

Overview of Chiba Thermal Power Station

1. Summary of power station

(1) Location 2-1377, Soga-cho, Chuo-ku, Chiba City, Chiba Prefecture, Japan

(2) Station Chief Akio Matsuzaki

(3) Site area About 760,000 m²

(4) Output and fuel

	Output	Fuel	Operation started in
Group 1	360MW x 4 Units	LNG	April 2000
Group 2	360MW x 4 Units	LNG	June 2000
Group 3	500MW x 3 Units	LNG	July 2014 (planned)*

* Trial operation of Group 3 of Unit 2 started on January 15, 2014 and that of Unit 3 of Group 7 on March 5, 2014. Formal operation of Unit 2 will start in June 2014 and that of Unit 3 in July 2014.

(5) Overview of Group 3 facilities

-Power generation system	1,500°C grade combined cycle type (MACC)
-Thermal efficiency	About 58% (based on lower heating value)
-Gas turbine	Simple open cycle single shaft type
-Air compressor	Axial flow compressor
-Heat recovery steam generator	Triple pressure reheat natural circulation type heat recovery steam generator
-Steam turbine	Single cylinder, single exhaust, condensing and reheat type
-Starting system	Thyristor starting system
-Generator	Horizontal shaft tubular type revolving field three-phase AC synchronous generator
-Smoke treatment facility	Exhaust gas denitration equipment: Dry ammonium catalytic reduction system Stack: 93 m, Single stack type

(6) Fuel LNG (Liquefied Natural Gas)

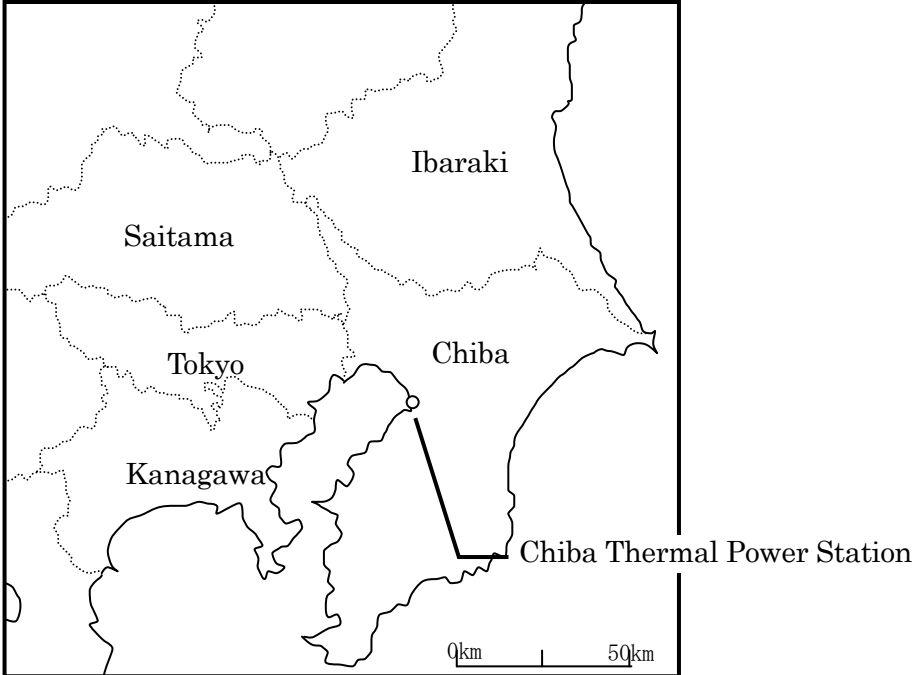
2. Construction history of Group 3, Unit 1

April 22, 2011 Gas turbine construction plan document was submitted (according to Article 48, Electricity Business Act).

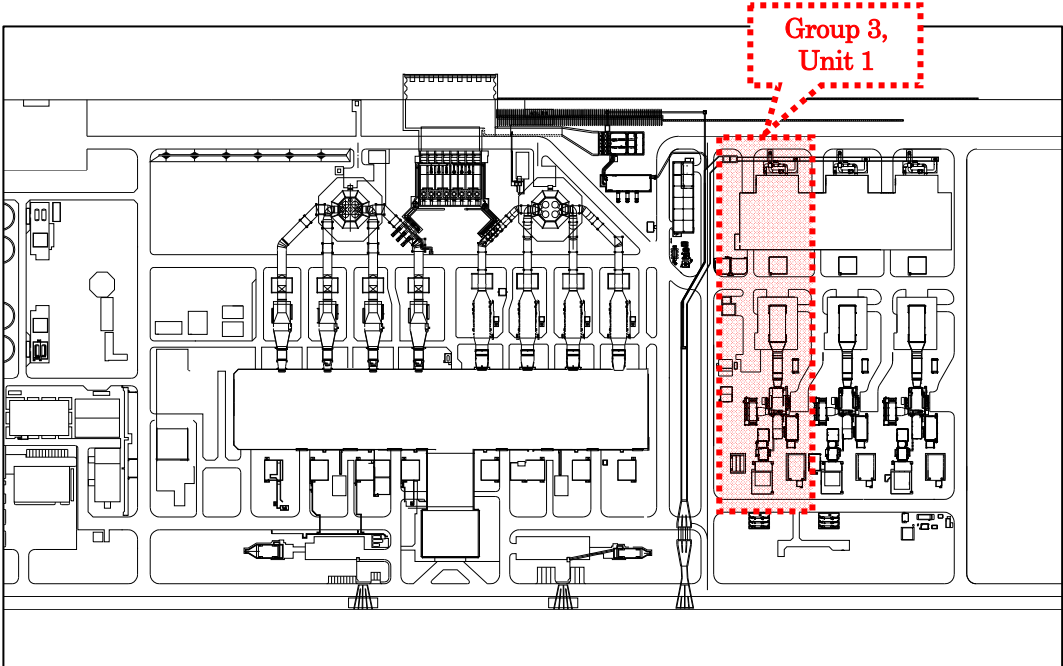
August 28, 2011 Gas turbine operation started.

January 10, 2012 Combined cycle construction plan document was submitted.
December 4, 2013 Trial operation started.
April 24, 2014 Commercial operation started.

3. Location of the power station



4. Layout of power plant (current)



5. View of the power station

<Before combined cycle construction>



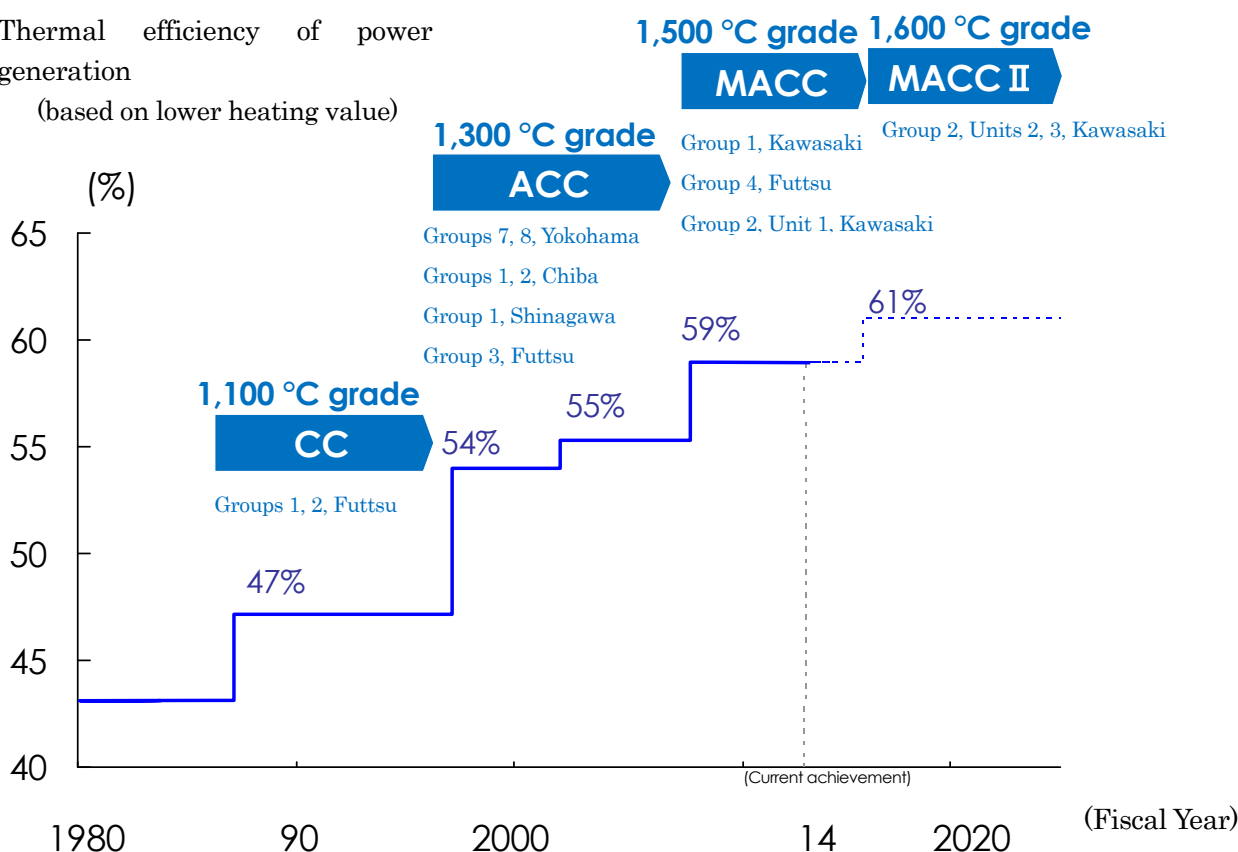
<After combined cycle construction>



*Units 1, 2, and 3 of Group 3 from bottom to top

<Data 1> Thermal efficiency improvement history

Thermal efficiency of power generation
(based on lower heating value)



<Data 2> Power stations of combined cycle power generation at 1,500°C grade (MACC)

Power station name	Output	Thermal efficiency (%)	Operation started in
Group 1, Units 1 to 3, Kawasaki Thermal Power Station	500MW x 3 Units	58.6	January 2009
Group 2, Unit 1, Kawasaki Thermal Power Station	500MW x 1 Unit*	58.6	February 2013
Group 4, Units 1 to 3, Futsu Thermal Power Station	507MW x 3 Units	58.6	October 2010
Group 3, Unit 1, Chiba Thermal Power Station	500MW x 1 Unit	About 58	April 2014

Planned power stations (MACC)

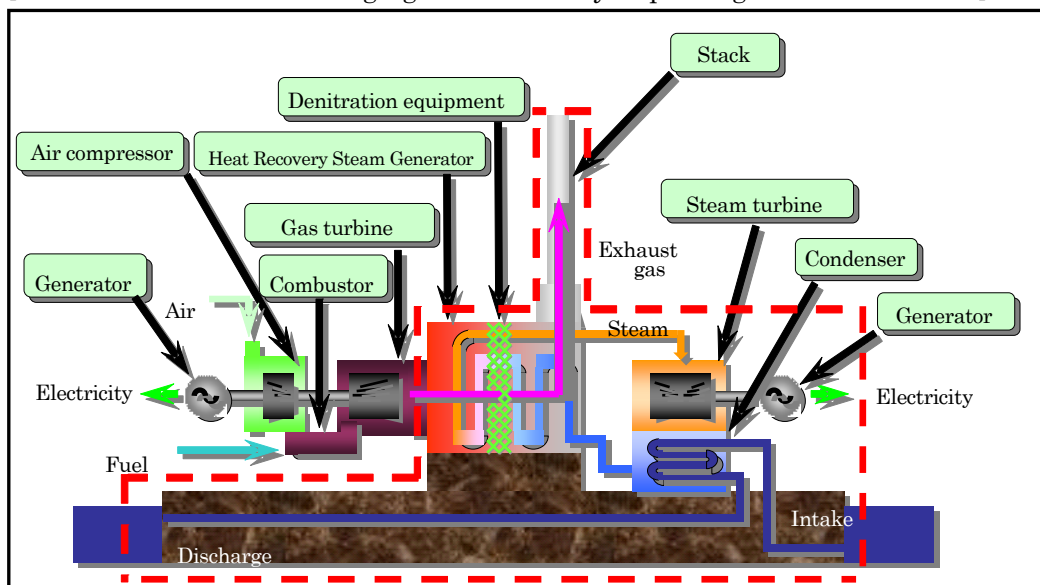
Power station name	Output	Thermal efficiency (%)	Operation will start in
Group 3, Units 2 and 3, Chiba Thermal Power Station	500MW x 2 Units	About 58	June and July 2014

*MACCII is under construction for Group 2, Units 2 and 3, Kawasaki Thermal Power Station.

<Data 3> Change of gas turbine power generation facilities to combined cycle power generation facilities

Reconstruction to combined cycle power generation facilities is performed by adding a heat recovery steam generator, steam turbine and power generator to the gas turbine power generation facilities. This type of facility effectively utilizes the exhaust heat from the gas turbine to increase the output by about 500MW, without consuming additional fuel, and improve the thermal efficiency. In addition, by installing exhaust gas denitration equipment in the heat recovery steam generator, the emission of nitrogen oxide during operations can be suppressed to reduce the impact on the environment.

[Construction areas for changing to combined cycle power generation facilities]



The facilities enclosed by the red line are the equipment newly installed for the change to combined cycle type facilities