

BUILDING
ENERGY EFFICIENCY



Encouraging Demand-Side Energy Efficiency through the Eco-Point Program

JAPAN

IN JAPAN, LEDS LIGHT THE WAY TO EFFICIENCY GOALS

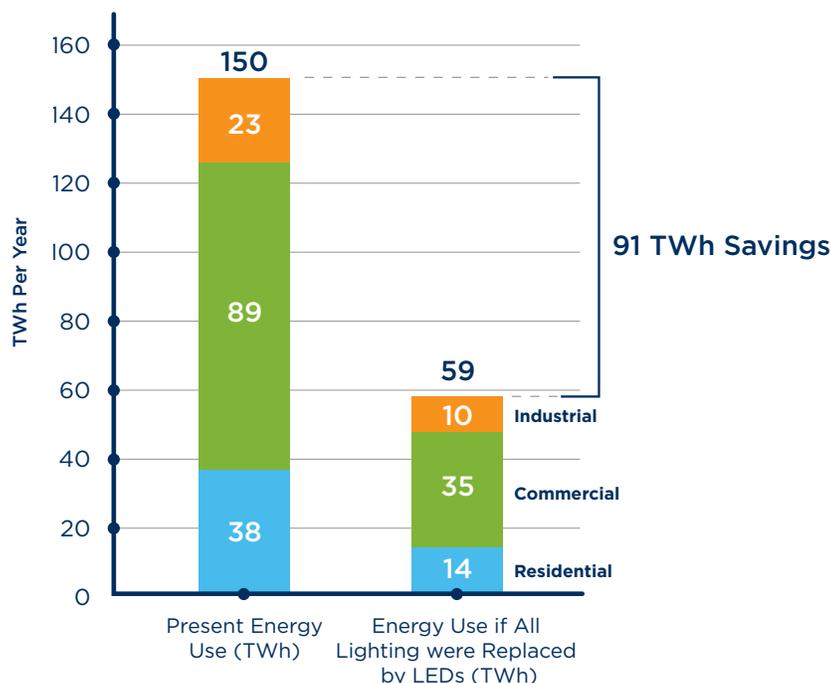


Eco-Point consumer rebate program encourages adoption of energy efficient lighting.

In Japan, lighting offers significant potential for energy efficiency improvements. Recent technological advances have made it possible for light-emitting diode (LED) lamps to replace traditional incandescent and fluorescent lamps as a source of lighting. New LED lamps are roughly eight times more efficient and have lifespans up to ten times longer than their incandescent counterparts.

Lighting accounts for 16 percent of total annual electricity consumption (150.6 terawatt hours) in Japan. According to Japan's Institute for Energy Economics, if all existing incandescent and fluorescent lamps in Japan were switched to LEDs, over 90 terawatt hours of electricity could be saved annually. This figure would represent 61 percent of Japan's annual lighting electricity consumption and 9 percent of Japan's total electricity consumption.¹ A simulation run by the Japan Electric Lamp Manufacturers Association found that the effect of this transition would be a reduction of 27 million tons carbon dioxide per year.

Figure 1: Electricity Saving Potential of LED Lamps



Source: Suehiro and Shibata.

The transition to LED lamps has been slow. Barriers include upfront costs that are higher than incumbent lighting technologies. Although switching to LED lamps is cost-effective in the long run due to lower electricity costs, the payback time can vary from 1.4 years to 18.5 years depending on the type of fixture—an incandescent light or fluorescent—being replaced. In addition, LED bulbs can cost 25 times more than incandescent bulbs. The upfront cost of replacing all lights in Japan with LEDs is estimated at USD 197 billion.² However, replacing only the 340 million incandescent lamps would cost around USD 10 billion, and result in energy savings of 27.3 terrawatt hours per year with a payback period under two years. In this case, the cost effectiveness of the electricity savings would be about USD 0.016 per kilowatt hour (based on a 40,000-hour lifetime).

POINT SYSTEM REBATES

To overcome barriers to LED deployment, the government of Japan augmented a popular consumer rebate program, known as the “Eco-Point” program, to promote the use of LED lighting. Eco-Point originally launched in April 2009 to encourage consumers to buy energy-efficient air conditioners, refrigerators, and digital televisions. The program was scheduled to run through March 2011 with a total budget of approximately USD 8.7 billion. The original goals of the program were to promote actions to address global warming, stimulate the economy, and popularize digital television broadcasting across Japan.

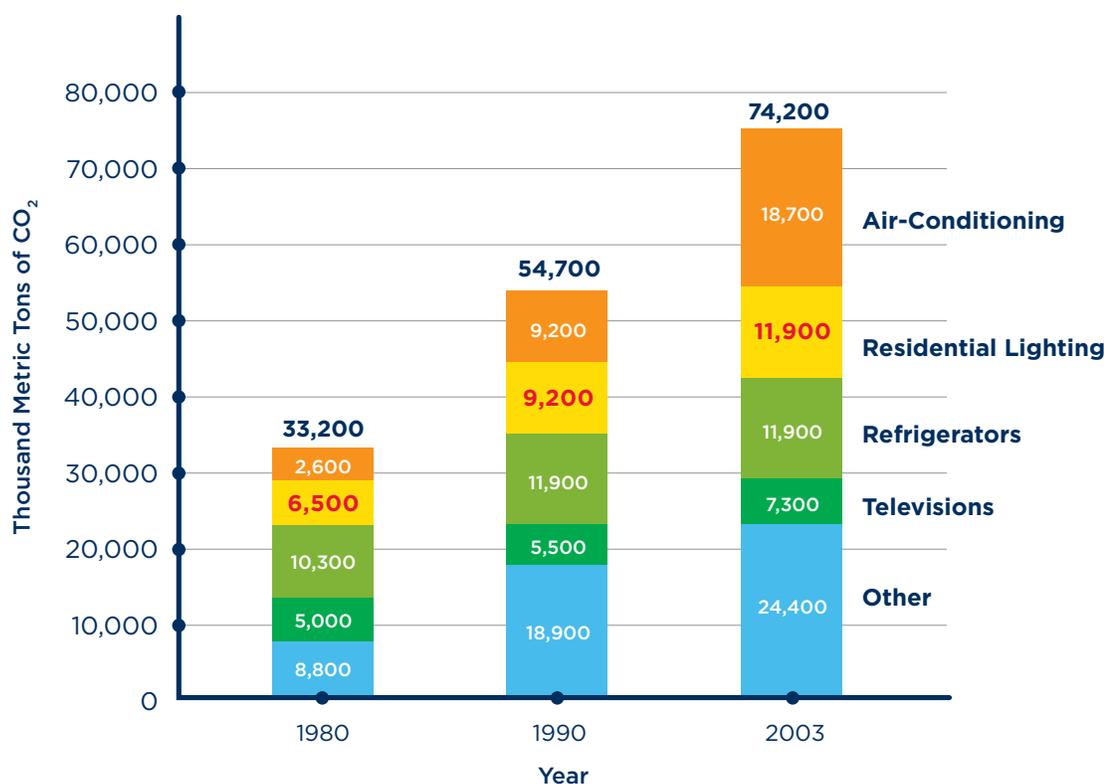
Purchasers of approved home appliances could apply for Eco-Points worth 5 to 10 percent of the product’s value; each Eco-Point was worth JPY 1 (approximately USD 0.0125). Consumers could then exchange their Eco-Points for a variety of items sponsored by the government (gift certificates, prepaid cards, regional specialties, and energy-efficient or environment-friendly products) or donate them to any of 181 environmental organizations. LED lamps were introduced to the program in December 2009, and beginning in April 2010 consumers could use Eco-Points to buy LED lamps at a 2 to 1 Eco-point ratio. For example, an LED lamp which cost JPY 4,000 would only require 2,000 Eco-Points. This policy generated widespread interest among consumers, with 450,000 applications submitted by 2011 to obtain LED lamps in exchange for Eco-Points worth approximately USD 46 million.³

Eco-Point was part of a larger effort in Japan to improve energy efficiency and meet its goal of reducing carbon emissions by 25 percent by 2020 and by 80 percent by 2050, compared to 1990 levels. Its strategy rests on four main pillars: (1) provide incentives to individuals and the private sector to encourage carbon dioxide reduction efforts; (2) calculate and report emissions; (3) provide policy support to accelerate dissemination of existing low carbon technology; and (4) support research and development for low carbon infrastructure, and human capacity development.⁴ In addition, the March 2011 Japan earthquake and subsequent Fukushima nuclear power crisis spurred an unprecedented transformation of the country’s entire energy policy and greater support for energy efficiency measures.

LIGHTING THE WAY

Japan’s Ministry of Trade, Economy, and Industry estimated that the Eco-Point program would result in carbon dioxide emission reductions of approximately 2.7 million metric tons per year due to the diffusion of green refrigerators, air conditioning systems, and digital televisions. By June 2011, 45 million applications for Eco-Points had been accepted, totaling about USD 8 billion in Eco-Points.⁵

Figure 2: Breakdown of CO₂ Emissions from Residential Sector in Japan



Source: Fukada.

The Eco-Point program also had a strong affect on the LED lighting market by addressing major barriers to deployment:

- **High initial costs.** LED lighting is more expensive than conventional lighting technology. By reducing upfront expenses through this rebate program, Eco-Point became an attractive option for people interested in replacing their lighting but who were deterred by the upfront costs of LEDs.
- **Limited investment.** Manufacturers are unlikely to invest in research and development without a reasonable prospect of return on their investments. By increasing the demand for LED lamps, Eco-Point encouraged investment, competition, and innovation among LED manufacturers.
- **Inconvenience to consumers.** The inconvenience and incidental costs of switching from one lighting technology to another may deter consumers from switching. With a heightened demand for LEDs, fostered by Eco-Point, stakeholders were encouraged to collaborate on ways to mitigate the switching costs from older technologies. One important outcome was the development of industrywide lighting fixture standards promulgated by the Japan Electric Lamp Manufacturers Association, which promoted connectors and starter systems that were compatible with LED systems.⁶
- **Lack of information.** Through its promotional efforts, Eco-Point educated consumers about the environmental and economic benefits of using LED lamps, helping to improve public awareness and driving demand for the new technology.

The Eco-Point program resulted in a shift toward LED lamps and additional cost reductions due to economies of scale effects. Reports show that from the time LEDs were included in Eco-Point to June 2010, consumer sales of LED lamps surged to 19 percent of total light-bulb sales by volume, and 60 percent by total value. At the same time, the average cost of LED lamps fell by about 25 percent.⁷

Despite encouraging new and efficient technologies, the program received criticism for promoting the consumption of additional energy-consuming home appliances. Eco-Point initially encouraged digital television purchases, which ultimately

accounted for 82 percent of all Eco-Point expenditures.⁸ By adding LED lamps to the program, the Eco-Point program played a key role in disseminating LED technology to the public and demonstrating their significant energy savings potential.

In 2012, the environment and industry ministries in Japan asked relevant companies to refrain from manufacturing and selling incandescent light bulbs. This joint request to the business sector came as power outages stemming from the 2011 earthquake meant that additional electricity savings were needed to meet summertime electric demand, and thus accelerated the introduction of LEDs in homes and offices. Previously, in 2008, the government had asked manufacturers to stop producing incandescent bulbs by 2012, and several major producers have already complied.

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Jessup, Philip. July 2011. "Japan's Eco-point Program transforms market for LED lamps." LEDs Magazine. Web. June 2012. <<http://ledsmagazine.com/features/8/7/6>>

ENDNOTES

Note: All currency conversions were made at the exchange rate on October 25, 2012 (1 USD = 80 JPY)

- ¹ Suehiro, Shigeru, and Yoshiaki Shibata. 2011. "Electricity Saving Potential and Cost & Benefit of LED Lighting in Japan." The Institute of Energy Economics Japan (IEEJ). Web. December 2012. <<http://eneken.iecee.or.jp/data/3985.pdf>>
- ² *Ibid.*
- ³ Jessup, Philip. July 2011. "Japan's Eco-point Program transforms market for LED lamps." LEDs Magazine. Web. June 2012. <<http://ledsmagazine.com/features/8/7/6>>
- ⁴ Gondor, Derek, & Fukuya Iino. 2010. "Why Japan should leapfrog its Kyoto climate target." Our world 2.0 / United Nations University, May 21, 2010. Web. July 2012. <<http://ourworld.unu.edu/en/japan-should-jump-over-its-kyoto-climate-target/>>
- ⁵ Ministry of Economy, Trade and Industry, Japan. June 2011. "Implementation Status of the Program to Promote the Spread of Green Home Appliances by Utilizing Eco-Points." Web. June 2012. <http://www.meti.go.jp/english/press/2011/0614_01.html>

⁶ Suehiro, Shigeru, and Yoshiaki Shibata, 2011, *op cit.*

⁷ Jessup, 2011, *op cit.*

⁸ Jessup, 2011, *op cit.*

Figure References

Figure 1: Electricity Saving Potential of LED Lamps

Suehiro, Shigeru, and Yoshiaki Shibata. 2011. "Electricity Saving Potential and Cost & Benefit of LED Lighting in Japan." The Institute of Energy Economics Japan (IEEJ). Web. December 2012. <<http://eneken.iecee.or.jp/data/3985.pdf>>

Figure 2: Breakdown of CO₂ emissions from residential sector in Japan

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