

Anhui Yuanchen Environmental Protection  
Science And Technology Co., Ltd



# Intelligent Environmental Protection Island



## Contact Us

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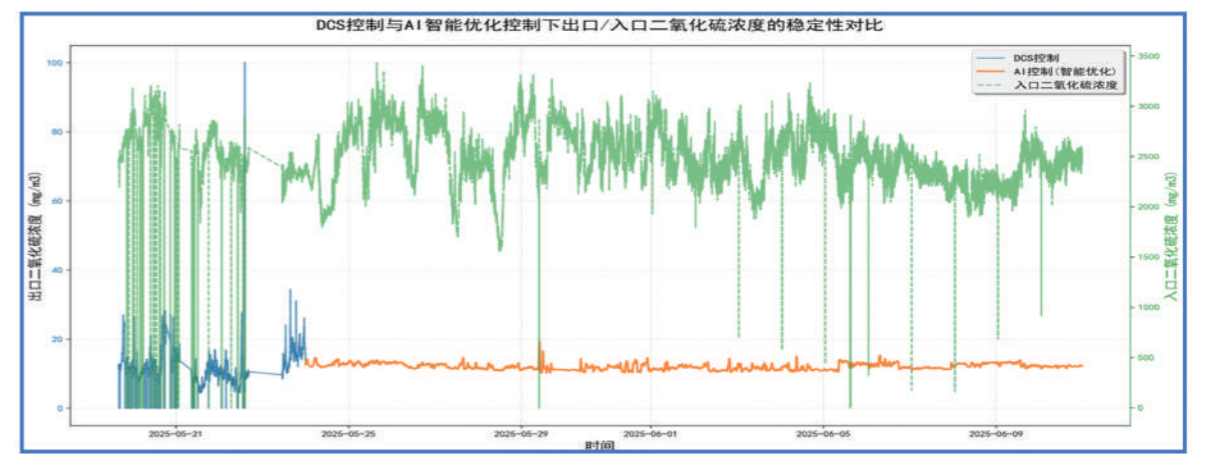


# About Us

Yuanchen Technology was founded in May 2005. With over 20 years of experience in R&D and application of environmentally friendly new materials technology, it has specialized in industrial kiln flue gas treatment and pioneered industrial AI energy-carbon technology. Focusing on the AI Intelligent Environmental Protection Island, it combines intelligent computing power with advanced algorithms to help customers achieve pollution reduction, carbon reduction, quality improvement, and efficiency enhancement for value re-creation.



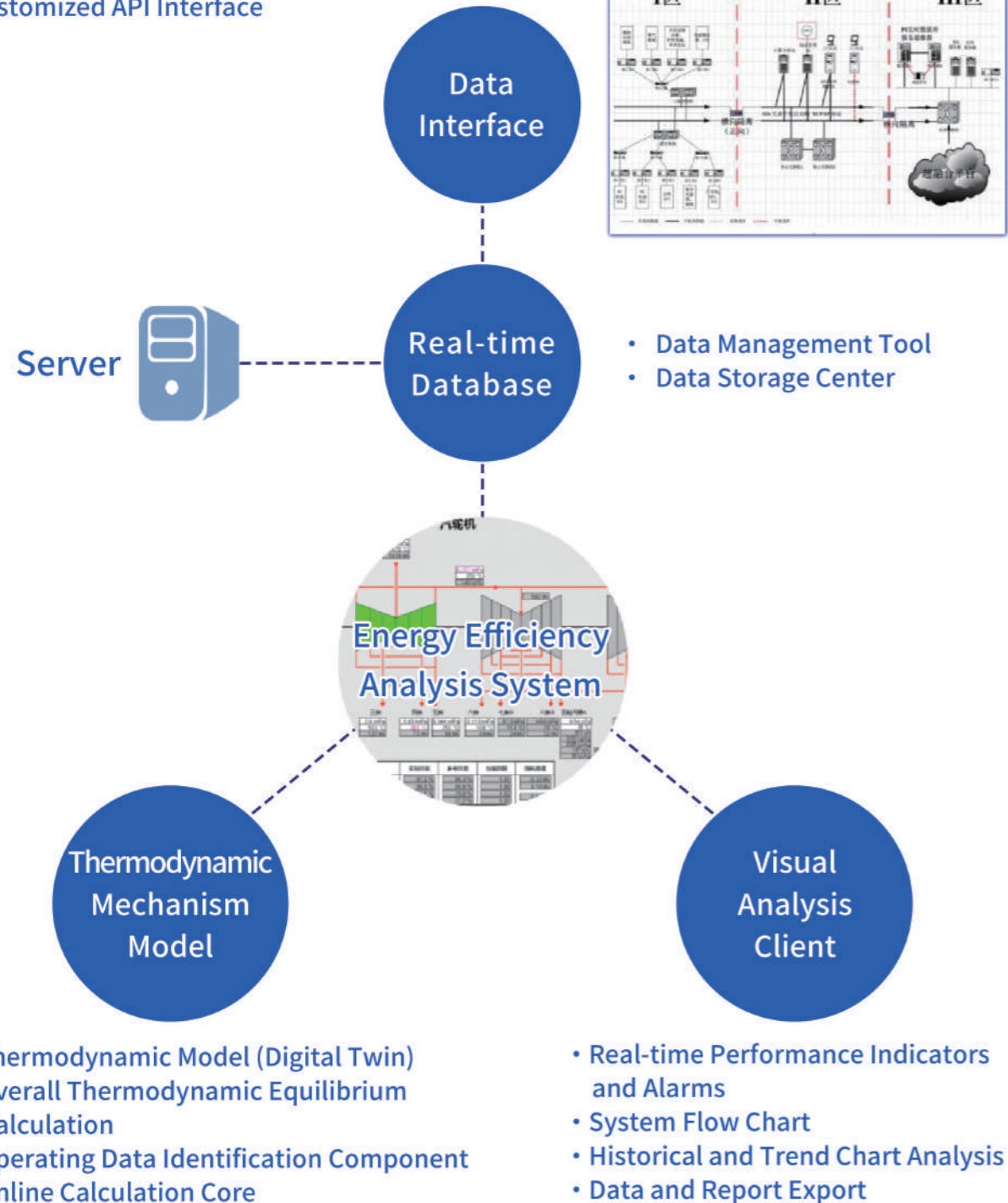
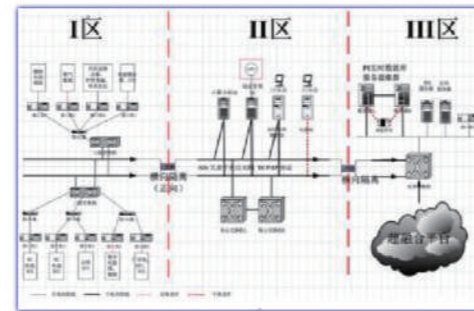
# AI Intelligent Environmental Protection Island Benefit Analysis



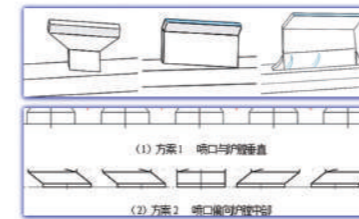
Pros and Cons of Precise NH3 Injection & AI NH3 Injection		
	Precise NH3 Injection	AI NH3 Injection
<b>Pros</b>	<ul style="list-style-type: none"> <li>1. Mature logic and principles with extensive proven applications;</li> <li>2. No complex algorithms required; relies on mature DCS system with short deployment period;</li> <li>3. Low failure rate, low dependence on data quality, suitable for steady-state operation with small condition fluctuations.</li> </ul>	<ul style="list-style-type: none"> <li>1. Small renovation workload, initial investment 20% lower;</li> <li>2. Short downtime or non-stop communication connection;</li> <li>3. Real-time response;</li> <li>4. High control accuracy;</li> <li>5. Self-adaptive capability;</li> <li>6. Low NH3 slip;</li> <li>7. Mouse click operation reduced by over 50%</li> </ul>
<b>Cons</b>	<ul style="list-style-type: none"> <li>1. Large renovation workload, high initial investment;</li> <li>2. Requires long downtime;</li> <li>3. Response lag;</li> <li>4. Limited control accuracy;</li> <li>5. Lack of self-adaptation;</li> <li>6. NH3 slip near critical limit</li> </ul>	<ul style="list-style-type: none"> <li>1. Few competing products available in the market;</li> <li>2. High data dependence;</li> <li>3. Higher dependence on sensors.</li> </ul>
<b>Workload Zoning</b>	CFD Simulation + Zonal Retrofit + PID Upgrade	CFD Simulation + Flow Uniformity Optimization + Intelligent Control (Including prediction, self-learning, multi-factor decision-making)

# Boiler Intelligent System Solution

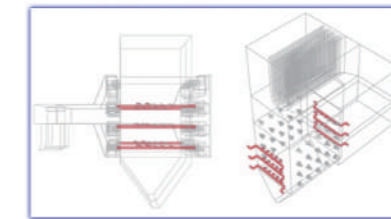
- Safe Deployment in Production Area 3
- Data sources can come from systems such as DCS, PI, and SIS
- One-way data transmission with positive isolation
- standard industrial data interfaces such as OPC
- Customized API Interface



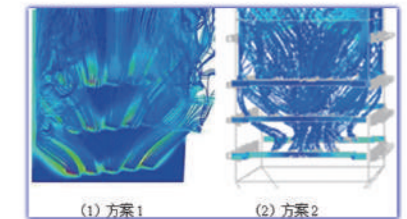
# Research and Application of High-temperature Corrosion Control for Water-cooled Walls of Opposed Firing Boilers



Form and Arrangement of Wall-Attached Air Nozzles



General Design Schematic of the New Wall-Attached Air Technology



Wall-attached Airflow Distribution Performance

## Comprehensive Control Technology for High-temperature Corrosion of Water-cooled Walls in Opposed Firing Boilers

Anti-corrosion Technology for Equal Pressure Air Distribution in Secondary Air Boxes

New Directionally Regulated Wall-Attached Air Technology

Refined Combustion Optimization and Adjustment After Renovation

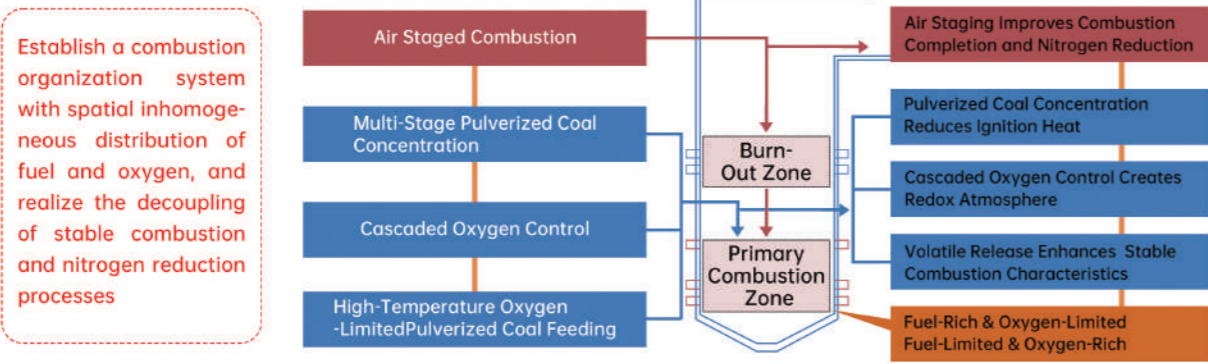


- Reduce the reducing atmosphere in the near-wall area, mitigate high-temperature corrosion of water-cooled walls, and lower the risk of tube burst;
- Enhance combustion uniformity, reduce the combustible content in fly ash and CO concentration, and improve boiler combustion efficiency;
- Improve the operational safety and economy of the unit.

# Research and Application of Oxygen-Enriched Stable Combustion Technology for Coal-Fired Boilers Under Low Load

# Combustion Control Technology Based on Multi-Source Data Fusion

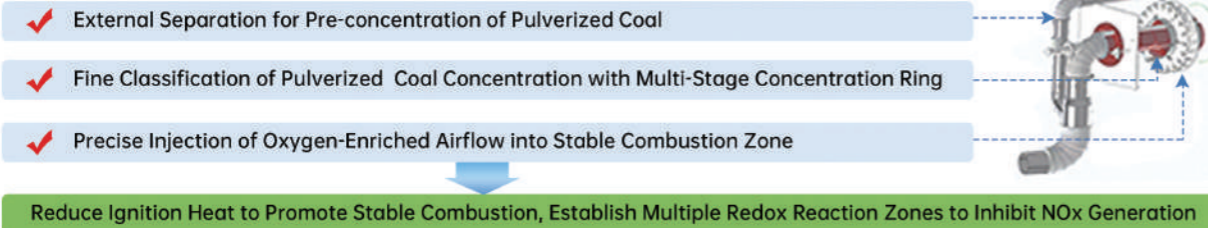
## Technology / Research Idea



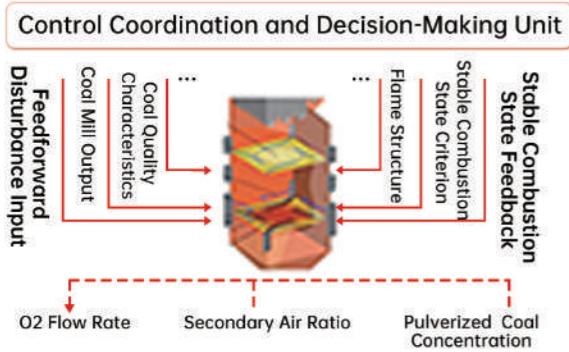
Establish a combustion organization system with spatial inhomogeneous distribution of fuel and oxygen, and realize the decoupling of stable combustion and nitrogen reduction processes

## Key Breakthroughs

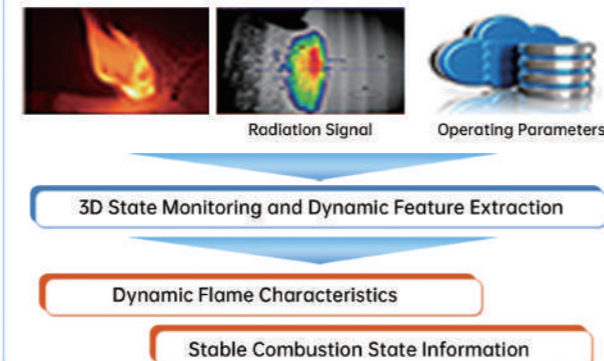
### Pulverized Coal Concentration Separation and Cascaded Oxygen Control Combustion Process Reconstruction Method



### Adaptive Coordination Control Strategy for Multivariable Coupling Process of Oxygen-Enriched Combustion



### Multi-Source Information Driven Quantitative Characterization Method for Flame Stable Combustion State



Establish a Dynamic Quantitative Characterization Method for Flame Stable Combustion, Quantify the Promoting Effect of Oxygen Injection on Stable Combustion, and Clarify the Oxygen-Assisted Combustion Stability Boundary

Achieve Stable Operation of Multiple Coal Types at 10%-100% Load, with NO<sub>x</sub> Emission Increase < 50% at 15% Rated Load

## Key Issues

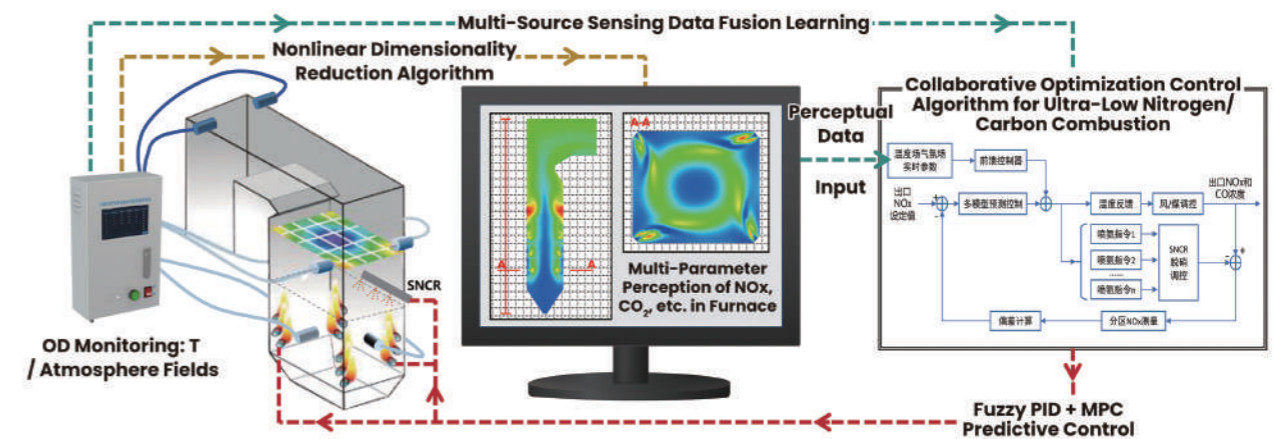
- ✓ Low Precision of In-furnace On-line Monitoring Technology
- ✓ Difficulty in Obtaining Key Parameters Such as NO<sub>x</sub> in Furnace Under Variable Load
- ✓ Lack of Coordination Strategy for Multi-Parameter NO<sub>x</sub> Regulation

- 1 Tail Flue Gas CO Emission ≤ 200 mg/m<sup>3</sup>
- 2 Stable In-furnace NO<sub>x</sub> Concentration ≤ 50mg/m<sup>3</sup> Under Variable Load
- 3 Comprehensive Investment and Operation Cost Reduced by ≥ 50% Compared with Traditional SCR

## On-line Monitoring and Diagnosis of In-furnace Combustion

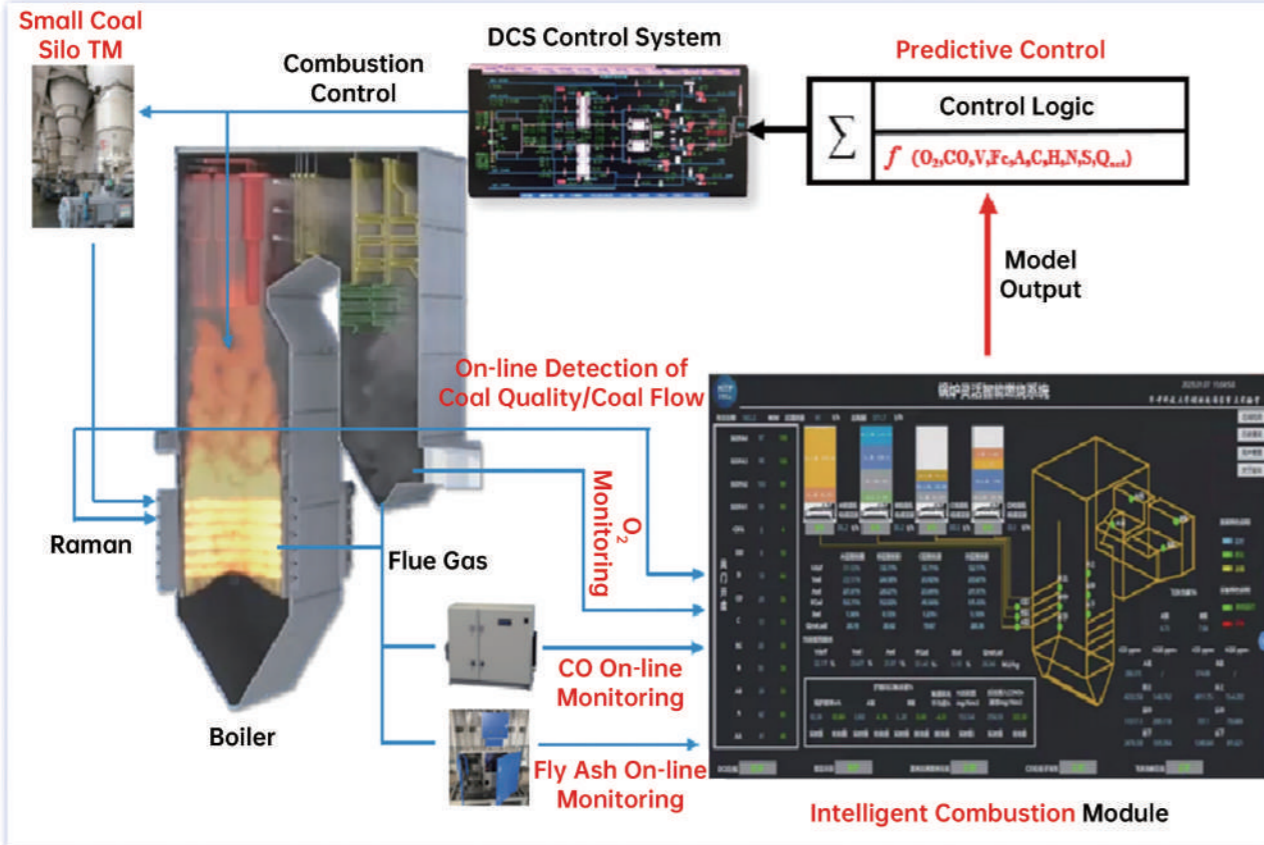
## Perception of Key In-furnace Parameters

## Integrated Control Method for Low-Nitrogen/Low-Carbon Combustion



As the Project Undertaking Unit, Apply for the **2024 National Key R&D Program Project**

# Boiler Combustion Air-Pulverized Coal Balancing Technology



# Certification, Appraisal & Novelty Search

China Electricity Council / China Association of Environmental Protection Industry:

- Internationally Advanced Level
- First applied in flue gas pollutant treatment for 1000MW-class coal-fired power generating units

2025年10月31日，中国电力企业联合会与中国环境保护产业协会在江苏省苏州市联合组织召开由安徽皖能环保科技有限公司、华中科技大学、安徽皖能电力有限公司共同完成的“基于AI多模态检测与智能控制燃煤锅炉燃烧平衡优化控制”项目科技成果评审会。评审委员会听取了项目研究报告、技术经济分析报告、国内外同类技术对比分析报告和科技创新报告等文件，考察了安徽皖能电力有限公司项目现场，经质询与讨论，形成评审意见如下：

**评审委员会名单**

工作单位	所学专业	现从事专业	职称	签名
鄂环环保有限公司	环境工程	水环境保护与治理研究	院士	余江青
工业和信息化部	电子信息	人工智能、智能制造和数字化产业	正高	孙志杰
中国科学院	能源动力工程	燃煤锅炉工程	正高	姜培宇
中国科学院	能源与环保	能源与环保	正高	张树华
中国科学院	能源与环保	能源与环保	正高	杨国龙
中国科学院	能源与环保	能源与环保	正高	何志东
中国科学院	能源与环保	能源与环保	正高	孙志杰
中国科学院	能源与环保	能源与环保	正高	孙志杰
中国科学院	能源与环保	能源与环保	正高	孙志杰

用户使用证明：安徽皖能环保科技有限公司向安徽皖能电力有限公司4#机组（1000MW）智能环保科技项目，运行稳定良好，各方评价均达到5星7日双向互评。《AI智能控制燃煤锅炉燃烧平衡优化控制》技术成果应用，在皖能集团沙坪电厂有限公司自6月14日起4#机组环保岛智能控制环保岛控制系统，用于环保与能效协同优化智能控制。

用户评价：“该成果显著提升了我们的人效和能效，环保及能效提升，值得肯定。”

用户签字：日期：2025年10月31日

Application Certification, Achievement Appraisal

## Pulverized Coal Monitoring and Blending Technology

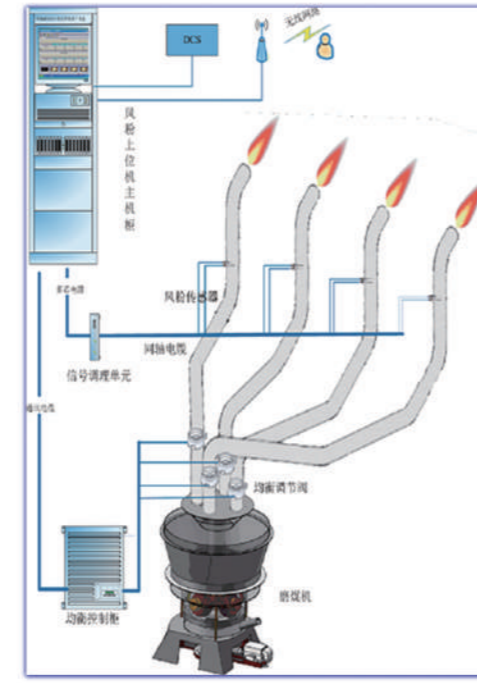
- On-line Coal Quality Detection Technology by Laser Raman Method.
- Intelligent Blending Optimization Technology Based on In-furnace Coal Quality Analysis.
- Automatic Balancing Technology Based on On-line Air-Pulverized Coal Measurement.

## Intelligent Combustion Control Technology

- On-line Detection Technology of Fly Ash Carbon Content Based on Soft/Hard Measurement Coupling.
- Boiler Intelligent Combustion Technology Based on CO/O<sub>2</sub> Dual-Parameter Coordination.

## Flexible Fuel Storage and Supply Technology

- High Flexibility Storage and Supply TM & Flexible Fuel TM Technology.



## Shanghai Institute of Scientific and Technical Information:

— Internationally Advanced Level

ISTIS 国际证书(005)号 编号: 2025100821936 CSII

### 水平检索报告

项目名称: 基于AI多模态检测与智能控制燃煤锅炉燃烧平衡优化控制  
委托人: 安徽皖能环保科技有限公司  
检索性质: 成果  
委托日期: 2025年09月15日  
完成日期: 2025年10月18日

上海科学技术情报研究所  
(国家知识产权局指定机构)

检索范围: 国内、国外、港澳台、文摘、专利、标准、会议、学位论文、科技报告、图书、期刊、报纸、音视频、多媒体、其他。

检索日期: 2025年10月18日

检索结果: 检索到相关文献 12 篇，其中发明专利 3 篇，实用新型专利 2 篇，软件著作权 2 篇，论文 3 篇，会议 2 篇。

检索结论: 检索到的文献与本项目技术成果具有较高的相关性，表明本项目技术成果在国内外具有一定的新颖性和创造性。

检索员(签字): 唐鹤 审核员(签字): 唐鹤  
检索员职称: 研究员 审核员职称: 研究员

2025年10月18日

Novelty Search Report

# AI Environmental Protection Island Projects Cases



China Resources Chenzhou  
1×660MW Unit



Tangshan Ganglu Iron & Steel  
360 m<sup>2</sup> Sintering Machine



Shazhou Power  
1×1000MW Unit  
(Project Appraised)



Guanggu Zhundong  
2×660MW Units



Zhongshan Thermal Power  
1×200MW Unit



SPIC Pingwei  
1×1000MW Unit



Jindadi Group CHP  
3×390 t/h



Yuguang Zinc Industry  
1×75t/h



CHN Energy Nanning  
Power Plant 2×660 MW

# CASE LIST

No.	Client Name	Plant	Unit	Start/End Date	Service Scope Description
1	Hebei Zhongke Langbo Environmental Protection Technology Co., Ltd.	Metallurgy	360m <sup>2</sup>	2024.8-2025.3	AI DeNox, DeNOx and DeSOx systems
2	Zhangjiagang Shazhou Electric Power Co., Ltd.	Power	1*1000MW	2025.6-2025.10	AI DeNox, DeNOx and DeSOx systems
3	Wuhan Optics Valley Environmental Protection Technology Co., Ltd.	Power	2*660MW	2025.6-2025.9	AI DeNox, DeNOx and DeSOx systems
4	Guizhou Zhongshan Yemazhai Thermal Power Co., Ltd.	Power	3*200MW	2025.4-2025.9	AI DeNox, DeNOx and DeSOx systems
5	Fujian Longking Environmental Protection Co., Ltd.	Chemical	2*260T/h	2025.8-2025.9	AI Ammonia Injection
6	Huarun Power Hunan Co., Ltd.	Power	650MW	2025.9-2025.12	AI DeNox, DeNOx and DeSOx systems
7	Henan Yuguang Zinc Industry Co., Ltd.	Metallurgy	1*75T/h	2025.11	AI DeNOx System
8	Pingwei #3 Power Generation Co., Ltd.	Power	1000MW	2026.2	AI DeNox, DeNOx and DeSOx systems
9	Guoneng Nanning Power Generation Co., Ltd.	Power	2*660MW	2026.3	AI DeNox, DeNOx and DeSOx systems
10	Everbright Biomass Energy(Guixi) Co., Ltd	Biomass	130T/h	2026.3	AI DeNox, DeNOx and DeSOx systems
11	Xibaipo Power Plant	Power	2*330MW	2026.3	AI Ammonia Injection
12	Zhangjiagang Shazhou Electric Power Co., Ltd.	Power	630MW+1000MW	2026.3	AI Ammonia Injection