Comments on "Japan's Growth Based on International Sustainable Development"

ESRI International Conference 2015
: To Ensure Japan's Economic Growth
31 July 2015

Kazumasa Iwata
Japan Center for Economic Research

JCER

Introduction

1. After the Fukushima nuclear accident, Japan has been forced to rely heavily on imported LNG and coal as sources of energy.

2. As Prof. Sachs' paper warns, there is an increasing risk of global warning.

3. It is a challenging task for Japan to achieve economic growth, while cutting greenhouse gas emissions by 80% in 2050 (the "Touyako summit" commitment in 2008).

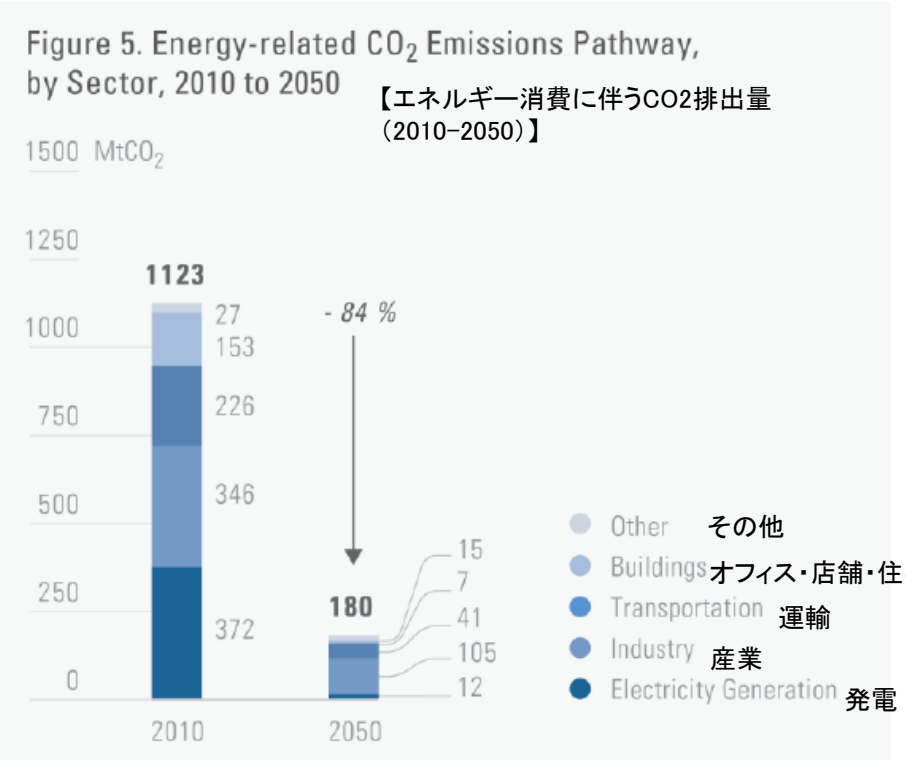
Ⅰ. UN Projects on Deep Decarbonization Pathways

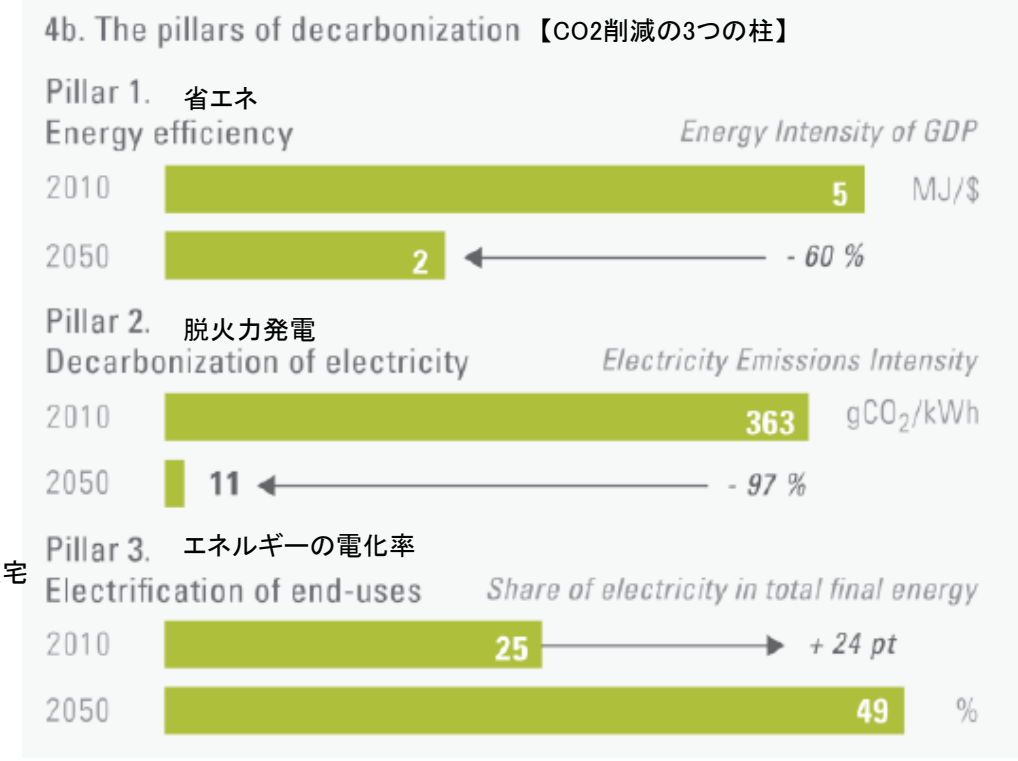
1. In September 2014, the UN sustainable development projects (the DDPP) predicted that from a technological viewpoint, it is feasible for Japan to achieve 80% cut of emissions in 2050, given the 15% electricity supply by nuclear power (no new nuclear power plant with 40 duration years) and the active use of CCS(Carbon Capture and Storage).

2. Key performance indicators as below;

- Energy Efficiency(60% cut)
- Decarbonization of Electricity(97% cut)
- Electrification of End-use energy(24%increase)

Fig.1 DDPP in Japan





(Source) IDDRI "Pathways to deep decarbonization – Interim 2014 Report"

Ⅱ. Japanese Government Projection

1. In April 2015, the Japanese Government announced the new energy path and the greenhouse gas emission reduction target in 2030.

2. Energy saving will be 17% in 2030,compared with the “business as usual” case.

3. Nuclear power will account for 20-22% in electricity supply, while renewable energy will provide 22-24%. The remaining part (54-58%) will be provided by fossil fuels.

4. The new target to cut greenhouse gas emissions is set at 26% in 2030(base year 2013).

Ⅲ. JCER Projection

1. Prior to the government announcement, JCER published the new energy path and the green house gas emission reduction target in February 2015.

2. Energy saving will amount to 20% in 2030 and 40% in 2050, due to higher energy prices and industrial structure changes from manufacturing-based economy to the economy centering on information related services in a second machine age (“Singularity is near”).

Ⅲ. JCER Projection

3. The combination of higher energy prices and energy saving is the main driver to attain the emission reduction target.

- In case the real energy prices remain stable, we need to introduce a new pricing on CO_2 emissions and reinforce the environment tax.

4. Anecdotal evidence shows that the success in raising productivity leads to more energy saving.

- McKinsey Global Institute predicts that Japan can achieve 4% rate of increase of labor productivity in coming decade, given its wide gap with the US.
- We need to implement “best practice” and promote innovation based on “disruptive technologies” such as IoT, advanced robots, next generation genomics and nanotechnology.

Ⅲ. JCER Projection

5. Renewable energy will take on 60% of electricity supply in 2050.

6. Nuclear power will provide 15% of electricity supply in 2030.

- The costs of electricity generation by nuclear power will be almost equivalent to those of renewable energy, if we include the insurance fees of severe accidents and increase the subsidy to local communities within 30km circle of the nuclear power plant.

Ⅲ. JCER Projection

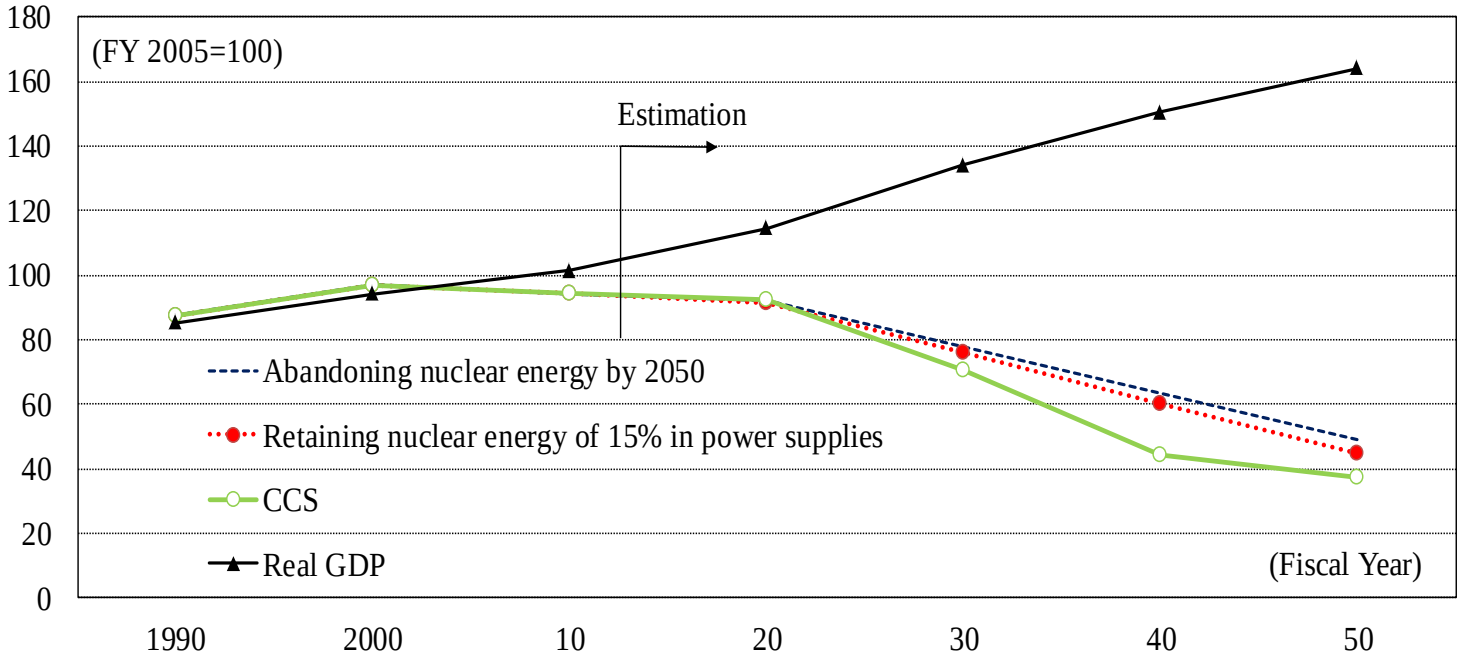
7. The remaining electricity supply of 25% will come from fossil fuels including coal(given advanced gasification technology on coal fire stations).

- Under the assumption of the availability of the CCS after 2025 will make possible zero emission of power generation after 2040.

8. It is possible to attain a 30% cut of CO_2 emissions in 2030 (base year 2005) and more than 60% cut in 2050.

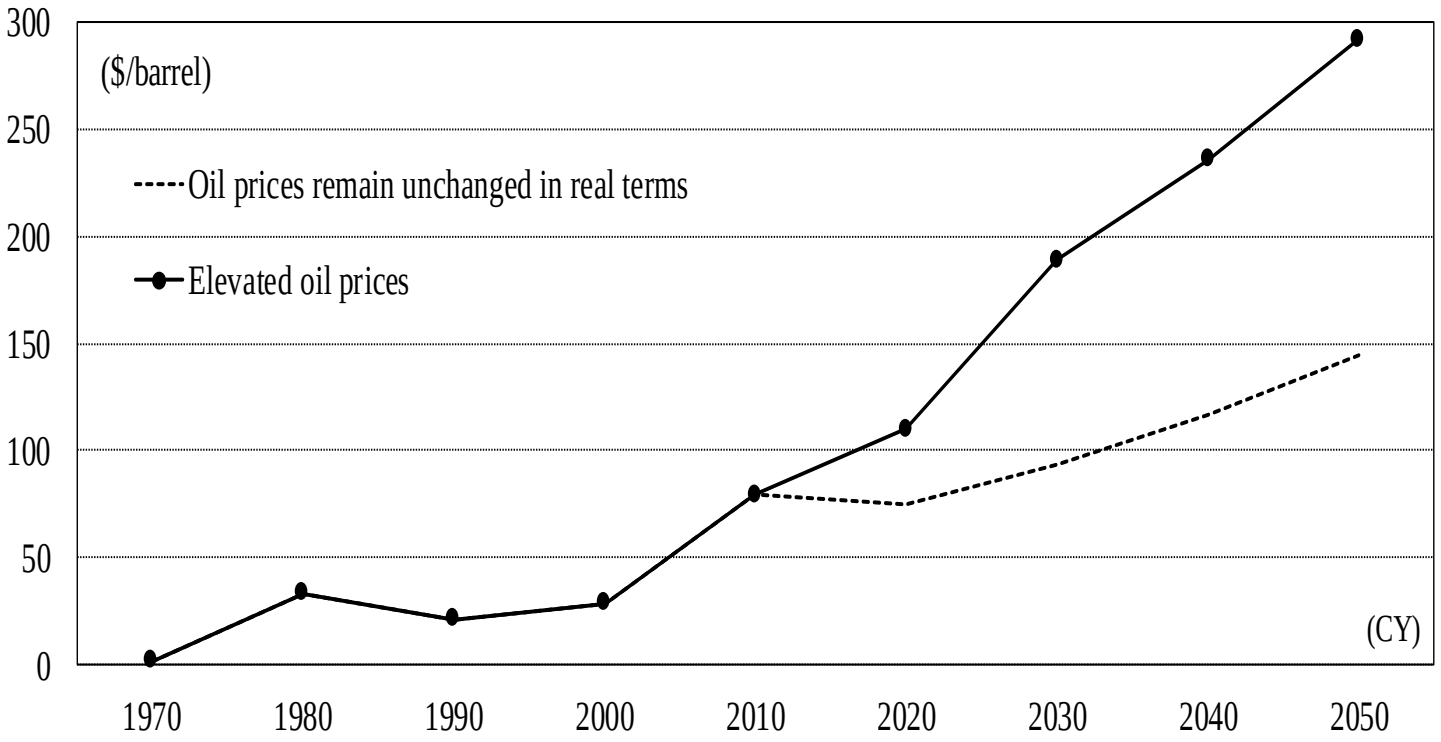
- It is needed to reinforce the effort, in order to attain the target 80% cut of emissions in 2050 by introducing the trade in emission rights and raising the environment tax rate.

Fig.2 Even under Economic Growth, a 63% CO_2 Reduction Relative to FY 2005 is Achievable (58% Reduction Relative to FY 1990)



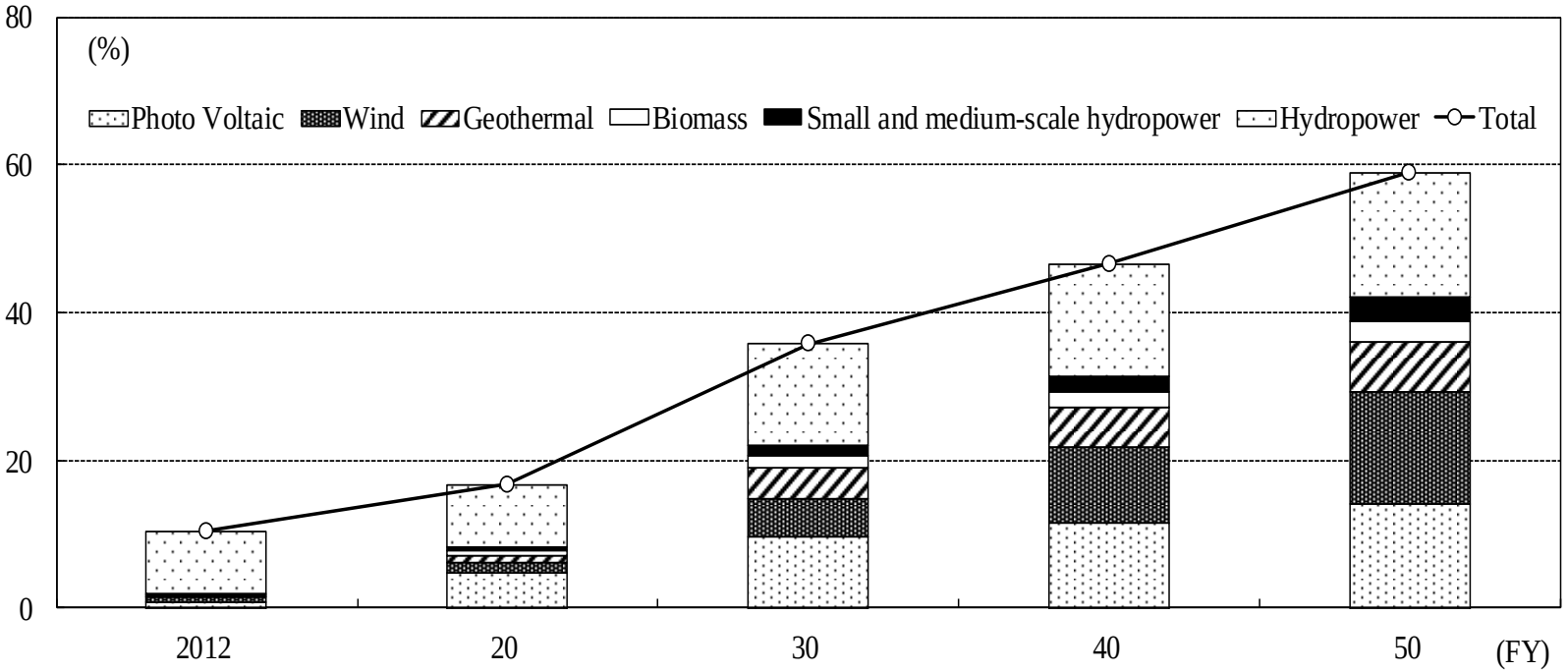
(Note) In the case of utilization of CCS with a 63% reduction, the emission reduction is the same whether nuclear power is phased out or maintained because the CO2 from thermal power stations generated due to the difference between the two will all be absorbed through CCS. In the case of the phase-out of nuclear power, nuclear power stations are gradually decommissioned from fiscal 2030, reaching zero in fiscal 2050. In the case of maintenance of nuclear power, nuclear power's contribution to total electricity is maintained at 15% from fiscal 2030.
(Sources) Database of the Institute of Energy Economics, Japan, and the system of national accounts (SNA). Real GDP figures are growth scenario forecasts in JCER Long-Term World Forecast-Three Scenarios.
For the complete text, see http://www.jcer.or.jp/eng/research/policy.html ,
JCER "Vision 2050: The Future of Energy and Environmental Choice－Fiscal 2014 Report－"

Fig.3 Crude Oil Price Assumption



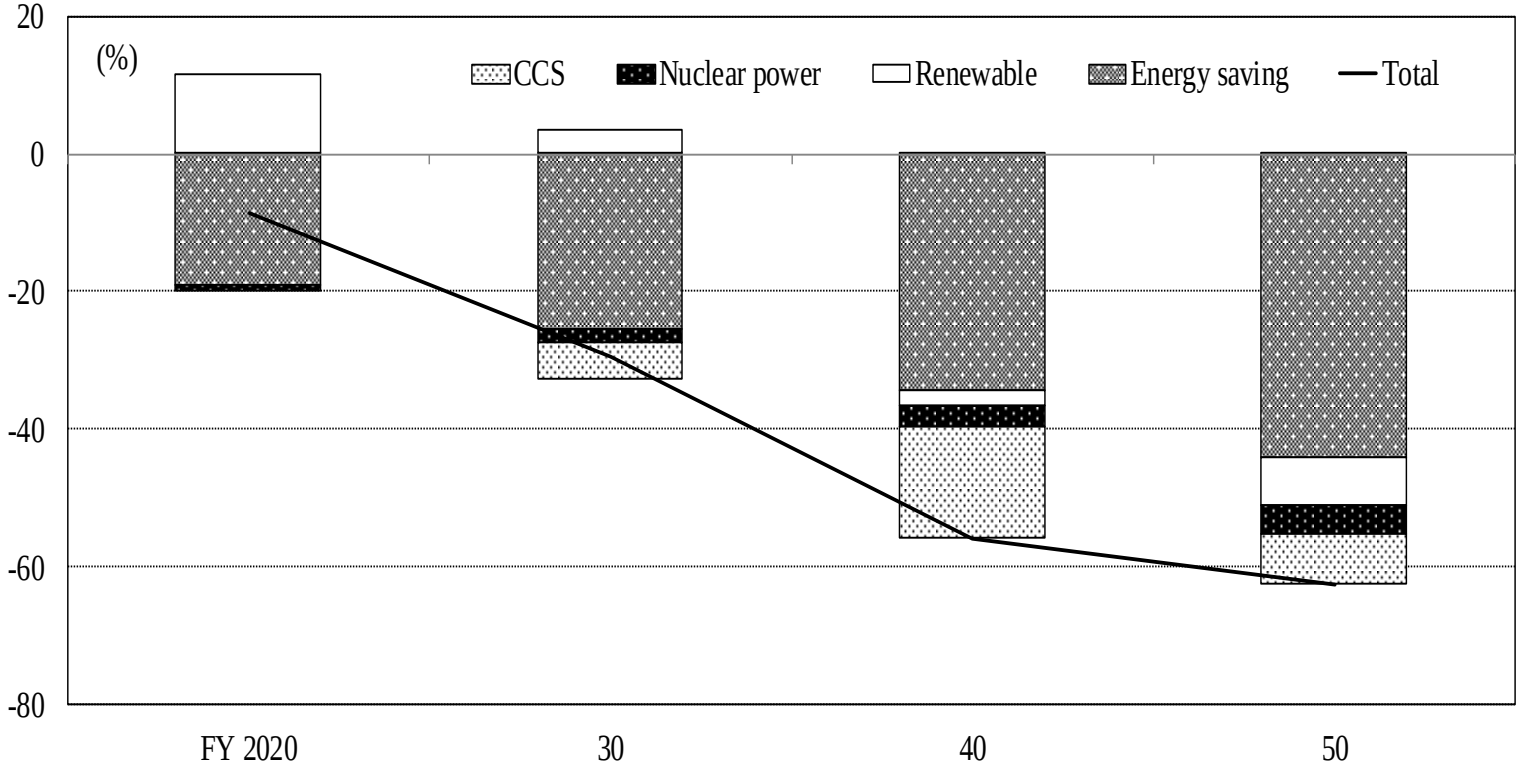
(Source) IEA "World Energy Outlook 2014"
For the complete text, see http://www.jcer.or.jp/eng/research/policy.html ,
JCER "Vision 2050: The Future of Energy and Environmental Choice－Fiscal 2014 Report－"

Fig.4 Ratios of Renewable Energy Sources (Including Existing Hydroelectric Power) to Total Electricity Generation



(Source) Survey of Electric Power Statistics
For the complete text, see http://www.jcer.or.jp/eng/research/policy.html ,
JCER "Vision 2050: The Future of Energy and Environmental Choice－Fiscal 2014 Report－"

Fig.5 Breakdown of CO_2 Reduction by Energy Conservation, Nuclear Power and CCS



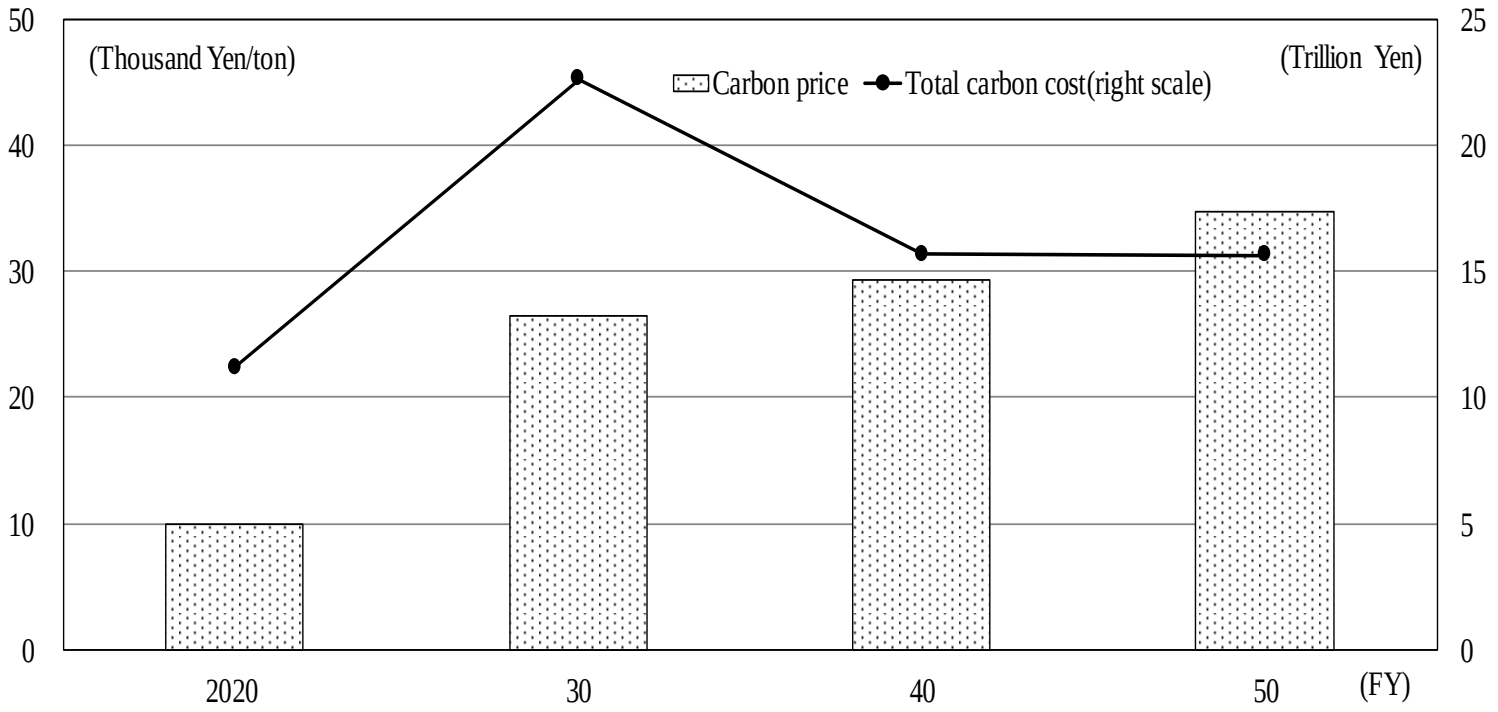
(Source) For the complete text, see http://www.jcer.or.jp/eng/research/policy.html ,
JCER "Vision 2050: The Future of Energy and Environmental Choice－Fiscal 2014 Report－"
(Note) The reason renewable energy sources appear to increase CO_2 in fiscal 2020 and fiscal 2030 is because we included the increase in CO_2 resulting from the use of thermal power to make up for the suspension of operations of nuclear power plants. We included this increase in renewable energy sources for the sake of convenience to verify when the increase associated with the use of thermal power in place of nuclear power can be covered by renewable energy sources.

Table 1 Reductions in Each Case

Reduction rate of CO_2(%)	Abandoning nuclear energy by 2050	Retaining nuclear energy of 15% of total power supplies	Applying CCS
The rate in fy 2030 in comparison with fy 2005	-22.3	-24.3	-29.5
The rate in fy 2050 in comparison with fy 2005	-51.2	-55.4	-62.7
The rate in fy 2030 in comparison with fy 1990	-11.3	-13.5	-19.5
The rate in fy 2050 in comparison with fy 1990	-44.3	-49.1	-57.5

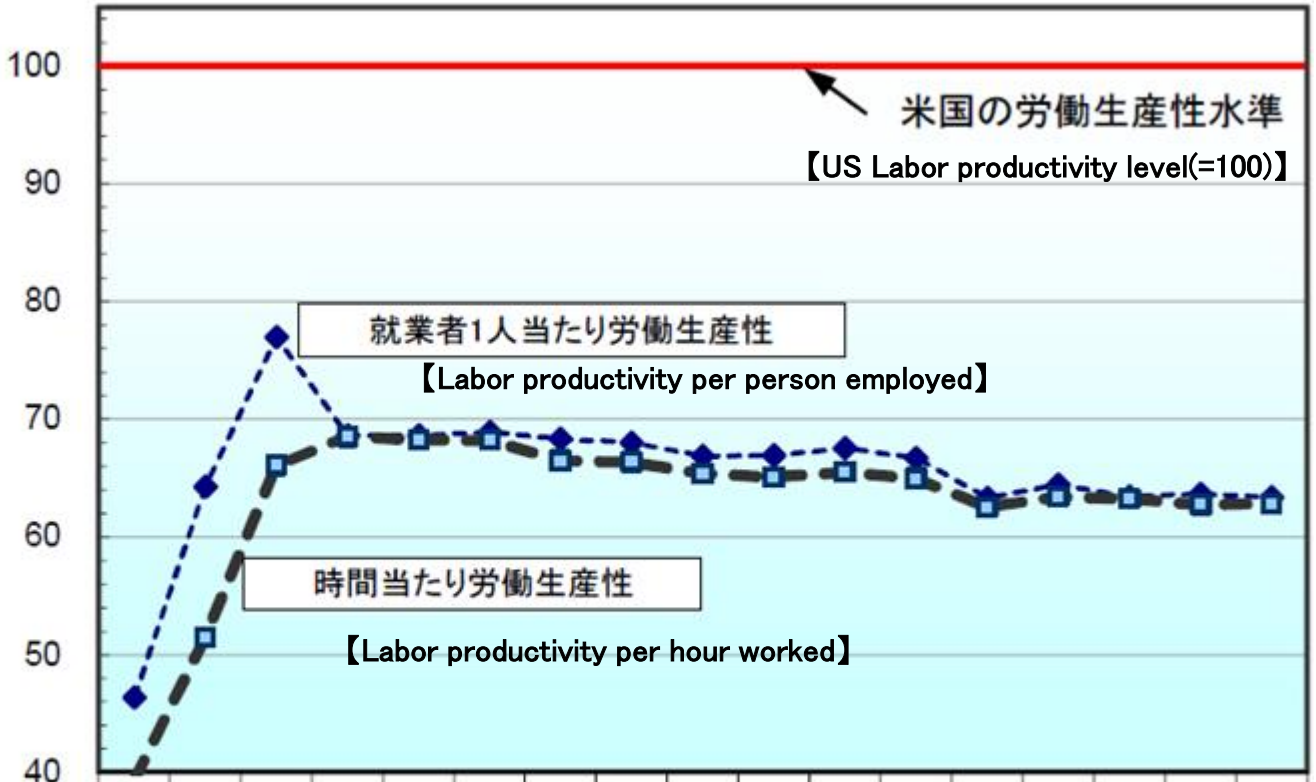
(Source) For the complete text, see http://www.jcer.or.jp/eng/research/policy.html ,
JCER "Vision 2050: The Future of Energy and Environmental Choice－Fiscal 2014 Report－"

Fig.6 CO_2 Prices and User Cost Accompanying Emissions



(Source) For the complete text, see http://www.jcer.or.jp/eng/research/policy.html ,
JCER "Vision 2050: The Future of Energy and Environmental Choice－Fiscal 2014 Report－"

Fig.7 Japan's Labor Productivity Gap with the US



	1970	1980	1990	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
【Labor productivity per person employed】	46.4	64.3	77.0	68.6	68.6	68.9	68.3	68.0	66.9	66.9	67.5	66.7	63.3	64.5	63.4	63.6	63.4
【Labor productivity per worked】	39.3	51.4	66.1	68.5	68.2	68.2	66.5	66.3	65.4	65.1	65.5	64.9	62.5	63.4	63.2	62.7	62.8

(Source) Japan Productivity Center"Trend of Productivity in Japan 2014"(in Japanese)

Reference

[1]IDDRI, Pathways to Deep Decarbonization, Interim 2014 Report, November 2014

[2]Japan Center for Economic Research, Vision 2050: The Future of Energy and Environment Choice, February 2015

[3]McKinsey Global Institute, The Future of Japan: Reigniting Productivity and Growth, March 2015