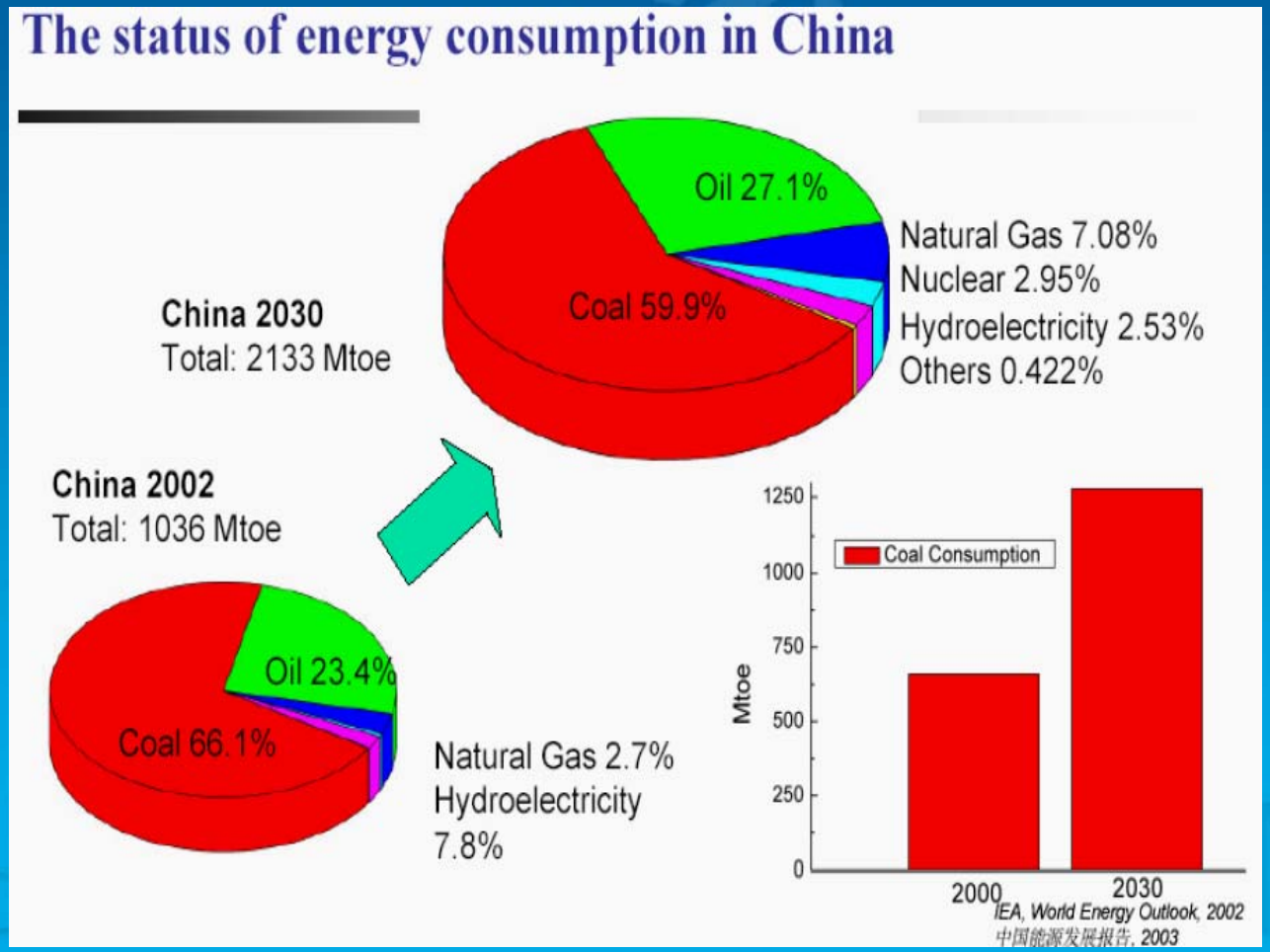
中国华电集团公司
CHINA HUADIAN CORPORATION

200MW级IGCC示范项目进展

Progress of 200MW IGCC Demonstrative Project

中国华电集团公司
CHINA HUADIAN CORPORATION

中国能源消费状况
Energy Consumption in China Today



中国华电集团公司
CHINA HUADIAN CORPORATION

“十一五”国家863项目 –

浙江半山IGCC发电示范工程

半山**3X390MW**联合循环机组

Banshan 3X390 CC unit

坦帕POLK IGCC机组

TAMPA Polk IGCC unit

课题组团队组成
Research Team Composition

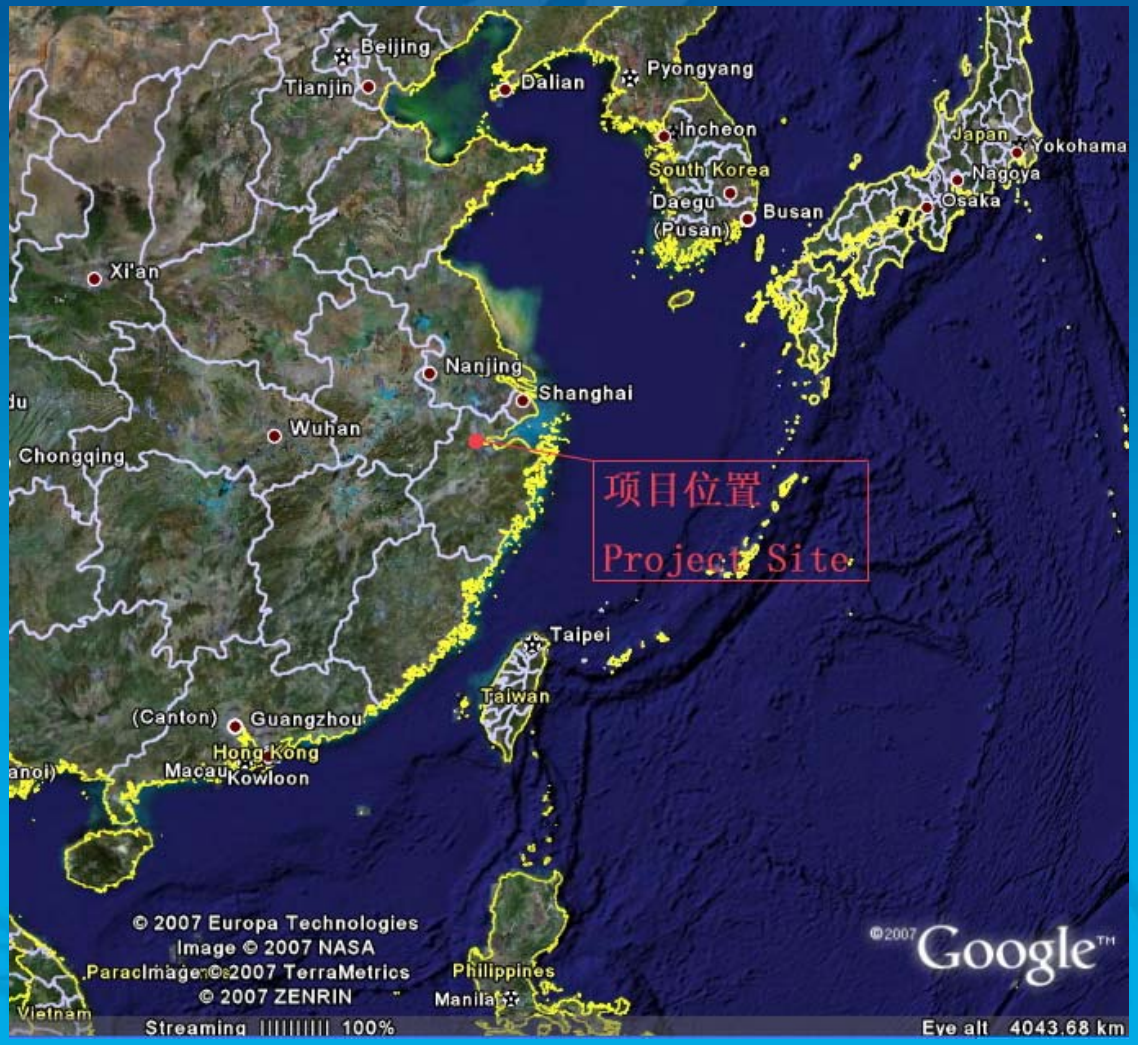
- 中国华电集团公司
  China Huadian Corporation
- 国家电站燃烧工程技术研究中心
  National Power Plant Combustion Engineering Technology Research Center
- 中国科学院工程热物理
  Institute of Engineering Thermophysics, Chinese Academy of Sciences
- 华东理工大学
  East China University of Science and Technology
- 浙江省电力设计院
  Zhejiang Electric Power Design Institute
- 杭州华电半山发电有限公司
  Hangzhou huadian Banshan power generation Co., LTD.

子课题设置 Tasks of Research

- 200MW级IGCC总体方案和系统优化集成及常规岛技术开发
  System optimize
- 200MW级IGCC气化岛技术开发
  Gasification technology
- 200MW级IGCC燃机岛技术开发
  Gas turbine combust system
- 200MW级IGCC电站设计与自动化控制技术
  Design and control technology
- 200MW级IGCC示范工程与整体运行技术研究
  Operate technology

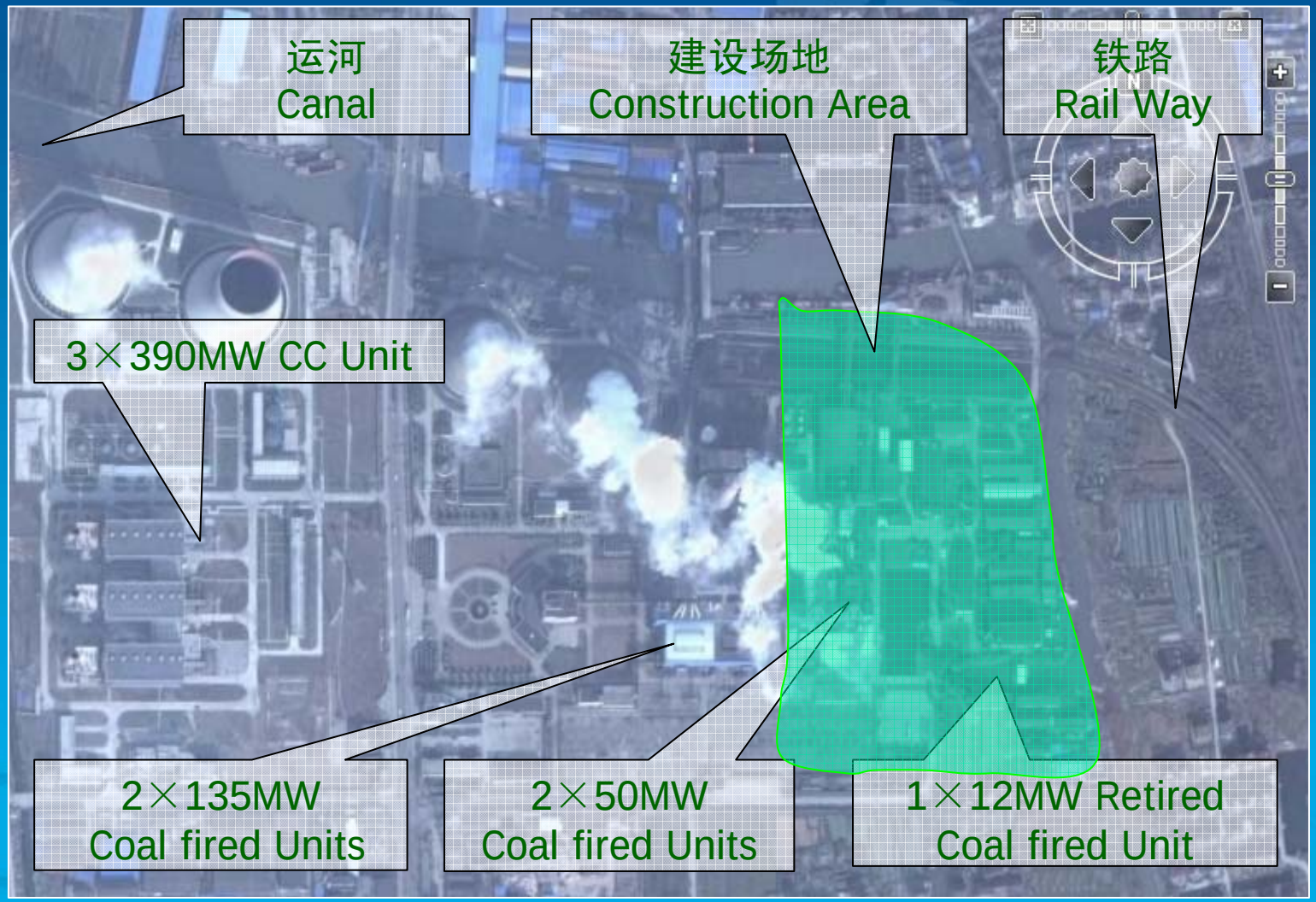
中国华电集团公司
CHINA HUADIAN CORPORATION

项目地理位置 Project Location



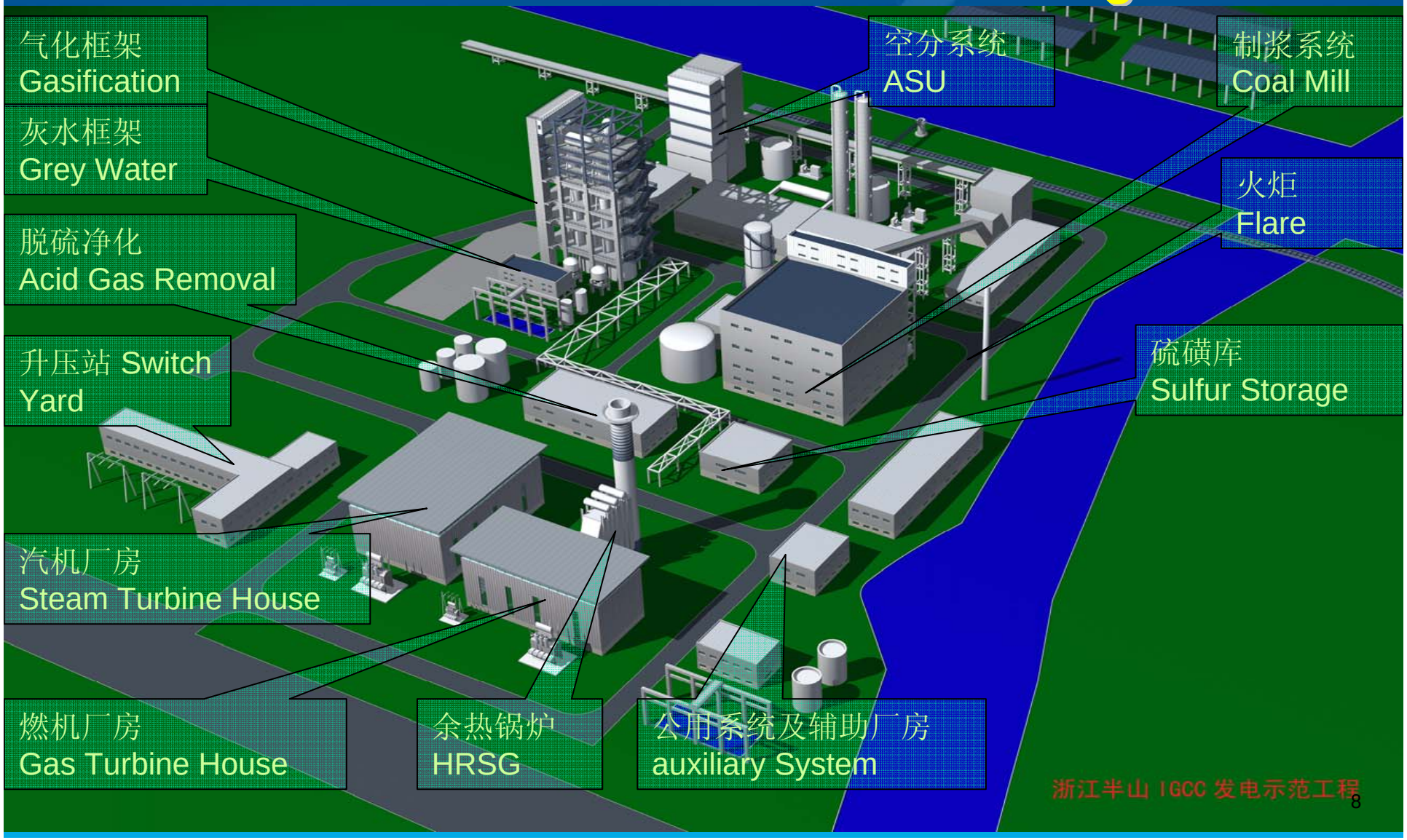
中国华电集团公司
CHINA HUADIAN CORPORATION

项目建设场地概况 Site Topography



中国华电集团公司
CHINA HUADIAN CORPORATION

电站总体布置 IGCC General Arrangement



环保指标 Economic Indicators

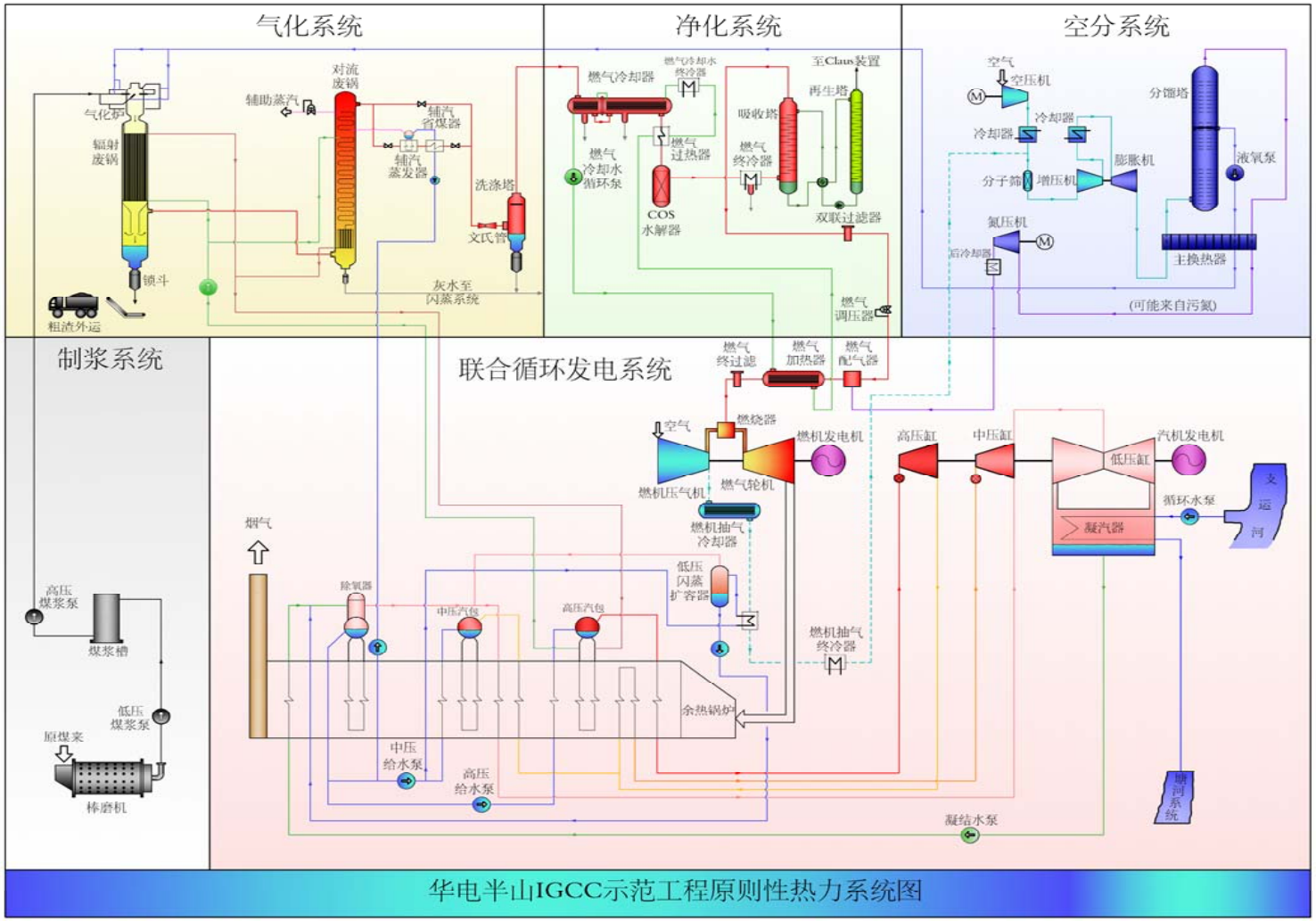
- 总脱硫效率>98%
  Sulfur removal efficiency >98%
- SO2排放<45mg/Nm^3
  SO2 emission <45mg/Nm^3
- NOX排放<80mg/Nm^3
  NOx emission <80mg/Nm^3
- 颗粒物排放<2mg/Nm^3
  PM emission <2mg/Nm^3

经济指标 Economic Indicators

- 工程的静态投资约20亿元
  Static Investment：~2 billion RMB
- 每千瓦容量静态投资约8500元/kW
  Unit investment：~8500RMB/kW
- 机组的发电效率>46%
  Efficiency of power plant (gross): >46%
- 厂区用地面积7.6公顷
  Project area: 7.6 ha

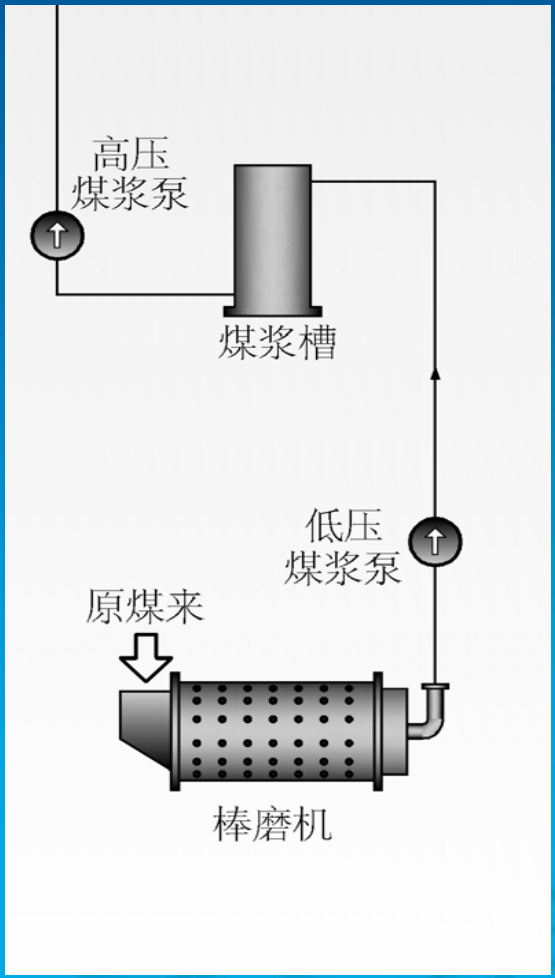
中国华电集团公司
CHINA HUADIAN CORPORATION

热力系统 System



华电半山IGCC示范工程原则性热力系统图

制浆系统 Coal Slurry Preparation System



湿式棒磨机制成水煤浆

Slurry prepared by wet mill

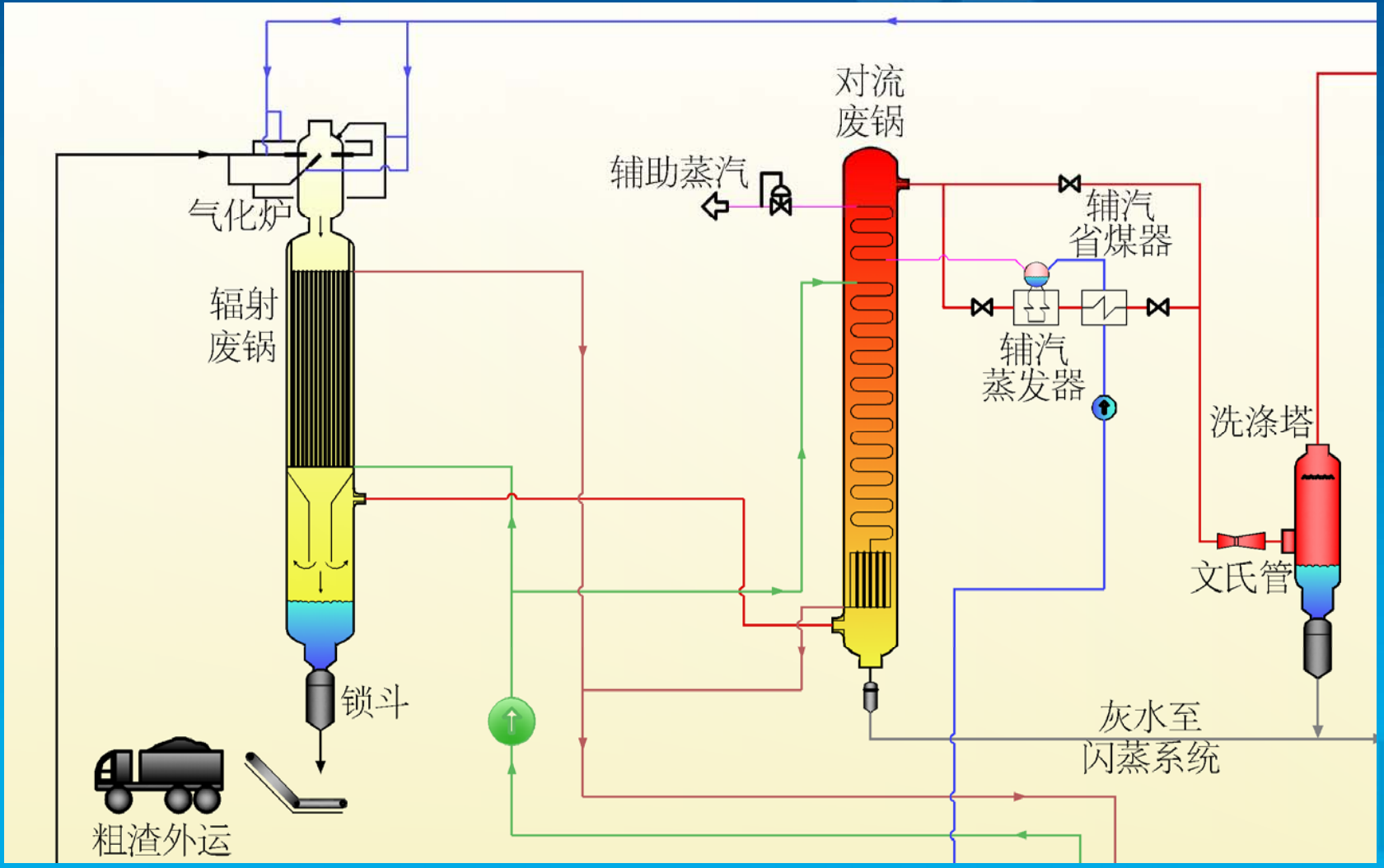
低压煤浆泵将水煤浆送入煤浆槽

Slurry send to storage tank by LP pump

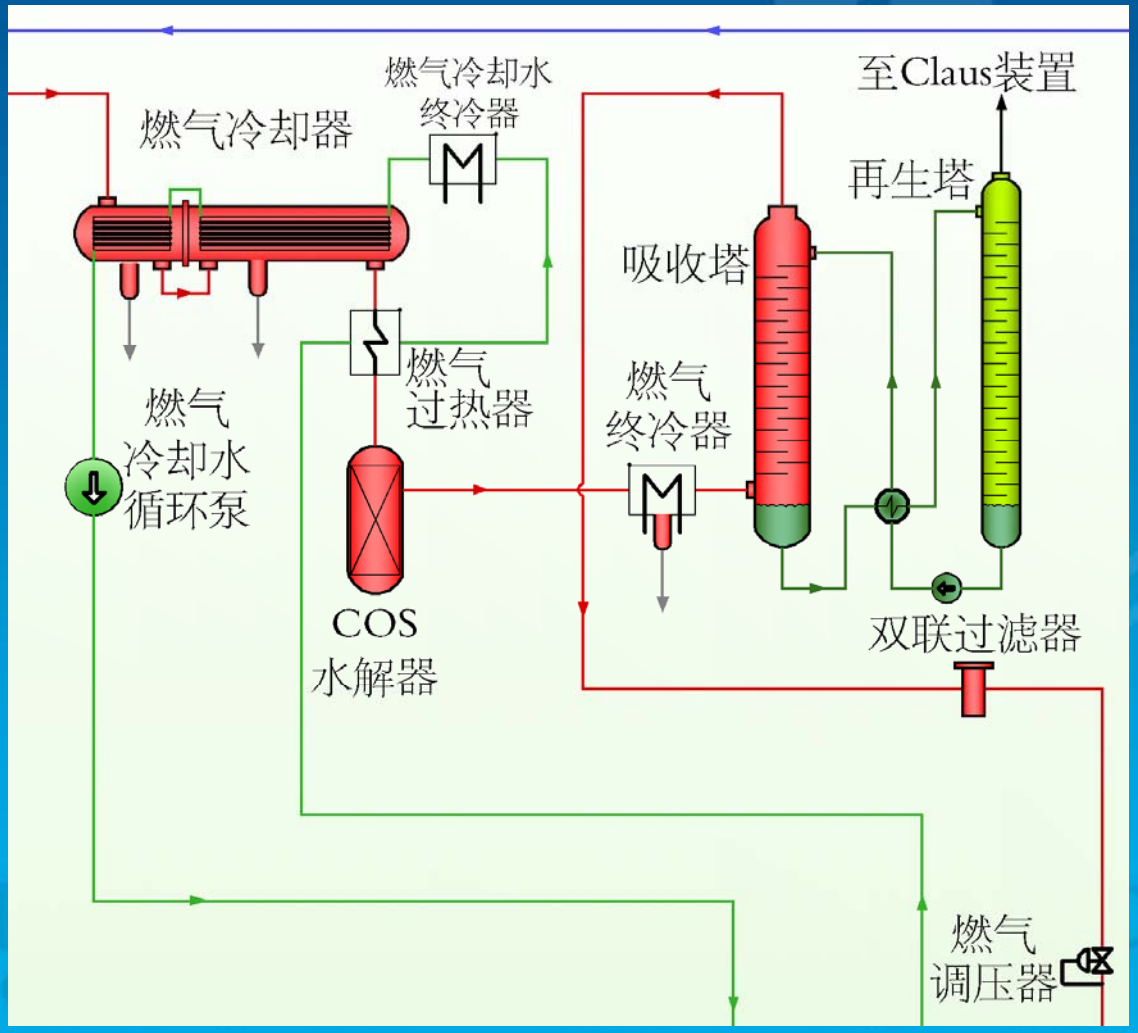
高压煤浆泵将水煤浆送入气化炉

Slurry feed to gasifier by HP pump

气化系统 Gasification System

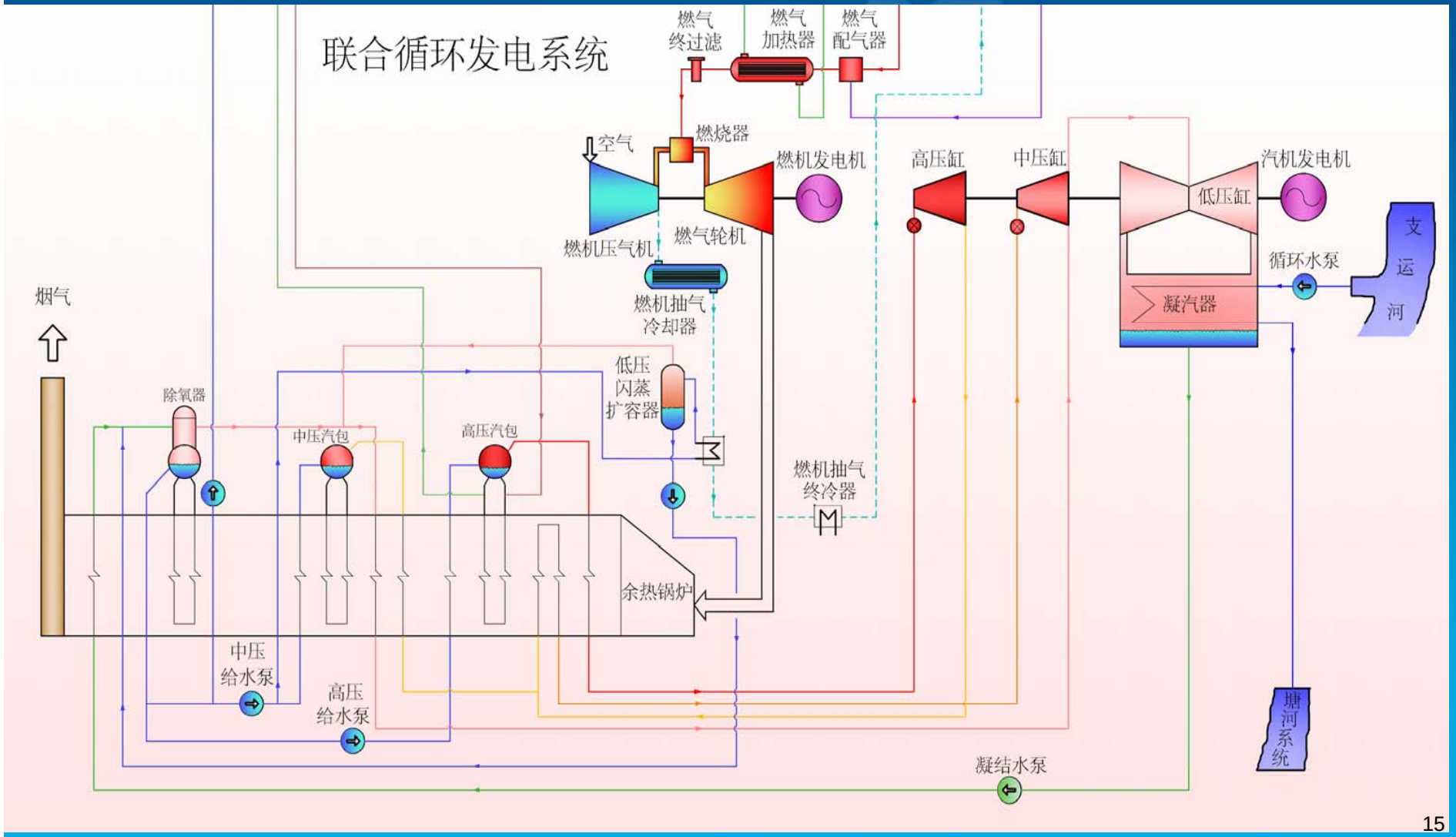


净化系统 Acid Gas Removal System



中国华电集团公司
CHINA HUADIAN CORPORATION

联合循环系统 Combined Cycle Power Generation System



空分系统 ASU

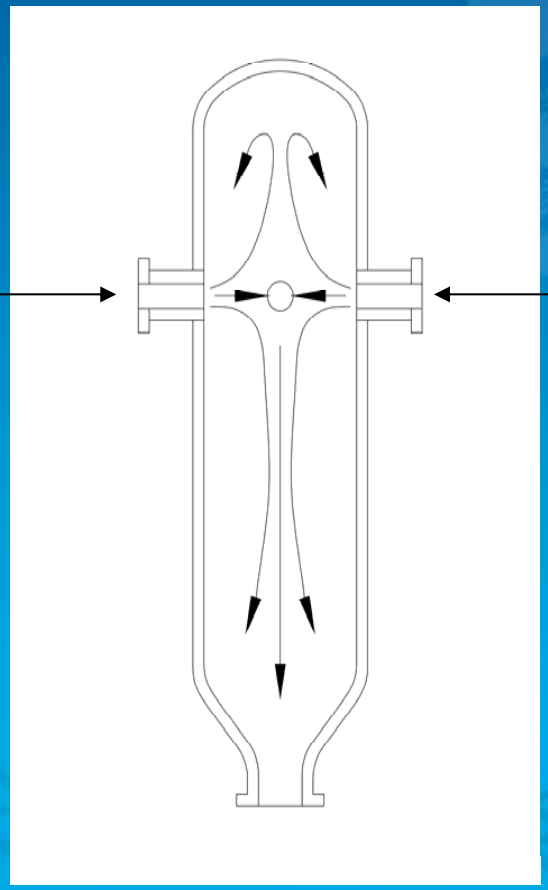
- 空分采用低温精馏法
  ASU type: Low temperature rectify

4喷嘴对置式气化炉

Opposed 4 Nozzle Gasifier

水煤浆及氧气

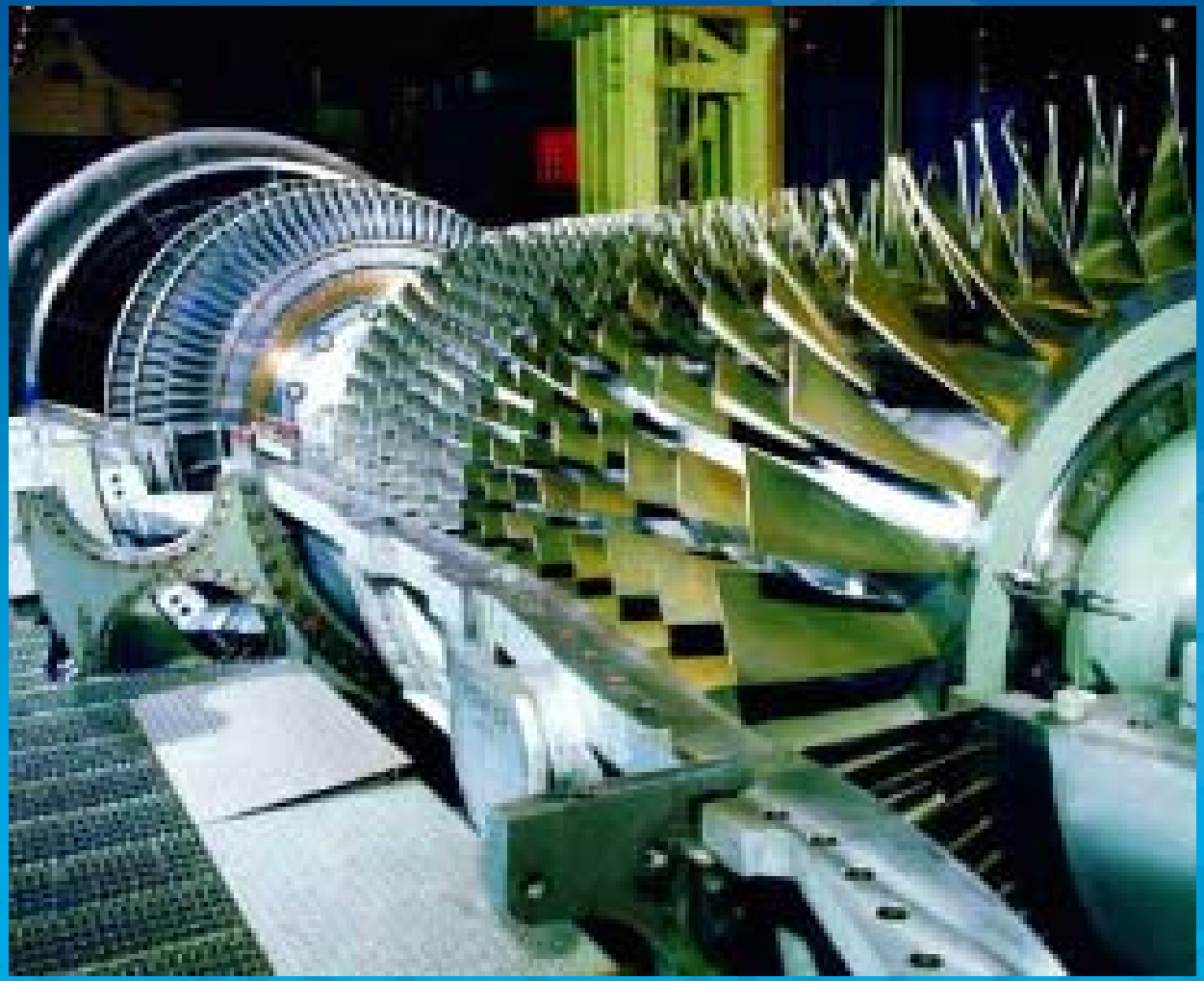
Slurry & Oxygen



水煤浆及氧气

Slurry & Oxygen

E CLASS Gas Turbine



技术特点—全热回收
Characteristic – Complete Heat Recovery

- 辐射及对流废锅
  Radiant & Convective syngas cooler
- 净化系统显热回收
  Heat recovery of acid gas removal system
- 压气机抽气显热回收
  Heat recovery of air extraction from GT
- 对流废锅尾段设置辅助蒸汽过热器
  Aux. Steam system located on the end of convective cooler
- 余热锅炉采用三压、再热、带自除氧设计
  HRSG type: triple pressure with reheat and deaerator
- 120℃以下的低位热能，用于溴化锂机组制冷
  Energy under 120℃ recovery: LiBr absorption refrigeration

工程计划 Project Plan

- 初步可行性报告计划5月31日前评审

  Project feasibility report finished at 31th. MAY
- 预计2008年初开工建设

  Pilling work will be started at Jan. 2008
- 2010年6月投产发电

  Beginning to operating: Jun. 2010

IGCC存在的问题与展望

Open Questions and Outlook of IGCC

- 初投资高，建议国家以政策支持形成IGCC规模产业链，以降低造价

  High investment

- 优化系统设计，提高IGCC电厂总体可用率

  System optimization

- 开发现实和可行CO_2捕集及封存技术

  CO_2 Capture & Storage

谢　谢

Thanks