

Economic and Energy Outlook of Japan for FY2021

On the way back to a normal energy situation while
ending the COVID-19 pandemic

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Major “assumptions”

COVID-19

- FY2020: Gradual improvement after January 2021
- FY2021: Gradual improvement (remission of infection spread and spread of vaccine)

Global economy

- 2020: -4.4%, 2021: +5.2%*
- 2020 is the worst since WWII but will recover in 2021 to only 0.6% higher than 2019.

Import CIF prices

November 2020 → FY2020 → FY2021

- Crude oil: \$42/bbl → 43 → 52
- LNG: \$6.4/MBtu → 6.8 → 7.3
(\$332/t → 352 → 380)
- Steam coal : \$72/t → 81 → 93

Hashizume from IEEJ “Outlook and Challenges for Oil Market”, Hashimoto from IEEJ “Outlook and Challenges for Gas Market”, and Ito from IEEJ “Outlook and Challenges for International Coal Market”

Foreign exchange rate

November 2020 → FY2020 → FY2021

- JPY104.7/\$ → 105.8 → 105.0

*PPP based

Nuclear power generation

- A total of nine nuclear power plants have restarted. Two more will be restarted within FY2020 and two more in FY2021, bringing the number of restarted nuclear power plants to 13.
- In FY2020, they will operate for an average of five months, generating 44.2 TWh (-27.5%). Five will be stopped due to delays in the completion of counterterrorism facilities and injunction by judicial determination.
- In FY2021, they will operate for an average of eight months, generating 79.7 TWh (+80.0%). Four will stop due to delays in the completion of counterterrorism facilities and injunction by judicial determination.

Air temperature

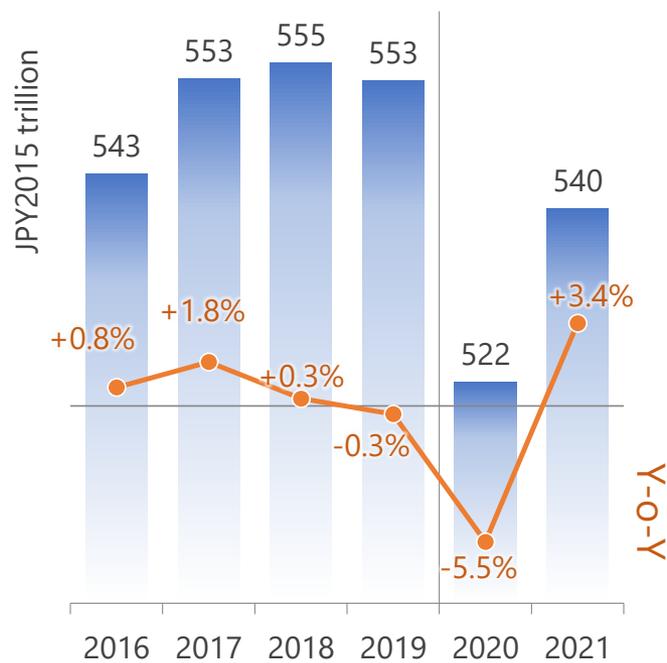
- According to the Japan Meteorological Agency’s forecast, we assume the winter in FY2020 to be a slightly warmer than normal but colder than in the previous year (-1.2°C). The summer in FY2021 will be cooler (-0.5°C) and winter slightly colder than those of FY2020 (-0.2°C).

GDP growth will be +3.4%, but GDP will be lower than FY2019

- The economy will remain lower than before COVID-19.
- Private demand will be lower than 2012 after the earthquake due to continuous prevention of the spread of infection and drop in income and labor.
- Public demand will hit the record high.

- Industrial production will increase in heavy electric machinery, automobile and other manufacturers with the recovery of world and domestic economy.
- But industrial production will be only higher than the level of FY 2009 after the Lehman shock.

Real GDP



Index of industrial production



Total energy consumption will increase but only natural gas will significantly decrease

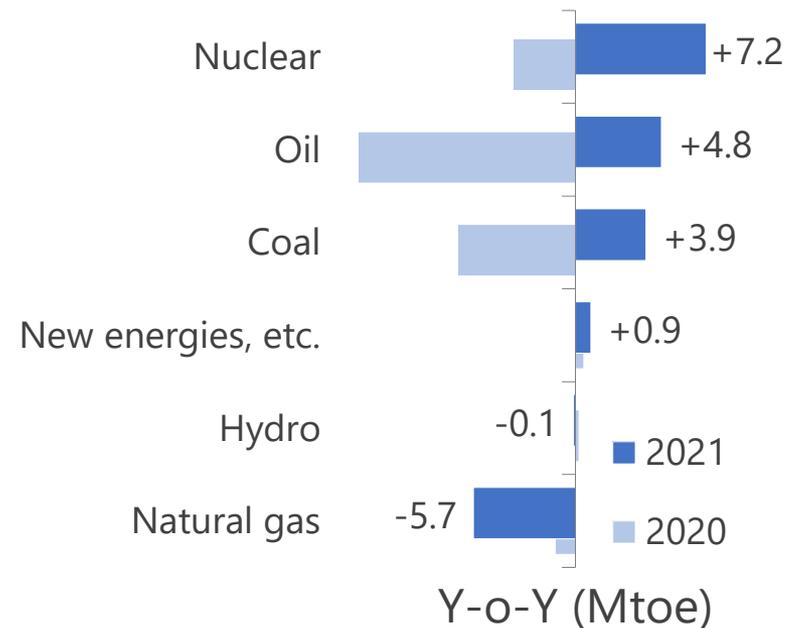
- Total energy consumption will increase with recoveries in industrial production and transportation demand but the lowest since FY1987 except for the previous year.
- For the second consecutive year, improvements of total energy consumption per GDP will slow down.

- Coal will largely increase with a recovery of crude steel production in addition to newly installed coal power generation.
- With an increase in nuclear, LNG imports will fall for the first time since the earthquake to the same level as in FY2010.

Primary energy supply



Primary energy supply changes



CO₂ relative to FY2013 will fulfil more than 90% of the Paris commitment two years in a row

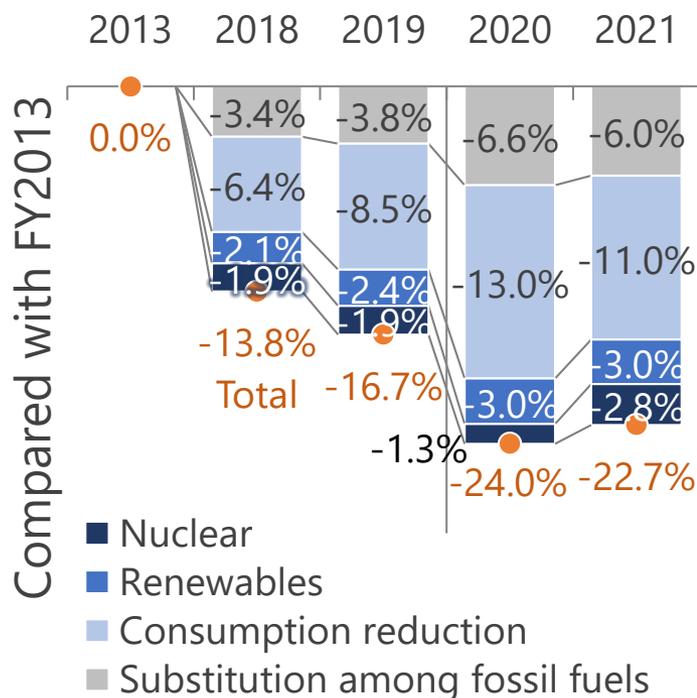
- While CO₂ will increase due to the recovery of economic activities, it will be much lower than before COVID-19.
- CO₂ will be lower than 1Gt two years in a row and more than 90% of the Paris target will be achieved.

- Reduction contribution of nuclear will increase.
- Identifying progress of reduction target will be more difficult because of the energy consumption decrease due to the temporal downturn of economic activities.

Energy-related CO₂ emissions



CO₂ emissions change and contribution

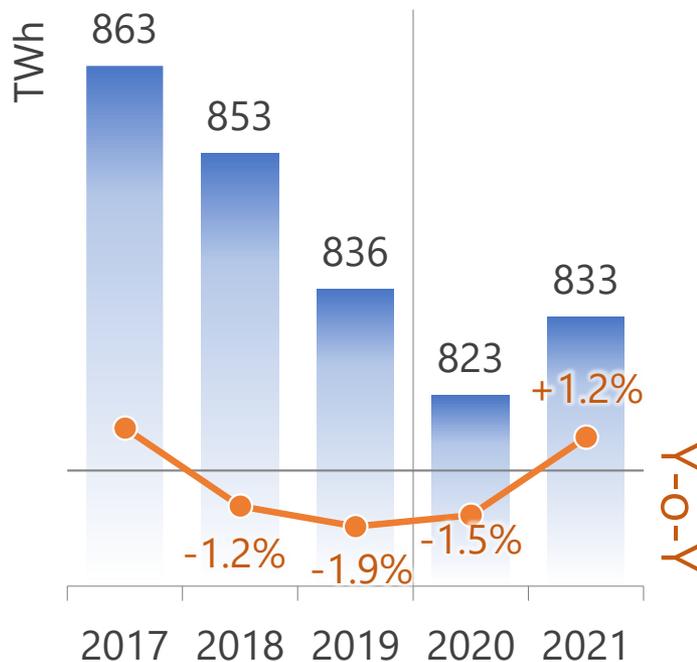


Lighting services will remain high and power services will recover

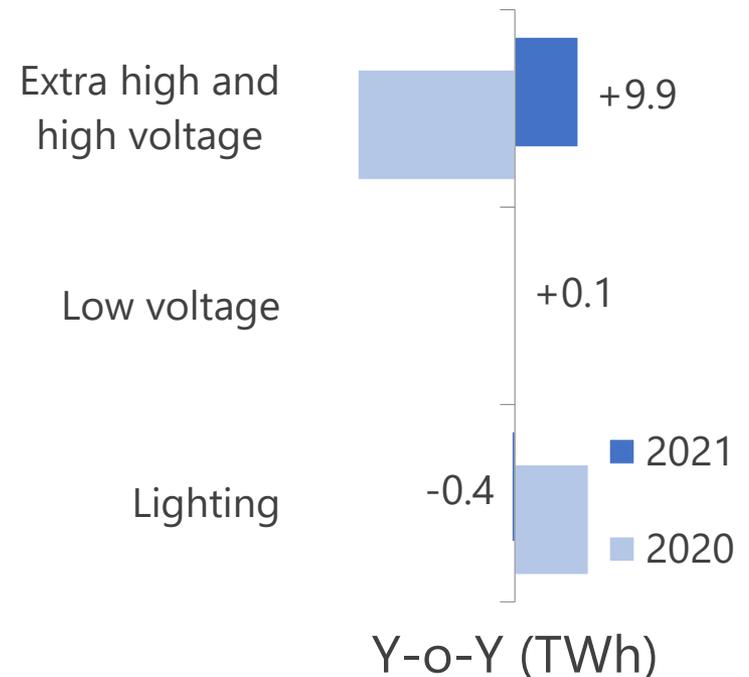
- Electricity sales will increase with the recovery of industrial production while temperature will remain almost constant.
- FY2021 will be slightly lower than FY2019 before COVID-19.

- Despite an increase in all-electric homes, sales for lighting services will slightly decrease primarily due to less Working from Home.
- Sales for power services will grow with production recovery in industries.

Electricity sales



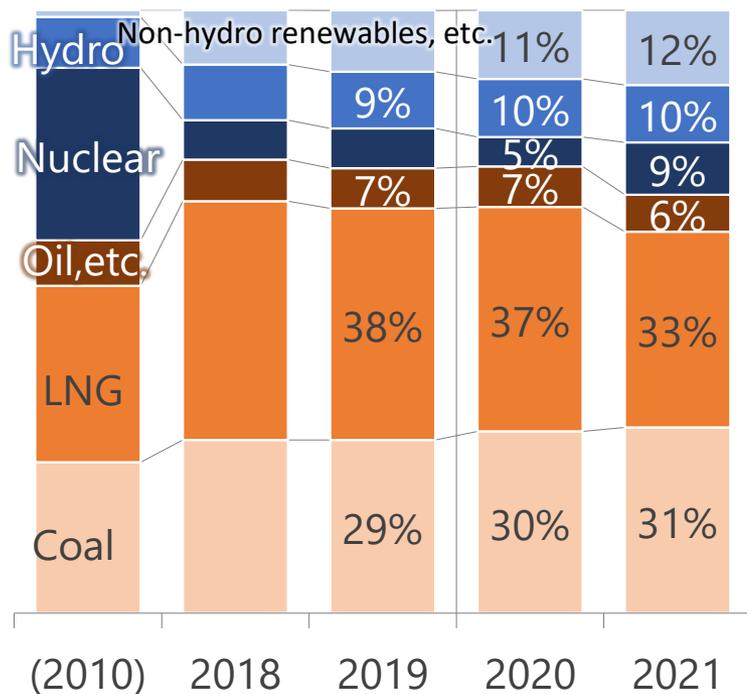
Electricity sales changes



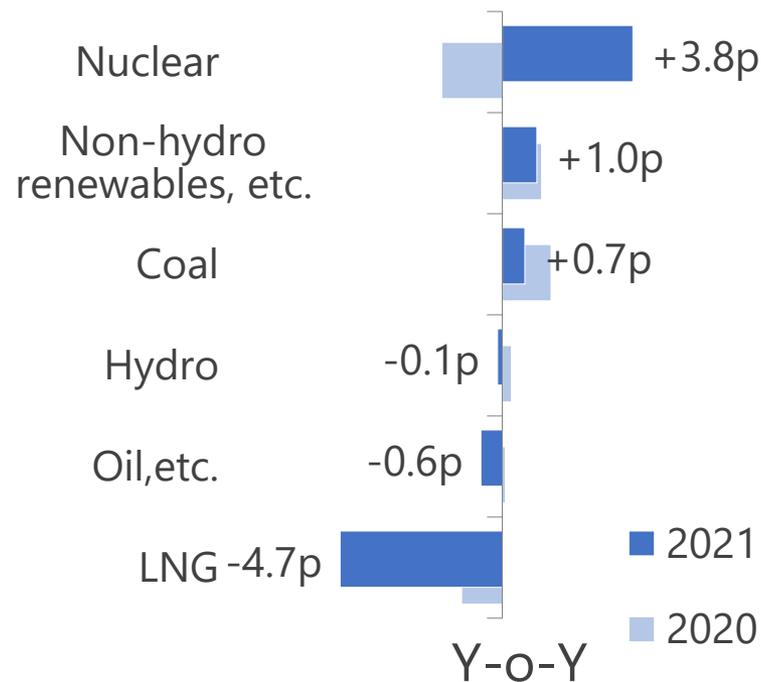
While fossil fuel power generation will fall below 70%, coal will increase

- Zero-emission power sources (renewables and nuclear) will fall once in FY2020 but reach 30% in FY2021 for the first time after the earthquake.
- Note that they are 8p lower than before the earthquake and the expansion is required to continue.
- Nuclear will largely increase with the completion of the counterterrorism facilities in addition to the progression of restart.
- LNG will fall drastically with the increases of other sources but be 3p higher than FY2010.

Electric utilities' power generation mix



Power generation mix changes



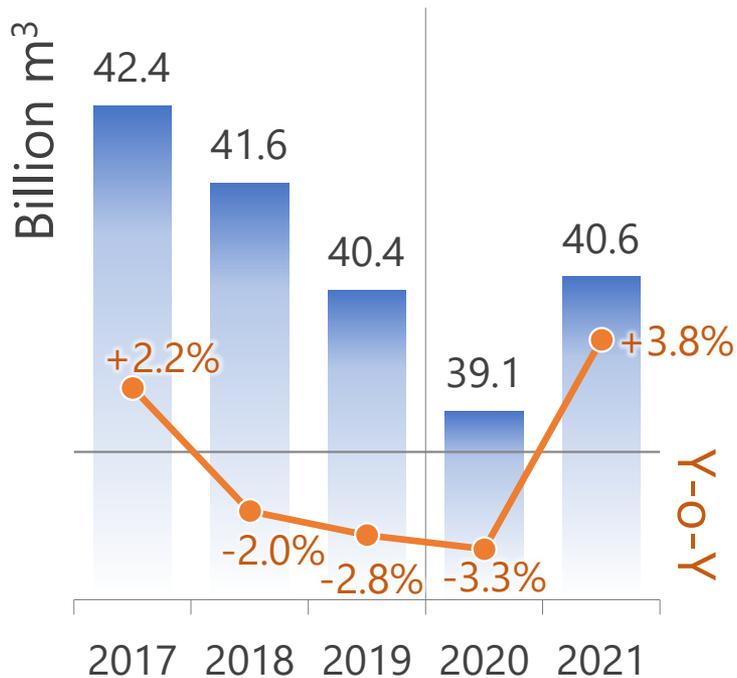
Note 1: FY2010 data are for general electric utilities under a former classification. Data lose continuity as data in FY2015 are based on old standards.

Note 2: Hydro includes pumped storage and oil, etc. includes city gas, coal products and others.

City gas sales will be higher than FY2019

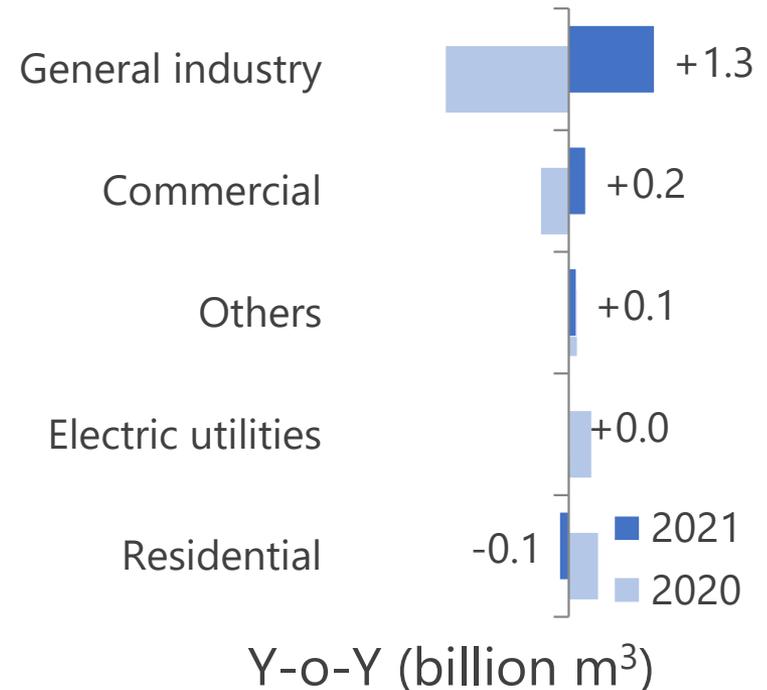
- Total gas sales will increase with a V-shape.
- Note that the demand in FY2019 was lower due to the hottest winter since the availability of statistics in FY1897.

City gas sales



- Sales for residential will decrease due to less Working from Home with few effects of temperature.
- While sales to general industry and commercial will increase, they will be lower than FY2019.

City gas sales changes

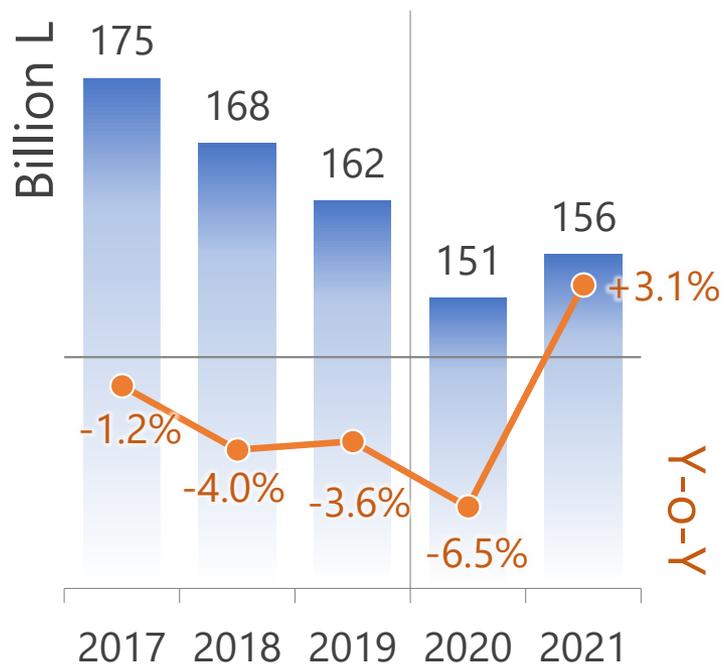


Fuel oil sales will increase for the first time in nine years but the long-term decrease trend continues

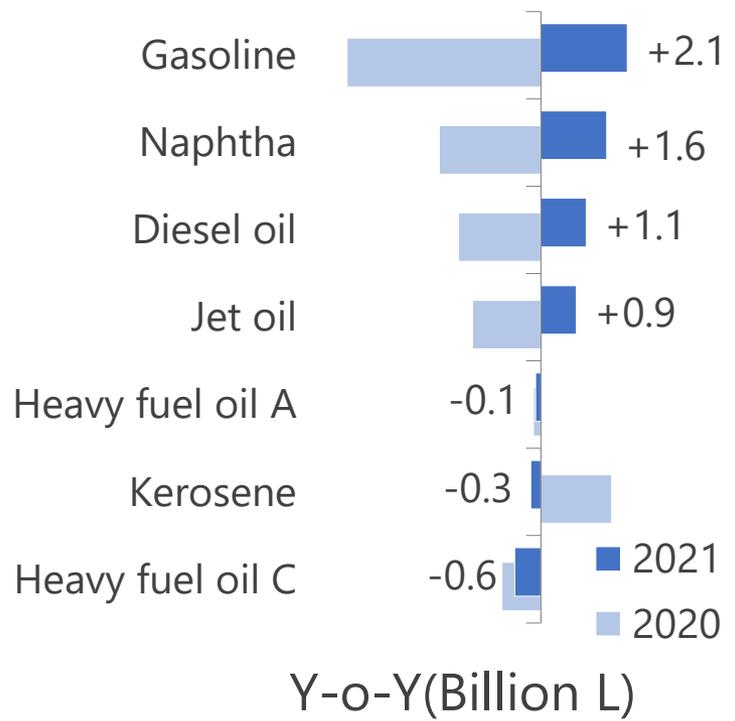
- Fuel oil sales will increase with the recovery of industrial production and transportation demand from FY2020 but decrease from FY2019.
- All fuel oils except for the kerosene will be below FY2019.

- Sales of kerosene and heavy fuel oil A will fall due to energy saving and fuel switching with few effects of temperature.
- Sales of naphtha will increase with less regular ethylene plant repairs.

Fuel oil sales



Fuel oil sales change



Transportation energy consumption will fall below 70 Mtoe two years in a row

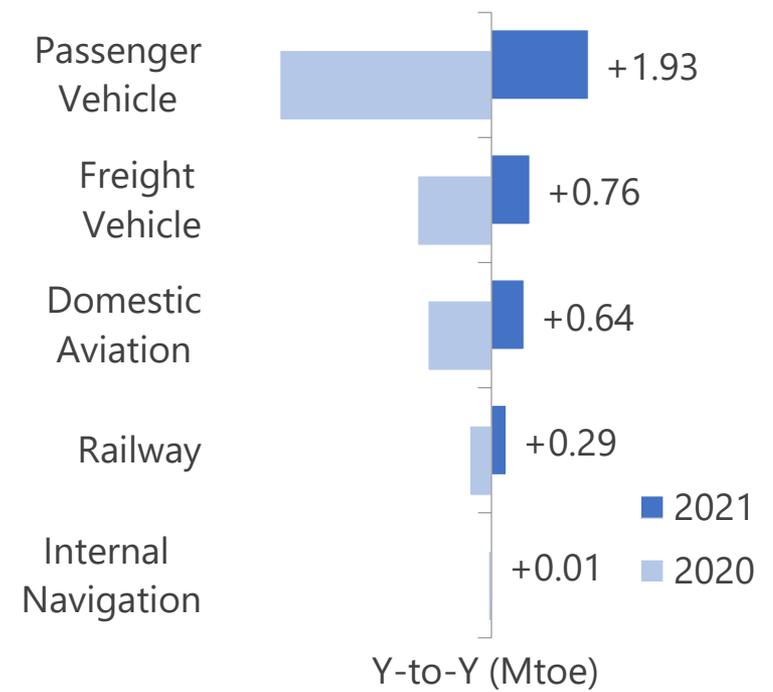
- Passenger will increase with the recovery of travel distance and freight will increase with the recovery of industrial activities.
- But the recovery is moderate in FY2021 and it will be lower than 70 Mtoe for the second year in a row.

- Energy consumption will increase in the all modes.
- The internal navigation will increase but the long-term decrease trend continues.
- Other modes will be low for the first time in FY1988 and FY1989 besides FY2020.

Transportation energy consumption



Transportation energy consumption by mode

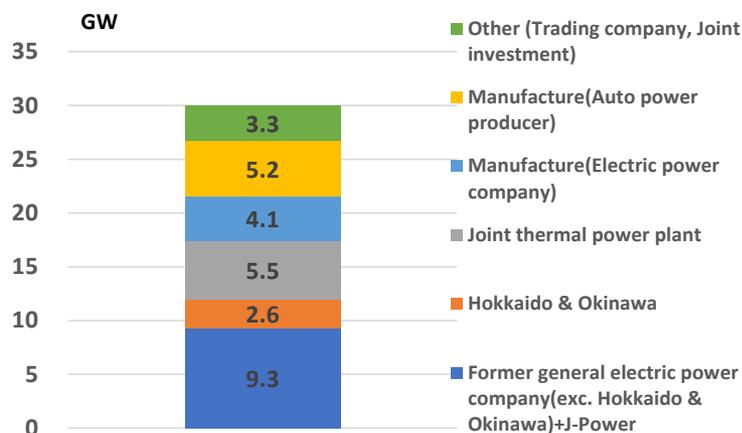


Impacts of fading-out inefficient coal-fired power plants

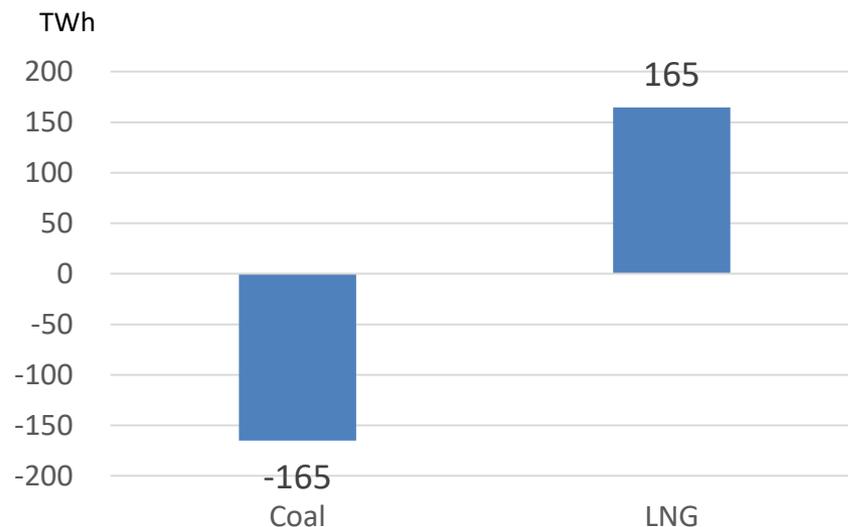
We tentatively analyzed the impacts of fading-out inefficient coal-fired power generation (below USC) planned by 2030 utilizing the projected FY2021 economy and energy supply and demand situation.

- Regardless of the amount of coal-fired power generation, renewable and nuclear restart are constant, as a result gas-fired power generation will substitute.
- Joint thermal power plant and manufacture consume heat from plants., gas-fired power generation will be assumed to be newly built.

Total capacity of inefficient coal-fired power generation



Changes of power generation

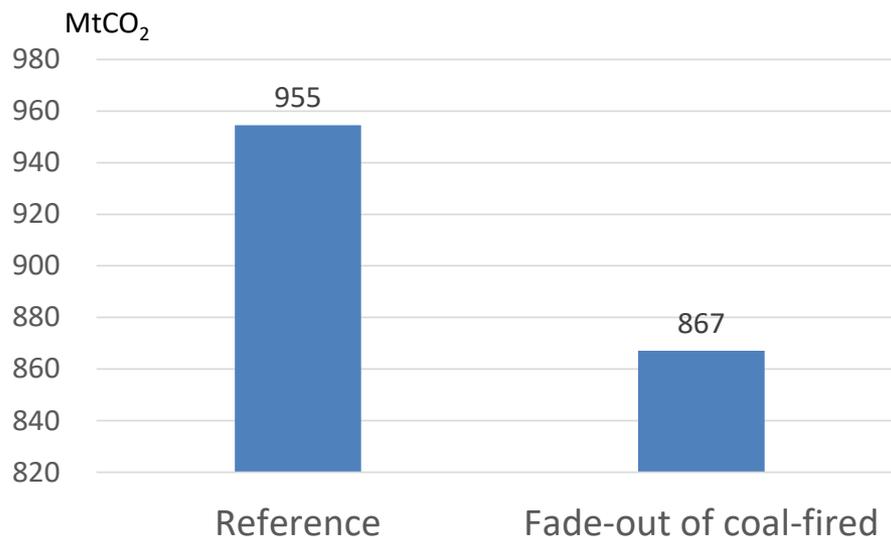


Note: Electric utilities are referred from the reference material of the first meeting of coal-fired review WG
 : Auto power producers of manufactures are referred from the material 7 & 8 of the second meeting and 7 & 8 of the third meeting material of the WG

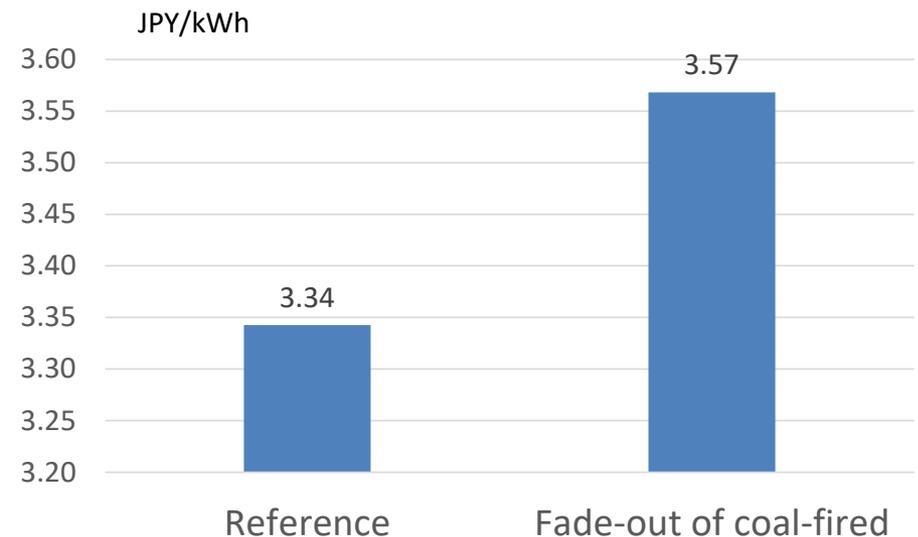
Impacts of fading-out inefficient coal-fired power plants

- CO₂ emissions would decrease by 87Mt, the equivalent of 7.1% of FY2013.
- Only fuel costs will rise JPY0.23/kWh (6.7%).
- 1.8 trillion of construction costs of gas-fired power generation are added separately. Costs for processing byproducts in another way will be plus.
- Setting the target of the coal-fired power generation efficiency including biomass, heat utilization and byproducts and regular reporting are required.
- Evaluating and preparing fading-out plans by operators are required irrespective of FY2030.
- Reviewing in the macro view is important with whole CO₂ reduction progress and the impacts of fading-out based on the reports and plans.

CO₂ emission



Fuel cost

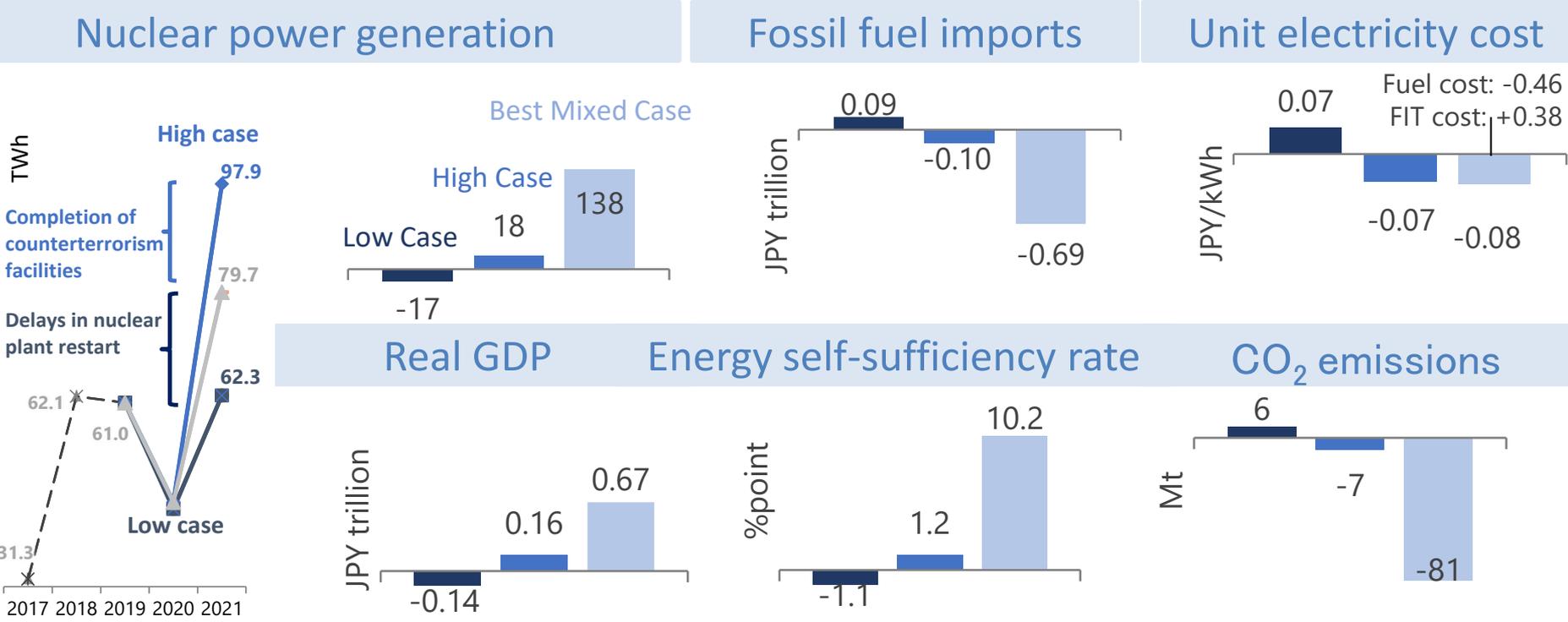


Impacts of the completion of counterterrorism facilities and delays in nuclear plant restart

Nuclear power generation growth would boost the economy through fossil fuel import and electricity cost cuts, reduce CO₂ emissions in a manner to help mitigating climate change and contribute to energy security by improving the energy self-sufficiency rate.

Plants which have a deadline of counterterrorism facility completion after FY2021 will increase. Smoothing the restart of the nuclear power generation with the consideration of each power plant contributes to achieving 3Es.

Effects of nuclear power generation changes (compared with Reference Scenario) [FY2021]



Note: See the report for definitions of the Reference Scenario and each case. The Best Mixed Case covers the effect of a change in renewables power generation.