# New Power Generation Mix and Policy Direction

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## Environment-friendly power generation mix policy

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#### Move away from nuclear power

- Discontinue a construction of Shin–Kori No. 5 and No. 6 plants and nullify all new nuclear power plant construction plans
- · Prohibit the life extension of aged nuclear power plants and close Wolsong No. 1
- · Nuclear power generation is phased out and transitioned to the zero-nuclear age

• De-coalification

- Terminate constructions of coal power plants with less than 10% process rate and discontinue new coal power plant constructions
- · Early shutdown of aged coal power plant over 30 years

Promoting renewable energy

· Adjust upward renewable energy production rate to 20% by 2030



## Prospect of the electricity demand in the 8<sup>th</sup> plan

A peak demand in 2030 is expected to be about 102GW (Demand Forecast Working Group, 2017.7.13)

#### Electricity demand in 2030 to decline







Source: Basic Plan for Electricity Supply and Demand Working Group

## Power generation mix in 2030 by scenario

Category	S1		S2	
	In 2030			
	8 <sup>th</sup> plan demand			
	Maintaining a basic direction of		Nuclear and coal	
	the 7 <sup>th</sup> plan <sup>1)</sup>		phase-out	
	Generation (GWh)	Ratio (%)	Generation (GWh)	Ratio (%)
Nuclear	262,522	41.3	134,048	21.2
Coal	241,142	38.0	220,349	34.8
Gas	54,051	8.5	147,372	23.3
Renewables	74,190	11.7	129,007	20.4
Other	3,024	0.5	1,833	0.3
Total	634,929	100	632,609	100

Note 1) Maintaining the power capacity mix of the 7<sup>th</sup> plan



## Frequently asked questions

•Will a decline in electricity demand moderate the electricity price increase caused by nuclear and coal phase-out?

- · The decline in electricity demand does not directly affect changes in electricity price.
- The change in electricity demand is an indirect factor that affects the average cost of electricity generation by changing shares of energy sources.
- · The generation mix and the electricity generation costs directly affect the electricity price.

• Will a decline in the unit costs of renewable energy due to technological innovation moderate the electricity price increase caused by nuclear and coal phase-out?

• Even if unit costs of new facilities decrease, the decline in unit costs of renewable energy will not be as large as expected because the unit costs of existing facilities are not changed.



## Frequently asked questions

If unit costs of solar energy decrease by 54% by the year 2030 compared to 2017





## Frequently asked questions

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Will the increase in generation costs be significantly larger considering integration costs?

• The integration costs of intermittent sources such as solar or wind power are relatively large, and as the proportion of such sources increases, the integration costs increases more.



· However, because solar and wind power account for about 10% of the total power generation in 2030, the overall unit costs will not rise significantly (expected to rise by  $1\sim 2\%$ p).



#### Main criteria for power generation mix decision

Energy security: secure energy supply & low 'price volatility'

- Economics: providing economically the electricity
- Environment: response to the climate change & antipollution.
- Safety: maintaining the safety of generation facilities and by-products
- Public acceptance: deploying generation facilities to which people prefer



## Further policy considerations

#### External costs

Social consensus on nuclear accident costs, comprehensive discussion on pollutants released by fossil fuels, and in-depth analysis of external costs for renewable energy are needed.

#### Reserve rate

The appropriate reserve ratio should be calculated according to the changes in power generation mix (in particular, the expansion of renewable energy).

LNG demand increase and energy security

In S2, compared with S1, about 12.55 million tons of additional LNG demand is generated in 2030.

#### CO2 emissions

In S2, compared with S1, about 17 million tons of additional CO2 will be emitted in 2030.



#### Further policy considerations

#### Flexible system



 In Germany, power wholesale prices are formed as negative (-) due to the increase in renewable energy generation several times

- Concerns over oversupply due to increased PV power generation in California, USA, and increase facility requirement with easy output transit (CAISO, 2014)
- October, 2014 Declaration of default of purchasing renewable power generation by six power companies in Japan and reform the system
- 9 times load rejection occurred in Jeju during the period of 2015-2016







