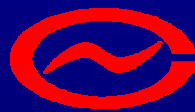


Overview of China's IGCC and Co-production Technology Research and Development



Prof. LI Zhen-zhong

February 25, 2008

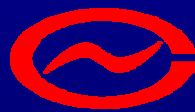


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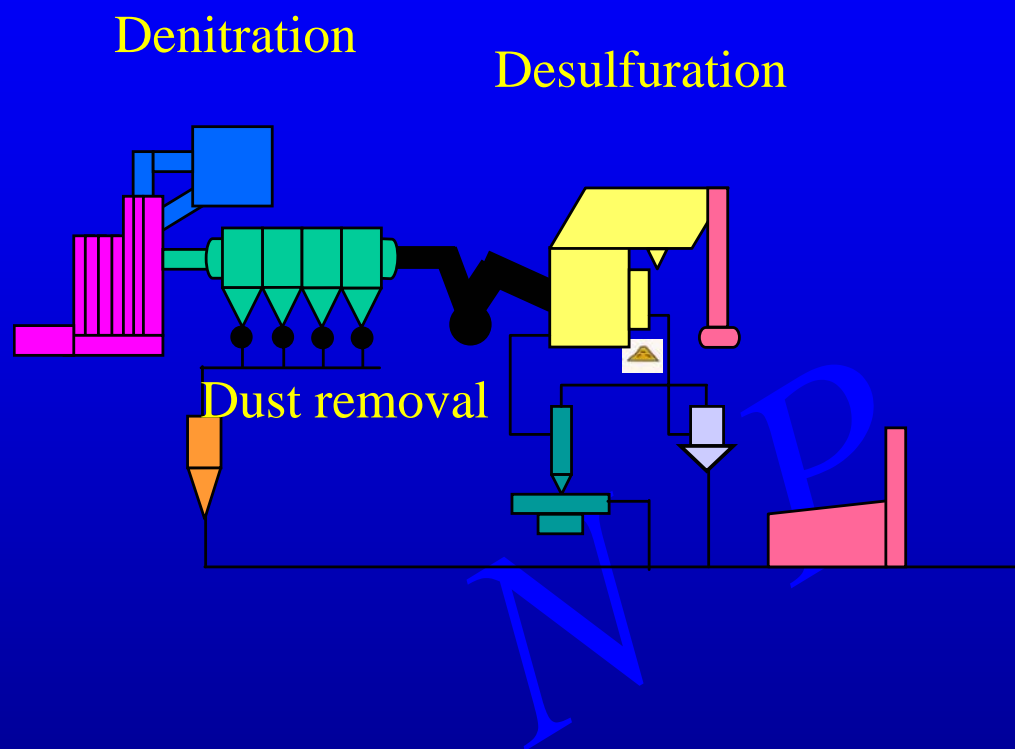
Contents

- **IGCC Power Generation Technology**
- **IGCC Power Generation and Co-production Technology**
- **Preliminary Research on Future Power Generation Technology**



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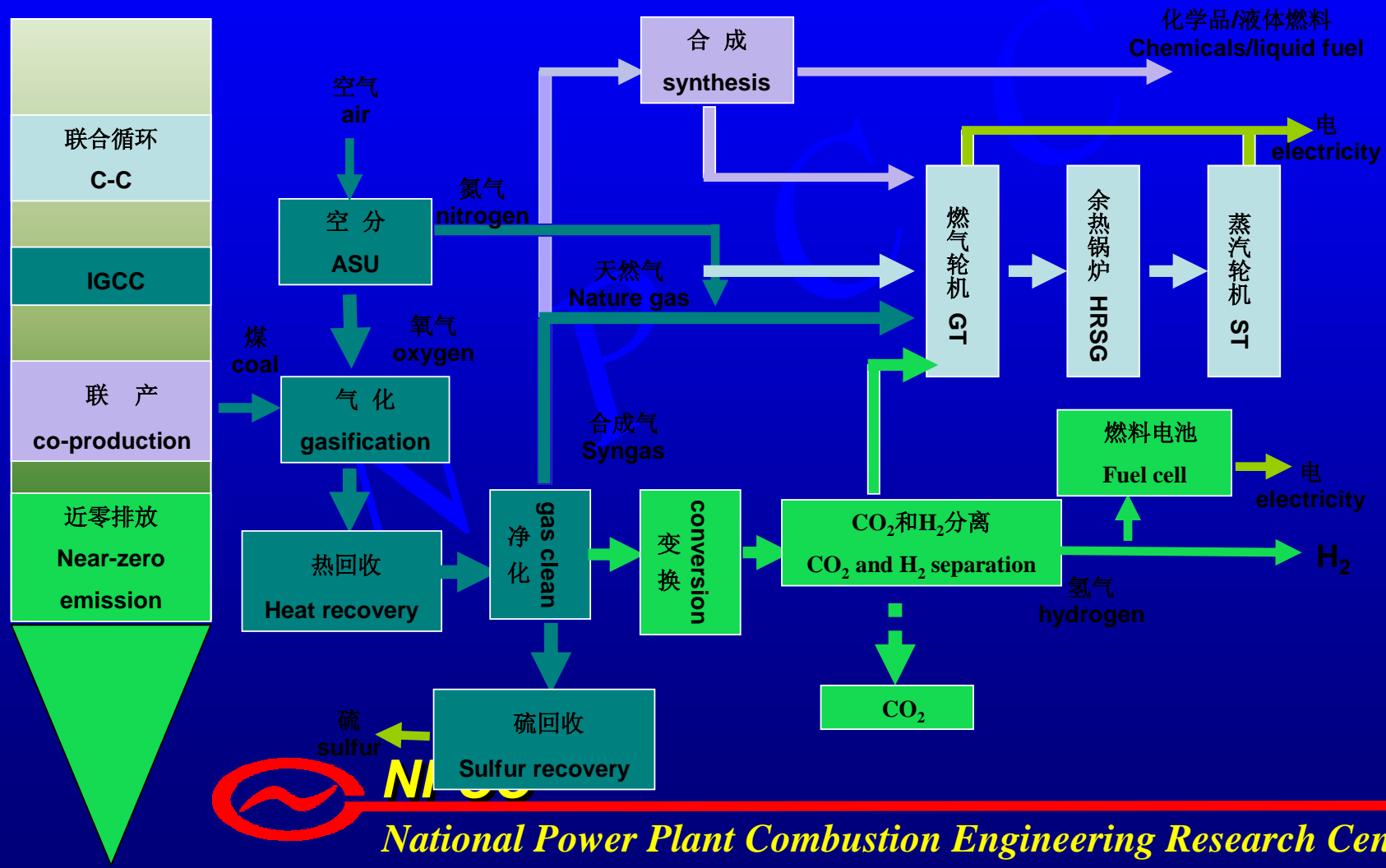
China is a large country of energy production and consumption that mainly based on coal, during the technological development process of coal-fired power generation, the pollutant emission issues of dust, SO_x, NO_x has almost been solved.



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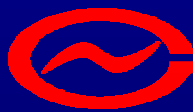
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China is doing research and development on future power generation technology and industrial demonstration aiming at CO₂ reduction.



IGCC Power Generation Technology

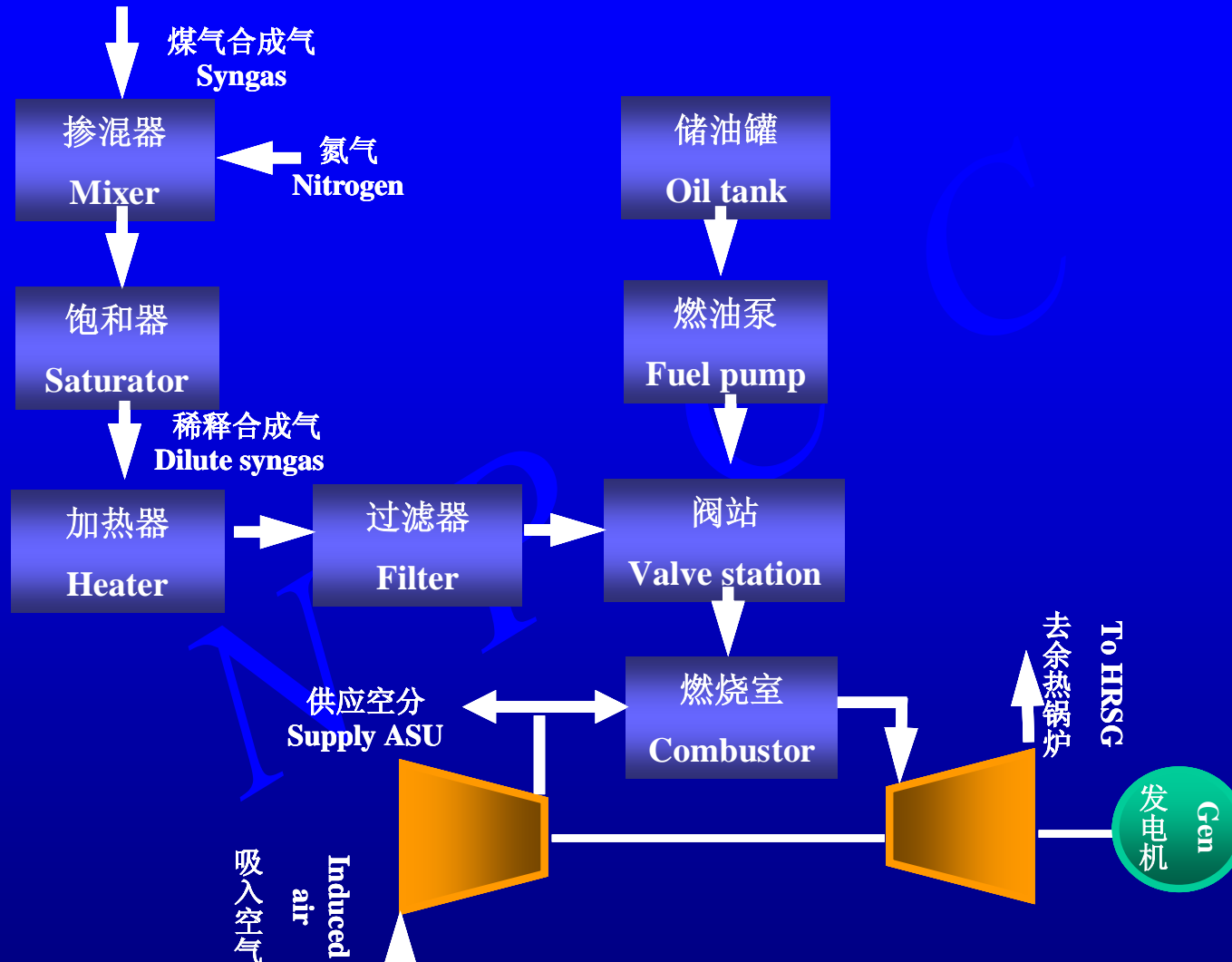
Study on coal-based gasification technology, syngas gas turbine technology with low pollution, system integration and optimization of IGCC, power plant and auxiliary equipment design technology. On the basis of these, establish typical IGCC demonstration system.



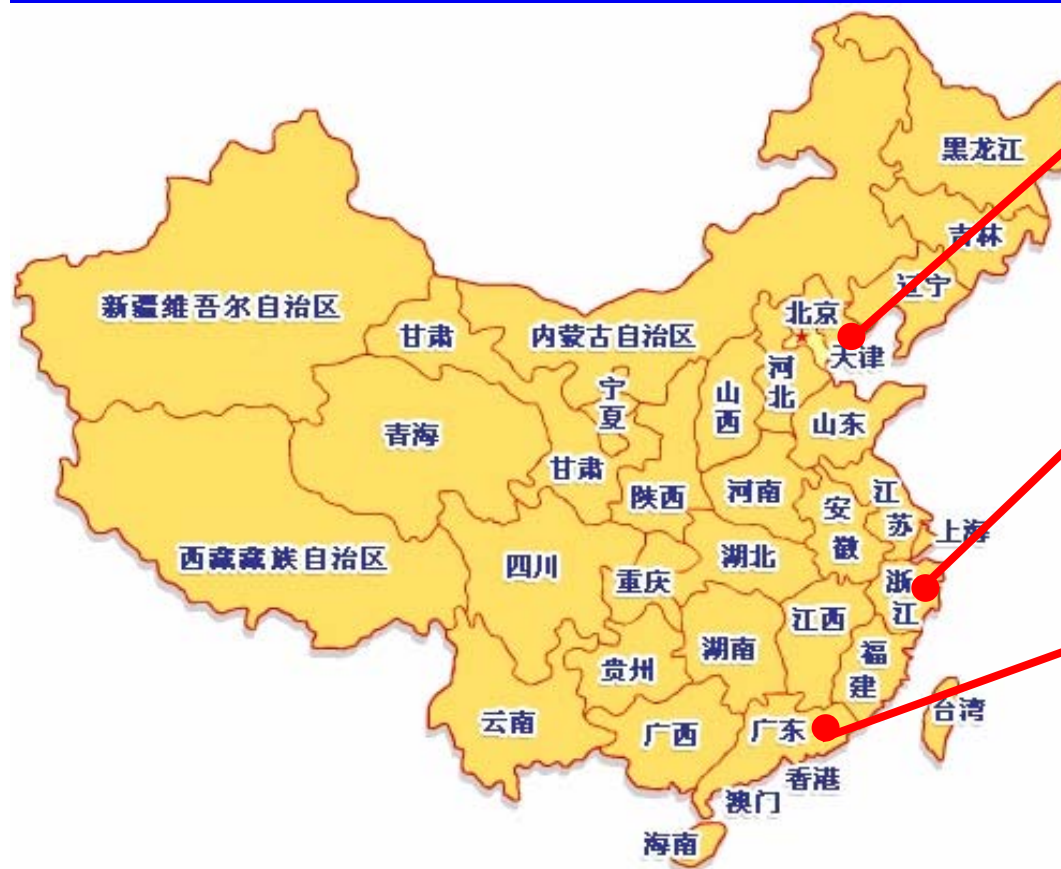
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Gas Turbine Island



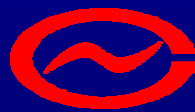
Established Typical IGCC Demonstration System



The region around Bohai——Tianjin
Established new 200MW
Dry pulverized coal gasification
technology E level gas turbine

Yangtze delta area——Hangzhou
Established new 200MW
Coal-water slurry gasification
technology 130MW gas turbine

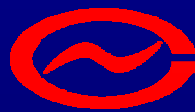
Pearl River delta area—Dongguan
120MW oil saving project
Pulverized coal pressurized dense phase bed
gasification technology 40MW gas turbine
200MW e level
Pulverized coal pressurized dense phase bed
gasification technology 130MW gas turbine



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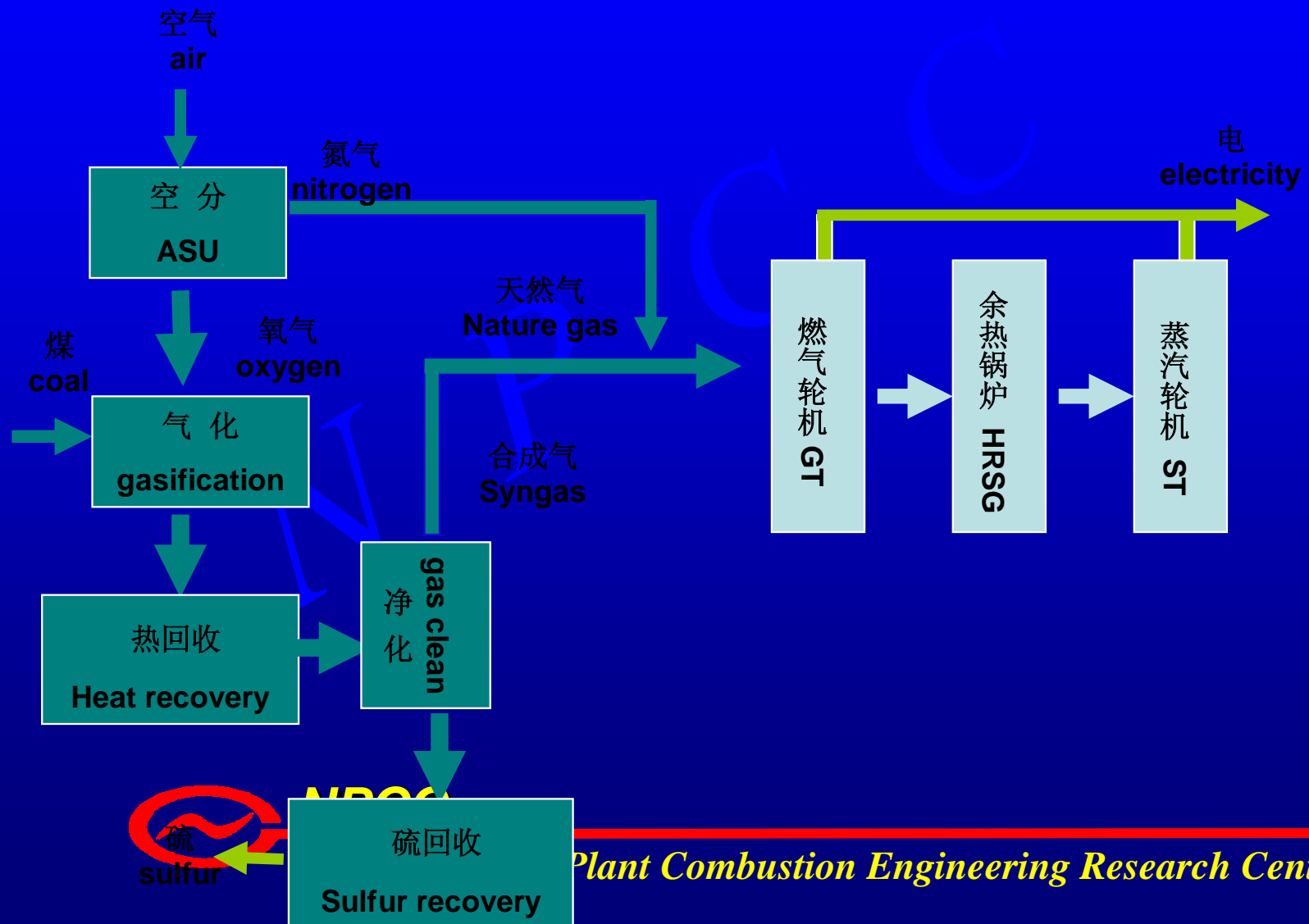
Besides the three demonstration systems above, there is still planning to carry out three IGCC industrial demonstration projects.



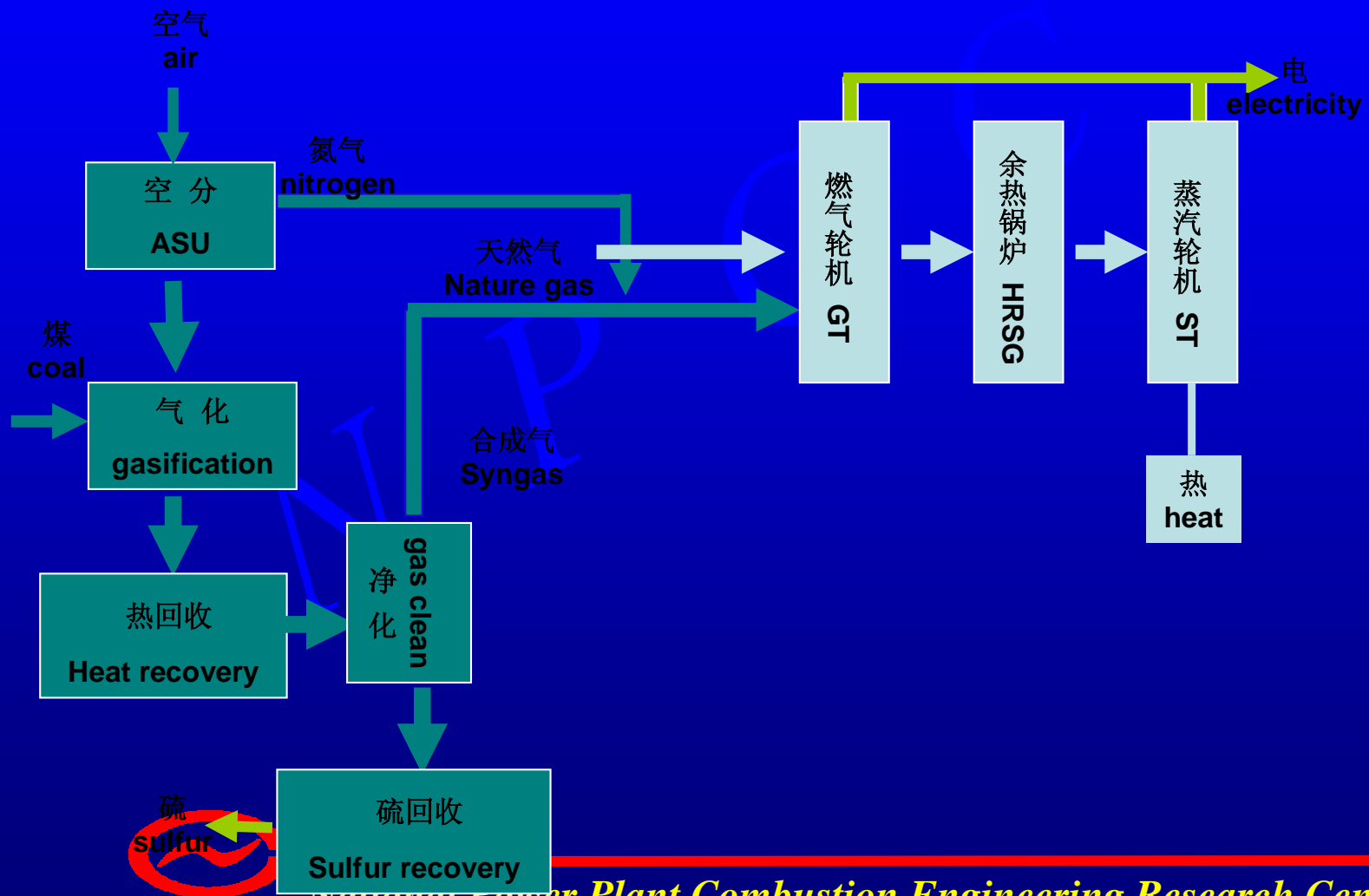
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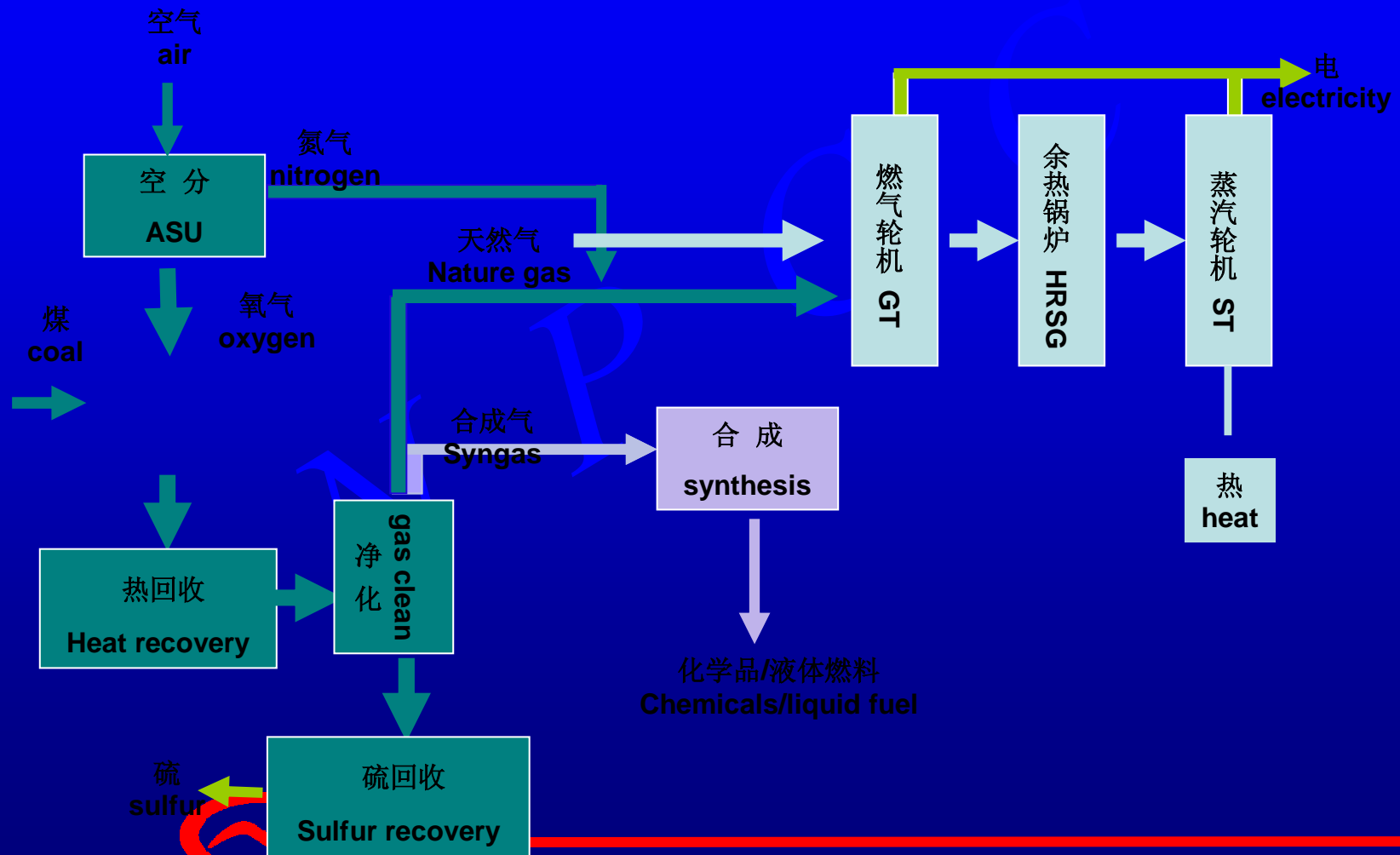
(1) Coal-water slurry/dry pulverized coal gasification, 9F level gas turbine power generation system



(2) Coal-water slurry/dry pulverized coal gasification, 9F level gas turbine heating system



(3) Coal-water slurry/dry pulverized coal gasification, 9F level gas turbine poly-generation system



IGCC Power Generation and Co-production Technology

Established project: YanKuang Group

“coal gasification power generation and methanol co-production project”

It was established in 2003 and passed check in 2006. The design production capacity is 200,000 t/a acetic acid, 240,000 t/a methanol and combined with 60,000 KW electricity. chilled coal-water slurry gasifier, 6B level gas turbine.



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Project under construction

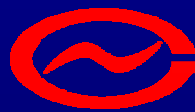


ShanXi YuLin Oil-
electricity co-production
demonstration project

Megaton-scale synthesis oil
/60MW electricity co-
production 4 low temperature
F-T synthesis reactors
40MW gas turbine

ShanXi Lu' an Oil-
electricity co-production
demonstration project

160,000t/a synthesis oil /60MW
electricity co-production Single
F-T synthesis reactor 40MW gas
turbine



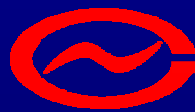
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Preliminary Research on Future Power Generation Technology

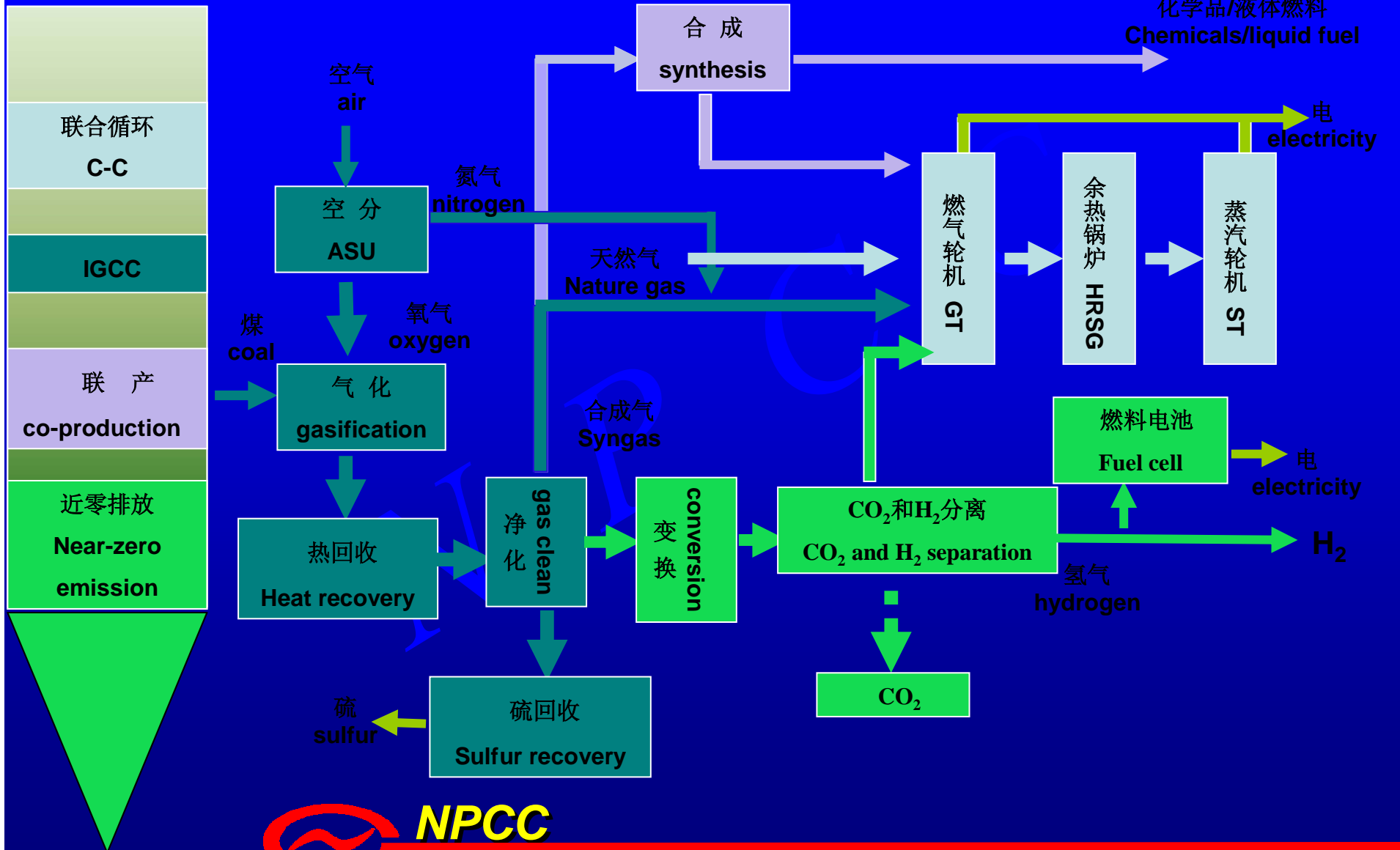
Participate in international cooperation according to our country's the energy present situation and research foundation.

The core of the future power generation is realizing CO₂ separation and hydrogen power generation to further improve efficiency on the basic of existing IGCC technology.



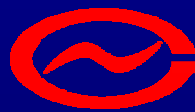
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China's FutureGen General Target

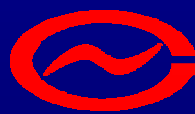
(1) Establish a testing system and research platform of IGCC hydrogen power technology and CO₂ removal key unit technology and system integration technology based on coal-base gasification technology, studying on the unit technology and system integration above, providing economic and technique analysis evidence for engineering of near-zero coal-fired power technique.



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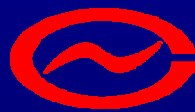
(2) Research on key unit technology and system technology of CO₂ capture, utilization and equestration of coal-fired power plant, establish industrial pilot equipment, providing key technology and system technology for coal-fired power plant, while studying on economic and technique analysis to provide scientific evidence for our country' s choice of CO₂ near-zero emission technology and technical scheme.



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(3) Completed the task that was undertaken by China side of U.S.-China FutureGen Cooperation Program, providing technological support and service for U.S.-China FutureGen and international cooperation of CO₂ reduction from coal-fired power.

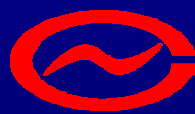


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Research on Future Power Generation Mainstream Technology, mainly including:

- (1) Research and development of unit technology**
- (2) Research and development of system technology**
- (3) Establish research-development platform of testing system and research on system integration**

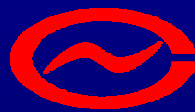


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(1) Research and Development of Unit Technology

**Hydrogen gas turbine,
coal-based CO₂ separation,
pure oxygen combustion and CO₂ capture
technology in flue gas and ect.**



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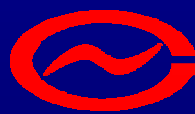
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(2) Research and Development of System Technology

System technology on coal-based gasification with CO₂ separation,

System technology on conventional coal-fired power plant with CO₂ separation ,

And system technology of CO₂ separation and utilization.



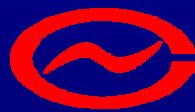
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(3) Establish Research-development Platform of Testing System and Research on System Integration

Research-development platform: hydrogen gas turbine, coal-based gasification with CO₂ removal, pure oxygen combustion testing system

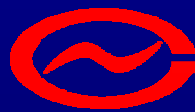
Establish systems of conventional coal-fired power plant with CO₂ capture and semi-industrial testing equipment with CO₂ enhance oil and coal-based gasification hydrogen fuel cell power generation



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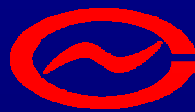
The study on China's IGCC and co-production technology will be carried out with the international cooperation organization, and which will supply scientific basis for technology choice and technical schemes of our country's next-generation IGCC with CO₂ capture in the future.



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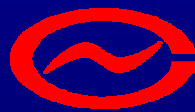
China is very pleased to cooperate studying on green coal power generation with U.S., European and Asian countries, especially Japan.



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Thank you!



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