Xymax Real Estate Institute
RESEARCH REPORT

Energy Consumption and Energy Cost in Office Buildings (September 2016)

The consumption remained flat. The cost and the price per unit continued to decrease.

December 2, 2016

Xymax Real Estate Institute has been studying the energy consumption and energy cost of office buildings in the Greater Tokyo area on a continuous basis. The report, which covers the results for the period between January 2010 and June 2016, was released in September this year. The latest report, which covers the results for the period ending September 2016, is available now.

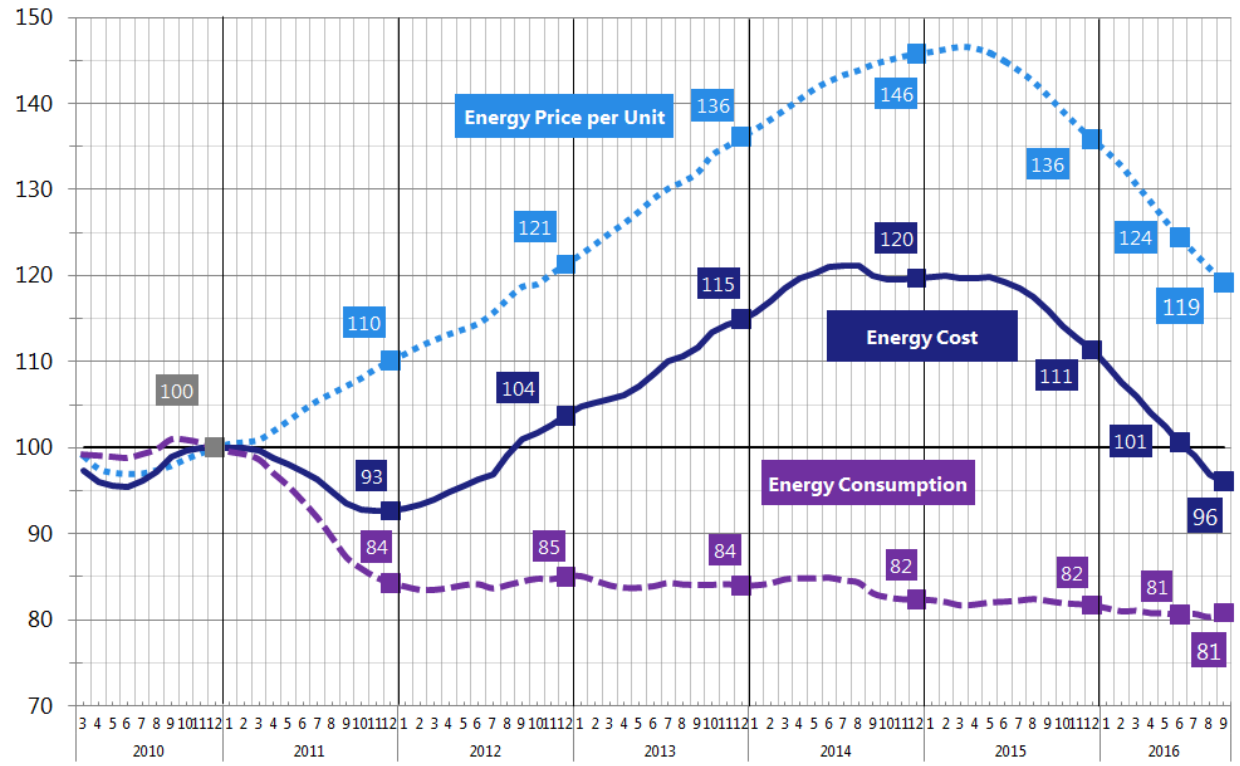
Findings from Research

- ■ Energy Consumption
  Remained roughly unchanged from the previous quarter (June 2016).
- ■ Energy Price per Unit
  5 points down from previous quarter (June 2016). Started to fall in March 2015.
- ■ Energy Cost
  5 points down from previous quarter (June 2016). Decreased in line with the falling consumption and price.

1. Office Building Energy Consumption & Cost – 12-Month Average

Figure 1 shows the 12-month moving average of the energy consumption, price per unit and cost. The energy price per unit (dotted line) kept falling since March 2015. The energy consumption (dashed line) nearly unchanged quarter-on-quarter. The energy cost (solid line) decreased below the level before the earthquake in 2011, reflecting the sharp decrease in the price per unit.

Figure 1: 12-Month Average Energy Consumption / Price per Unit / Cost



2. Energy Consumption, Price per Unit & Cost – Quarterly Average

Figure 2 shows changes in energy consumption volume. The July-September 2016 quarter was a year-on-year decrease of 1.7 MJ/sqm. Although the volume had slight ups and downs since 2011, it remained roughly flat.

Figure 2: Energy Consumption (MJ/sqm/month)

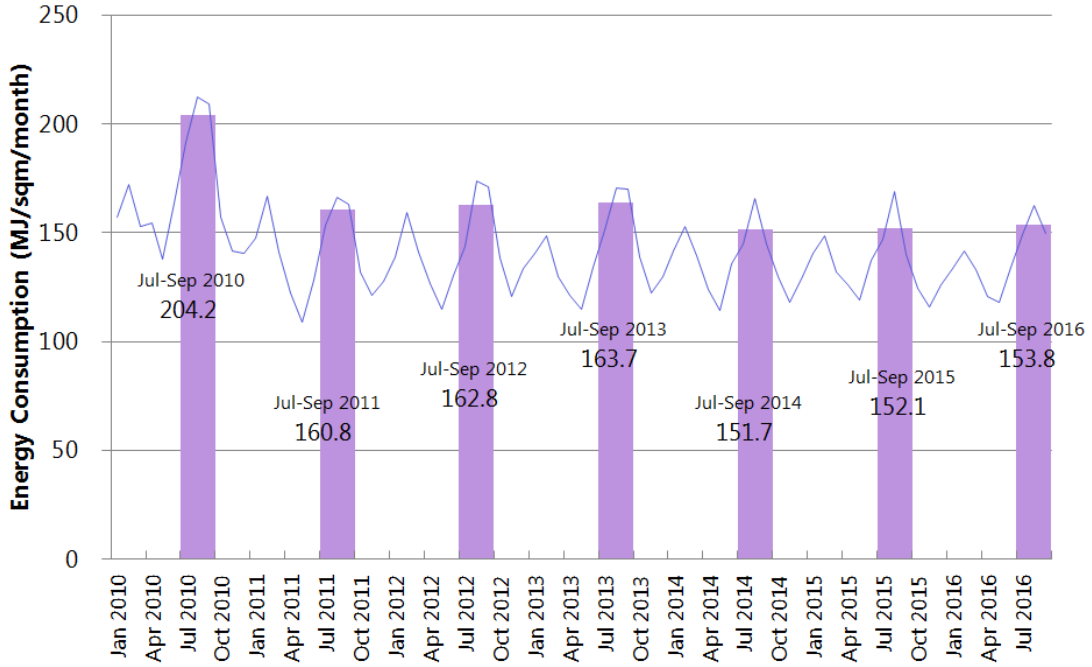


Figure 3 shows changes in energy price per unit. The July-September 2016 quarter was a year-on-year decrease of 0.35 yen/MJ. This is considered largely due to the continued decrease in the fuel adjustment charges since April 2015.

Figure 3: Energy Price per Unit (yen/MJ)

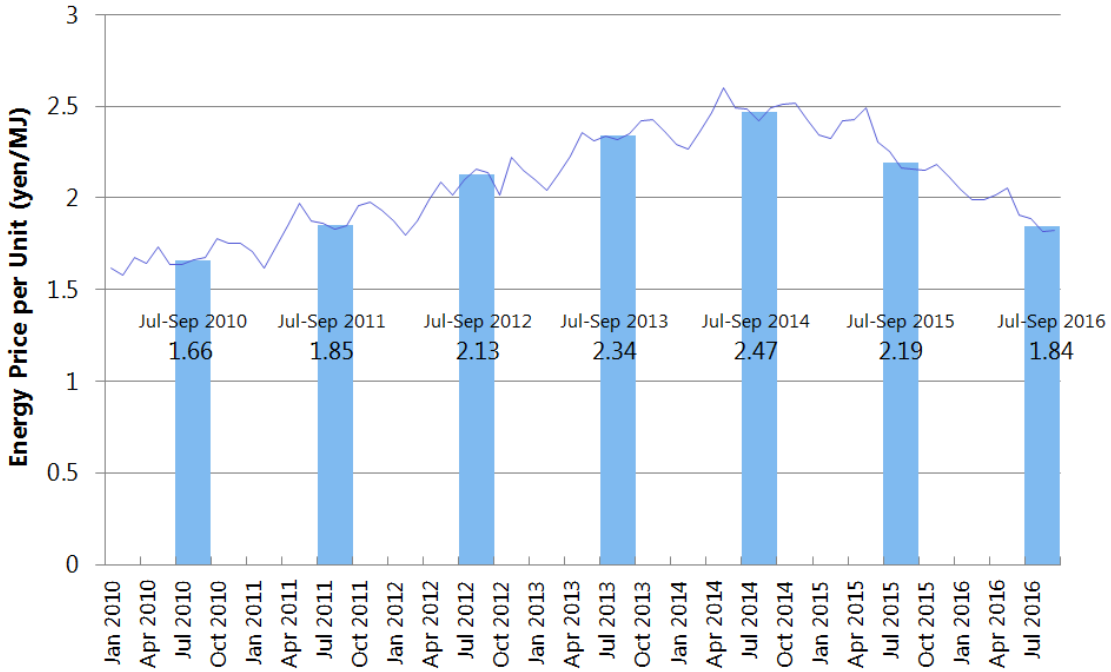
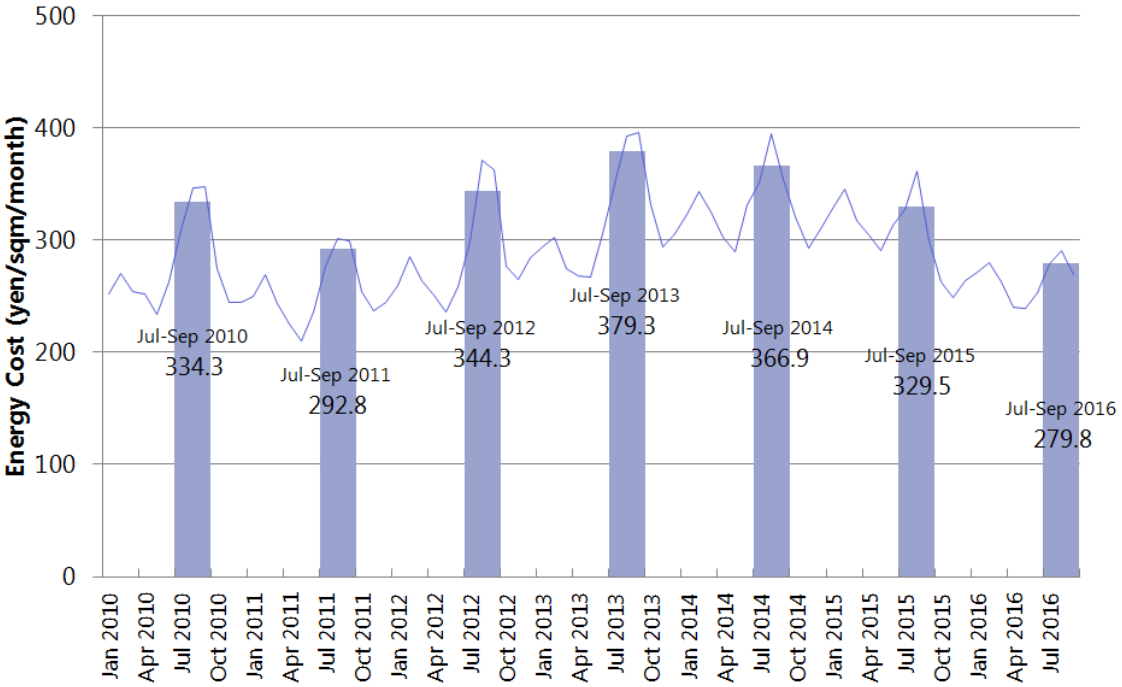


Figure 4 shows changes in energy cost. The July-September 2016 quarter was a year-on-year decrease of 49.7 yen/sqm/month. The cost fell sharply year-on-year by 15% largely due to the decrease in the energy price per unit.

Figure 4: Energy Cost (yen/sqm/month)



Research Overview

Period	April 2009 – September 2016 (90 months)
Subject Data	Of typical tenant-occupied office buildings in Greater Tokyo managed by Xymax Group, we obtained valid data from approx. 100 buildings.
How to Calculate	**A. Monthly energy consumption, price per unit and cost** 1) Gather the amount of consumption of and cost paid (excl. tax) for the electricity, gas, heat and oil in each building. 2) Convert the amounts of consumption in 1 to mega joule (MJ) (amount of primary energy) based on the following coefficients, and add all the results. Electricity: 9.76 MJ/kWh | City Gas: 45 MJ/m3 | Cool/hot water, steam: 1.36 MJ/MJ Open Steam: 2.68 MJ/kg | Bunker A: 39.1 MJ/L 3) Energy Consumption (MJ/sqm/month) → Divide the total consumption calculated in 2 by the gross floor area (excluding vacant space). Energy Price per Unit (Japanese yen/MJ) → Divide the total cost calculated in 1 by the total consumption calculated in 2. Energy Cost (Japanese yen/sqm/month) → Divide the total cost calculated in 1 by the gross floor area (excluding vacant space) 4) Calculate the average of the three estimates in the preceding step. **B. 12-month moving average** 1) The figures for each month are the average consumption, price per unit and cost estimated in A for the past 12 months. 2) Indexed based on December 2010 = 100
Notes	• "Month" in this study is based on the date of the meter reading, which differs by building and by the energy supplier. • To represent the continuity and accuracy of the data, the gross floor area excluding the vacant space is applied in this study.

• For the previous report, please refer to Energy Consumption and Energy Cost in Office Building (June 2016) released on September 7, 2016.

• We reviewed the data and corrected some numbers in the previous release.

For questions on this report, please contact us.

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