THE CURRENT STATUS AND FUTURE PROSPECTS OF JAPAN'S ENERGY AND CLIMATE POLICY

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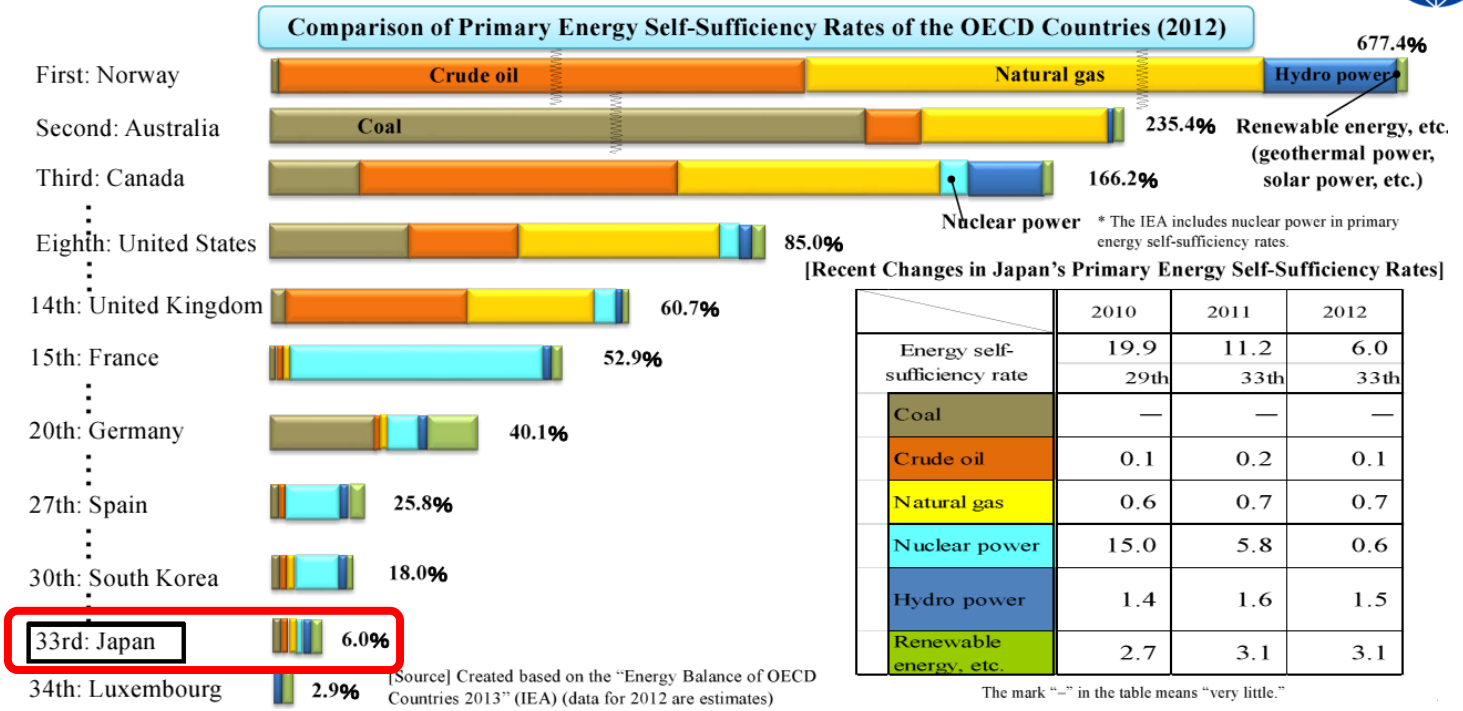
July 12, 2017

STRUCTURAL ENERGY ISSUES FACED BY JAPAN



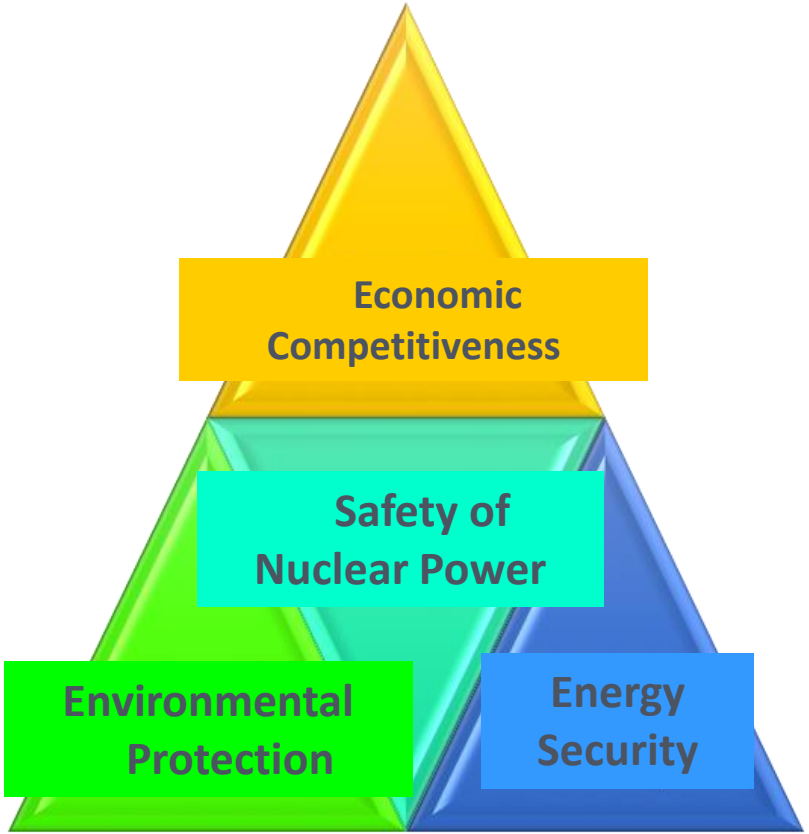
[Recent Changes in Japan's Primary Energy Self-Sufficiency Rates]

	2010	2011	2012
Energy self-sufficiency rate	19.9	11.2	6.0
	29th	33th	33th
Coal	—	—	—
Crude oil	0.1	0.2	0.1
Natural gas	0.6	0.7	0.7
Nuclear power	15.0	5.8	0.6
Hydro power	1.4	1.6	1.5
Renewable energy, etc.	2.7	3.1	3.1

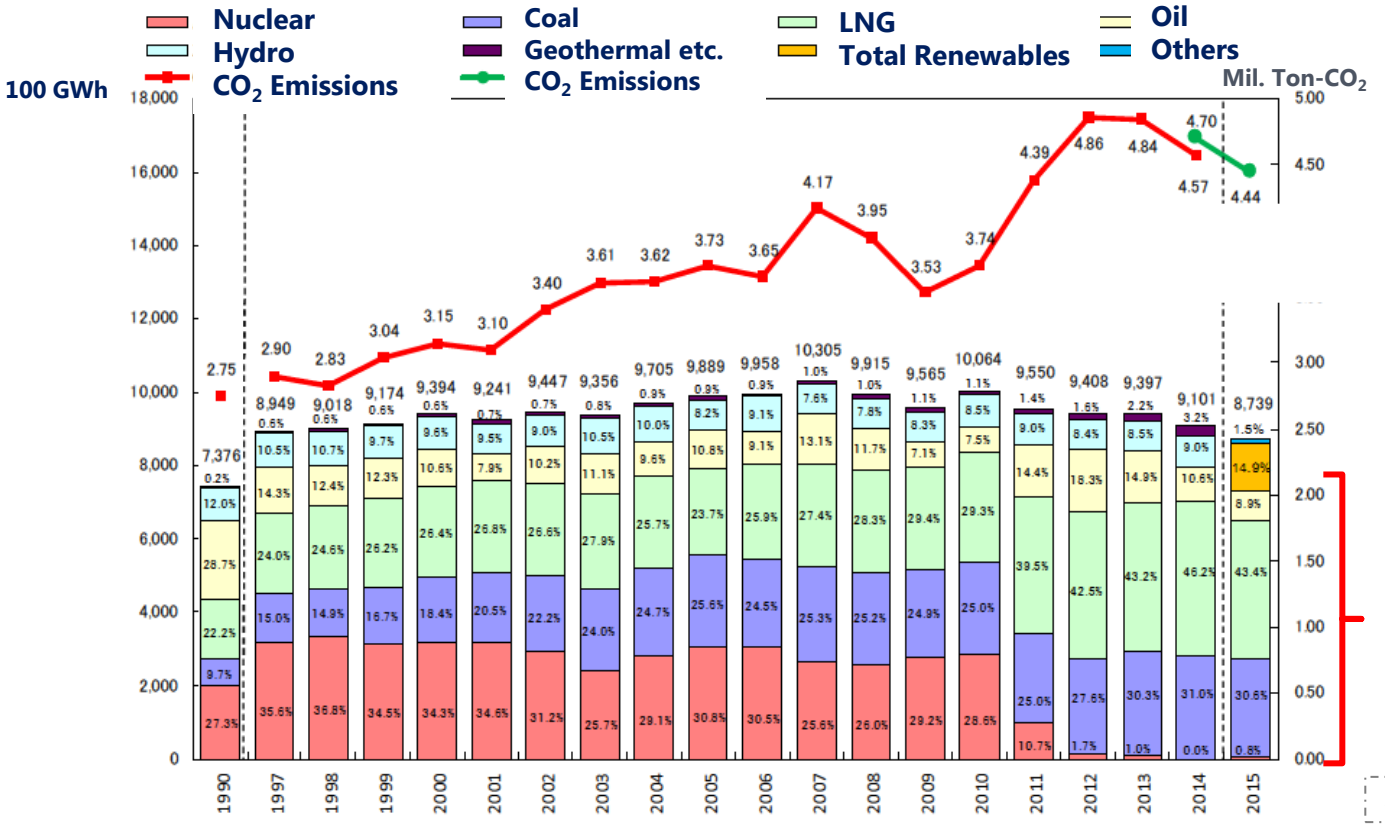
The mark "–" in the table means "very little."

Japan's energy supply system is very vulnerable, because its primary energy self-sufficiency rate has declined from 20% in 2010 to 6% in 2012 after the Fukushima nuclear accident.

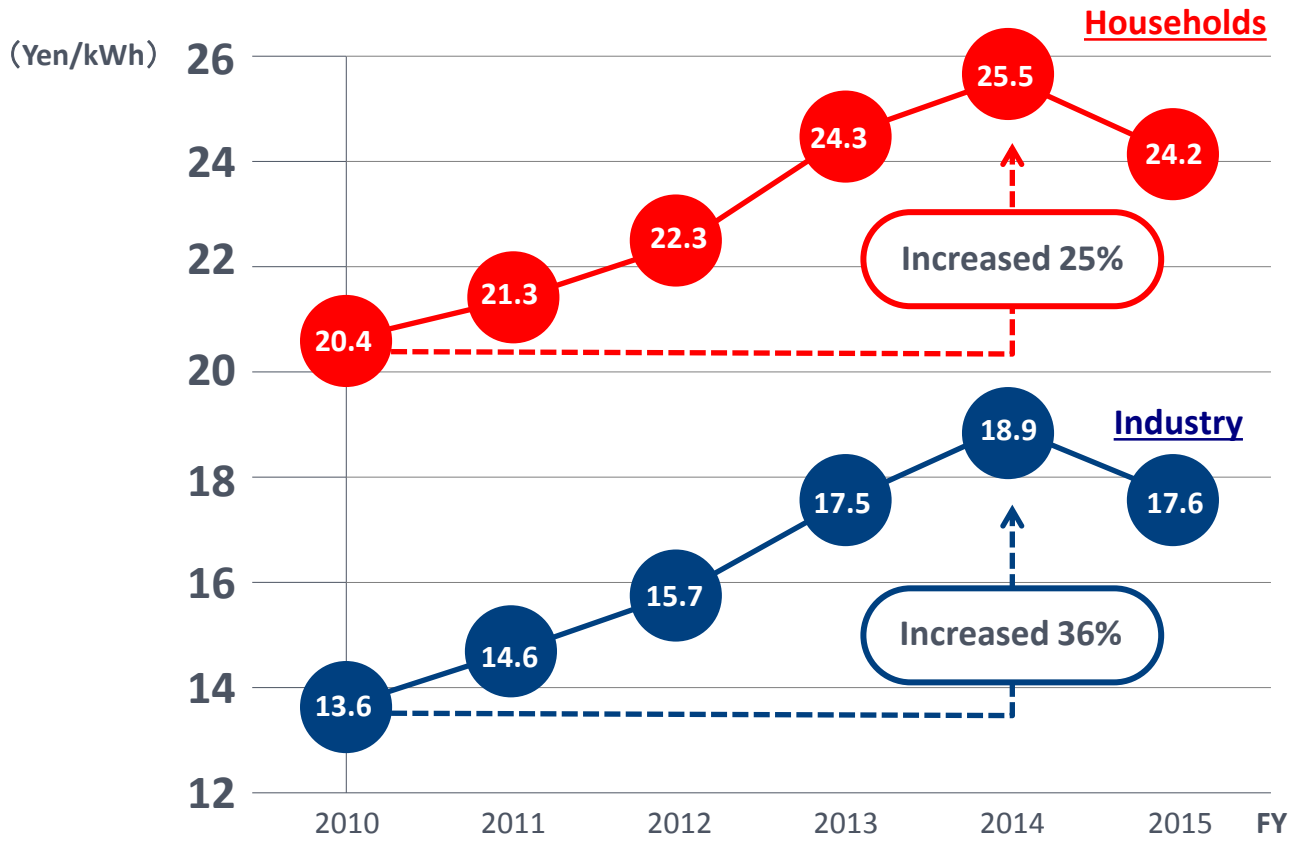
S +3E = OPTIMUM ENERGY MIX FOR JAPAN



POWER GENERATION BY FUEL AND CO_2 EMISSIONS



CHANGES IN ELECTRICITY UNIT PRICES



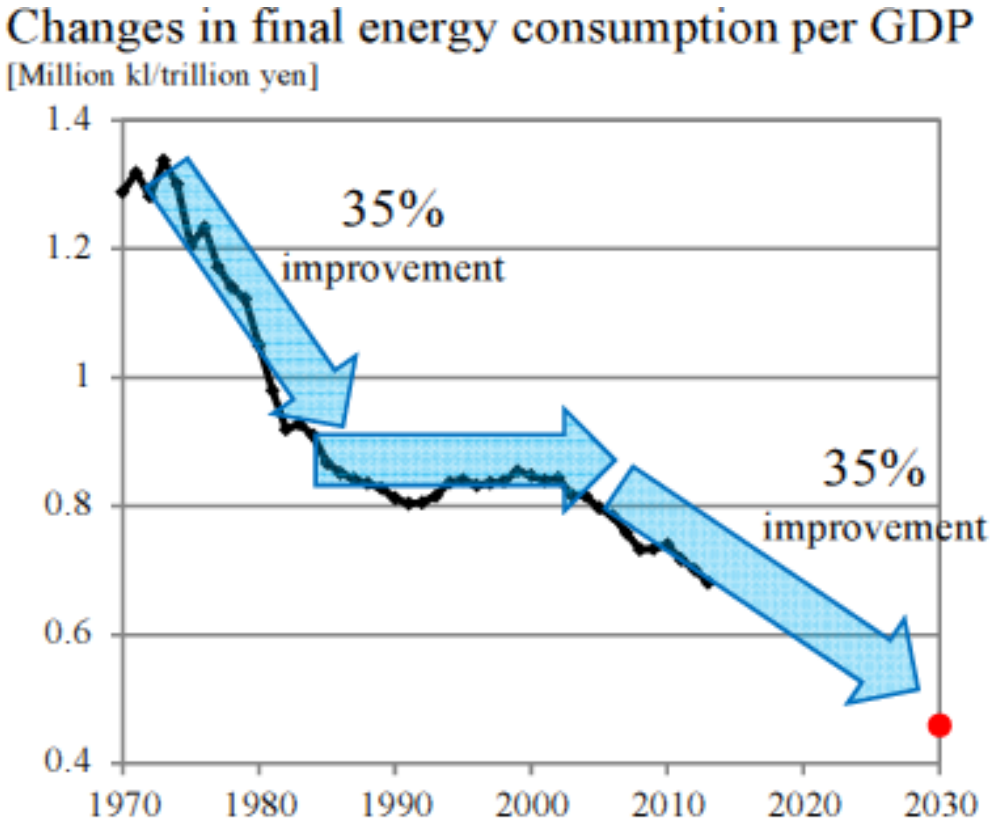
COMPARISON OF MAJOR COUNTRIES' INTENDED NATIONALLY DETERMINED CONTRIBUTIONS

	From **1990**	From **2005**	From **2013**	**GHG emissions per GDP** (kg/dollar GDP)	
				2012 Actual	2025 / 2030 Estimated
Japan (2030)	▲18.0%	▲25.4%	**▲26.0%**	0.28	0.1 6
U.S. (2025)	▲14-16%	**▲26-28%**	▲18-21%	0.45	0.27-0.28
EU (2030)	**▲40%**	▲35%	▲24%	0.31	0.17

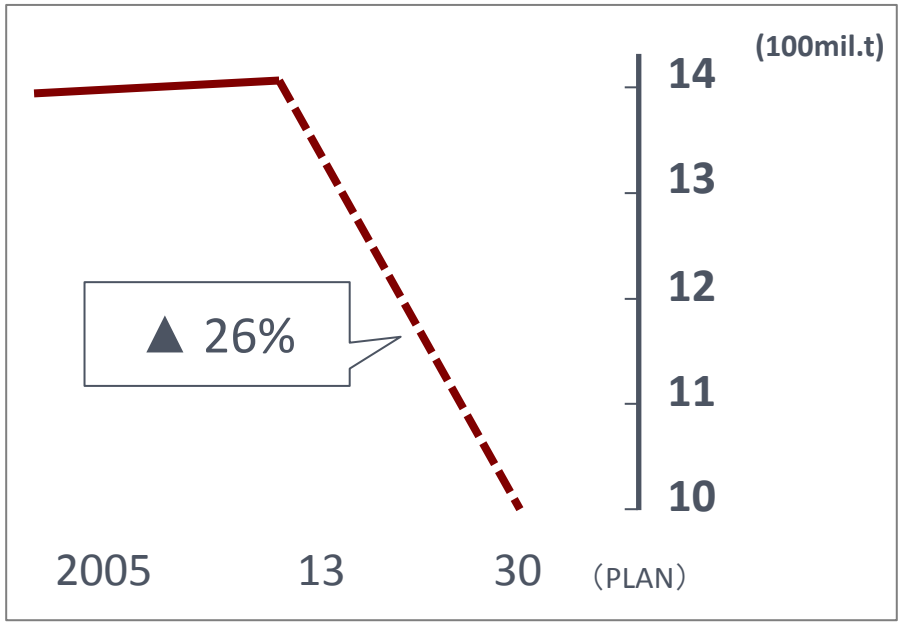
■ **The U.S. submitted a reduction target compared with 2005 and the EU a target compared with 1990.**

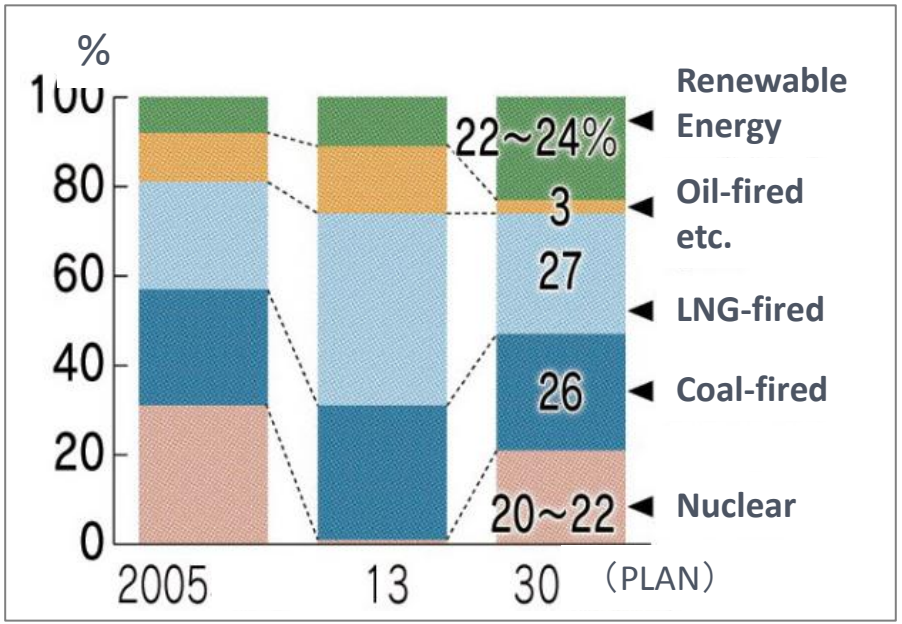
(Source) Reference Document 1 "Draft Commitment-related Materials" p.3-4 at 7th joint meeting (April 30, 2015) of the subcommittee on post-2020 global warming measures, Global Environment Subcommittee, Central Environment Council, and the working group on intended nationally determined contributions, Global Environment Subcommittee, Committee on Industrial Science and Technology Policy and Environment, Industrial Structure Council

TO PROMOTE ENERGY CONSERVATION



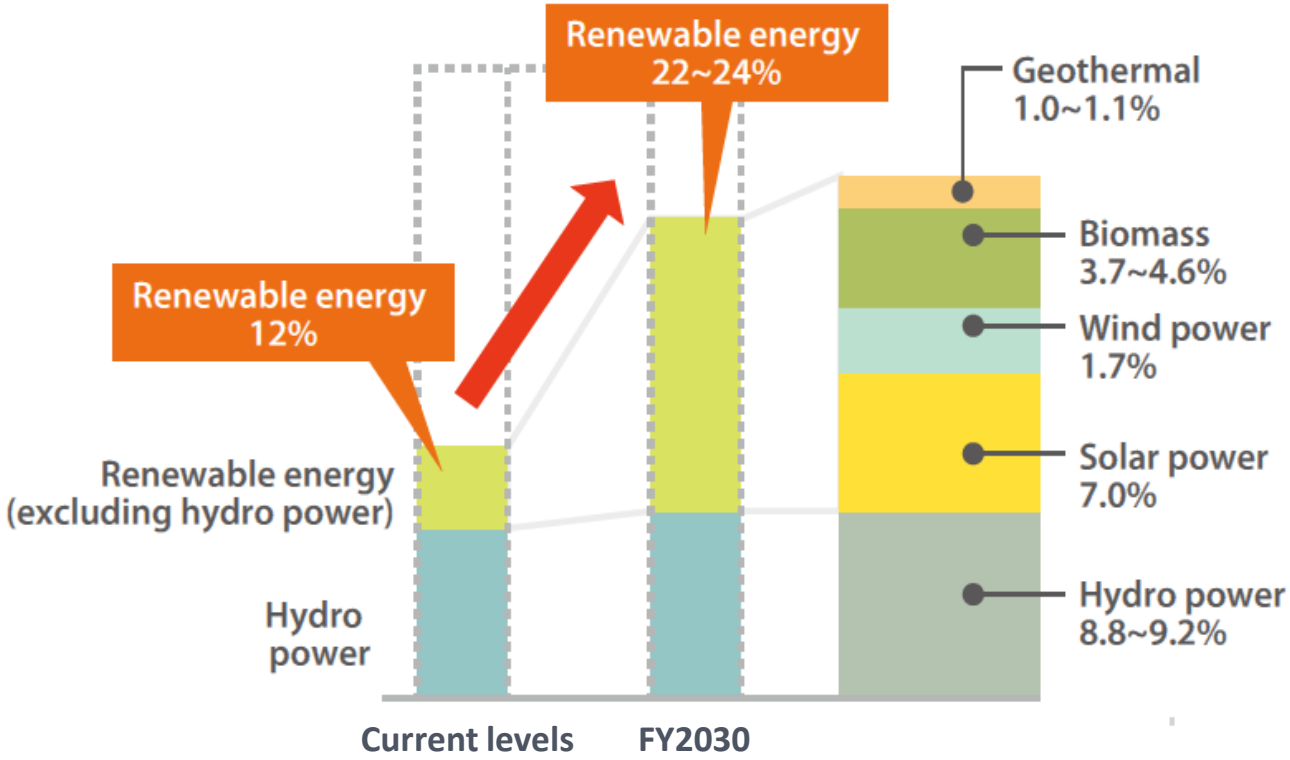
CO_2 Emissions and Electricity Generation Mix



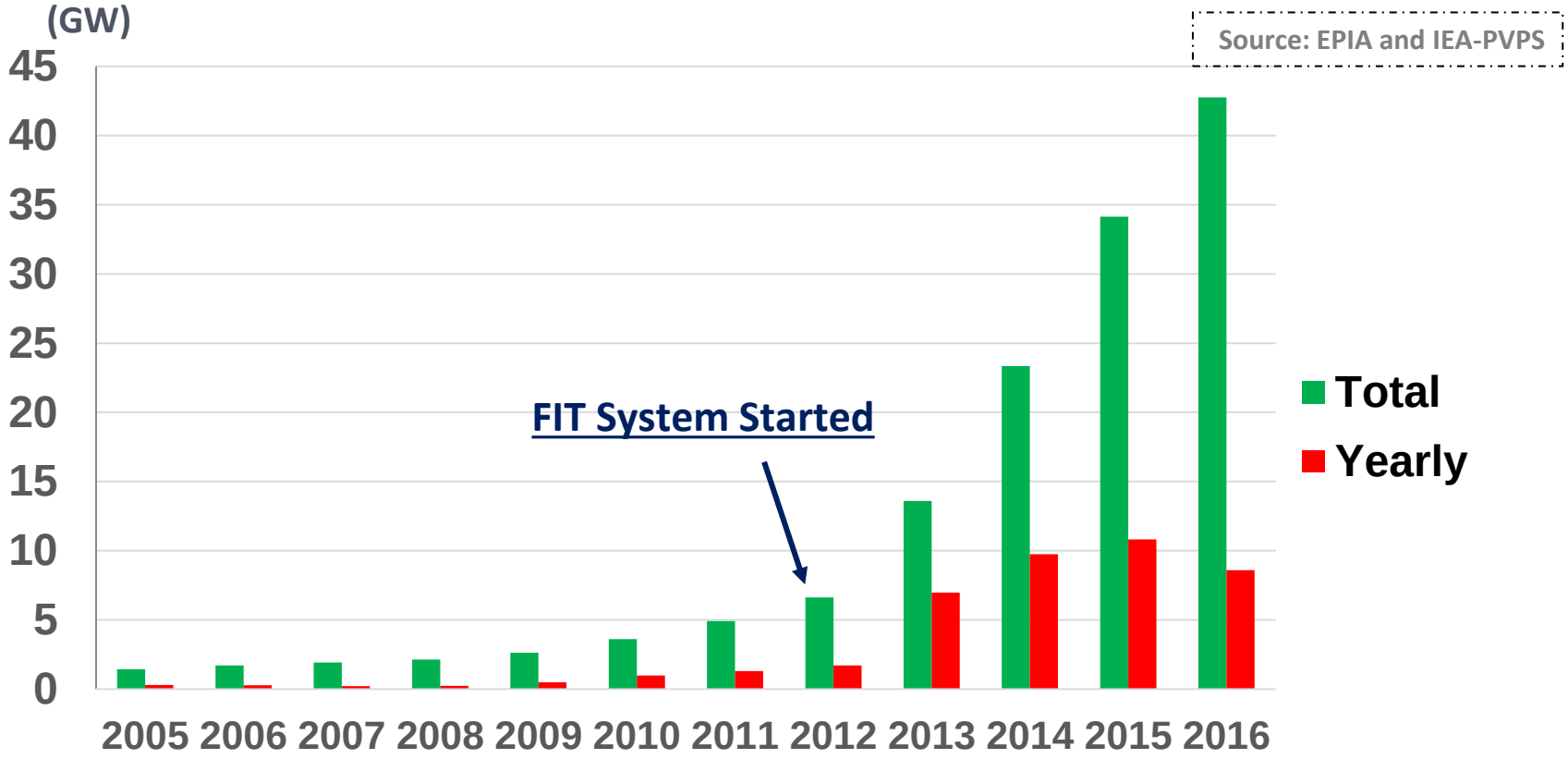


Source: METI, July 2015

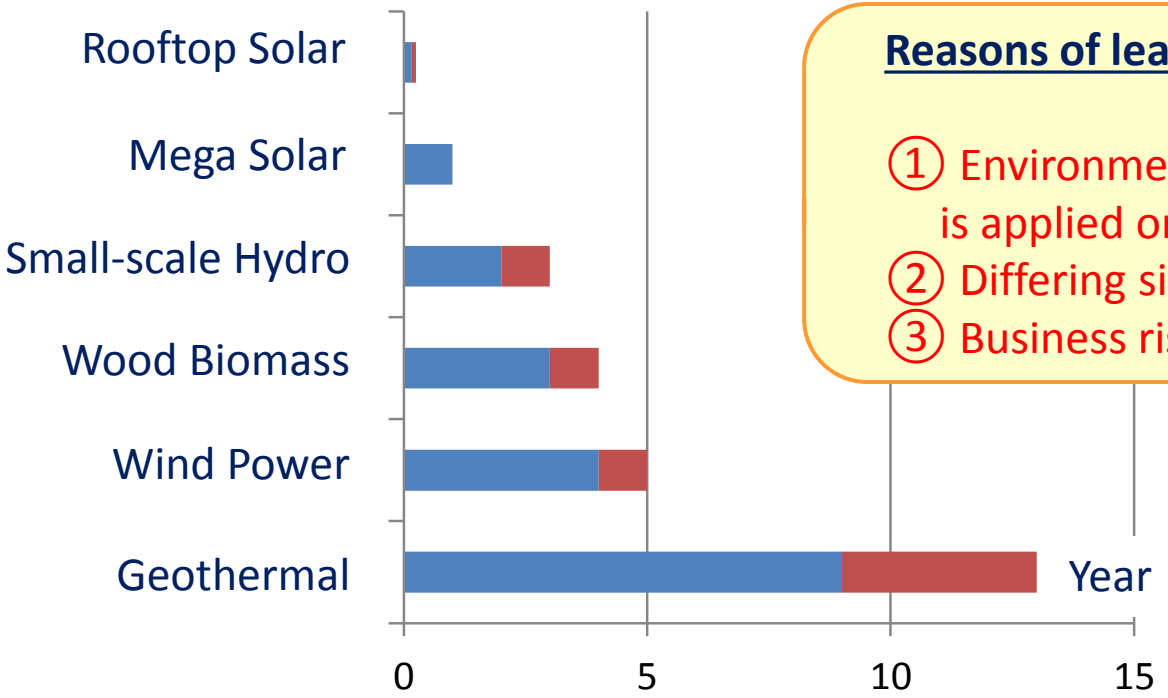
TWO-HOLD INCREASE IN RENEWABLE ENERGY FROM CURRENT LEVELS



INSTALLED PV CAPACITY IN JAPAN (GW)



RAPID EXPANSION OF SOLAR POWER IN JAPAN



Reasons of lead time difference

① Environmental assessment is applied or not
② Differing site conditions
③ Business risks

Lead time between planning and operation of plant

CHALLENGES IN EXPANDING RENEWABLE ENERGY (RE)

- **Restraint economic burden on electricity users**
  - Required costs of FIT system is $20 billion in 2017
  - Cost reductions by technological Innovation

- **Introduction of RE in a balanced manner**
  - Installed capacity of RE is too much concentrated on solar PV
  - Other types of RE such as wind, biomass and geothermal powers should be enhanced

- **Development of battery technologies**
  - Managing intermittency of solar and wind powers
  - Large storage battery is a key driver for further expansion of RE

NUCLEAR ENERGY AS A LOW CARBON TECHNOLOGY

- Nuclear energy is part of the solution to climate change.

- Process of restart of NPPs after Fukushima accident in Japan is very slow.
  - Operable NPPs (42) as of June 2017
  - In commercial operation (5)
  - Preparing for commercial operation (7)
  - Under review for restart (14)
  - Under construction (3) and Others (13)

- Government's target to achieve 20-22% of power generation by nuclear in 2030 is fairly ambitious, because almost 30 NPPs have to be operated.

CONCLUSION

1. Diversification of Energy Sources

- More efficient and cleaner use of fossil fuels
- De-carbonization in power generation by developing renewable and nuclear energies

2. To promote RD&D of innovative energy-related technologies

- Implementation of negawatt exchanges using IoT
- Development of innovative PV, electric battery, advanced nuclear power reactors, CCS etc.