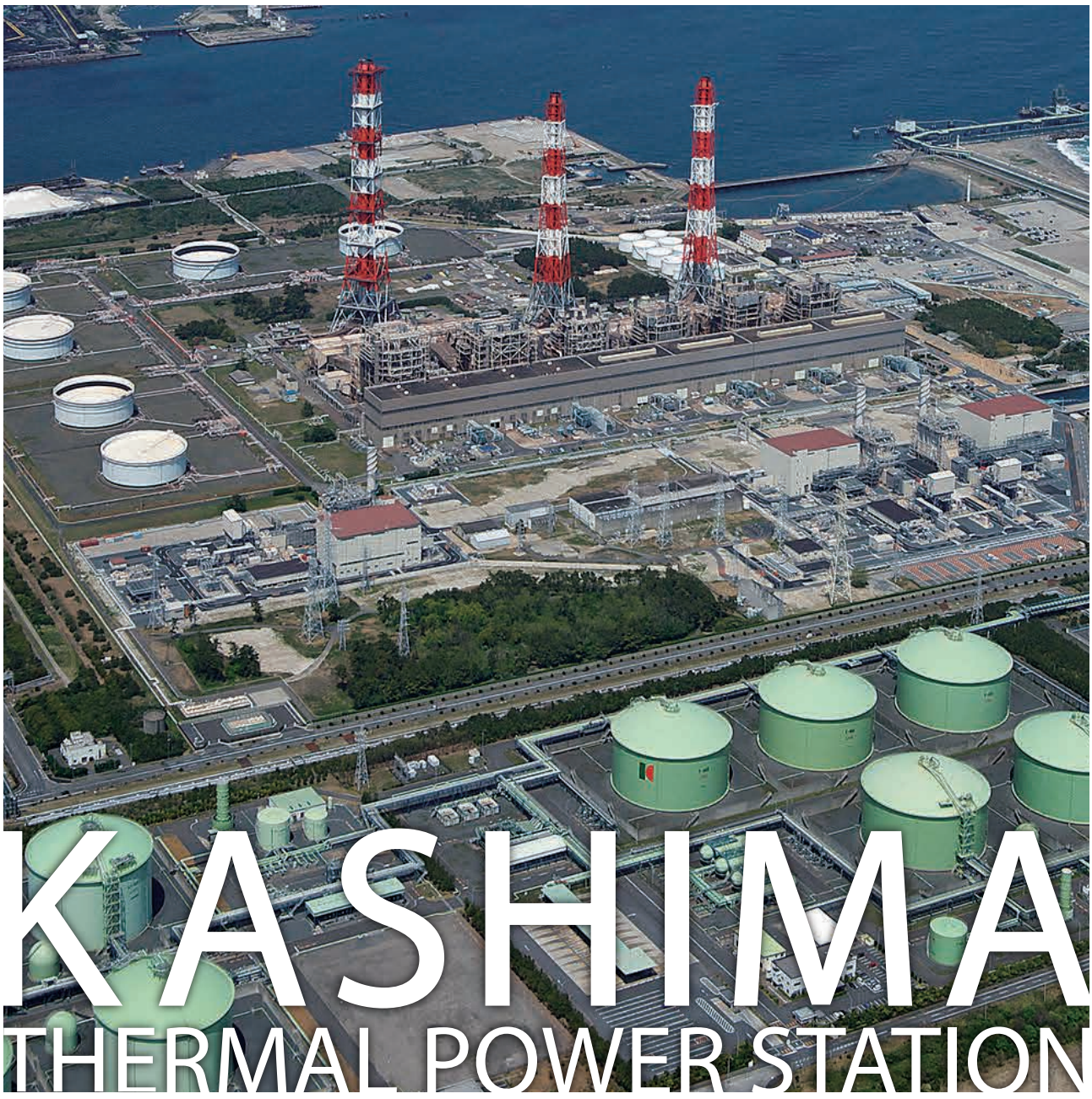


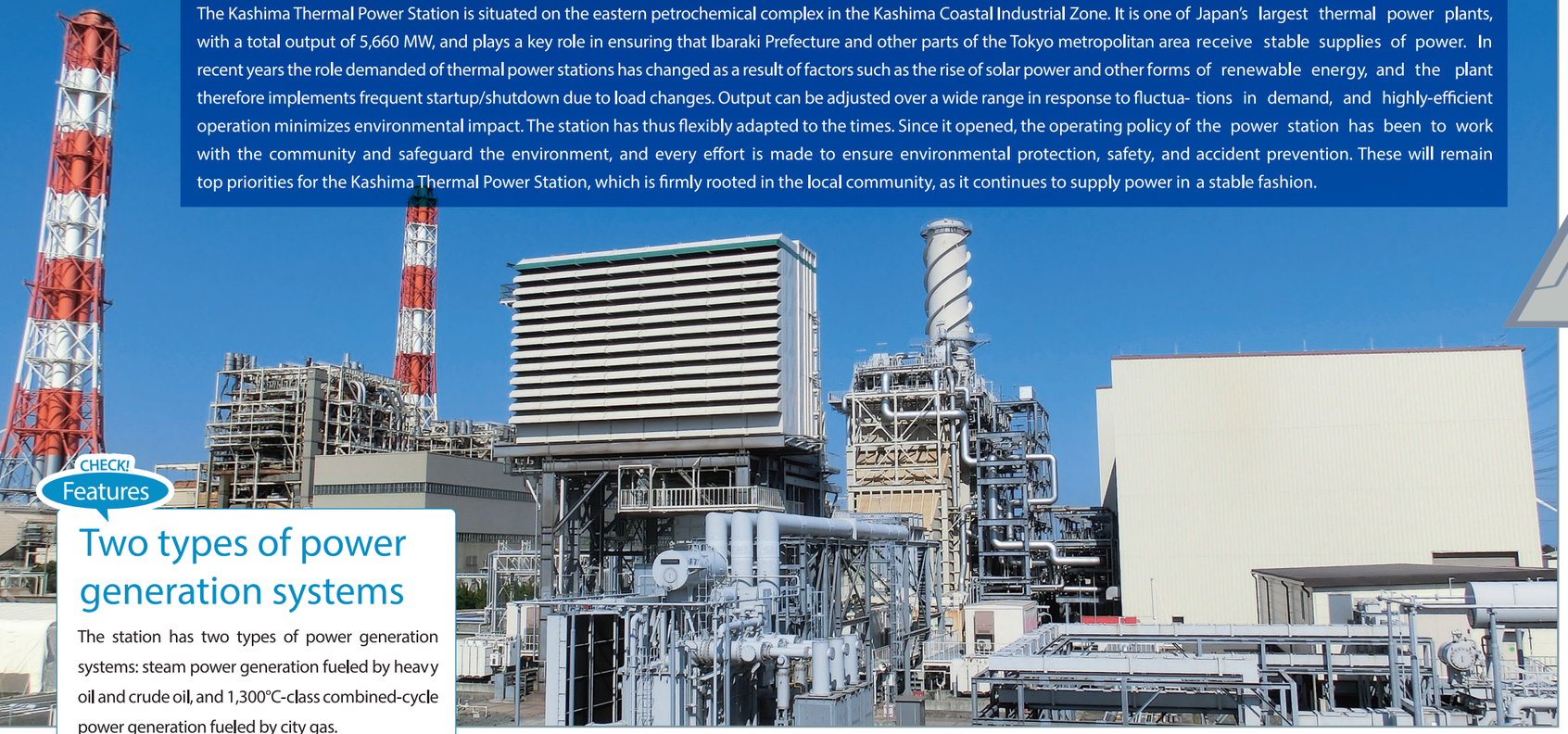
KASHIMA THERMAL POWER STATION

WELCOME TO KASHIMA THERMAL POWER STATION!

Japan's top-class large-capacity thermal power station

Japan's top-class large-capacity thermal power station

The Kashima Thermal Power Station is situated on the eastern petrochemical complex in the Kashima Coastal Industrial Zone. It is one of Japan's largest thermal power plants, with a total output of 5,660 MW, and plays a key role in ensuring that Ibaraki Prefecture and other parts of the Tokyo metropolitan area receive stable supplies of power. In recent years the role demanded of thermal power stations has changed as a result of factors such as the rise of solar power and other forms of renewable energy, and the plant therefore implements frequent startup/shutdown due to load changes. Output can be adjusted over a wide range in response to fluctua- tions in demand, and highly-efficient operation minimizes environmental impact. The station has thus flexibly adapted to the times. Since it opened, the operating policy of the power station has been to work with the community and safeguard the environment, and every effort is made to ensure environmental protection, safety, and accident prevention. These will remain top priorities for the Kashima Thermal Power Station, which is firmly rooted in the local community, as it continues to supply power in a stable fashion.

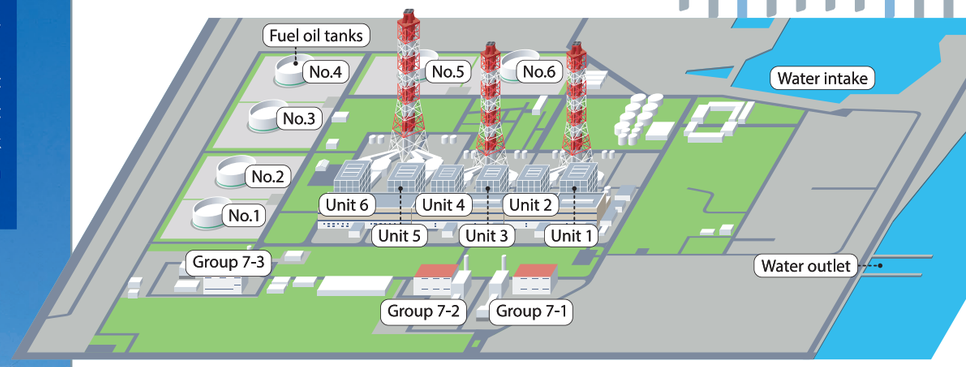


CHECK! Features

Two types of power generation systems

The station has two types of power generation systems: steam power generation fueled by heavy oil and crude oil, and 1,300°C-class combined-cycle power generation fueled by city gas.

Overall layout of the power station



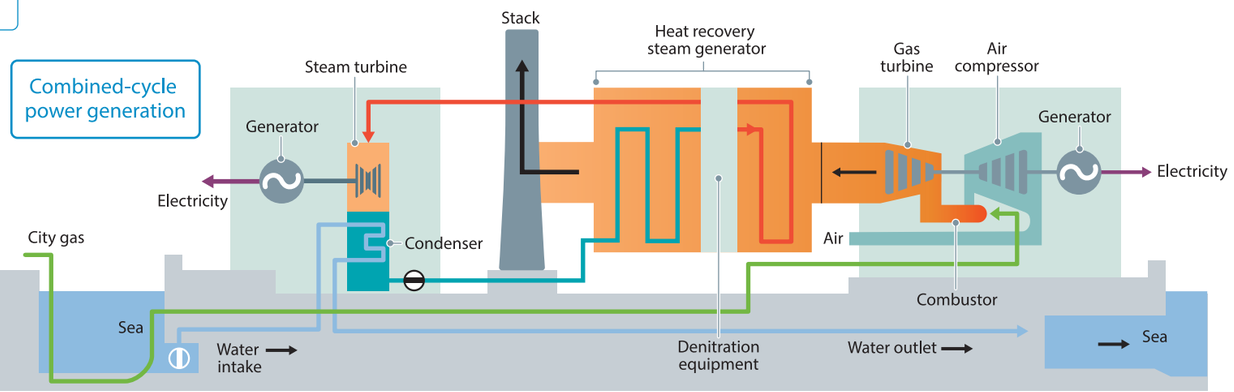
Outline of facilities

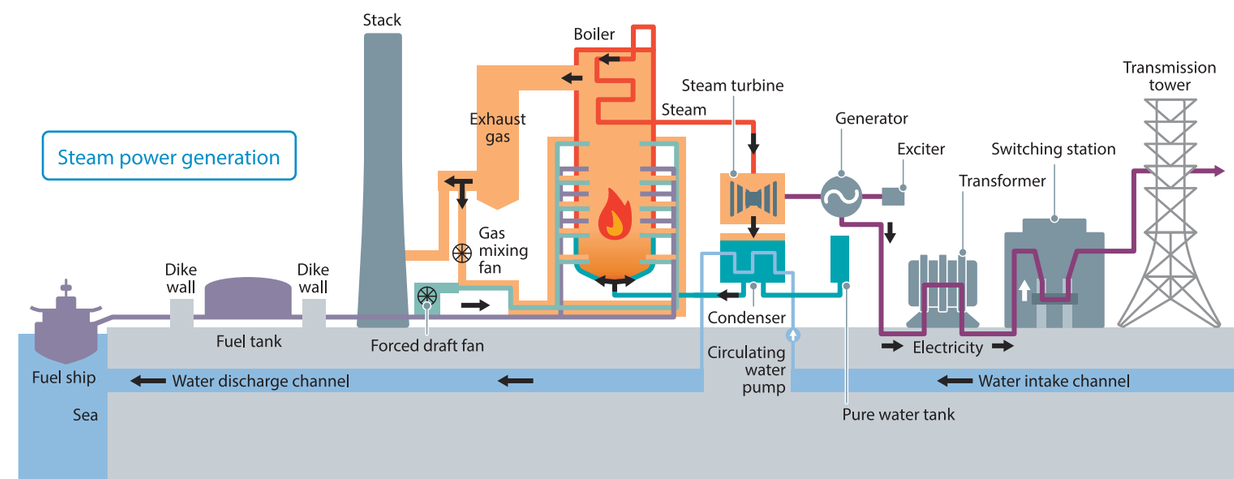
Unit No.		Output (MW)	Fuel	COD	GT combustion temperature (°C)	Power generation type
Unit 1		600	Heavy oil, crude oil	March 1971		Steam
Unit 2		600		September 1971		
Unit 3		600		February 1972		
Unit 4		600		April 1972		
Unit 5		1000		September 1974		
Unit 6		1000		June 1975		
Group 7	7-1	420	City gas	May 2014	1,300	Combined cycle
	7-2	420		June 2014	1,300	
	7-3	420		June 2014	1,300	

Name: Kashima Thermal Power Station Location: Kamisu City, Ibaraki Prefecture
Site area: Approx. 1,000,000 m²

Combined cycle

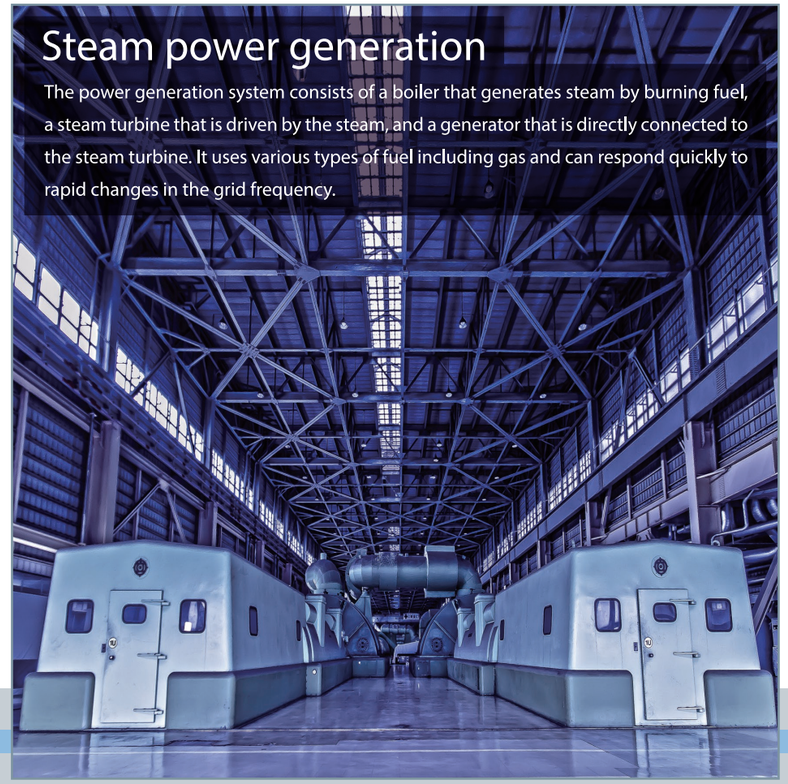
The combustion gas temperature has been increased to enhance the thermal efficiency by developing and improving the gas turbine heat-resistant material and cooling structure. The gas turbine is easy to start up and shut down (approximately one hour from startup to baseload in the Daily Start and Stop((DSS)) operation), and can thus respond quickly and appropriately to fluctuations in electricity demand. NOx emissions have been reduced by using the latest low-NOx burner and high-performance denitration equipment. The steam turbines produce one third of the total output, and this helps reduce the amount of warm waste water. The power station buildings and stacks are designed to blend in with the urban landscape.





Steam power generation

The power generation system consists of a boiler that generates steam by burning fuel, a steam turbine that is driven by the steam, and a generator that is directly connected to the steam turbine. It uses various types of fuel including gas and can respond quickly to rapid changes in the grid frequency.

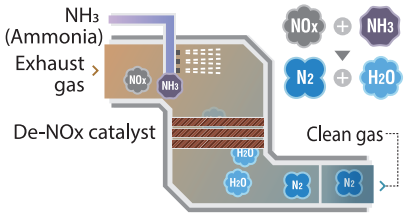


Environmental Initiatives

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.

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 by 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.

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