Economic and Energy Outlook of Japan toward FY2015

- Energy risk casts a shadow over the recovery of the Japanese economy -

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Context

Background

Japanese economy is showing signs of growth due to Abenomics, improvements of people mind, Japanese company's management efficiency, etc. in greater or less degree. On the other hand, there are some risks about energy situation like unstable electric power supply and demand, soaring fossil fuel costs, high risks at introducing too much solar photovoltaics at renewable energy. In addition to that, there is a geopolitical risk under the tense situation in the Middle East and Ukraine and there are many problems to solve.

It is indispensable to solve these problems for a sustainable growth of Japanese economy. It is suited to use quantitative information for analysing problem we faced or for considering energy mix. We projected Japanese economy, energy supply and demand and analysed the effect for various case toward FY2015.

Outlook toward FY2015

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

Special topics

- Sensibility analysis of nuclear power generation
- Impact analysis of rises in oil and LNG prices
- Impact analysis of depreciation of the yen

Major assumptions in the Reference Scenario

- **World economy (real GDP growth rates) toward FY2015**
  - United States: 2.5% or more
  - European Union: 1.0% or more
  - Asia: More than 6% despite of slowdown in China, India, etc.
- **Oil, LNG and coal import CIF prices**

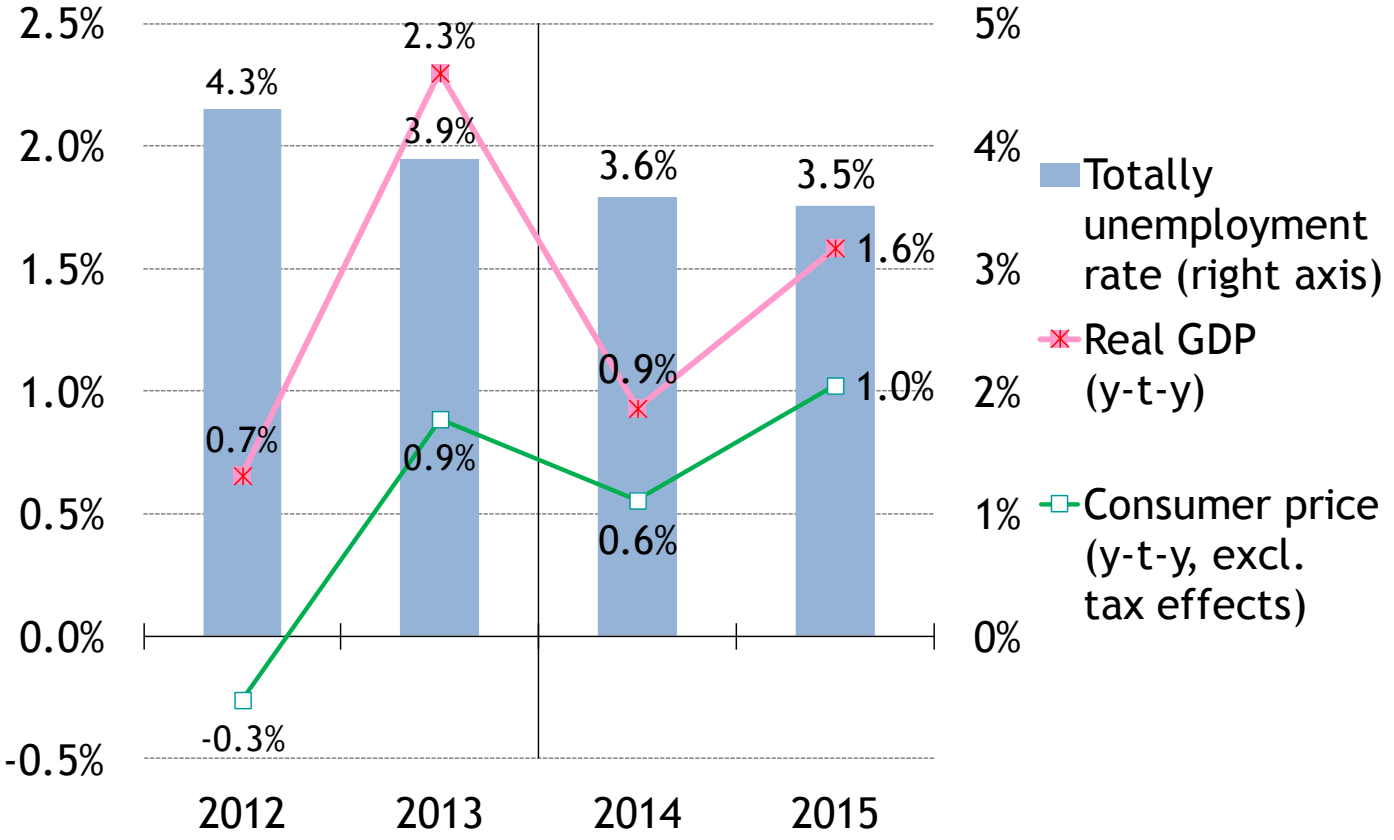
  Referring to Kobayashi, Kutani and Sagawa "Outlook on the International Oil, Natural Gas and Coal Situation," etc.

  May 2014 → FY2014→ FY2015
  - Oil: $109/bbl → 110 → 108
  - LNG: $850/t → 821 → 776
  - Steam coal: $99/t → 101 → 110
- **Taxes**
  - Consumption tax (VAT): Raised to 10% in October 2015 from 8%
- **Exchange rate**
  - JPY102/$ on average throughout the second half of 2014 and later
- **Nuclear power generation**
  - The first plants restart in early autumn. The second group restarts in early 2015, followed by other plants with two to six months of interval.
  - Seven plants restart by the end of FY2014 generating 14 TWh of electricity.
  - 19 plants generate 124 TWh of electricity in FY2015.
- **Electricity supply and demand**
  - Tighter than in the last summer
  - Each electric utility will secure a reserve capacity of at least 3% by saving and interchange of electricity (based on a government's report).
- **Climate conditions**
  - Cooler summer and chillier winter in FY2014 than the previous year.
  - FY2015 is almost similar with FY2014.

Japanese economy will recover gradually

- The economy grows by 0.9% in FY2014 with strong investments and exports despite of the rise in tax.
- The growth in FY2015 surpasses potential growth rate with recover of private consumption supported by better employment situation.

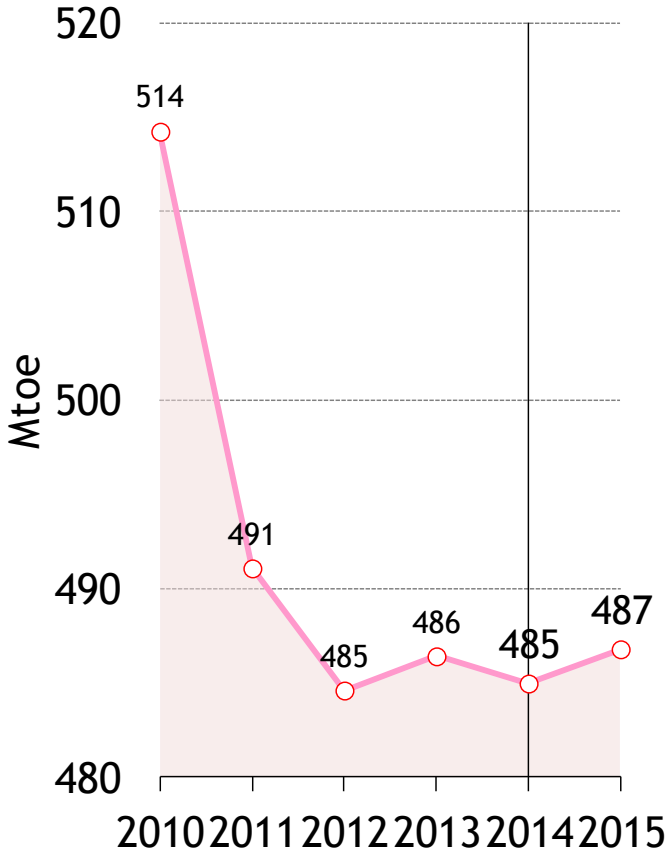
Real GDP, prices and employments



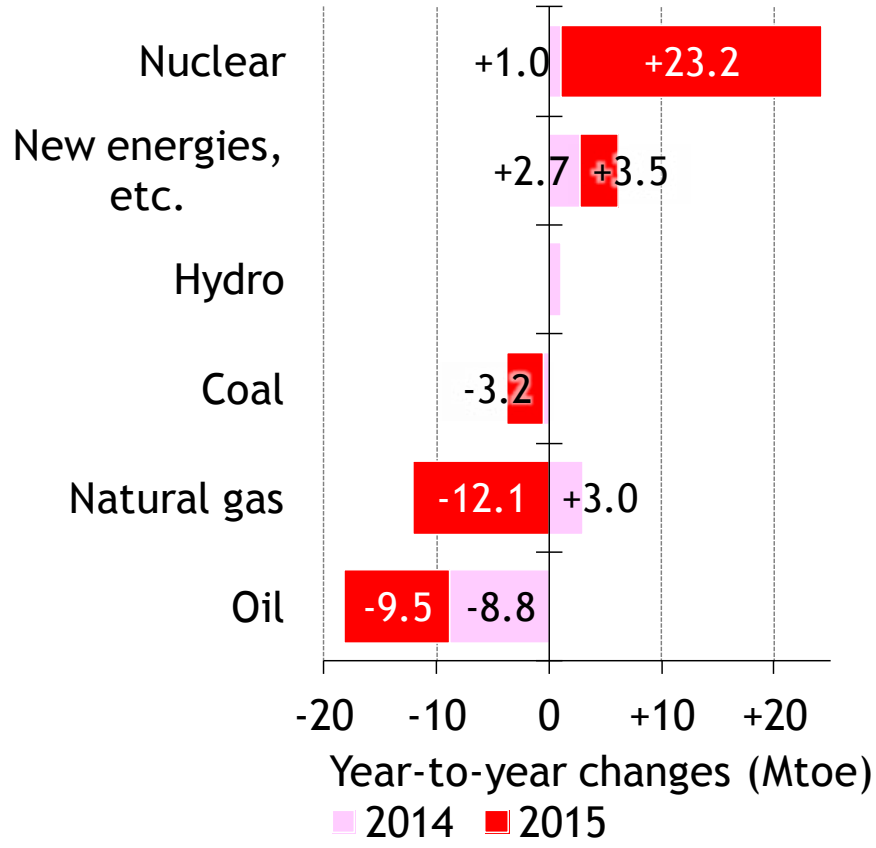
Energy saving offsets energy demand increases caused by economic growth

- TPES decreases slightly before levelling off substantially in FY2015.
- Oil dips below 200 Mtoe for the first time in 46 years, lowering oil dependency to 40%. Natural gas hits a new high in FY2014 followed by rapid decrease by 10% in the next year.

Primary energy supply



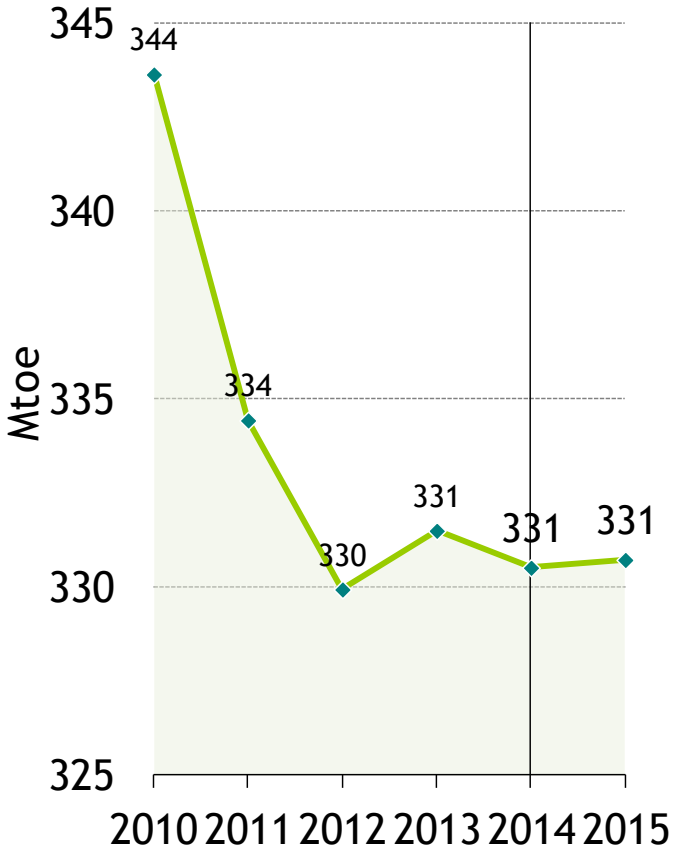
Primary energy supply by energy source



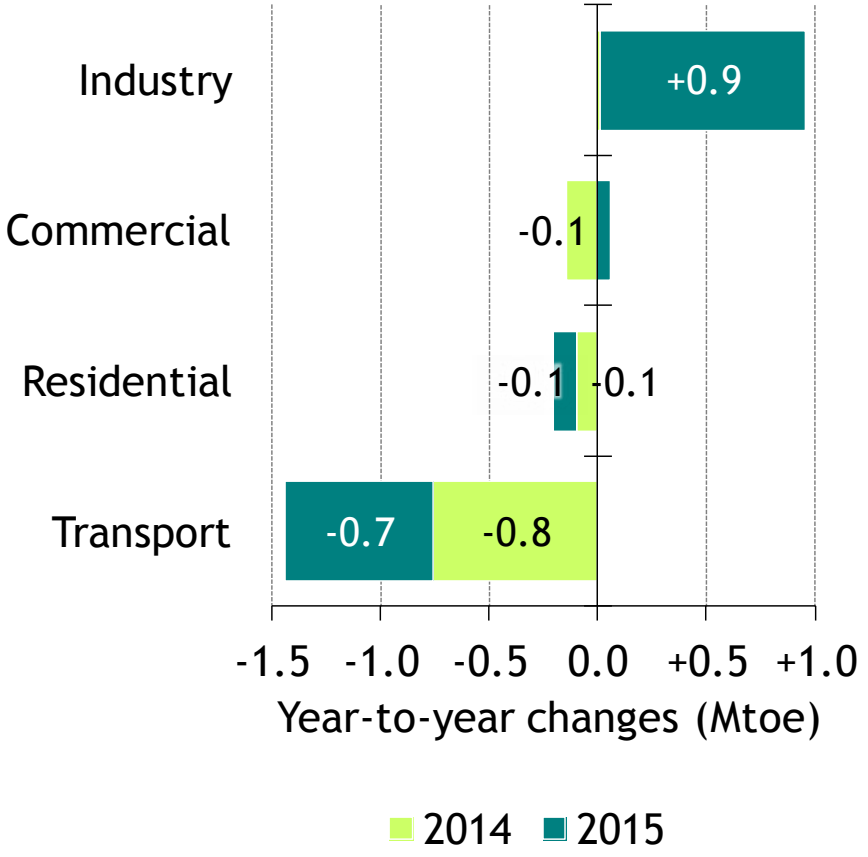
Final energy consumption neither increases nor decreases in total, but...

- TFEC stays in around 331 Mtoe for three years in a row. It is less than before the earthquake in FY2010 by 4%.
- Whilst industry records a new high after the earthquake, energy conservation in transport continues. Buildings will cease to fall.

Final energy consumption



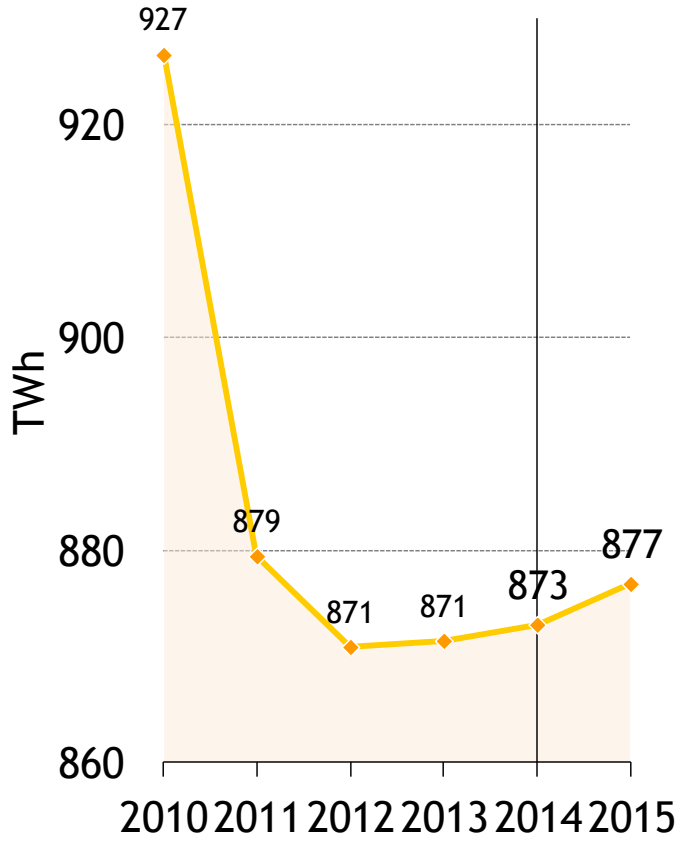
Final energy consumption by sector



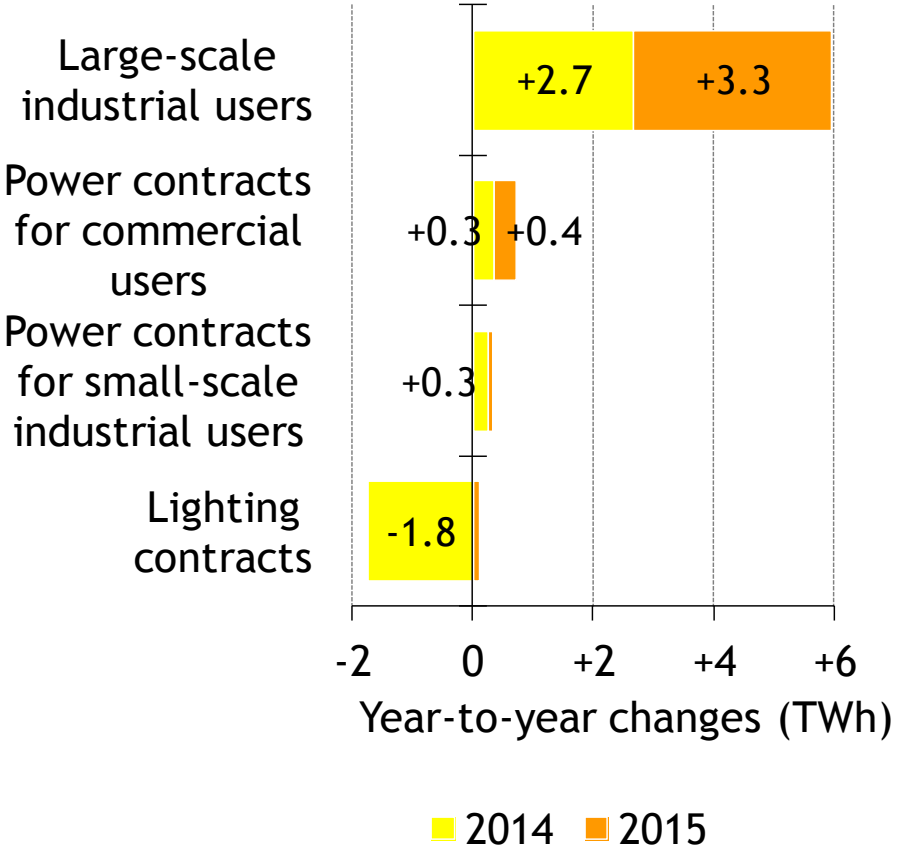
Increases in electricity sales become distinct

- The sales increases for three years in a row although they are less than before the earthquake by 5-6% due to electricity saving.
- "Power," mainly for industry, hits a new high after the earthquake. "Lighting," mainly for household, turns to increase in 3Q2015.

Electricity sales



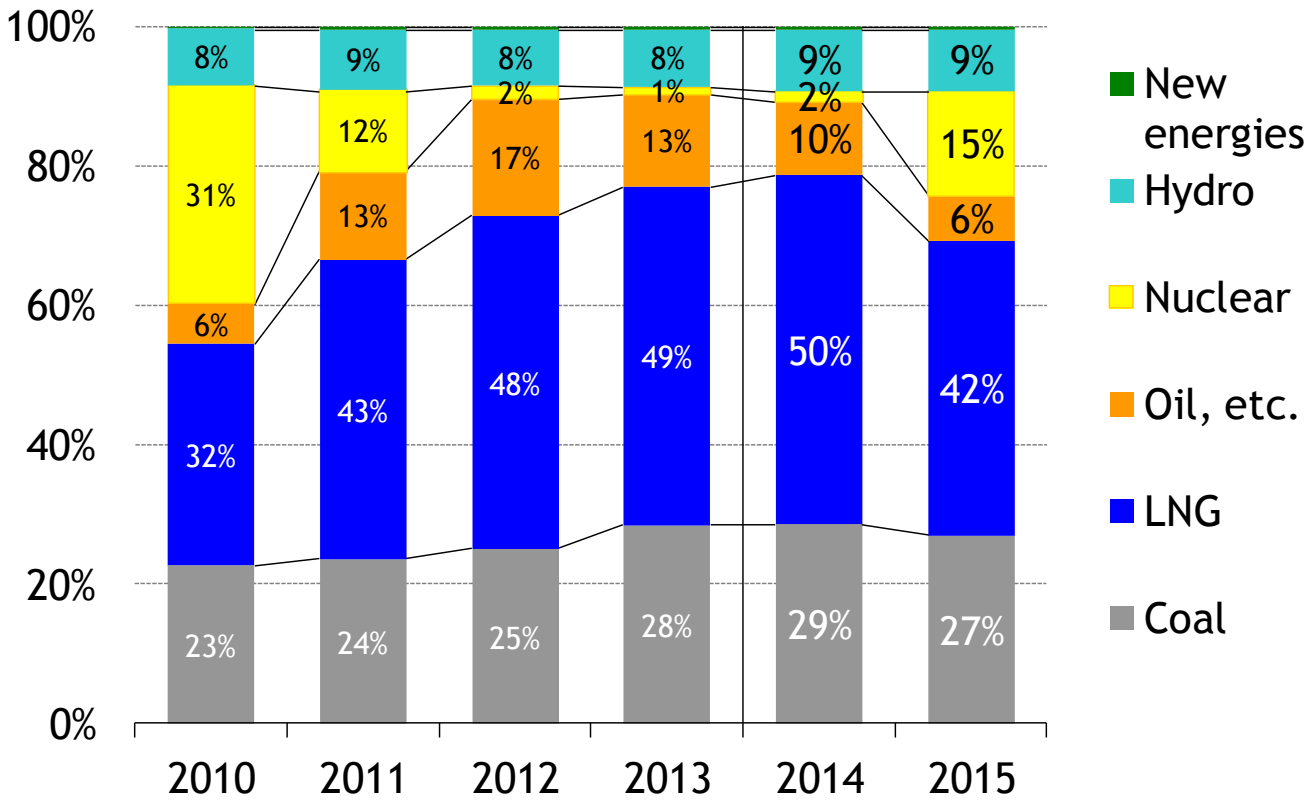
Electricity sales by use



LNG-fired power generation accounts for 50% in FY2014

- Share of coal-fired generation also increases to 29%. Thermal power generation in total, however, is slightly below than the peak in FY2013.
- LNG generates 20% more electricity in FY2015 than before the earthquake although share of thermal power generation shrinks to 76%.

Power generation mix for utilities

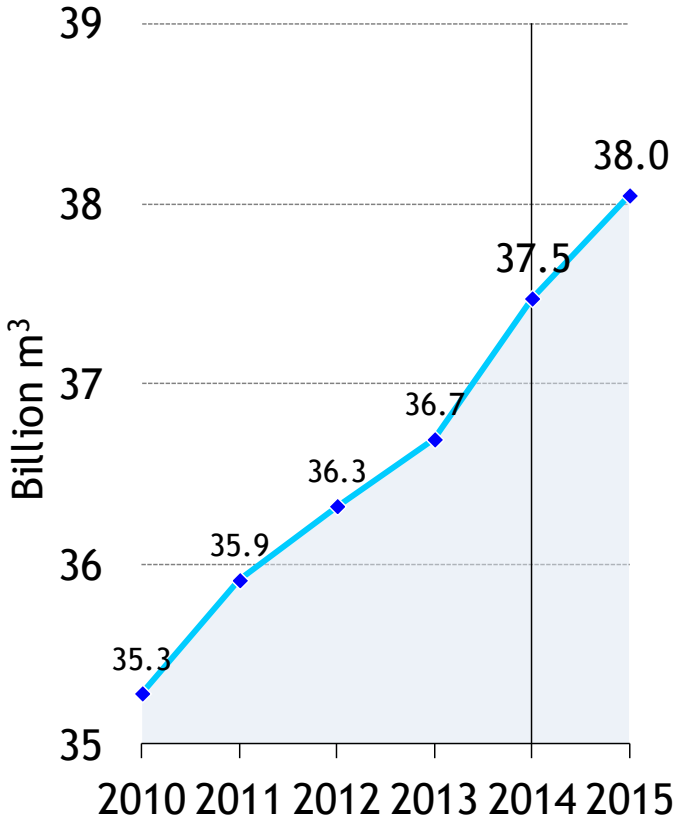


Note: Electricity purchased is not included.

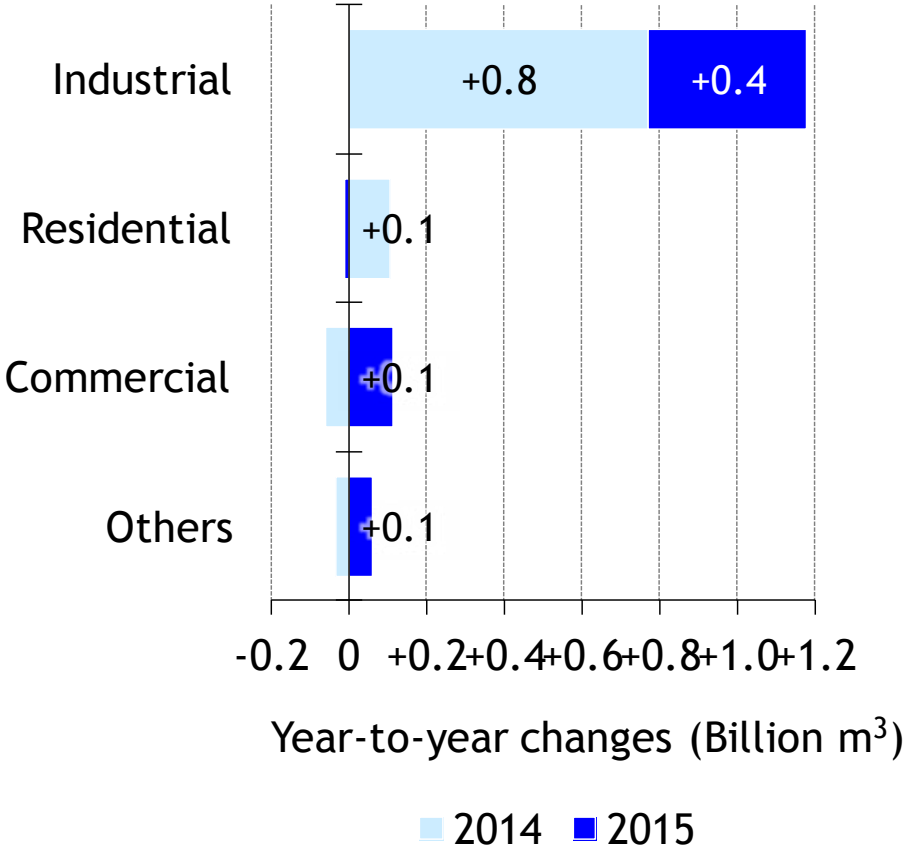
City gas sales rewrite the record high for the fifth straight year

- Sales for industrial uses increase for the sixth straight year of growth, topping 20 billion m^3. The industrial share of city gas reaches 55%.
- Whilst other uses hits the highest except for just before the earthquake, residential keeps a long downward trend in principle.

City gas sales



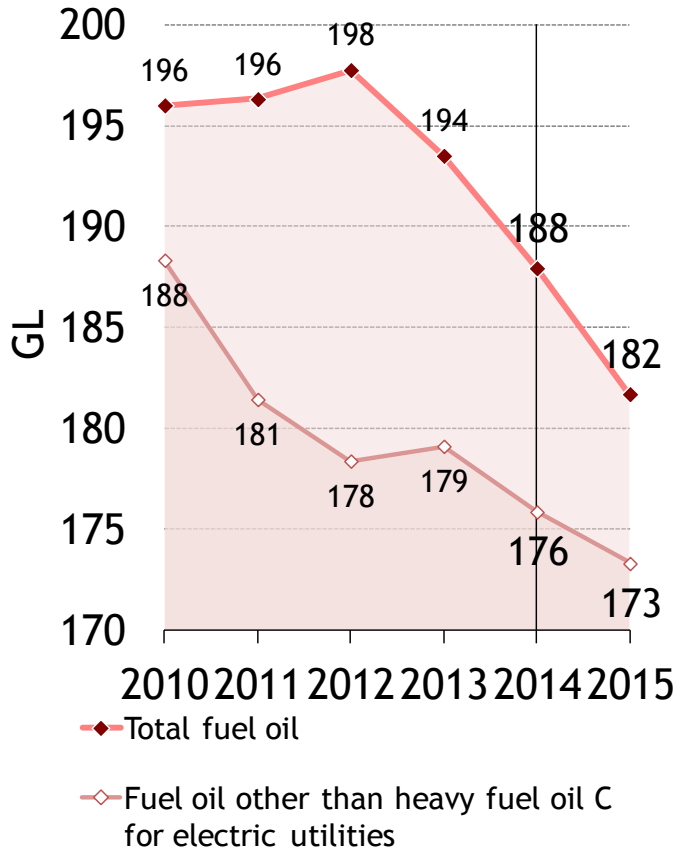
City gas sales by use



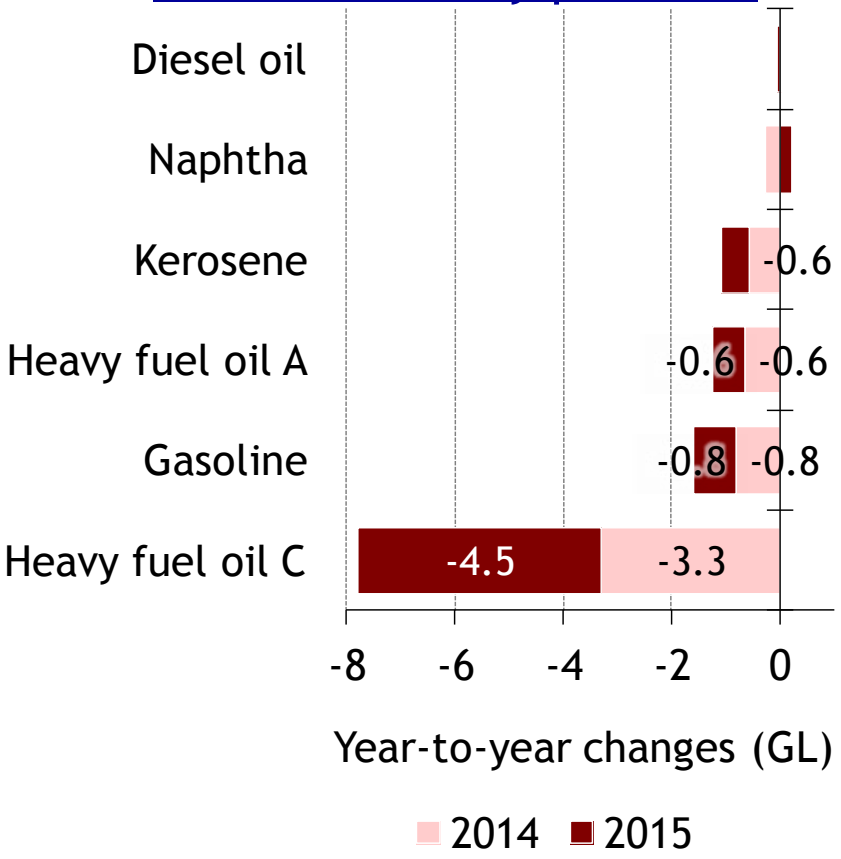
Fuel oil sales decrease by 6 GL a year

- Whilst naphtha and diesel oil sales show relatively firm, heavy fuel oil C for power generation diminishes.
- Gasoline drops to 53 GL, which is the lowest level since FY1996. The total sales may fall below 180 GL for the first time in a half of century by FY2016.

Fuel oil sales



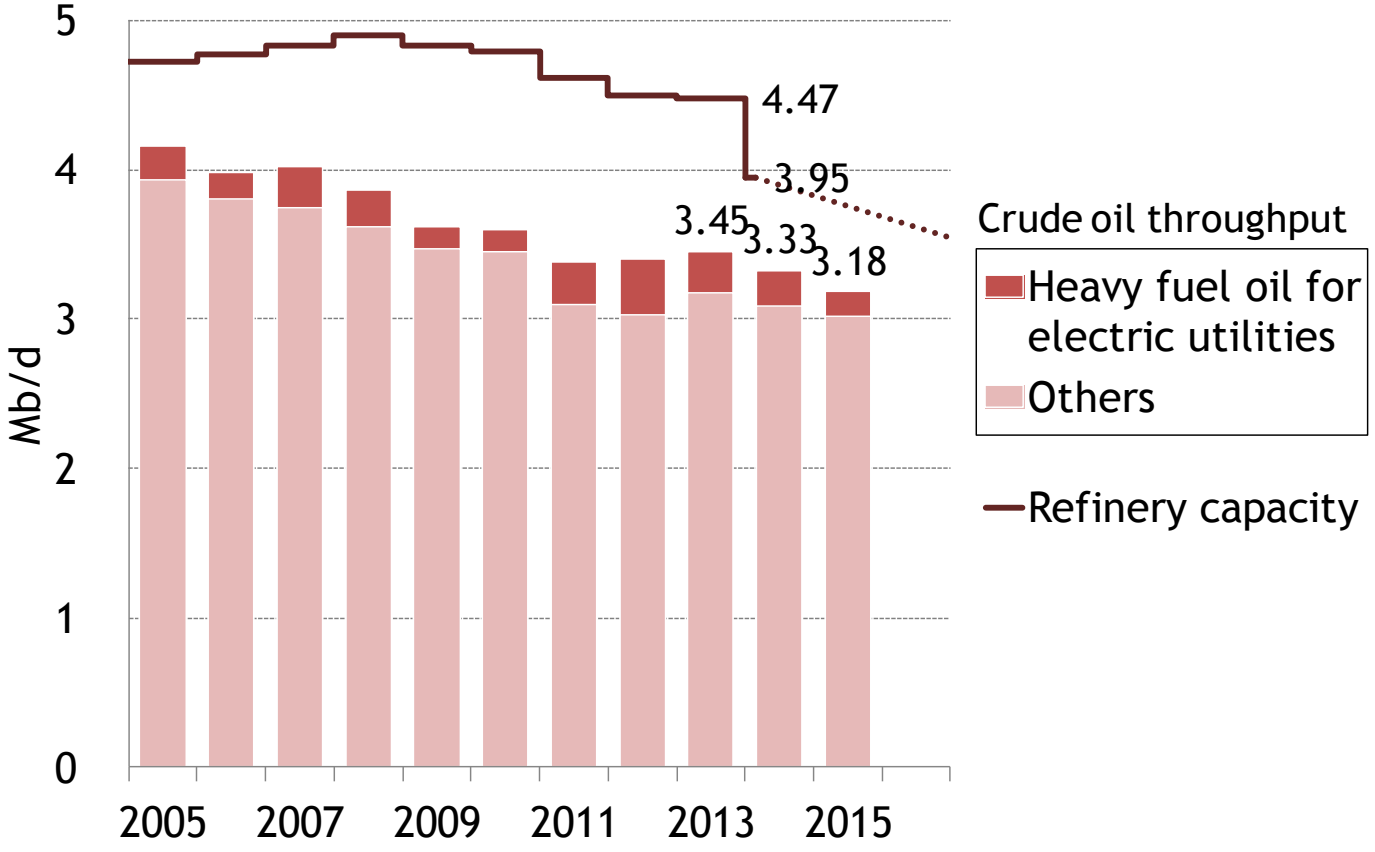
Fuel oil sales by products



Business plan, which may include regrouping refineries, will be submitted by October

- The current petroleum market is tightened due to capacity reduction to meet the law “Sophisticated Methods of Energy Supply Structures.”
- Additional capacity reduction by 400 kb/d may be needed to meet the new standard (draft) depending on measures.

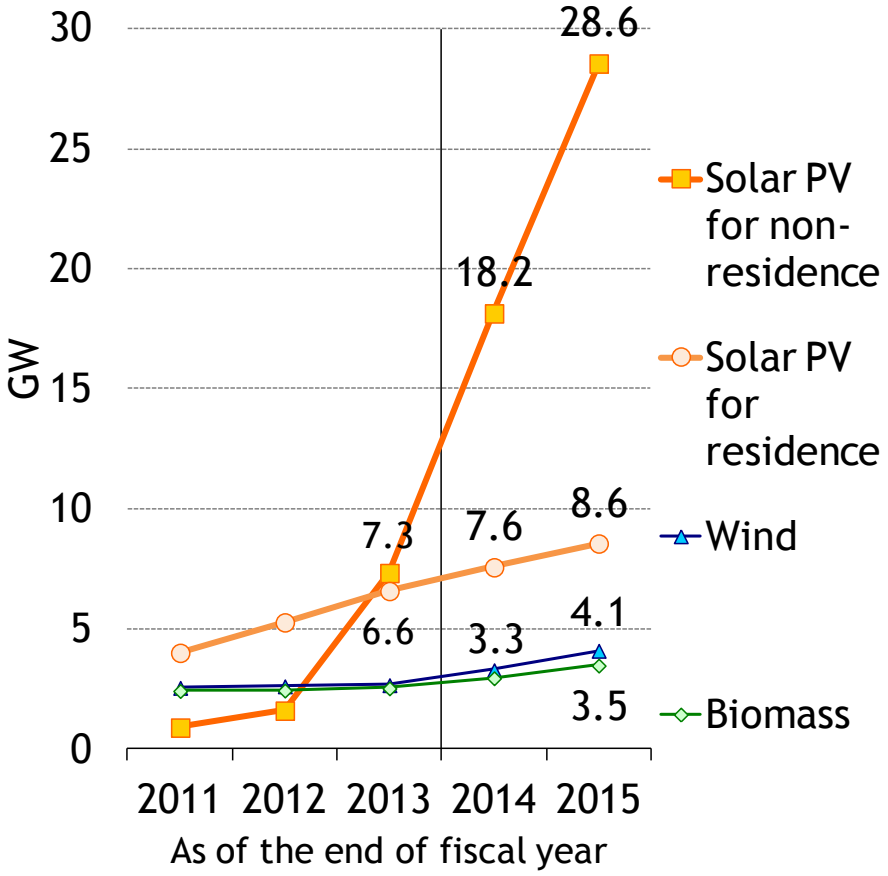
Crude oil throughput and refinery capacity



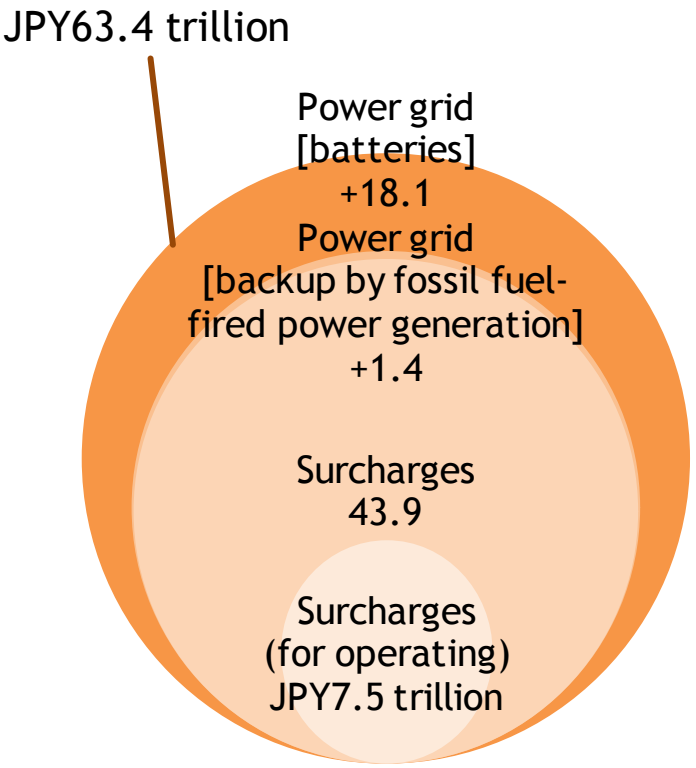
Both introduction of renewables and their burdens on consumers increase dramatically

- Installed capacity of renewable power generation increases to 54.9 GW, or 16% of total capacity, by the end of FY2015 generating 10% of power.
- Cumulative burdens related to FIT amount JPY63 trillion over 20 years for 89 GW of authorised capacity, which correspond to JPY3,600/MWh.

Installed capacity of renewables



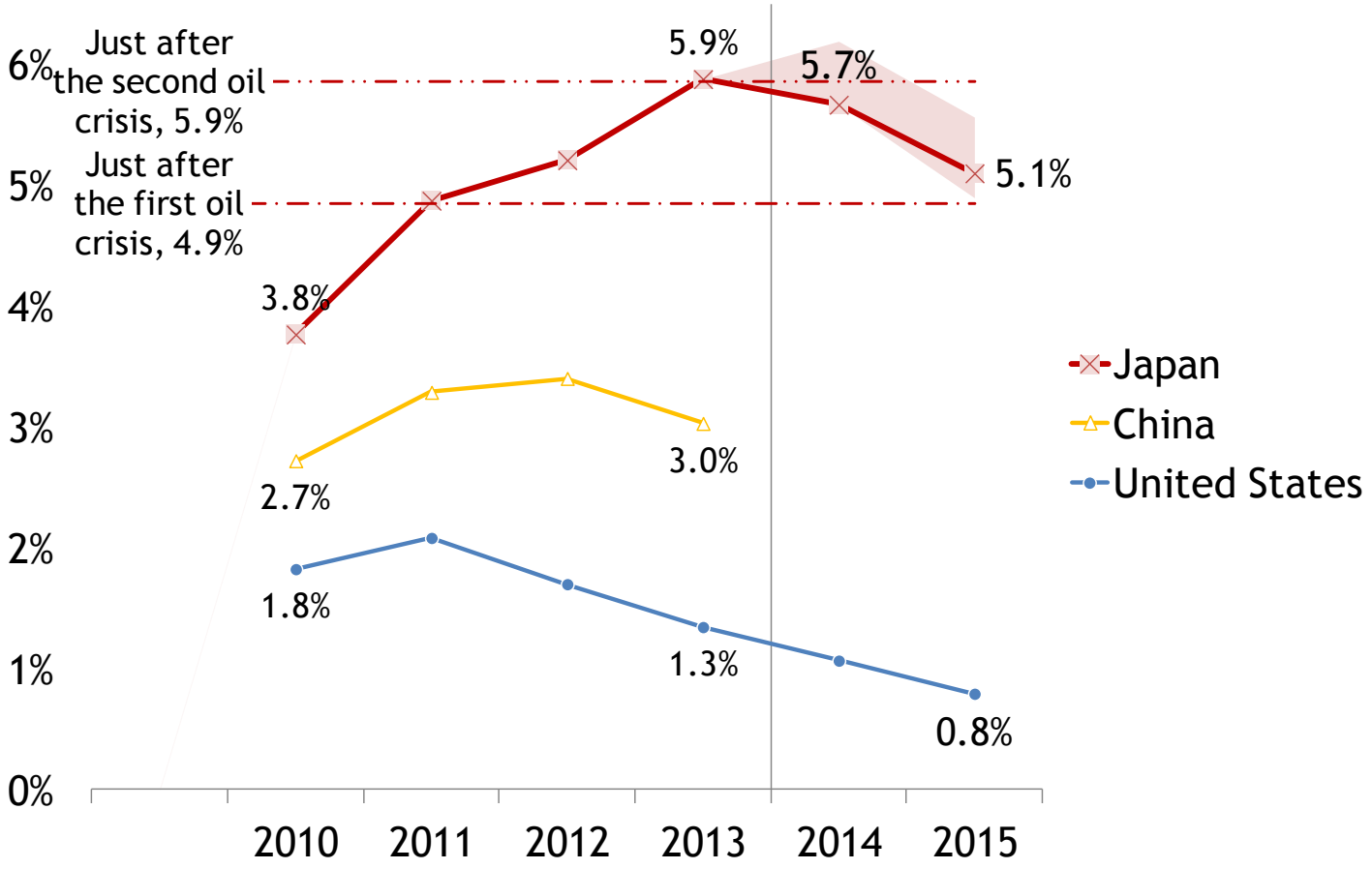
Cumulative burdens by FIT (for authorised as of March 2014)



A risk for the recovering Japan: Expanding gaps of energy costs

- Massive use and high prices of fossil fuels result in heavy burden of import spending, which is comparable with just after the oil crises.
- Although the burden reduces slightly in FY2015, the situation may not be improved significantly depending conditions.

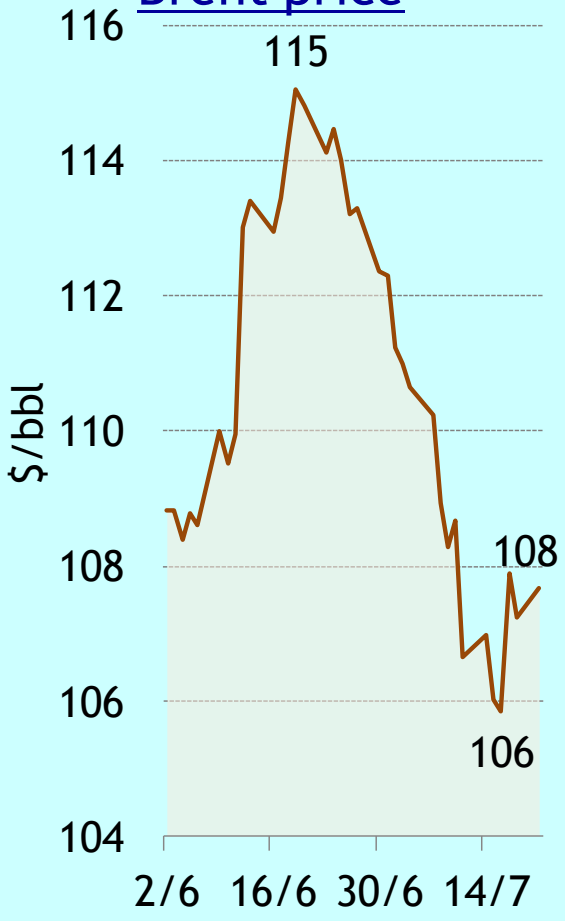
Ratio of net import spending of fossil fuels against nominal GDP



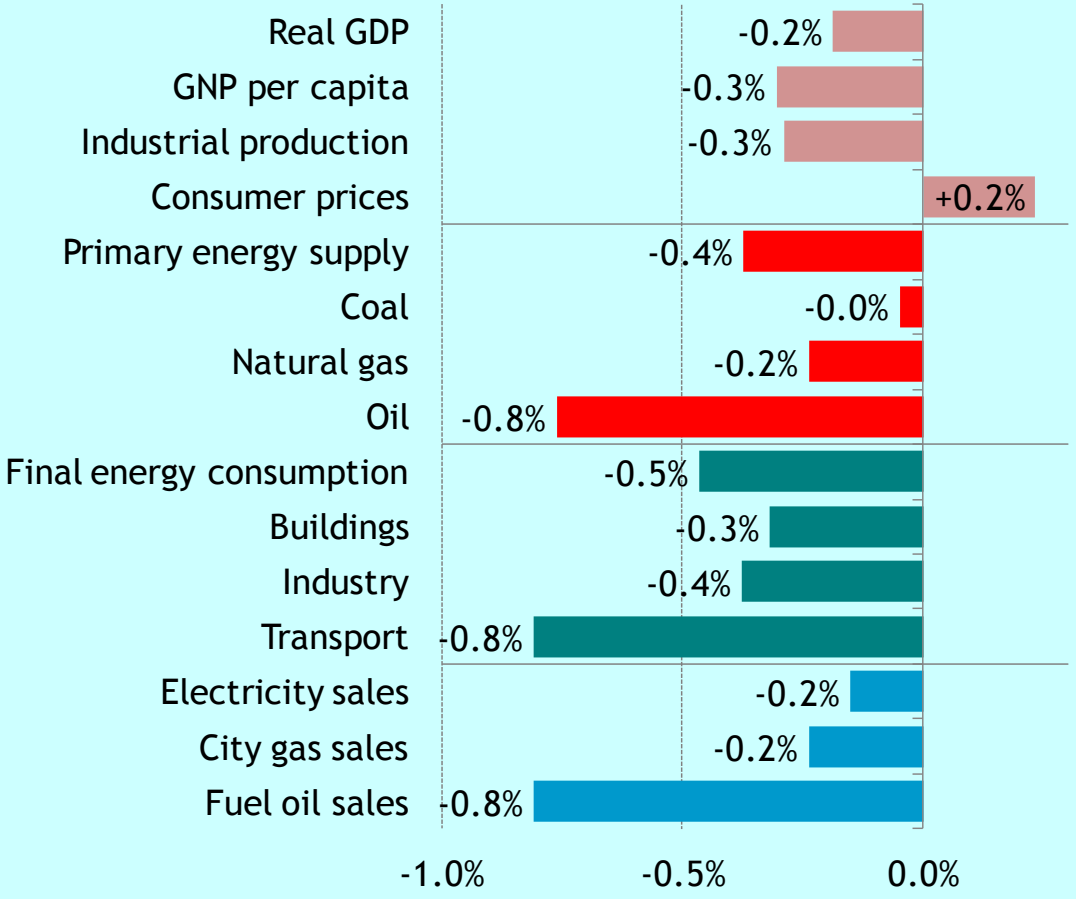
Japan – a vulnerable country against rises in international energy prices

- Real GDP and gross national income reduce by 0.2% and 0.3%, respectively due to price rises of oil by $10/bbl and of LNG by $50/t.
- The impacts reach also non-energy intensive industry and household.

Brent price



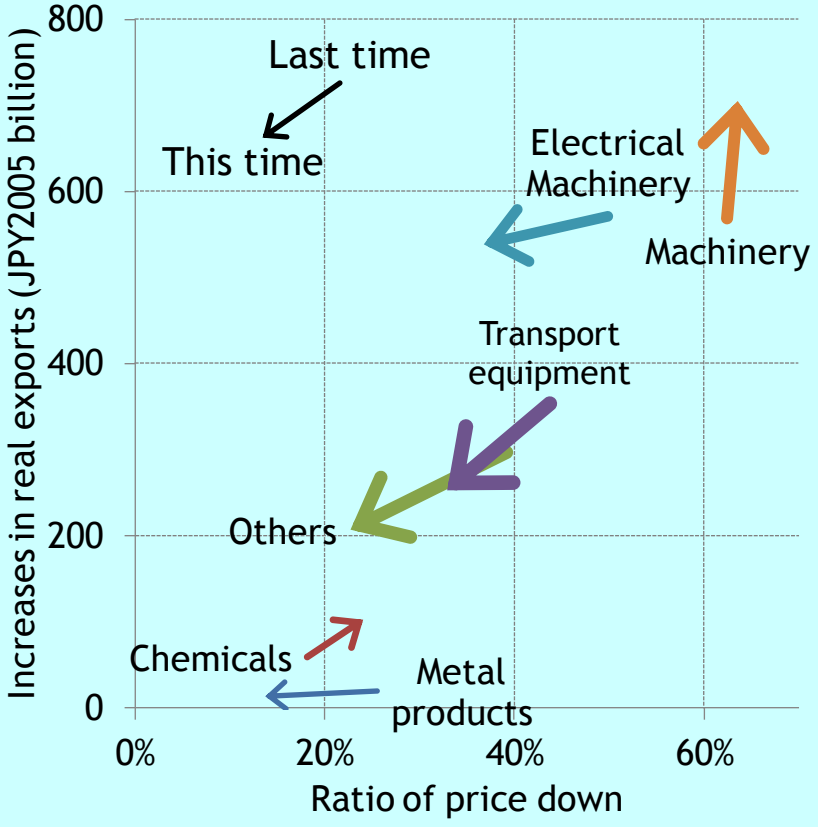
Impacts by rises in oil and LNG prices



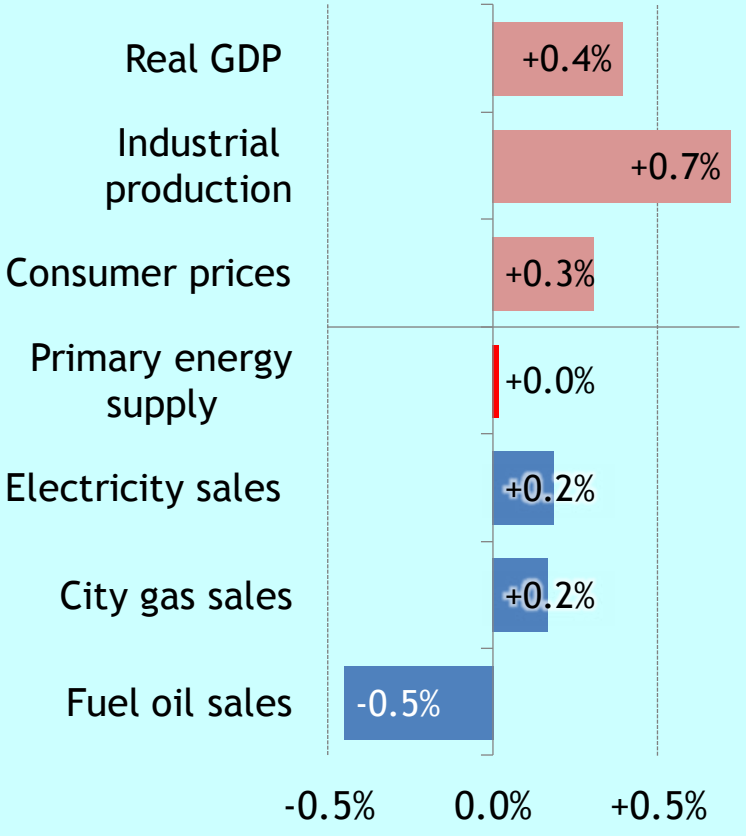
Depreciation of the yen is a centaur: it stimulates economy and raises prices

- Depreciation of the yen by JPY10/$ expands Japanese economy by 0.4% although the effect is obscure compared with the past.
- Effects by economic expansion and by price rises offset each other, resulting in almost no changes in energy consumption in total.

Impacts on exports by depreciation of the yen by JPY10/$



Impacts by depreciation of the yen by JPY10/$ (FY2015)



To cope with rigorousness and rapidness in nuclear power plant assessment brings huge merit

- Fossil fuel import spending decreases by JPY1.4 trillion if nuclear power generation increases by 120 TWh. Real GDP and gross national income increase by 0.14% and 0.23%, respectively.
- Power generation cost decreases by JPY1,600/MWh, reducing the risk of further electricity price hike.

Impacts of nuclear power plants' restart