



Clean Coal Day in Japan 2017

INTERNATIONAL SYMPOSIUM
ON ADVANCED COAL FIRED POWER GENERATION

PANEL DISCUSSION

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Coal in Energy Mix

- ◆ Optimum Energy Mix To Fit the Respective Energy Situations of each Countries
- ◆ Coal is Certainly A Major Player in Energy Mix in Asia, Africa, East Europa as well as Japan
- ◆ Advanced CCT is very Essential for Coal To Be A Major Player in Energy Mix

There are Competition and Cooperation Among Countries. Open Platform To Respect Genuines and Efforts is very Necessary for the Achievement in the Advanced CCT.



Advanced CCTs, Continuous Innovation

◆ Advanced Power Generation Technologies

- Higher Efficiency,
- Cleaner and Safer
- CO₂, Reduction to Zero

At Reasonable Cost

◆ How to Continue Research, Development, and Commercialization?

Fund Raising for Commercialization as well as R / D,
Public Acceptance and Support are Very Essential.



CCT, Cleaner and Safer Uses of Coals

◆ SO_x, NO_x, Particulates; PM 2.5, Mercury, Selene, Boron, Flurine in Exhaust

→ Zero Emission

→ Cleaner Atmosphere and Water

◆ Deeper Cleaning and Broader Application of Technologies Are Wanted.

Final Forms of Removed Pollutants Are Concerned.

Reasonable Cost / Performance has Been Achivement.



Utilization of Fly Ash and Slag

- ◆ Application in Civil Engineering, Land and Marine, Agriculture
- ◆ Better
 - Cost / Performance
 - Excellent Performance and Environment
- ◆ Advanced Technologies and Social Acceptance Are Still Wanted.
Mercury Issues Must Be Solved.



Spontaneous Combustion of Coal

- ◆ Frequent Fires at Coal Seam, Production and Utilization
- ◆ Human and Economical Loss, Pollution and CO2 Emission
 - Poor Reputation of Coal
- ◆ Science and Technology for Prediction, Detection and Prevention of Spontaneous Combustion Must Be Developed Particularly for Asia.

Do Not Overlook!

CO2 Capture and Sequestration Must Be Necessary



■ Further Development

- ✓ Investment of EOR for Oil and Methane
- ✓ CCS by Underground Water
- ✓ Green Earth

■ Another Approach for Japan

- ✓ Option 1: Hydrogen CO2 free by CCS

Large Scale Hydrogen Power Generation May Come Earlier than FCV.

- ✓ Option 2: CCS of CO2 from Fossil and Renewable Energy

Large Scale CCS at Suitable Site → Lower Cost for CO2 Trade



Green Plantation in Dessert

21C Oasis of Huge Scale will be Surrounded by Forests, Green Houses, and Advanced Agriculture. Solar, Wind and Bioenergy in Addition to Fossil Energy Support the Oasis in Power and Water Supply through Desalination. Large Scale EOR / CCS of CO₂ from Bioenergy as well as Fossil Resources Can Be Searched Around the Oasis in the Coastal Dessert for CO₂ Trade.



Continuous Research, Development Practice and Commercialization Needs

◆ Fund Raising

Government and Social Investment

◆ Since We need Electricity, Clean Air and Water as well as Coal Earth at the Same Time

Can We Ask Public Acceptance and Support of A-CCT?

How Can We persuade Public A-CCT Indispensable through their Recognizing Intermediate and Long Term Profits?