Economic and Energy Outlook of Japan for FY2014

—Japan is reaching a crucial moment—

20th December 2013

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Context

Background

Expectations on the future course of the Japanese economy are growing thanks to the “Abenomics” and an overseas economic recovery forecast. However, an earlier-expected expansion in exports has yet to emerge, with wage improvements remaining uncertain. The Japanese economy is feared to slump due to a consumption tax hike planned for April 2014 under such situation.

It is plagued with a mountain of energy problems including the tight electricity balance, safety assessment on nuclear power plants, risks of renewables diffusion concentrating in PVs, growing energy costs and rising dependence on energy imports. This outlook has been made to contribute to analysing immediate challenges and considering a more desirable energy mix in Japan.

Outlook for FY2014

- Macro economy and production activities
- Primary energy supply
- Final energy consumption
- Energy sales

Special topics

- Sensibility analysis of nuclear power generation
- Prospects for introduction of renewable power
- Sensibility analysis of the TPP

Major assumptions in the Reference Scenario

- **World economy (real GDP growth rates) in FY2014**
  - United States: 2.5% or more
  - European Union: Recover slowly
  - Asia: More than 6% due to strong ASEAN economy
- **Oil, LNG, and coal CIF prices**

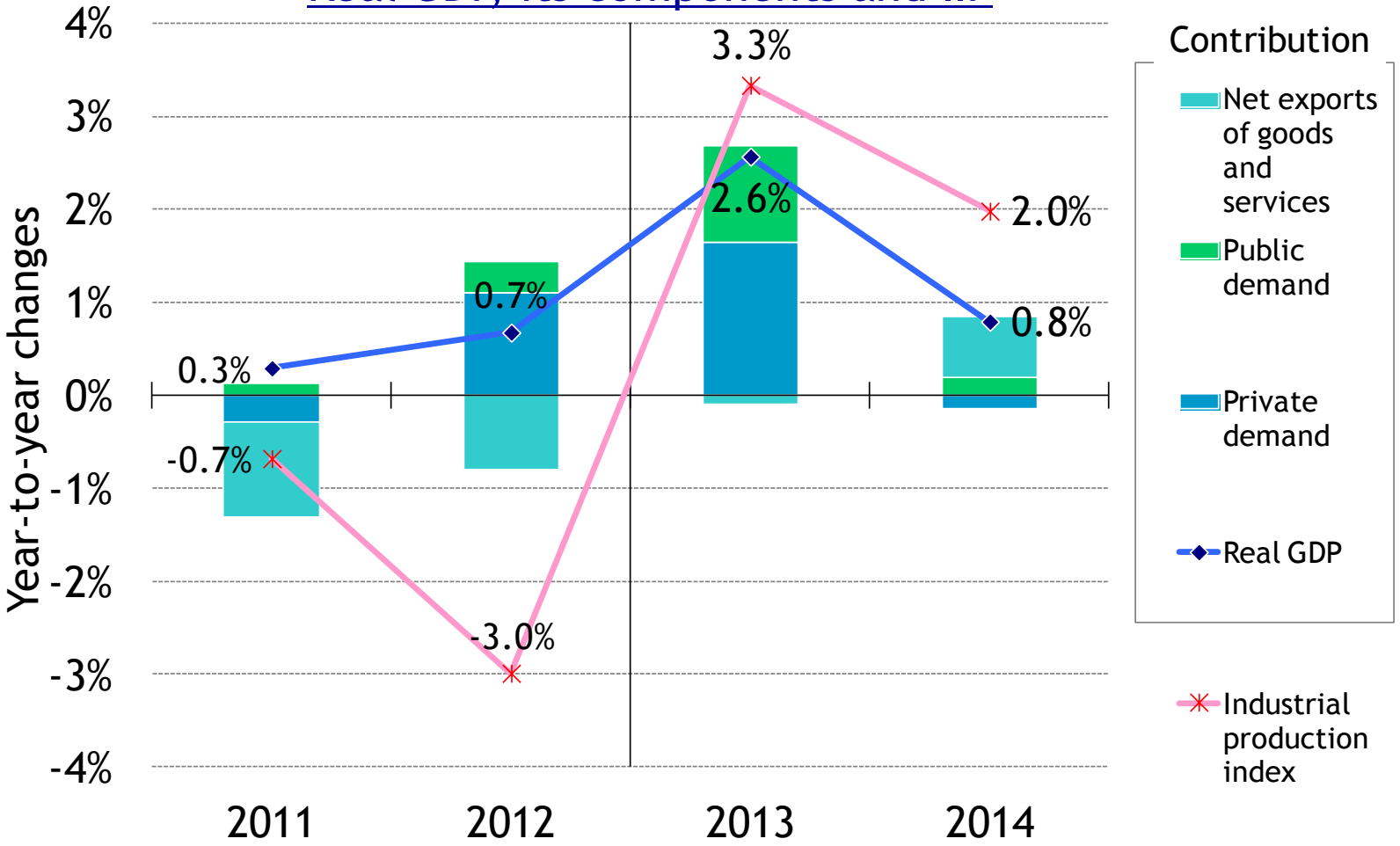
  Referring to Koyama and Morikawa "Outlook on the International Oil and Gas Situation," etc.

  October 2013 → FY2014
  - Oil: $113/bbl → $105/bbl
  - LNG: $788/t → $784/t
  - Steam coal: $103/t → $110/t
- **Taxes**
  - Consumption tax (VAT): Raised to 8% in April 2014 from 5%
  - Oil and coal tax: Raised by JPY96/t-CO_2 in April 2014
- **Exchange rate**
  - JPY100/$ on average throughout the second half of FY2013 and FY2014
- **Nuclear power generation**
  - The first group of restarting plants will take about nine months for assessment.
  - The following groups will take six months. Up to 16 plants restart by the end of FY2014 generating 82 TWh of electricity.
- **Electricity supply and demand**
  - Each electric utility will secure a reserve capacity of at least 3%, based on a government's report.
- **Climate conditions**
  - Warmer winter in FY2013 than the previous year
  - Milder summer and winter in FY2014

Japanese economy will slow down

- Japanese economy will achieve the highest growth in FY2013 in the last 17 years excluding the year just after the Lehman crisis.
- The robust economic growth will be tested if it is sustainable in FY2014.

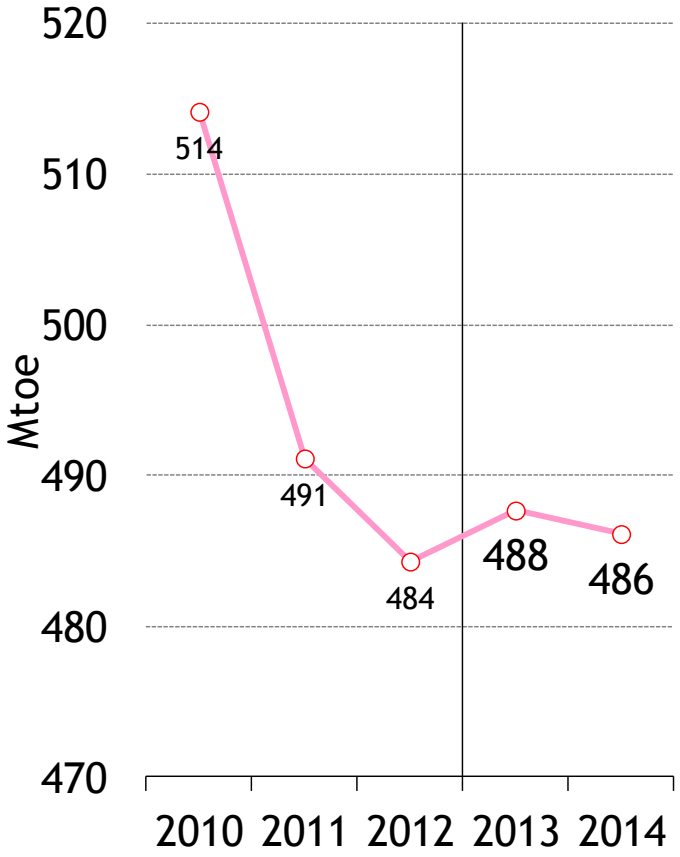
Real GDP, its components and IIP



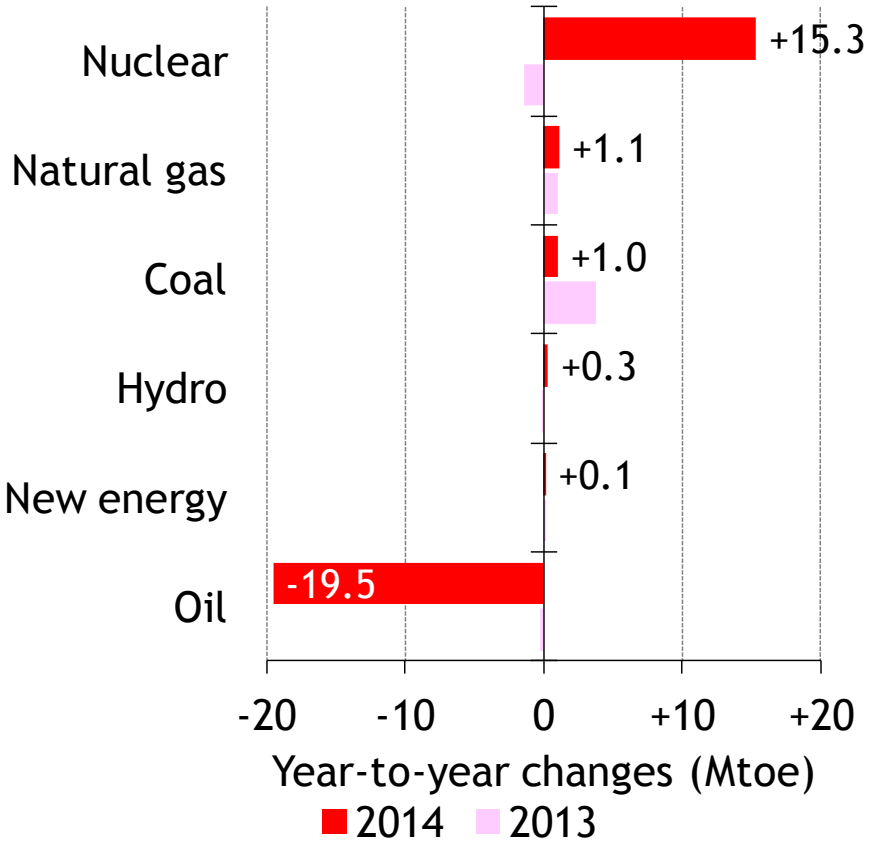
Primary energy supply will decline again

- The economic slowdown, electricity saving and energy conservation will reduce primary energy demand.
- Oil will dip substantially while natural gas and coal will record new highs.

Primary Energy Supply



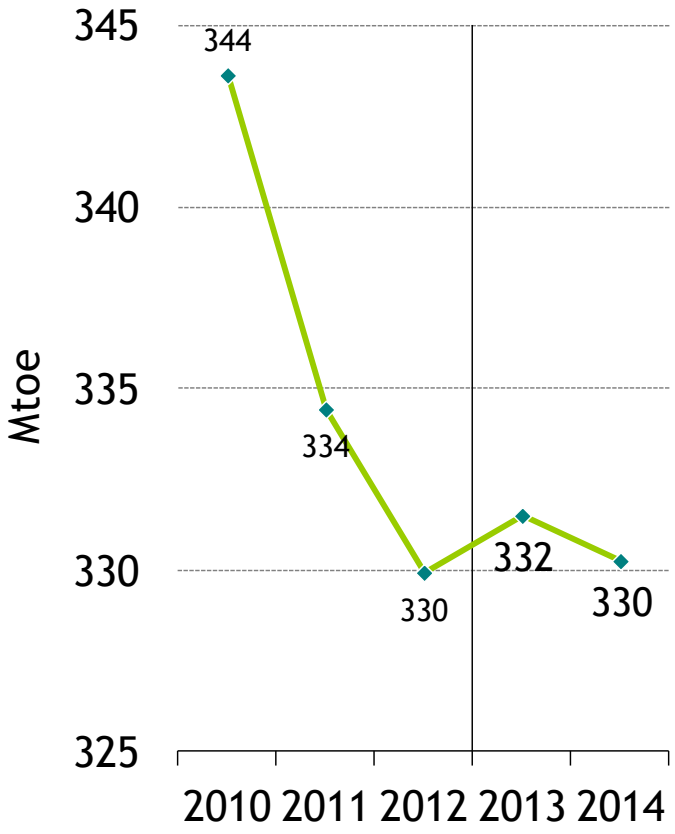
Primary energy supply by energy source



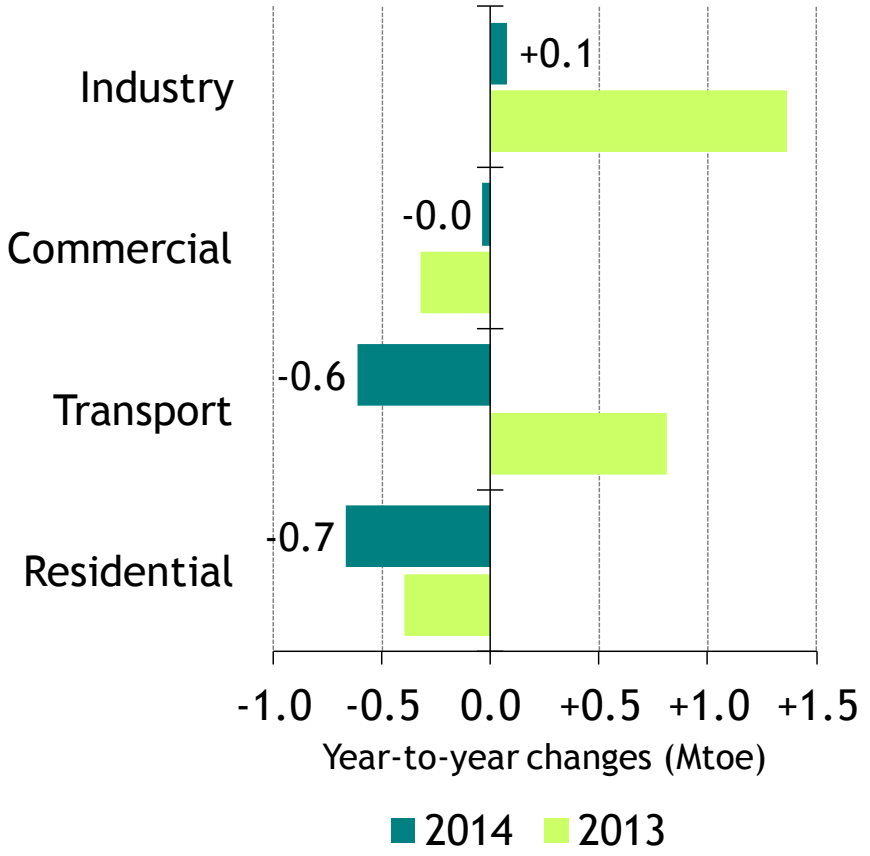
Final energy consumption will also be back to a declining trend

- The slowdown of production activities will result in a slight increase in energy consumption by industrial sector.
- Energy consumption by residential, commercial and transport sectors will decrease due to electricity saving, improvement of fuel economy, and mild temperatures.

Final energy consumption



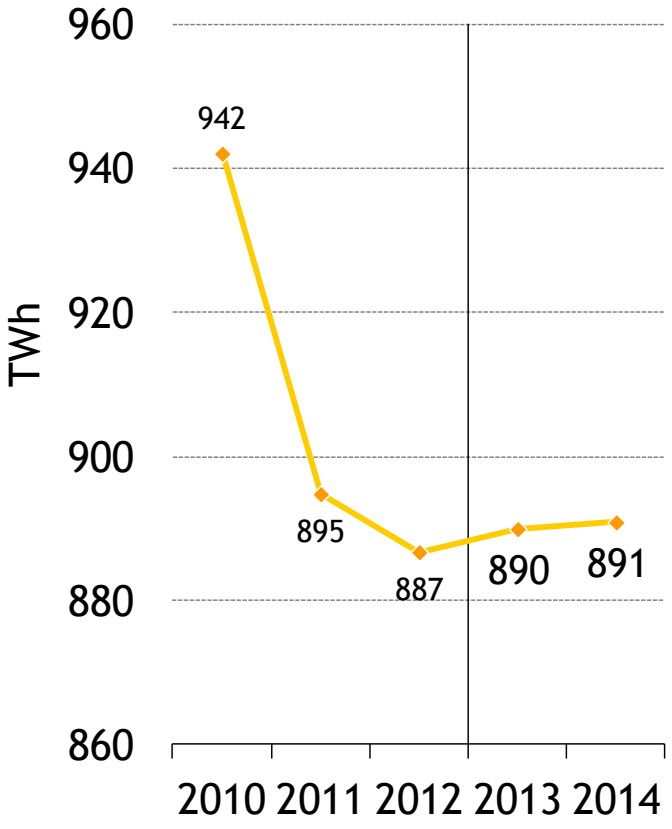
Final energy consumption by sector



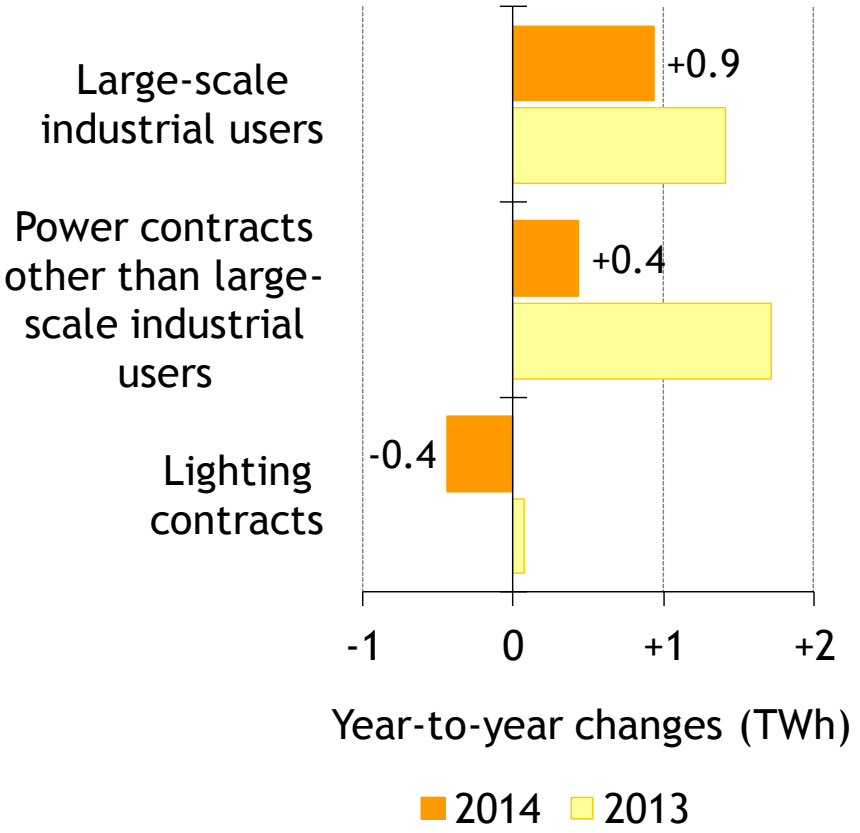
Electricity sales revert to increase but do not recover to the level before the earthquake

- Electricity sales increase for two years in a row though the pace is slow.
- Power contracts tow the growth while lightning contracts decrease.

Electricity sales



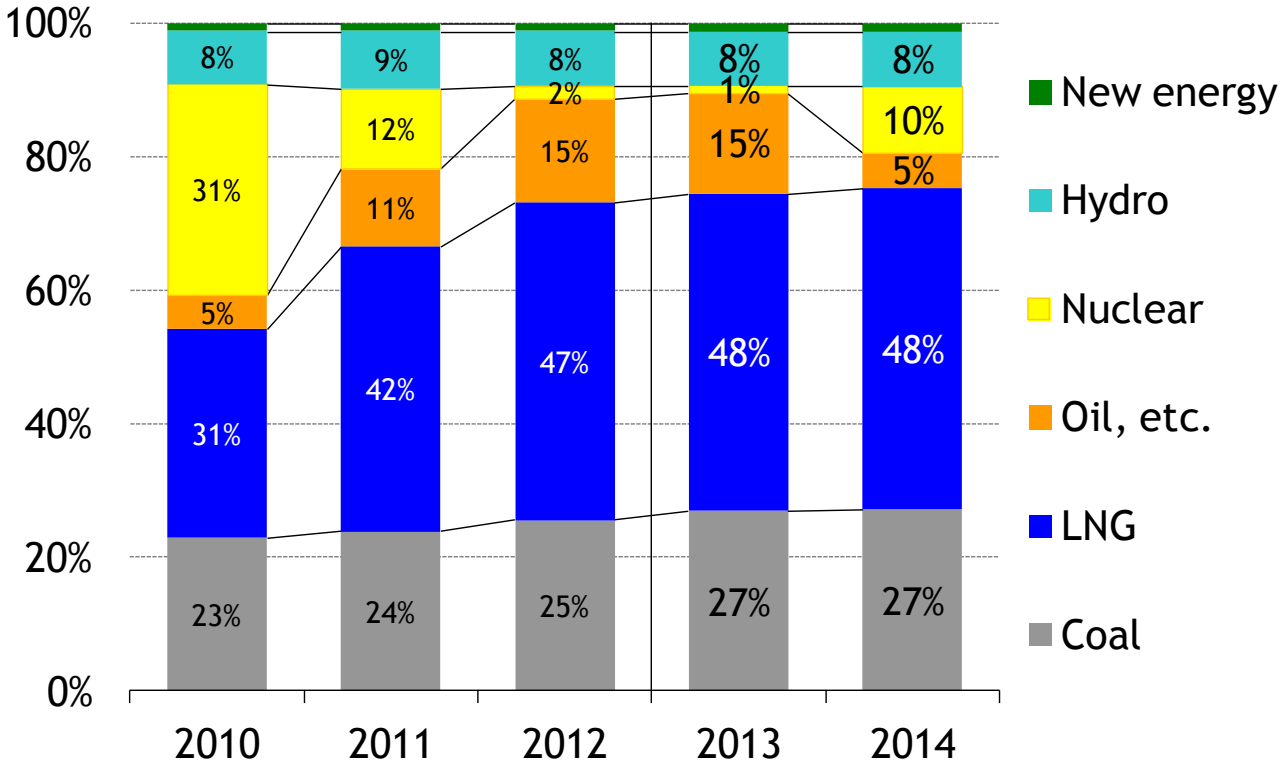
Electricity sales by contract



Thermal power generation will hit a record high in FY2013 before decline in FY2014

- Generated by coal- and LNG-fired thermal power continue increasing, while oil-fired thermal decreases greatly as nuclear power increases.
- Nevertheless, electricity generated by thermal power is 22% more, and that of nuclear is 72% less than in FY2010.

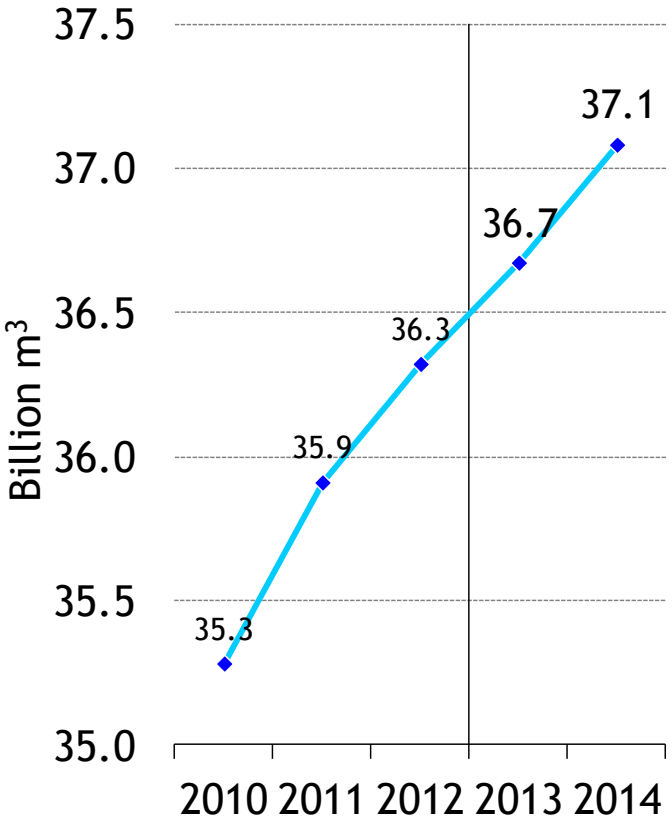
Power generation mix for utilities



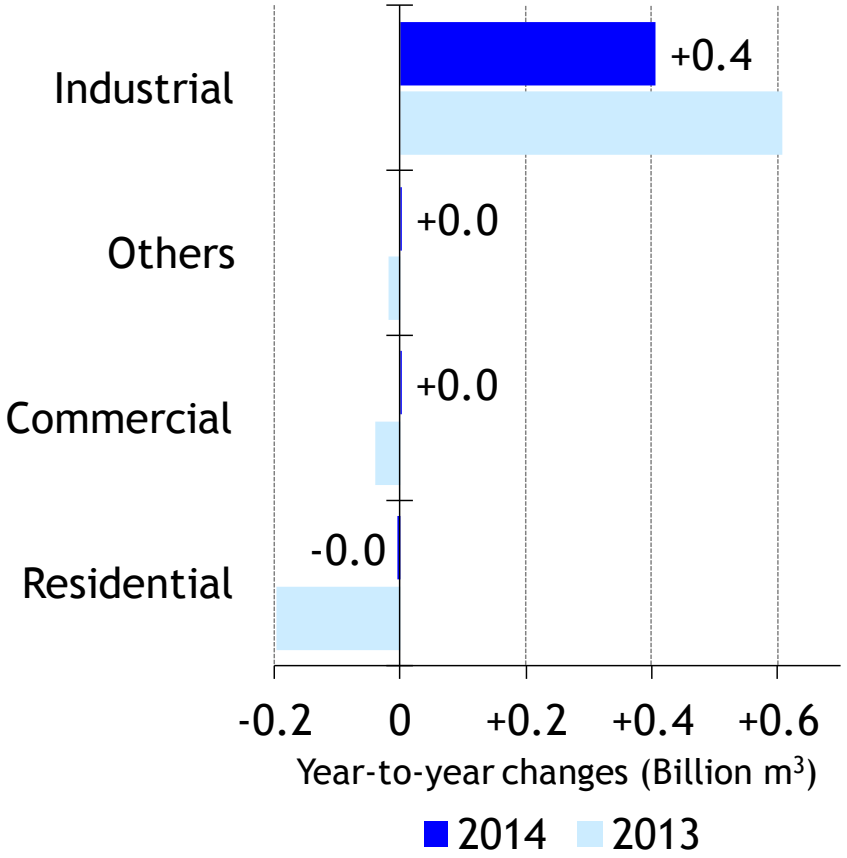
City gas sales break the historical record for four consecutive years

- Industrial sales increase for five years in a row, which account for all of the increase in total sales since FY2010.
- Sales for residential, commercial and others uses remain almost unchanged.

City gas sales



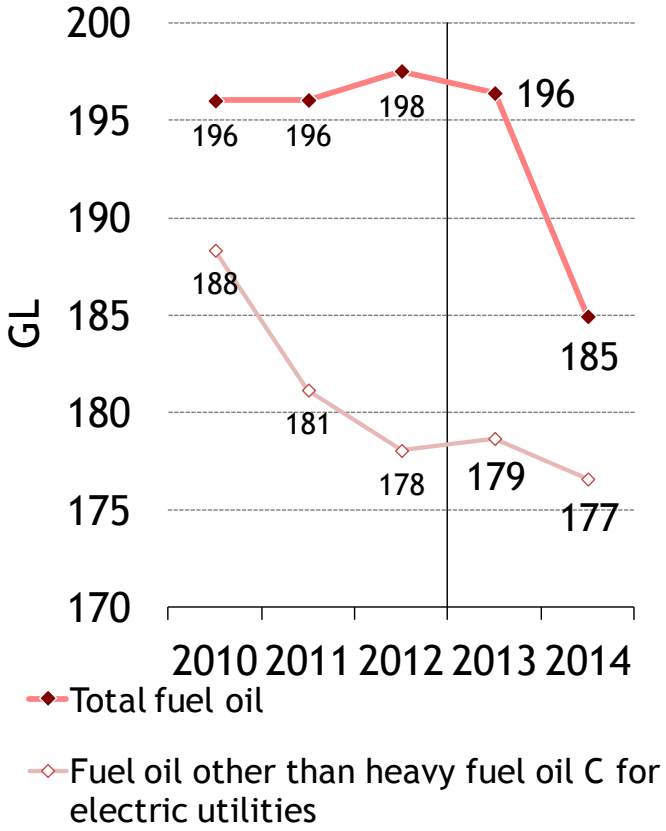
City gas sales by use



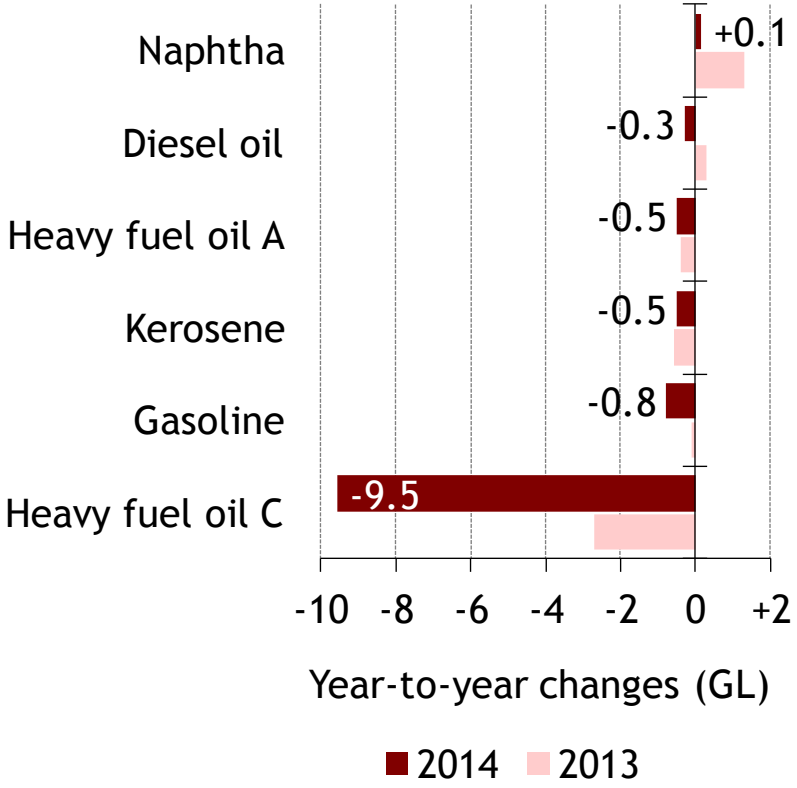
Fuel oil sales dip below 190 GL for the first time in 28 years

- Gasoline and kerosene will drop to the level of 16 years ago and 43 years ago, respectively.
- Although heavy fuel oil C for electric utilities will decrease by 9.4 GL, it is still 9% more than the level before the earthquake.

Fuel oil sales



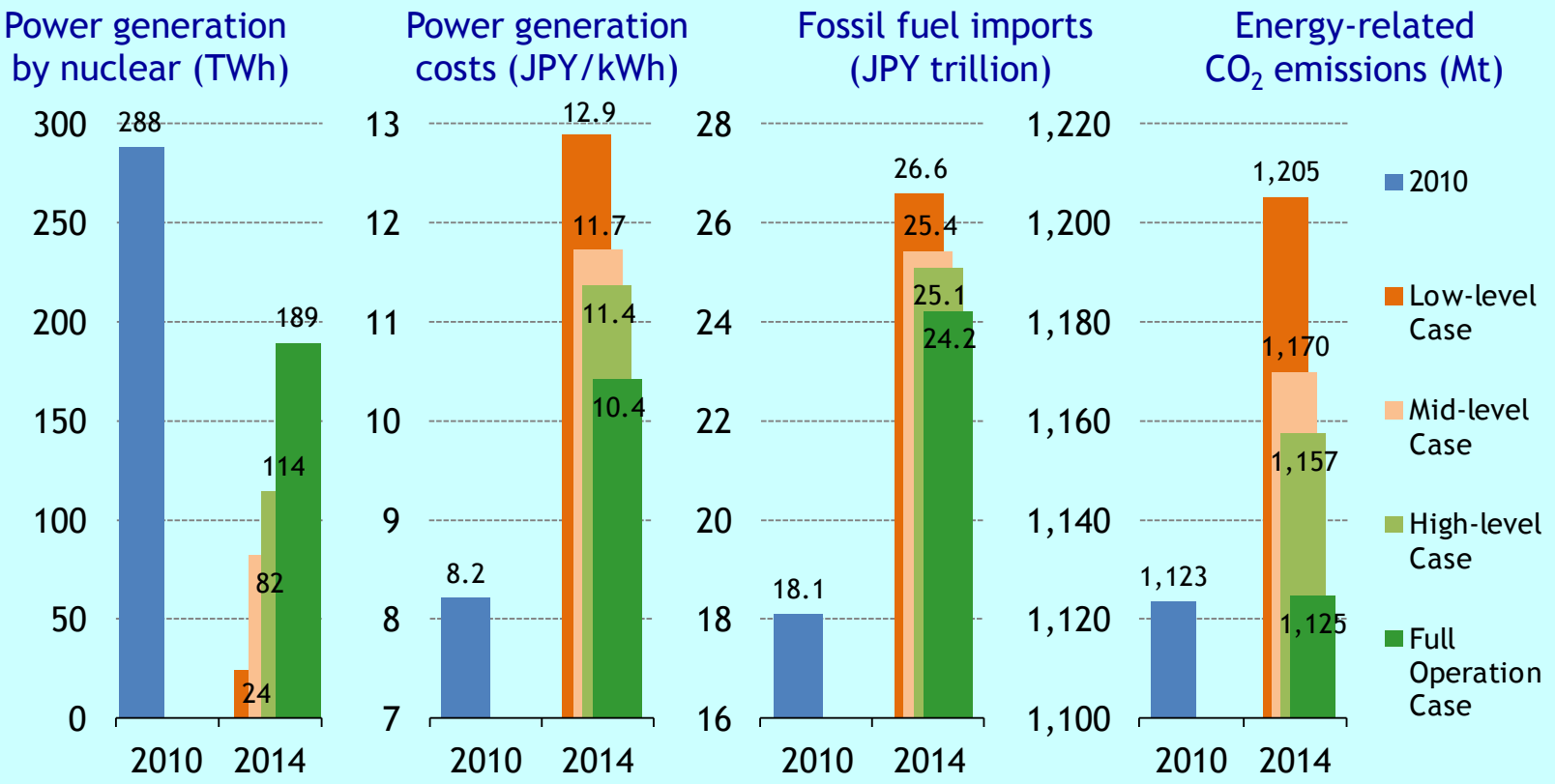
Fuel oil sales by products



Hoped more rigorous and better staffed safety assessment of nuclear power plants

- If the assessment proceeds smoothly as in the High-level Case, power generation costs will decrease by around JPY1,500/MWh from the Low-level Case, reducing the risk of further electricity price hike.
- And furthermore, fossil fuel imports will decrease by JPY1.5 trillion, and real GDP growth rate will expand by 0.17% points.

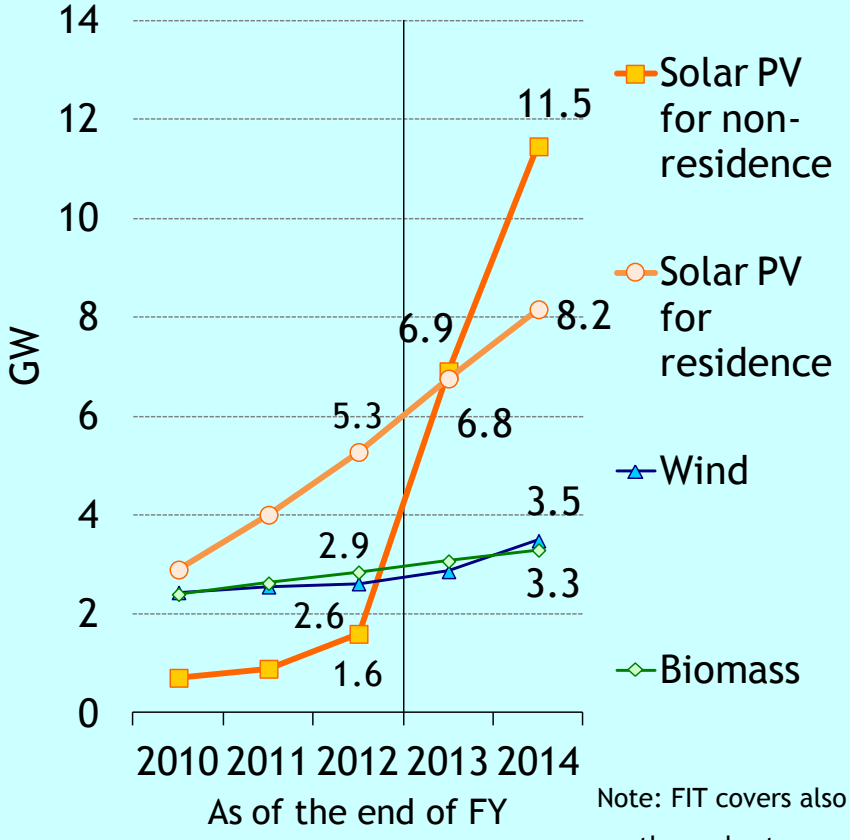
Impacts of nuclear power plants' restart in FY2014



Introduction of renewables and their burdens on consumers increase rapidly

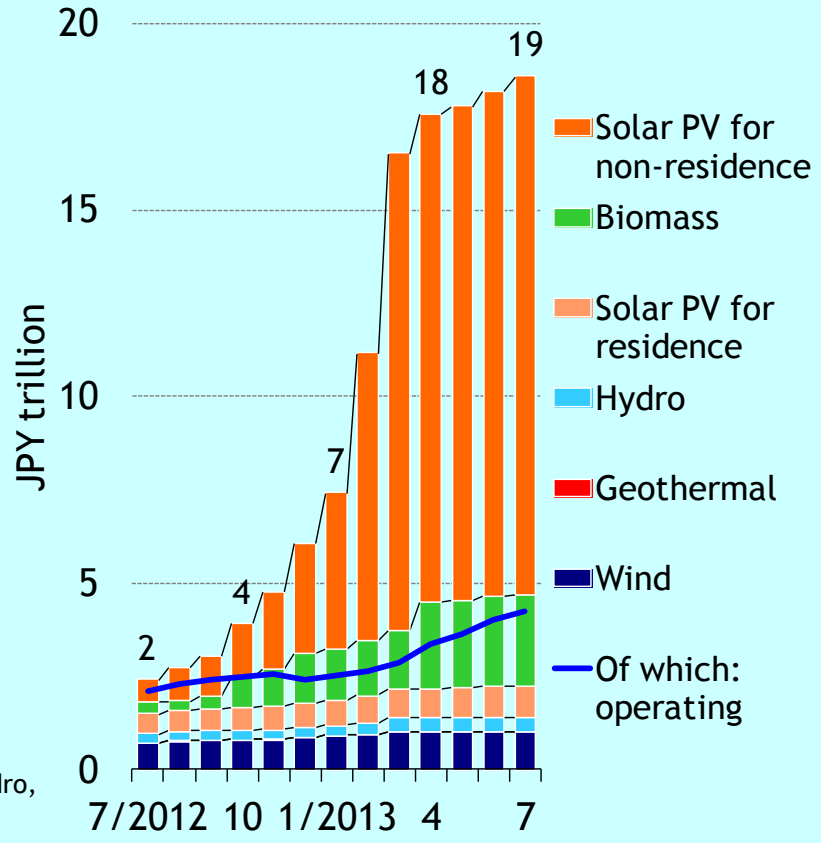
- Installed capacity of renewable power generation increases to 36.6 GW, equivalent to 13% of total capacity, by the end of FY2014 generating 7% of power generation.
- Cumulative burdens of FIT amount as much as JPY19 trillion over the next 20 years only for 43.8 GW of existing and authorised capacity in July 2013, which correspond to JPY1,100/MWh.

Installed capacity of renewables



Note: FIT covers also mini-hydro, geothermal, etc.

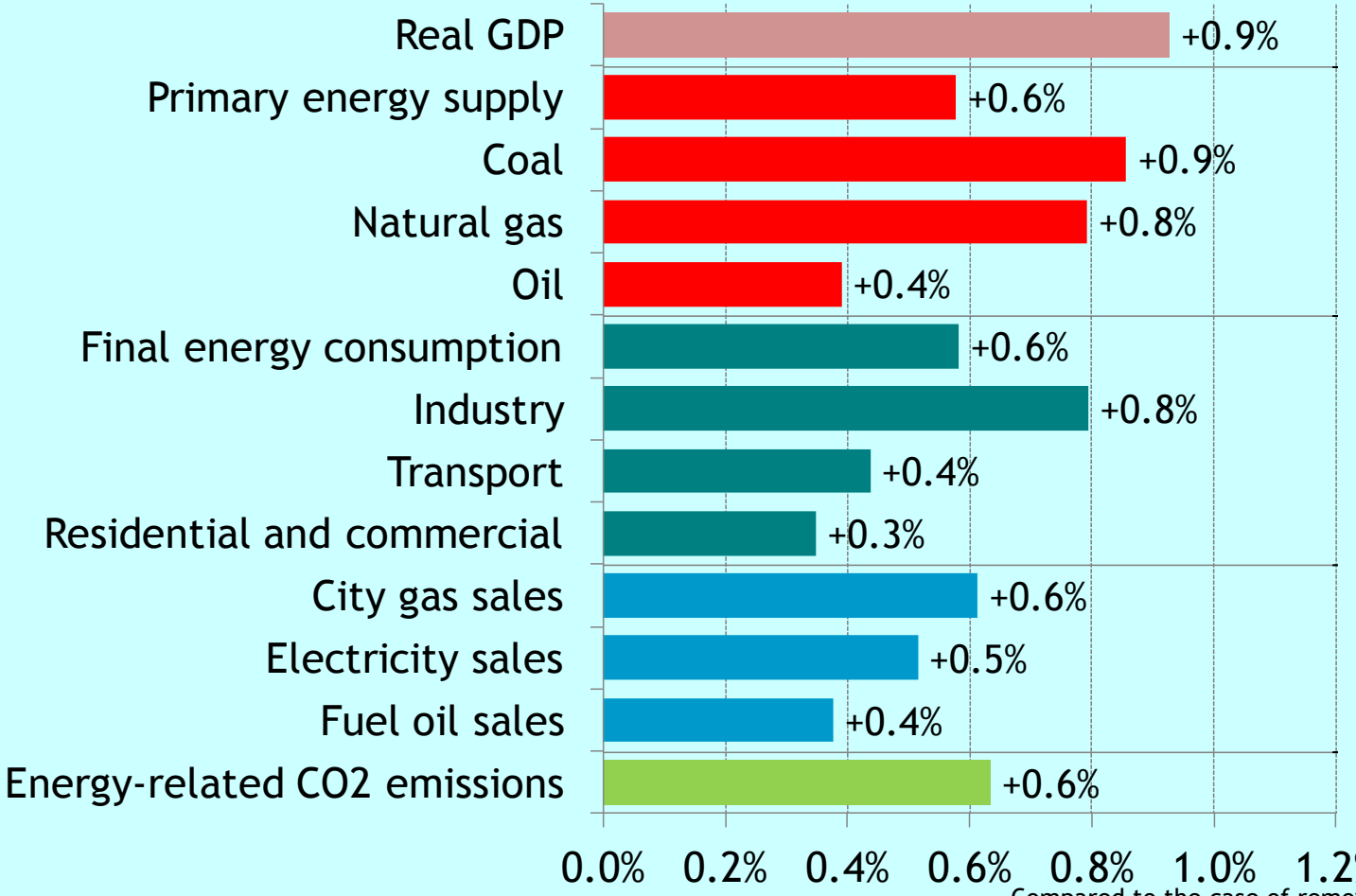
Cumulative burden by FIT (for authorised as of each month)



Japanese economy and energy consumption expand by the TPP

- The Japanese economy expands by 0.9% as a whole by removing customs. Energy consumption also increases by 0.6%.
- While all energy sales increase, city gas sales are most affected due to its high sales share for industry use.

Impacts of removing customs by the TPP



Compared to the case of removing no customs

Summary

Outlook toward FY2014

- **Macro economy**

  GDP growth slows due to effect of retroaction decrease by the last-minute demand of tax raise, etc.

- **Energy supply and demand**

  Energy consumption decreases for the first time in two years due to slowing economic recovery.

  Both natural gas and coal consumption hit new highs.

- **Energy sales**

  Steady growth of city gas, slight increase of electricity and sharp drop of fuel oil

- **CO_2 emissions**

  Decrease in FY2014 after hit the historical high in FY2013

Special topics

- **Restart of nuclear power plants**

  Hoped prompt procedures after finishing the highest-level safety assessment

- **Fast expansion of renewables**

  Required system improvement as soon as possible for adequate and sustainable introduction of renewables

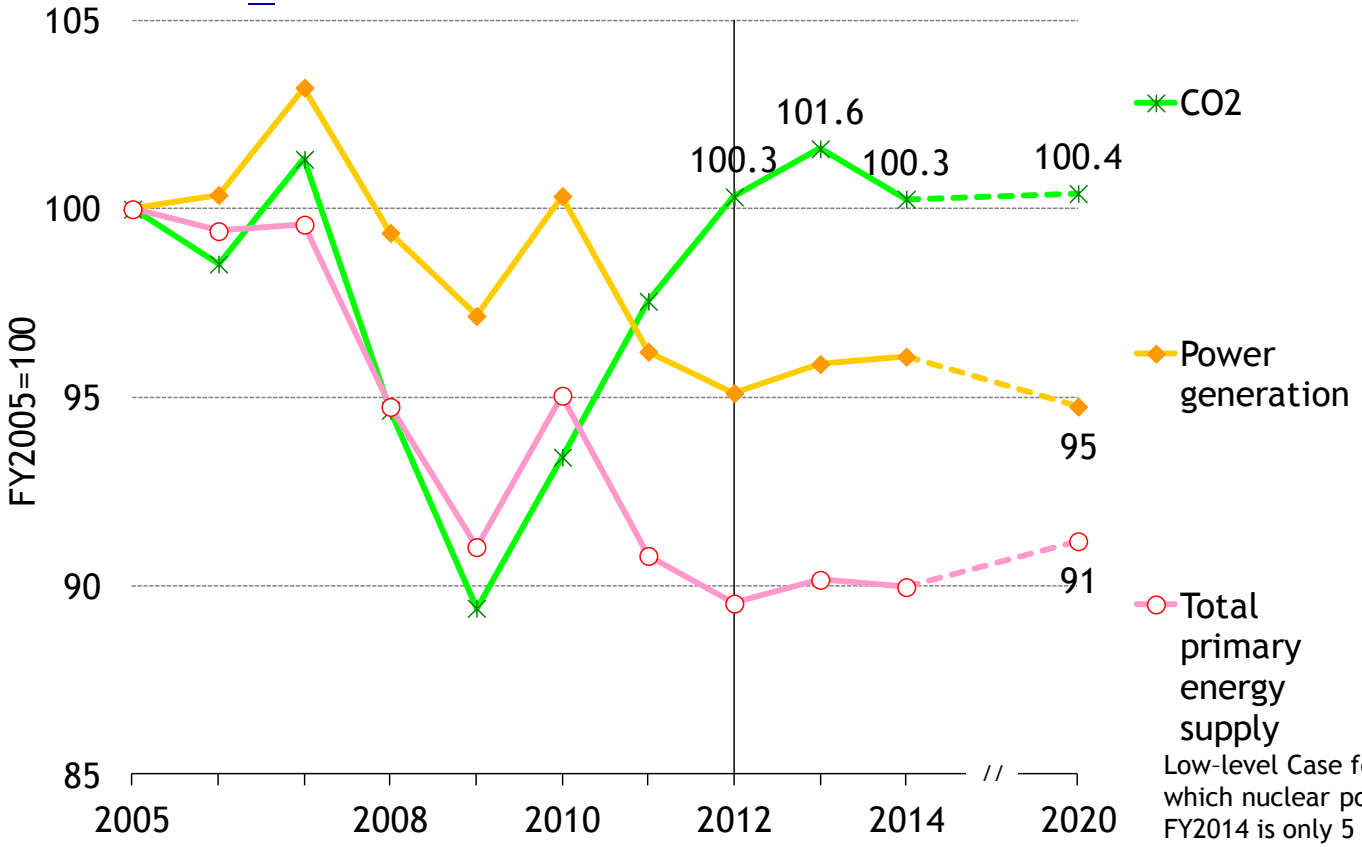
- **Impacts by the TPP**

  Energy demand increases due to the economic expansion

New target by FY2020: GHG -3.8%* from FY2005

- Increase in energy-related CO_2 emissions by 0.4% imply 9% and 5% of decreases in primary energy supply and power generation, respectively.
- Energy efficiency improvement of 2.0% per annum will be needed if 2.0% of economic growth is achieved as the Council on Economic and Fiscal Policy says.

Energy-related CO_2 emissions, primary energy supply and power generation



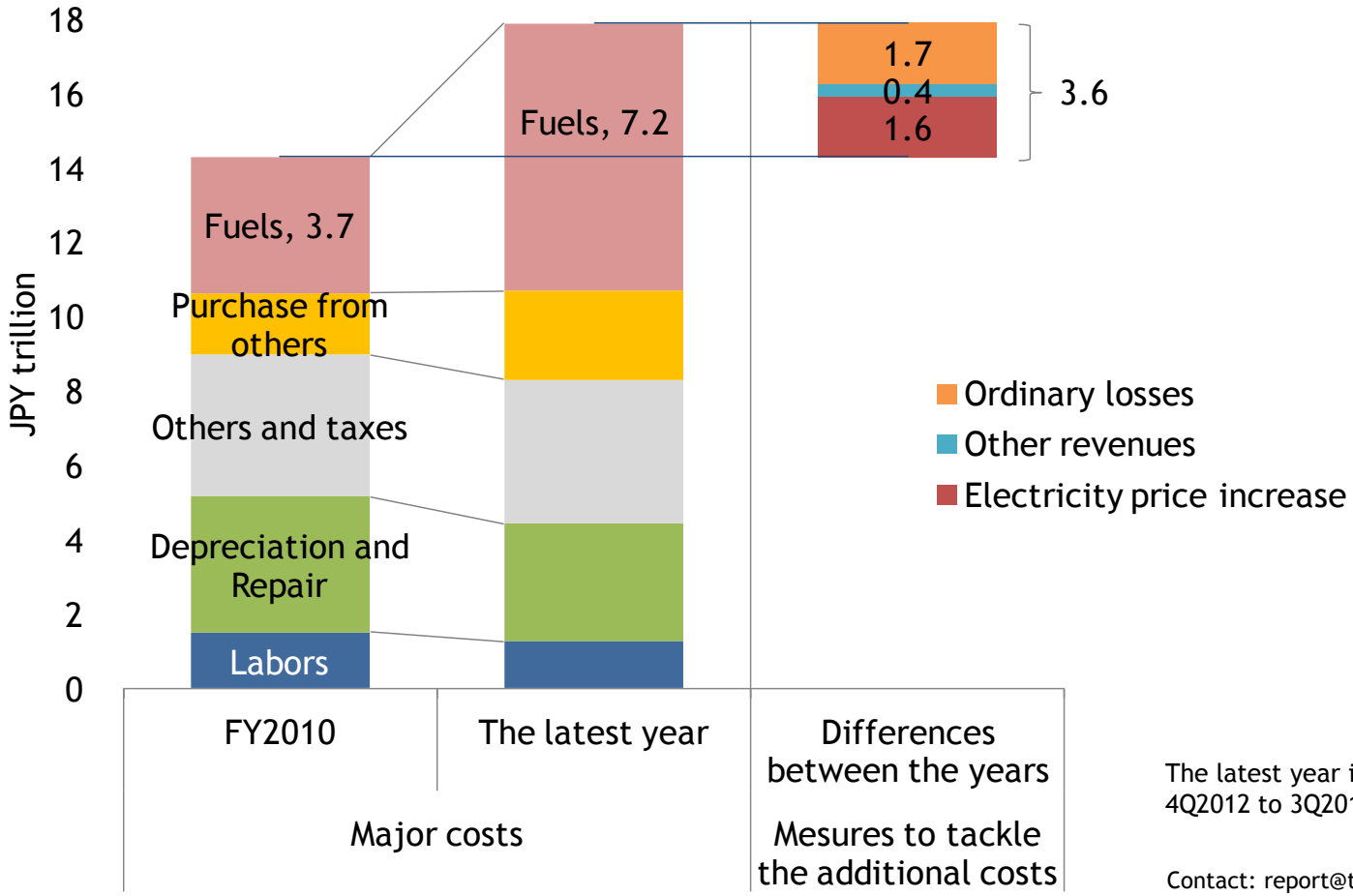
Low-level Case for projection in which nuclear power generation in FY2014 is only 5 TWh bigger than in FY2012

* By the Global Warming Prevention Headquarters (15 Nov 2013).
This tentative target assumes no GHGs reduction by nuclear but is based on carbon intensity of electricity in FY2012.

Further electricity tariff raises may happen

- High fuel costs rise power generation costs since the earthquake.
- Only less than half of JPY3.6 trillion of the increases in the costs has been covered by raises in electricity tariff.

Structure of increase in power generation costs



The latest year is a year from 4Q2012 to 3Q2013.

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