

Developing Renewable Energy Policies

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Energy Mix (Jul. 2015) ~Simultaneous implementation of 3E+S~

<Policy goals for 3E+S>

**Self-sufficiency rate
(Energy Security)**

Improve to around 25% from before the Great East Japan Earthquake level (about 20%)

**Electricity cost
(Economic Efficiency)**

Reduce from the current level

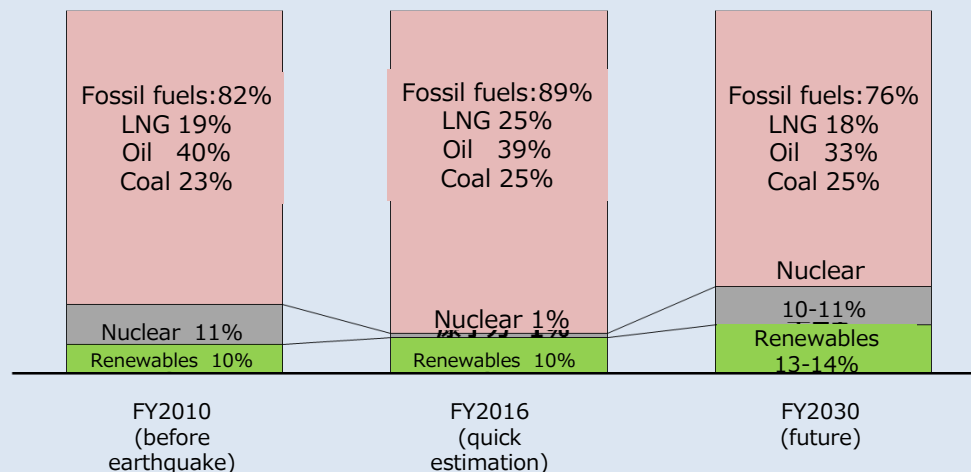
**GHG Emissions
(Environment)**

GHG emission reduction target comparable to US & EU

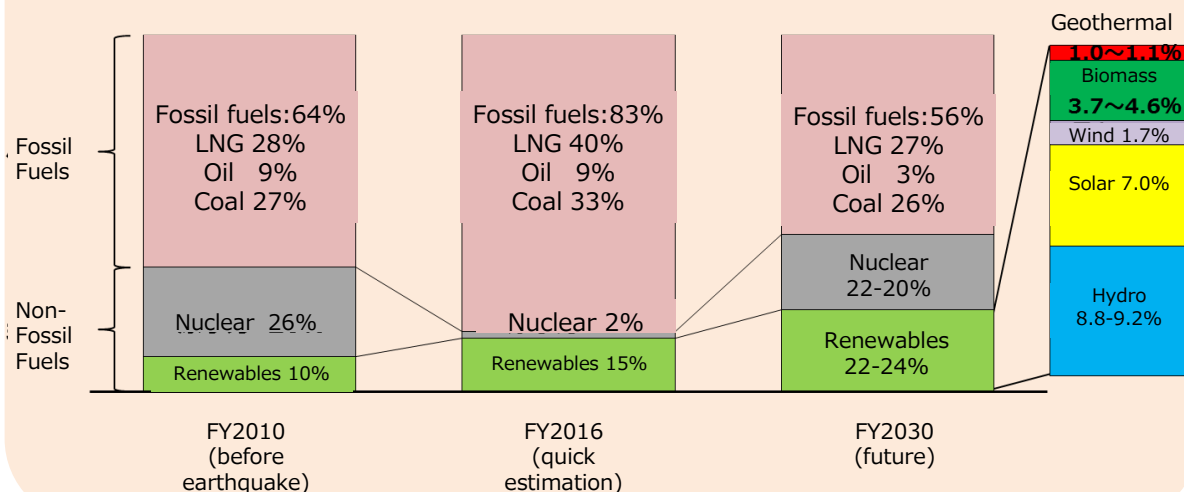
Safety

Safety is the major premise.

Primary Energy Supply



Energy Mix



General picture of issues and the future direction

Direction of issues and the Strategic Energy Plan

Acceleration of cost reduction and independence from FIT

Securing long-term stable business operations

Overcoming grid constraints

Expanding balancing power

The Strategic Energy Plan ~ Existing agenda

Handling of unoperated projects

Achieving price target ahead of schedule / Expanding the scope of auction

Strengthening business discipline

Development of rules for utilizing general sea areas under the Act on Promotion of Utilization of Sea Areas for the Development of Marine Renewable Energy Generation Facilities

Connect & Manage

Development of next-generation network

The 5th Strategic Energy Plan (Cabinet approved on July 3, 2018)

- Aiming at the "Use of renewable energy as major power source."

Towards 2030

~To reduce emission of GHG by 26%~

~To achieve energy mix target~

- Currently halfway to the target
- Deliberate promotion
- Realistic initiatives
- Intensify and enhance measures

<Primary measures>

ORenewable energy

- Lay foundations to use as major power source
- Cost reduction overcome system constraints, secure flexibility of thermal power

ONuclear power

- Lower dependency on nuclear power generation to the extent possible
- Restart of nuclear power plants and continuous improvement of safety

OFossil fuels

- Promote independent development of fossil fuels upstream, etc.
- Effective use of high-efficiency thermal power generation
- Enhance response to disaster risks, etc.

OEnergy efficiency

- Continued thorough energy efficiency
- Integrated implementation of regulation of Act on Rationalizing Energy Use and support measures

OPromotion of hydrogen/power storage/distributed energy

Towards 2050

~Toward reducing GHGs by 80%~

~Challenges towards energy transitions and decarbonization~

- Possibility and uncertainty
- Ambitious multi track scenario
- Pursue every option
- Choose priorities by scientific review

<Primary directions>

ORenewable energy

- Aim to use as major power source, economically independent and decarbonized
- Start on hydrogen/power storage/digital technology development

ONuclear power

- One of the options for decarbonization
- Pursuit of safe reactors, development of back end technologies

OFossil fuels

- Major power source during the transitional period. Enhance resource diplomacy.
- Shift to gas, fadeout inefficient coal
- Start hydrogen development for decarbonization

OHeat & transportation, distributed energy

- Challenges for decarbonization with hydrogen, power storage, etc.
- Distributed energy systems and regional development (Combination of next-generation renewables/power storage, EV, microgrids, etc.)

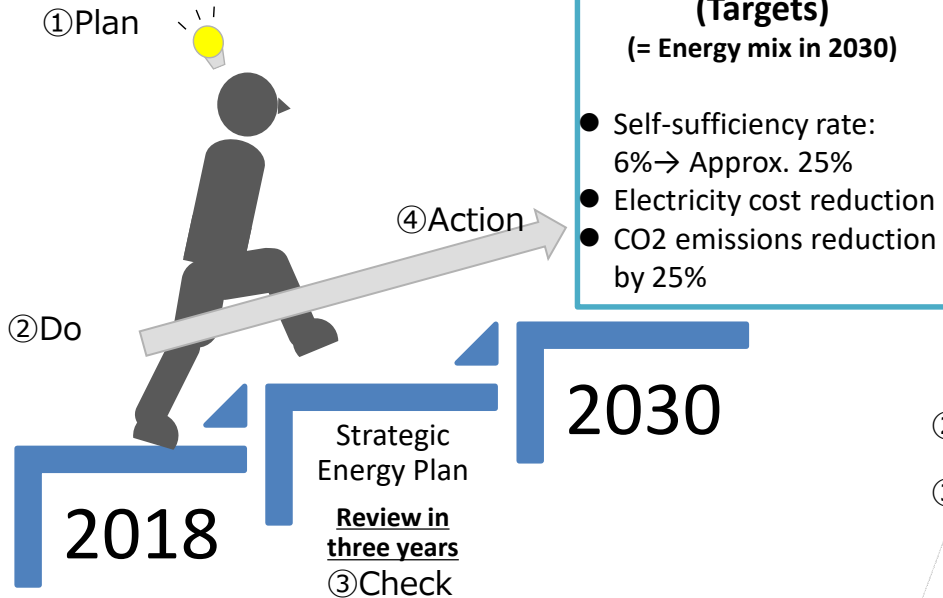
Multiple track scenario geared for designing the 2050 scenario under complex and unpredictable environment

~In order to design "flexible scenario with diversity," process of action by always grasping the latest situations/technologies with a 360 degrees vision.

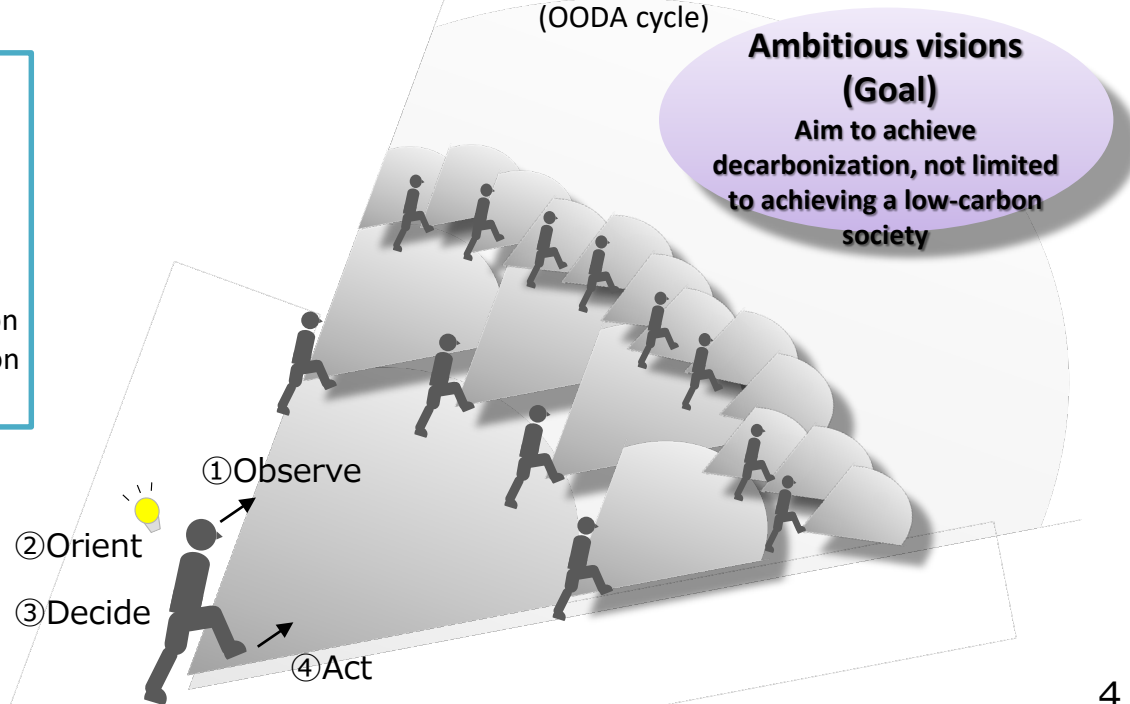
- **Predictable future with reasonable likelihood**
(Predictability ⇌ Realistic)
- **Given infrastructure and system**
 - ✓ Existing human resources
 - ✓ Existing technologies
 - ✓ Existing infrastructure

- **Uncertain future containing diverse possibilities**
(Uncertainties ⇌ Ambitious)
(VUCA: Volatility, Uncertainty, Complexity, Ambiguity)
- **Changeable infrastructure and system**
 - ✓ Human resources development
 - ✓ Technological innovation
 - ✓ Updated infrastructure

Straight-line efforts to achieve realistic targets
(PDCA cycle)



Multi track scenario with diverse options
(OODA cycle)



Challenges to discontinuous innovation towards 2050

