



China Natural Gas Power Generation Technology Policy Roadmap

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China's nature gas power generation installed capacity -1

- In 2008, China's power generation capacity was 792.93 million kilowatts, natural gas power generation installed capacity reached 25.14 million kilowatts, accounting for 3.2% of installed power generation; natural gas for power generation was 11.86 billion cubic meters, accounting for 14.7% of the total natural gas consumption in China.



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China's nature gas power generation installed capacity -2

- In 2008, the southeast coastal area installed capacity was 11.24 million kilowatts, accounting for 45% of the total installed capacity of natural gas; the Yangtze River Delta region was 958 million kilowatts, accounting for 38%; the Bohai Sea area was 2.336 million kilowatts, accounting for 9%, Central region was 96 million kilowatts, accounting for 3% , those four regional natural gas accounting for about 90% of total installed capacity.



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The trends of China's nature gas power generation

- With the supply of domestic and abroad natural gas resources to increase, more incentive policy of enlarge the utilization of the natural gas, the equipment of localization rate level gradually increasing, and the investment cost reducing, the large-scale natural gas-fired combined cycle generating units, will become China an important component of the electric power industry.



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The gap between China and developed countries -1

- China's gas turbine power generation capacity accounting for 3.2% of total capacity, much lower than the proportion of foreign industrial countries
- China's existing gas turbine and combined cycle power plant performance level is about the level of 1980s internationally



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The gap between China and developed countries -2



- China's gas turbine manufacturing scale of production and is still very low.
- At present most equipment and key components are still rely on imported.
- Domestic gas turbine power generation equipment market is basically occupied by foreign manufacturers.



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The features of natural gas combined cycle power generation system



- Much higher efficient than conventional coal-fired steam turbine cycle
- Short construction period, small footprint, land and water consumption
- High reliability, easy-to-fast "black start" will help to improve the security of grid operation.
- Lower emissions of pollutants.



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The technology lever in advanced countries

- Currently, the world's single gas turbine power over 300MW, simple cycle thermal efficiency over 39%, combined cycle power more than 780 MW, combined-cycle efficiency of over 58.5 percent.
- Over the past 20 years, gas turbine power generation technology has raptly developed. In 1994, ABB has introduced a generation efficiency of 58.5% of the combined cycle, followed by GM and Siemens launched the efficiency of nearly 60% of the combined cycle (Source: Declining Tendency other: Tsinghua in 2050 low-carbon issue.)



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The most advanced technical level of the gas turbine performance

国外主要公司		GE		ABB	Siemens (kwt)	西屋	三菱
简单	机型	MS9001FA	MS9001G	GT26	V94. 3A		
循环	输出功率 (MW)	226. 5	282	265	240	246	310
	压比	14. 7	23. 2	30	16. 6	17	21
	透平前燃气温度 (°C)	1, 288	1, 430	1, 260	1, 190	1, 290	1, 415
	热效率 (%)	35. 7	39. 5	38. 5	38	37	39
联合循环	机型	S109FA	S109G	KA26-1	GUDIS. 94. 3A	MPXP1 (TOIGI)	
	联合循环输出功率 (MW)	348. 5	420	396	359	420	
	联合循环效率 (%)	56. 3	58	58. 5	58. 1	58	



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China's natural gas combined cycle power system design the best match (Shandong Longkou Power Plant Case)



	燃气轮机型号	配汽方式	机组功率 (MW)	整机效率 (%)
方案1	ABB GT26	三压再热	397	57.83
方案2	Siemens V	双压再热	368	56.40
方案3	GE 9351FA	三压非再热	391	56.18
方案4	Mt sb	双压非再热	393	55.46



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Future "advanced class" gas turbine and combined cycle technology parameters



机型	单位	GE-MS7001H	西屋501-ATS
燃气初温	°C	1,430	1,510
压比	/	23	28
简单循环净出力	MW	/	290
简单循环效率	%	/	41
联合循环净出力	MW	400	426
联合循环效率	%	60	61
NOX排放	PPm	9	≈5



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China's nature gas power generation obstacles



- Technical barriers
- Operation barriers
- Price barriers
- Market barriers
- Policy barriers



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Policy Recommendations



- To develop a national middle and long term work plan natural for gas technology development and formulate favorite policy for nature gas development
- To develop natural gas equipment and facility technical standards and designing specifications
- To reform natural gas price system
- To encourage nature gas distributed cogeneration project appropriately
- To promote natural gas market incentive policy and to establish a market monitoring system



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China's nature gas power generation policy road map in the next 20 years



政策措施	2010-2015	2015-2020	2020-2015	2015-2030
To develop national nature gas development work plan 制定天然气发电技术政策发展纲要	→			
To develop technical standards and designing specifications for nature gas power equipment 制定天然气发电技术标准和设计规范	→			
To reform natural gas price system 完善有利于天然气发电发展的价格体系	→			
To encourage nature gas distributed cogeneration project 投资力度鼓励适度发展分布式热电联产项目				→
To promote natural gas market incentive policy and to establish a market monitoring system 制定完善有利于天然气发电行业和市场健康发展的政策与监管体系				→



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Thank you



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