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The Outlook of Chinese Coal-fired Electricity Generation Technologies to 2020

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CONTENT

1 Policy of Chinese Coal-fired Generation

- Coal-fired generators will have its seat in the next 30 years in China, due to the Chinese energy resource.
- To develop High Efficiency Low Emission (HELE) technology is the key research field for coal-fire unit.
- Less coal-consumption of electricity power
- Less CO_2 emission

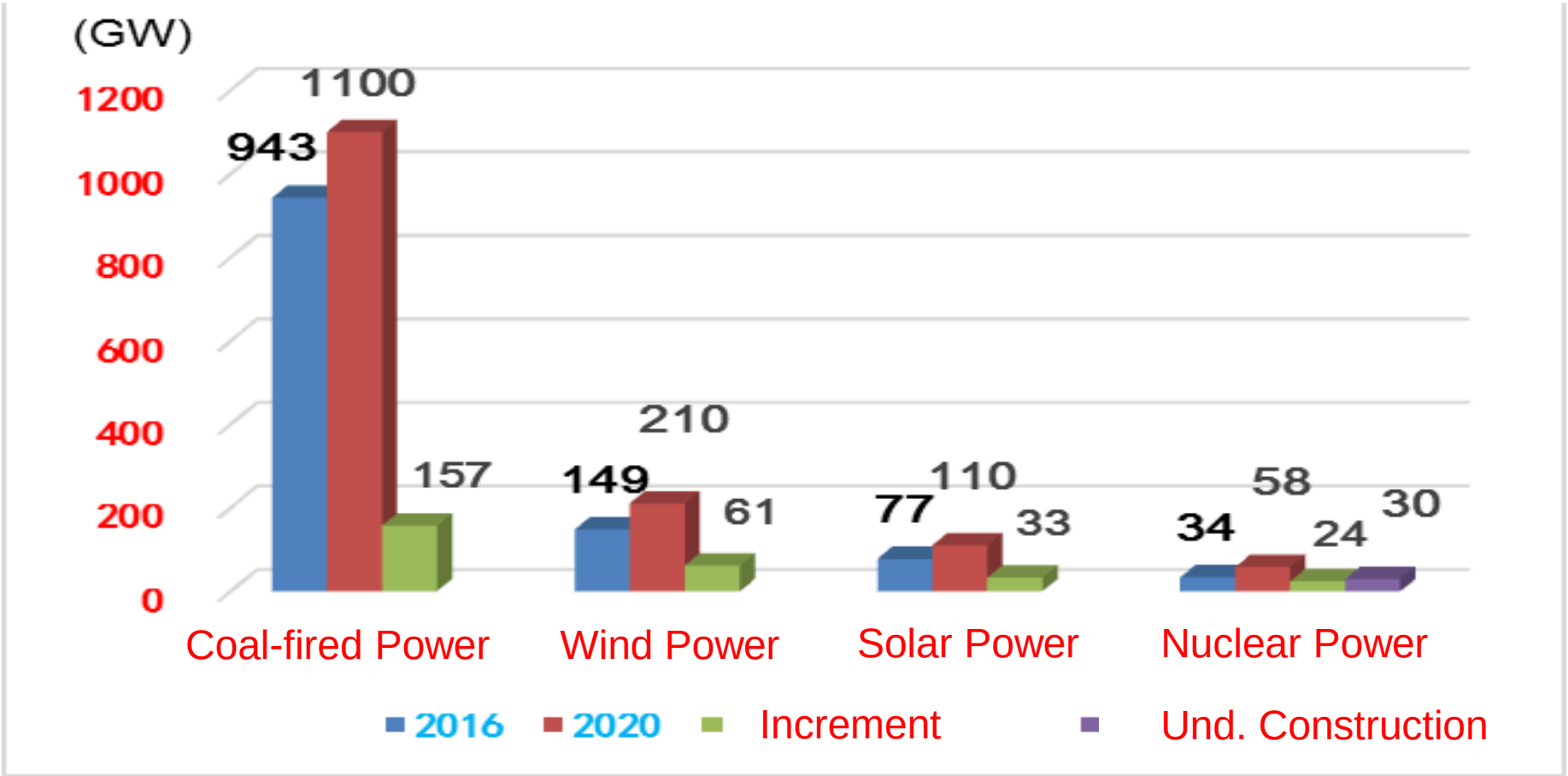
1 Policy of Chinese Coal-fired Generation

- coal-fired unit coal consumption rate (efficiency)

It is required by the government that the average coal consumption rate (net) shall be no less than 300g/kWh (41%) for new-built unit, and no less than 310g/kWh (39.7%) for as-built unit.

1 Policy of Chinese Coal-fired Generation

- Electricity infrastructure blueprint in the Chinese 13th 5-year plan



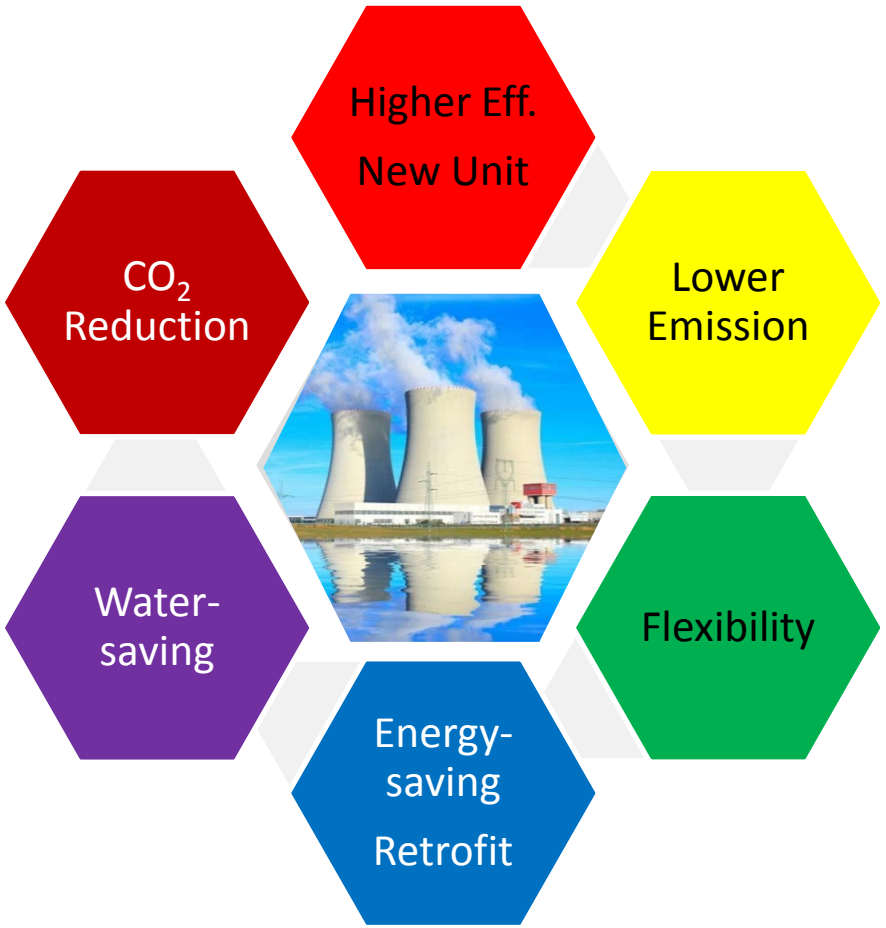
1 Policy of Chinese Coal-fired Generation

	Market Scale 2016-2020	Increment 2016-2020
Wind Power	61GW	40%+
Solar Power	33GW	40%+
Nuclear Power	30GW，in-depth feasibility study on inland nuclear unit	50%+
Coal-fired Power	10GW, newly installed 420GW，ultra-low emission retrofit 340GW, efficiency upgrade retrofit	0.5~1%
Coal-fired unit flexibility retrofit	133GW, CHP unit 82GW, unit without large-scale area-heating	New field



1 Policy of Chinese Coal-fired Generation

- Roadmap of coal-fire technology upgrade



2 Higher Efficiency technology

(1) 600℃ Class USC technology

Some pioneer projects are under construction

- Higher parameter (35MPa/610 ℃/630 ℃/630 ℃)
- State-of-the-art double-reheat boiler and turbine
- Deliberated thermal system
- New Arrangement
- Efficiency up-to 48%

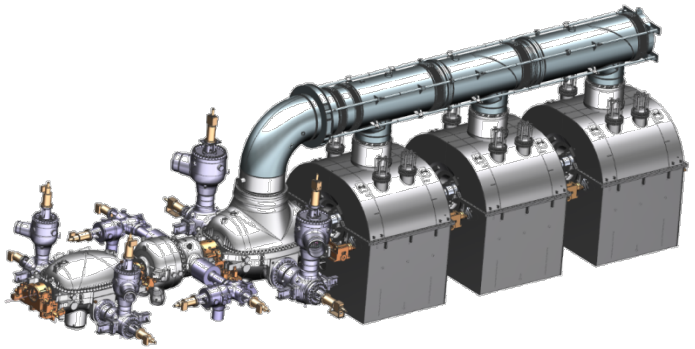


Fig. from Shanghai Electric Group Co. Ltd

2 Higher Efficiency technology

(2) 650℃ class AUSC technology

- New material will be used for boiler and pipe, such as Sanictro25, SP2215, HR6W
- Nickle-based material will be used for welded turbine rotator
- Much Less cost v.s. 700 AUSC unit
- Efficiency up-to 48% of SRH unit

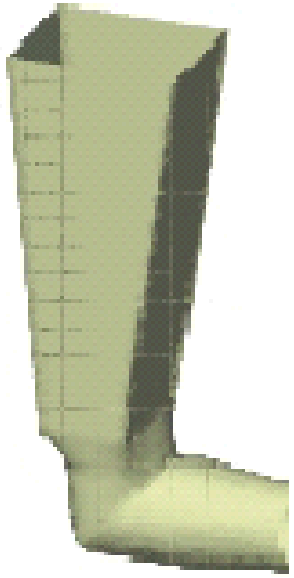
3 Energy-saving Technology for Retrofit

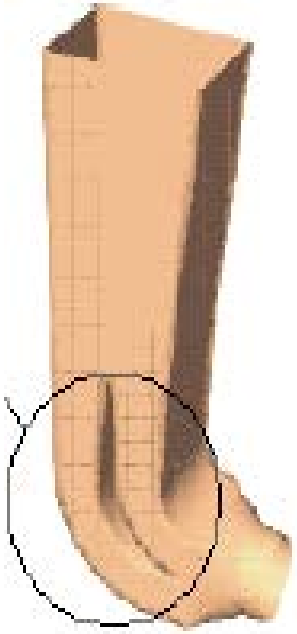
- Parameter upgrade for sub-SC unit
- Switch to CHP unit
- System and equipment improvement
- Flue gas heat recovery
- Streamline Duct

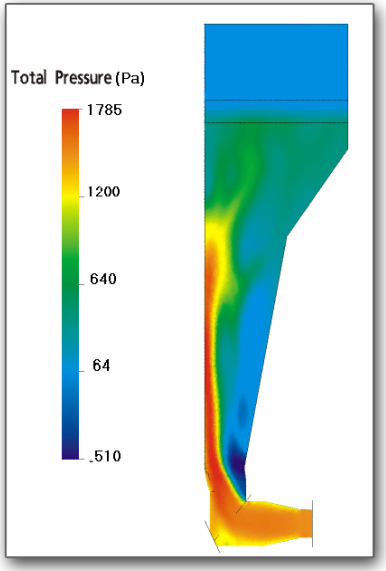
3 Energy-saving Technology for Retrofit

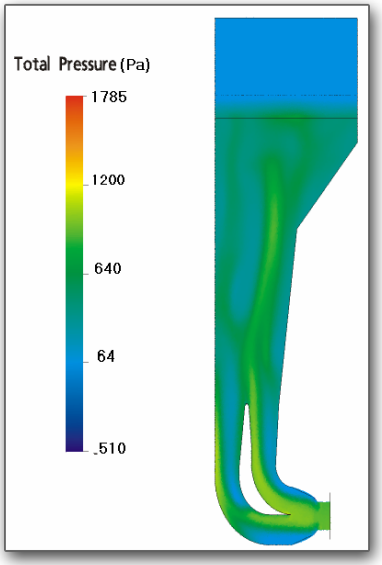
Case：Streamline duct

With CFD the duct can be designed as a streamline shape with aero foil type guide plate , which could considerately reduce the pressure loss .









3 Energy-saving Technology for Retrofit

A 1000MW Unit Case

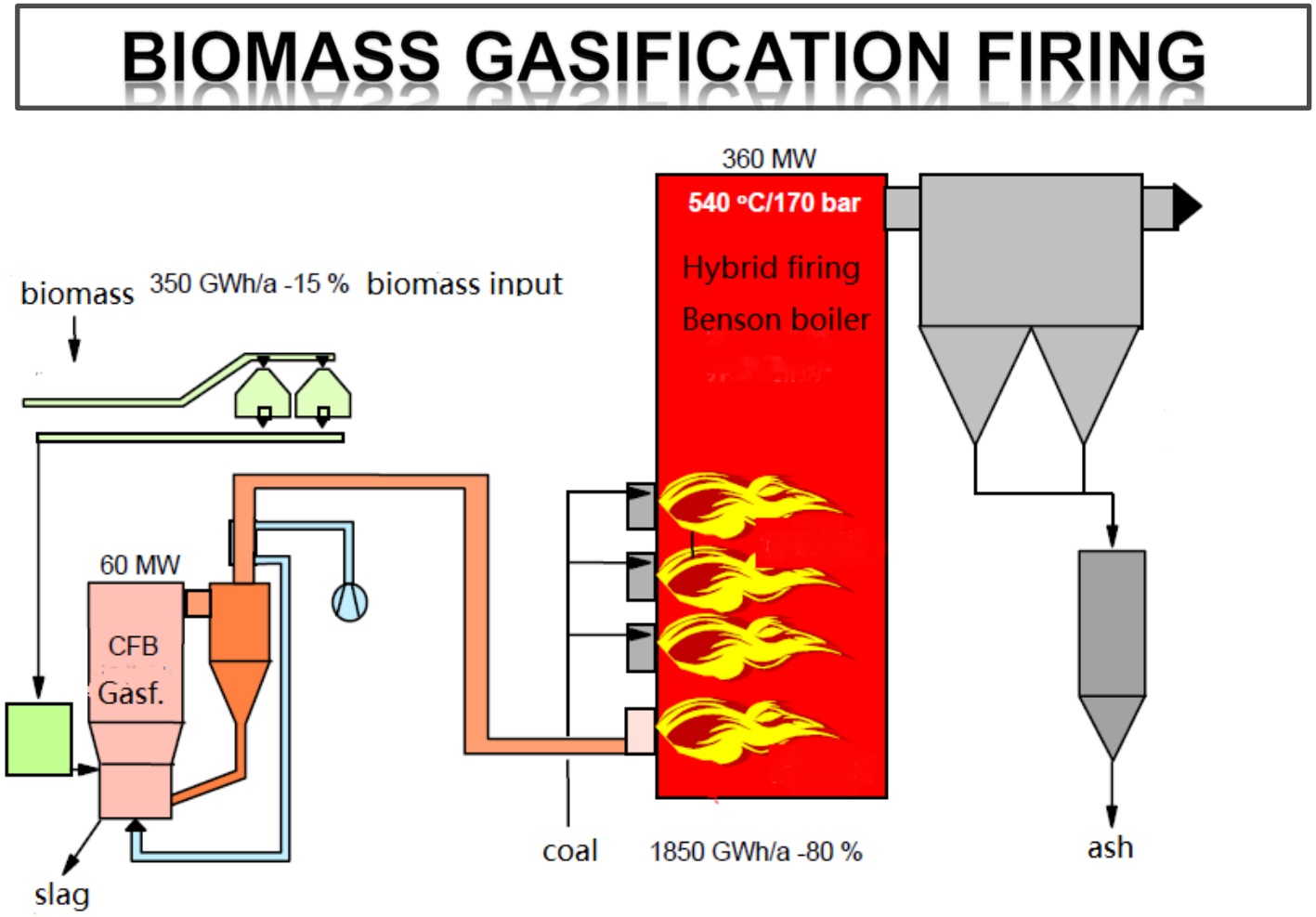
	Pressure Loss reduction	Power Saving
P.A. System	1kPa	400kW
S.A. System	1.2kPa	700kW
Duct System	1.5kPa	1800kW
Total	3.73kPa	2900kW

4 CO_2 Reduction Technology

(1) Hybrid combustion with coal and biomass

- Biomass fuel is a kind of renewable resource, regarded as CO_2 neutralizing fuel.
- Biomass fuel is a kind of commercial fuel with low NOx and SOx emission.
- The potential biomass fuel is in equivalent heat about 4 billion tons standard coal in China.

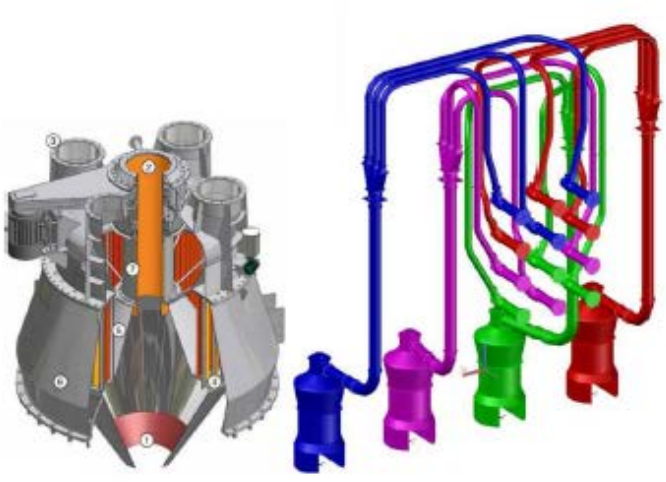
4 CO_2 Reduction Technology



4 CO_2 Reduction Technology

FURNACE HYBRID-FIRING

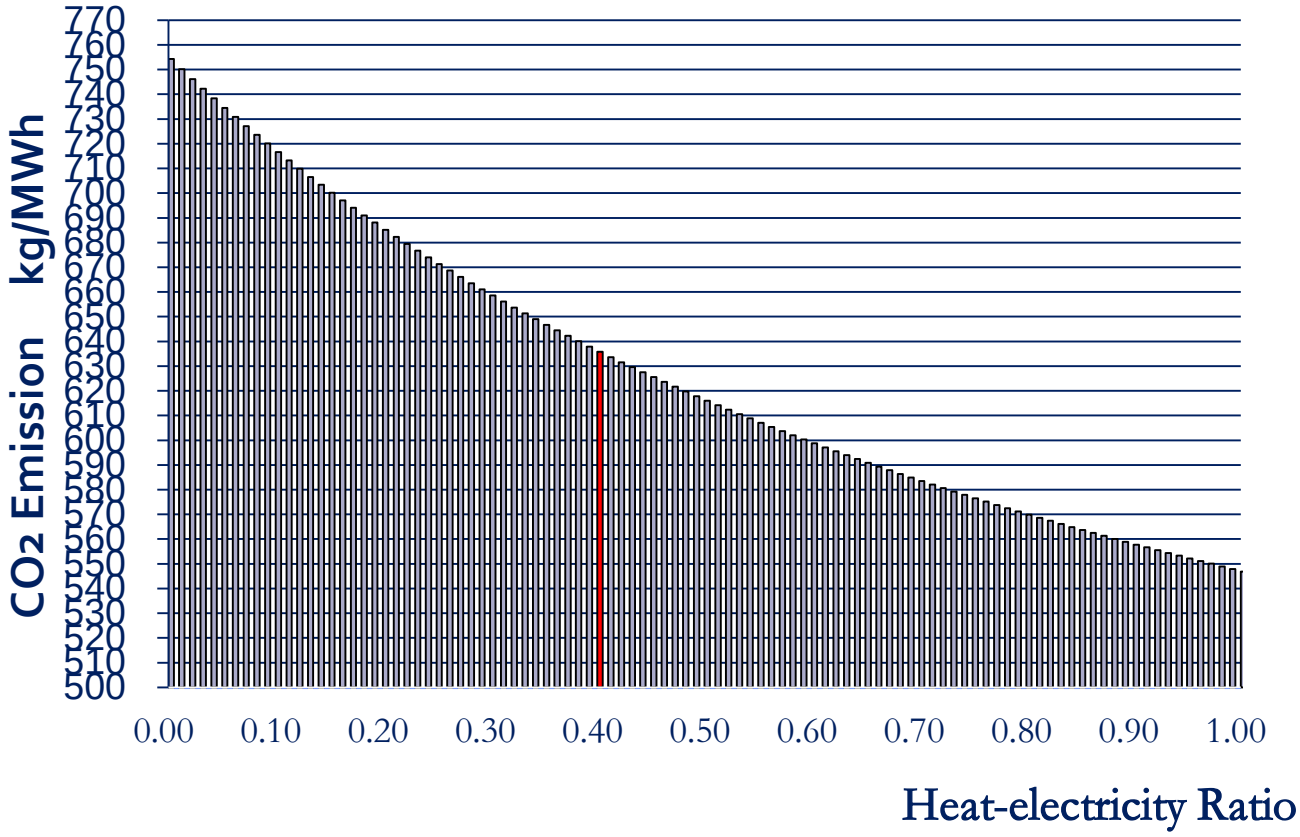
- Common biomass mill and common burner: 5% ~ 15% biomass fuel firing
- Individual biomass mill and common burner: 5% ~ 40% biomass fuel firing
- Individual biomass mill and individual burner: 5% ~ 40% biomass fuel firing



4 CO_2 Reduction Technology

(2) Other CO_2 reduction aspects

- Higher unit efficiency
- USC + Area Heating



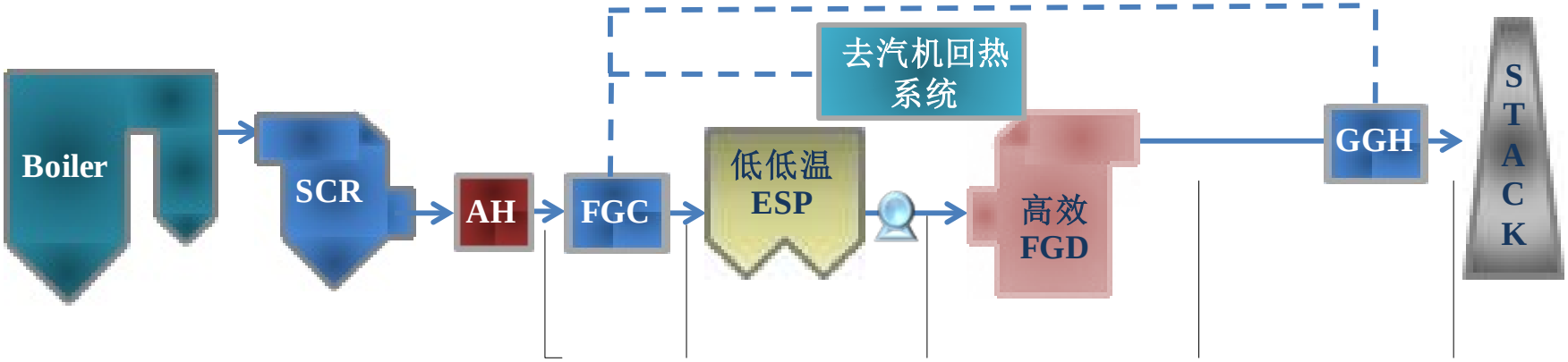
5 Water-saving Technology

- Air-cooling unit up to 1000MW USC unit
- Condensate water in flue gas recovery

Water consumption rate reaches less than 0.03m^3 /s.GW

6 Environmental Protection Technology

Ultra-low emission for firing inferior coal boiler



Thank You

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