Policy Direction and Tasks for Expanding New and Renewable Power Generation

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Chul-Yong Lee

Korea Energy Economics Institute

Outline

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02 Moon’s Energy Policy

03 Strategies for Renewable Power

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1 | Background

Threats and Challenges [1]

Climate Change

195 nations set path to keep temperature rise below 2°C in 2015
(cf.) Recently, U.S. withdrew from Paris agreement on climate change

Air Pollution

Air pollution caused an estimated 6.5 million deaths in 2012 (WHO, 2016.3.16)

<Korea, Seoul>

PARIS2015
UN CLIMATE CHANGE CONFERENCE
COP21·CMP11

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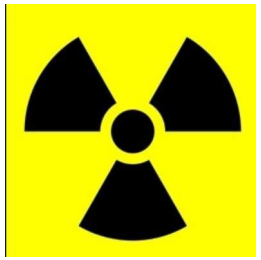
Energy Transition [1]

Energy Sources		Direction
		Encouraged
		Neutral
		Discouraged

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Threat and Challenge [2]

- Fukushima nuclear accident and domestic earthquake have raised concerns about nuclear safety.

  – Recently, the legislation on environmental and safety restrictions of the National Assembly has been strengthened (March, 2017).

<Fukushima nuclear accident >

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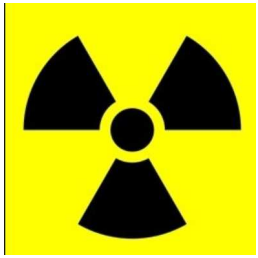
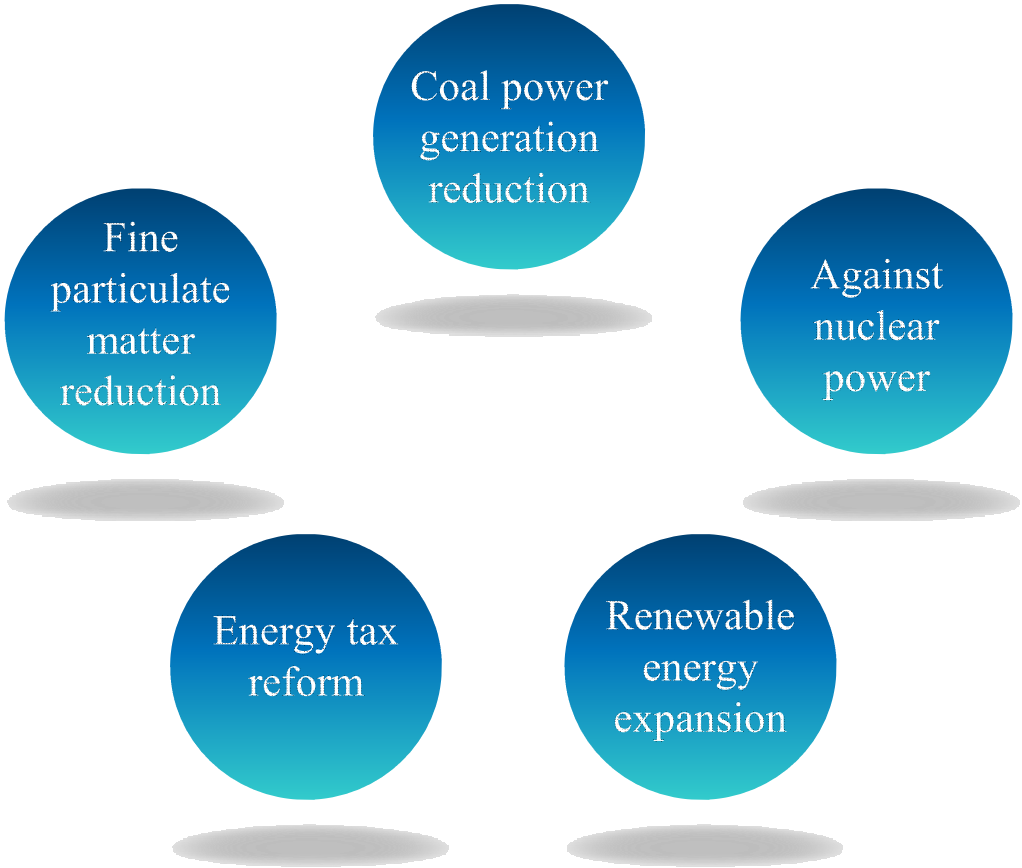
Energy Transition [2]

Energy Sources	Direction
	Encouraged
	Neutral
  	Discouraged

2 | Moon's Energy Policy

Moon's Energy Policy

- Transformation to an eco-friendly energy policy
  - Focusing on improvement of environment and safety as well as existing stable energy supply



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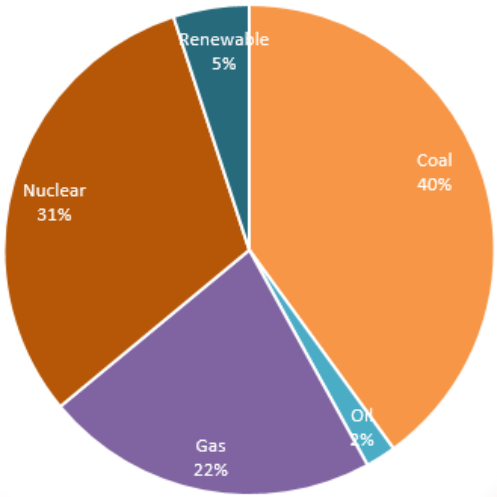
Energy Transition in Korea

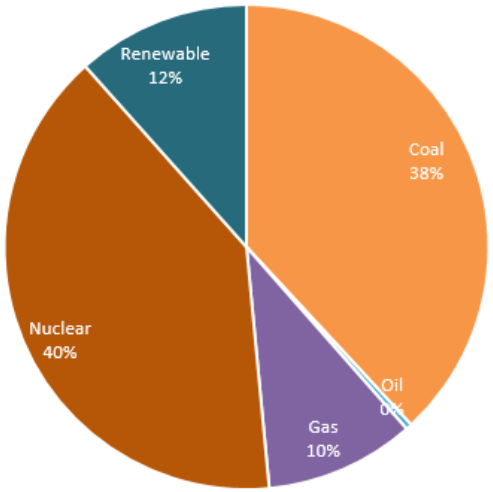
Power generation mix

< 2014 >



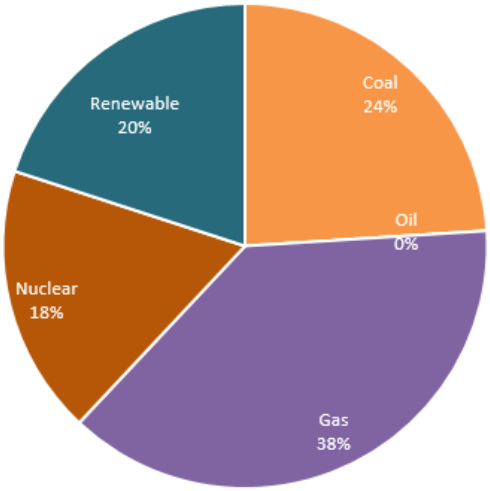
Source : KEPCO (2017)

< Existing Policy, 2029 >



Source : The 7th Basic Plan of Long-term Electricity Supply and Demand (2015)

<Moon's Target, 2030>



Note : Citation is not allowed because it is preliminary.

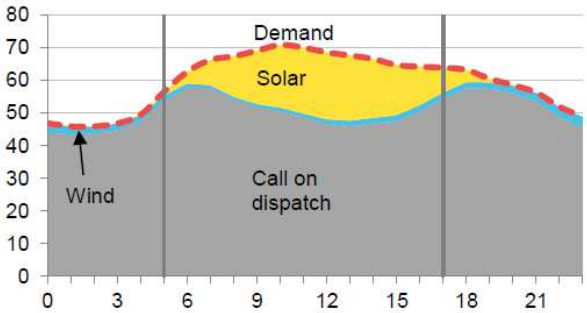
Is the Moon's Energy Policy Realizable?

- Limitations of renewable energy

Intermittent problem

High Cost

Low power density



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Intermittent problem

Grid flexibility and system resilience

– Increasing uncertainty of system operation plan and real-time operation due to volatility increase

– Under the current system, the acceptance limit of variable renewable energy is 15 ~ 18% (Jun, 2016) → About 16GW

– When backup power is secured, renewable energy can be expanded, but costs increase.

[Scarcity of renewable energy in long-term planning]

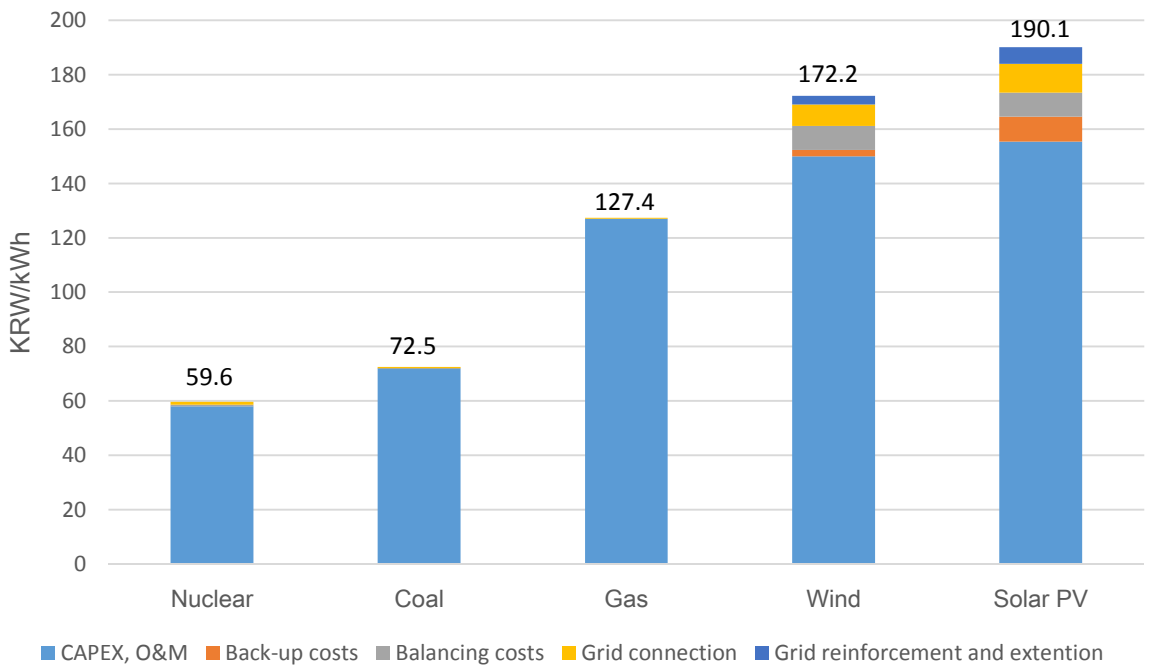
[Short-term variability of renewable energy]

Source : Bloomberg New Energy Finance, 2017

Cost increase

- Increase in electricity rate by more than 20% due to expansion of renewable energy and gas generation
  - Need for social acceptance process on cost increase

[System LCOE by energy sources, KRW/kWh]



Source : Lee (2017), Nuclear Energy Agency (2012)

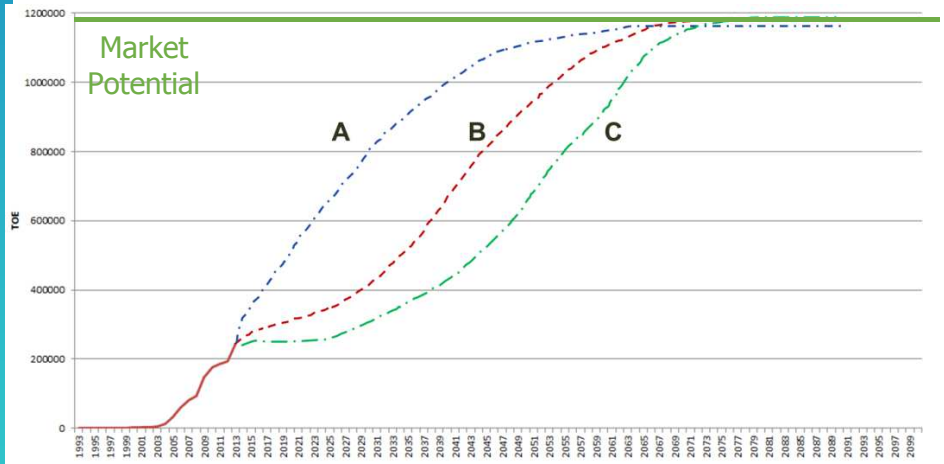
Low power density

Market potential of renewable energy

– Definition : upper limits of the market for an innovation

– There is no problem in achieving the goal in terms of market potential.

<Diffusion of wind power generation in Korea>



Source : Lee (2016)

<Market potential of renewable energy sources in Korea (Unit : TWh)>

	Solar PV	On-shore Wind	Off-shore Wind	Bio-energy	Total
Potential	155.1	34.5	127.7	12.6	331.9
Share of total power generation in 2015	28%	6%	23%	2%	61%

Source : KEI (2014)

3 | Strategies for Renewable Power

Strategy 1: Social Consensus Formation

Social consensus on energy transition

– A consensus mechanism should be established to derive social consensus on the increase in electricity rates due to the expansion of green electricity.

– Decision-making through social consensus is the fastest path in the long run.

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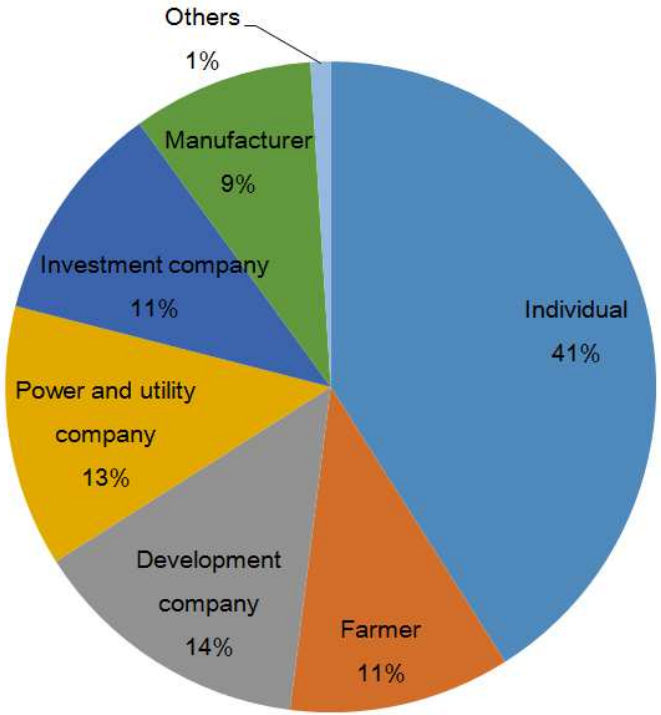
Strategy 2: Public Acceptance

Securing public and community acceptance of green energy

– Local residents can share benefits by participating in green energy projects

– Green pricing schemes can have a positive impact on green energy acceptance.

<Ownership of renewable energy facilities in Germany>



Source : German Wind Association, 2012

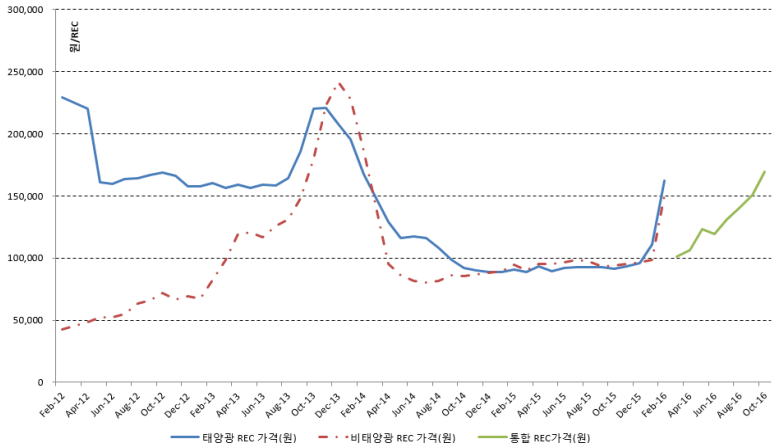
Strategy 3 : RPS Improvement

Unify complex REC market into auction market

– Difficulty in financing due to high uncertainty of renewable power business

– An unusual market is formed due to the obligation of RPS to power generation companies.

< Trend of SMP and REC price >

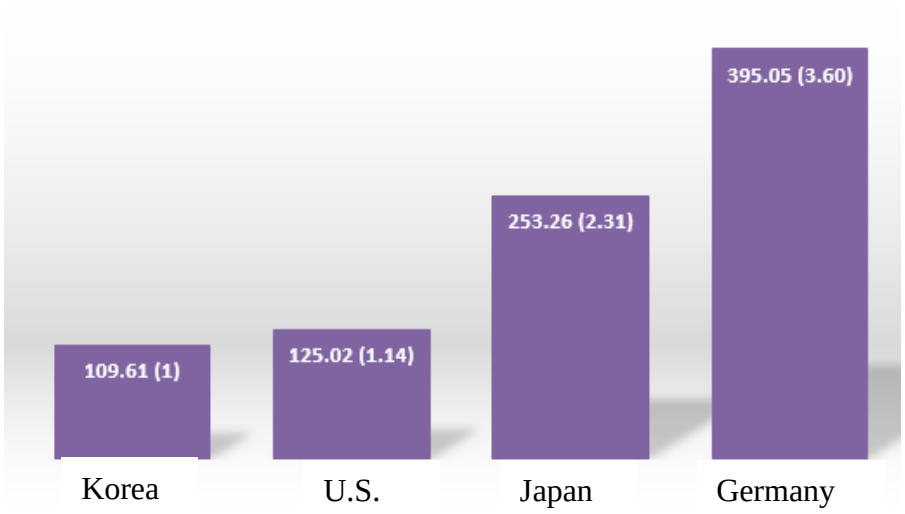


Source : KPX, 2017

Strategy 4: Appropriate Pricing

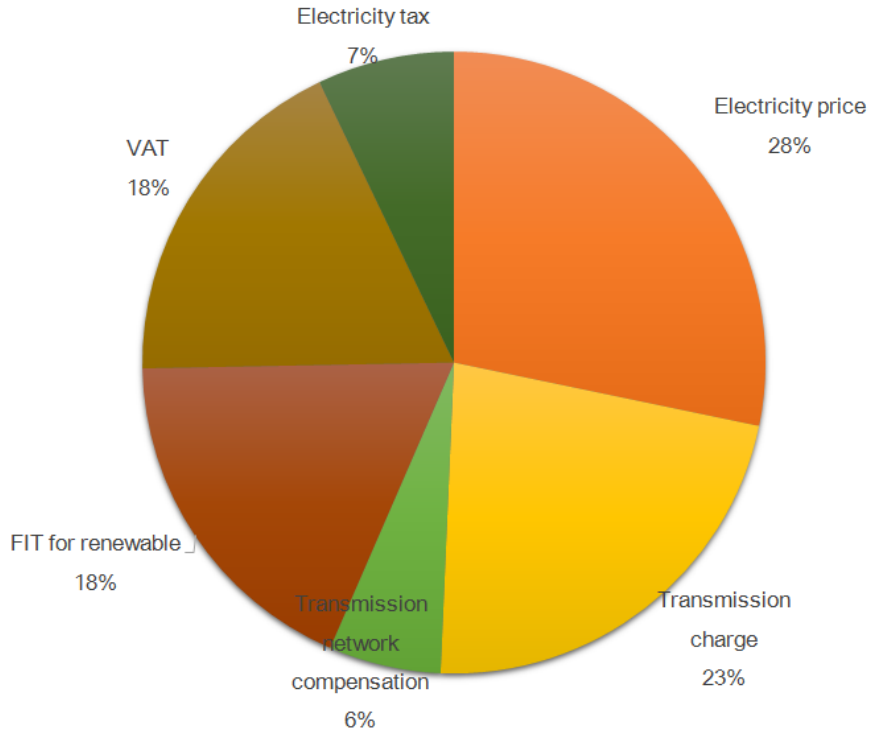
- Reasonable energy pricing with external costs and fuel costing system
  - The energy price should reflect power transport costs and environmental damage cost.
  - Fuel cost changes should be automatically reflected in the electricity bill.

< Household electricity rates by country >



Source : IEA, 2016

< Electricity rate structure in Germany >



Strategy 5 : Demand Response

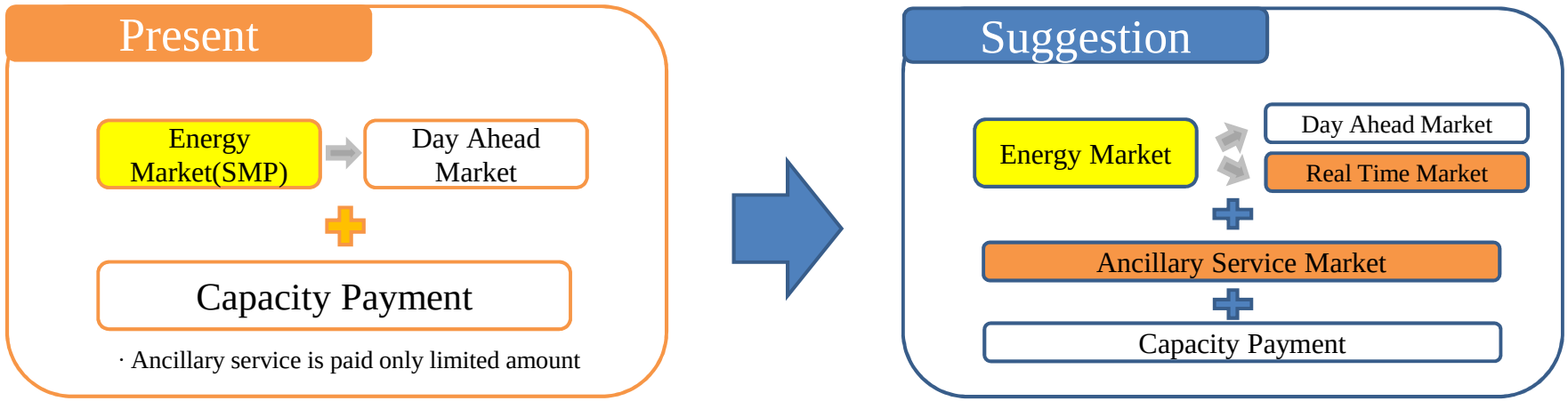
Demand response and real time price

– Raise market value for flexible resources as reflecting real-time supply

– Establish compensation system for utilizing ancillary service of demand response

– 3.8 GW demand resources are secured as of 2017

< Electricity market system>



Discussion

1. In South Korea, it is difficult to deploy renewable energy due to the opposition of local residents.

– How does your country increase the acceptance of local residents for renewable power?

2. In South Korea, it is difficult to expand variable renewable energy such as solar PV and wind power due to isolated power system.

– How does Japan solve the isolated power system problem?

3. How should the power system change in preparation for the expansion of variable renewable energy?

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Thank You

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