

September 21st, 2021 / at Toranomom Hills, Tokyo, Japan
The 30th Clean Coal Day International Symposium (2021)
Organizer: JCOAL (Japan Coal Frontier Organization)

Session 1:
Policy Updated towards Carbon Neutrality in the World
Global Movement; Role of Coal and Ammonia

moderator

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New Vision: Carbon Neutrality

■ October 26, 2020

1st Diet Speech by Prime Minister Suga “2050 Carbon Neutrality”

← October 13, 2020/ JERA “2050 Zero Emission” by ammonia and hydrogen

■ April 22, 2021

Prime Minister Suga announced at the “Leaders Summit on Climate”

“46% GHG Reduction by 2030 compared with 2013”

→NDC(Nationally Determined Contribution)

Upwardly revised at large extent from “26% GHG reduction by 2030 compared with 2013”

■ Energy Mix 2050 [reference case] (December 21, 2020)

*Renewable energy: 50 ~ 60%

*Cofiring by Hydrogen & Ammonia: 10%

*Carbon free thermal power other than hydrogen and ammonia (with CCUS)

+ Nuclear power: 30 ~ 40%

⇒ Real figure/ nuclear power 10% (conversion to secondary power supply)

CCUS=Carbon dioxide Capture, Utilization and Storage

New Energy Mix towards JFY2030

■ Zero Emission Power Supply: 56% ← 44% (current energy mix)

*Renewable energy: 36 ~ 38% ← 22 ~ 24%

*Nuclear power: 20 ~ 22% ← 20 ~ 22%

*Cofiring by Hydrogen & Ammonia : 1% ← New

■ Thermal Power Generation: 41% ← 56%

*LNG : 20% ← 27%

*Coal : 19% ← 26%

*Oil : 2% ← 3%

Issues of New Energy Mix

■ 4 issues

[1] Is it feasible “Renewable Energy 36 ~ 38%”?

: 6 ~ 8% will not be achieved?

[2] Is it feasible “Nuclear Power 20 ~ 22%”?

: 5 ~ 7% will not be achieved?

[3] Doesn't the reduction of thermal power and fossil fuel (coal and natural gas) hinder 3E?

: Coal reduction → Hinders energy security and economy

: Natural gas reduction → Hinders energy security and environment

: Will result in excess of nearly 15%? → Is massive national expenditure unavoidable as with the case of Kyoto Protocol?

[4] Doesn't the suppression of the total demand endanger the future of the Japanese industries?

: Beyond “extension of energy saving”

: Total amount of power generation ∴ Disruption between “10% decrease by 2030 ⇔ 30 to 50% increase by 2050”

Pathway to Carbon Neutrality

■ Power: Zero Emission Power Supply

- *Renewable energy, Nuclear power
- *Carbon-free thermal power (hydrogen, ammonia, CCUS)

■ Non-power: Heat Utilization, etc.

- *Electrification
[Total power demand of 1.3 ~1.5 trillion kWh, Electrification rate of 38%]
- *Hydrogen (Hydrogen reduction steel making, Fuel cell vehicle)
- *Methanation (e-gas), Synthetic fuel (e-fuel)
- *Biomass

■ Carbon Removal: Offset the final CO₂ emissions

- *Planting
- *DACCS (Direct Air Capture + Carbon dioxide Capture and Storage)

Power Generation Cost (2050)

■ RITE (Research Institute of Innovative Technology for the Earth) May 13, 2021

*Scenario / Energy Mix: Renewable energy • nuclear power • hydrogen/ammonia • CCUS thermal power)
/ Total power generation / Power generation cost (marginal cost)

- (1) Reference case = Basic index / 54%, 10%, 13%, 23% / 1.35 trillion kWh / 24.9 yen/kWh
- (2) Renewable energy 100% / 100%, 0%, 0%, 0% / 1.05 trillion kWh / 53.4 yen/kWh
- (3) Renewable energy Cost Reduction / 63%, 10%, 2%, 25% / 1.5 trillion kWh / 22.4 yen/kWh
- (4) Utilization of Nuclear power / 53%, 20%, 4%, 23% / 1.35 trillion kWh / 24.1 yen/kWh
- (5) Hydrogen and Ammonia Cost Reduction
/ 47%, 10%, 23%, 20% / 1.35 trillion kWh / 23.5 yen/kWh
- (6) CCUS Increase / 44%, 10%, 10%, 35% / 1.35 trillion kWh / 22.7 yen/kWh
- (7) Car Sharing / 51%, 10%, 15%, 24% / 1.35 trillion kWh / 24.6 yen/kWh

■ In any scenarios,

***Power generation cost of 2050 significantly exceeds the current cost (13 yen/kWh).**

Cost Reduction is the Biggest Challenge

- The realization of Carbon Neutrality raises the energy cost
⇒ Cost reduction is the biggest challenge
- Innovation as well as thorough Utilization of existing infrastructures are the keys
 - * Japanese unique pathway to Carbon Neutrality
 - Ammonia: Utilization of the existing coal-fired power plants
 - * Applicable to Asian countries and Emerging countries
Big Key to Carbon Neutrality for Non-OECD countries
Based by Japanese leadership basis
- The Utilization of Biomass is also important
 - * Focused on Sorghum and Black Pellets