October 5, 2009

2009 International Conference on
Promoting the Low-Carbon Cities

Global Warming Can Be Prevented by Green Purchasing?!

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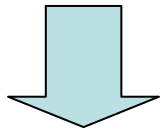
Yokohama's Reduction Targets

The City of Yokohama adopted the Yokohama Climate Change Action Policy, known as "CO-DO30," in January 2008.

What is CO-DO30?
Reduce greenhouse gas emissions per resident by 30% compared to 2004 levels by 2025. Reduce greenhouse gas emissions per resident by at least 60% compared to 2004 levels by 2050.

Simulation of the energy-saving benefits of introducing green products in Yokohama (Nakahara Laboratory)

Introduction of “Top Runner” standards



How much of a reduction in greenhouse gas emissions could be expected if households in Yokohama switched to green products?

Study Overview

Study dates: September 20 to October 8, 2008

Study subjects: Households in Yokohama with children in upper elementary school who participated in Energy Saving Action for Children.

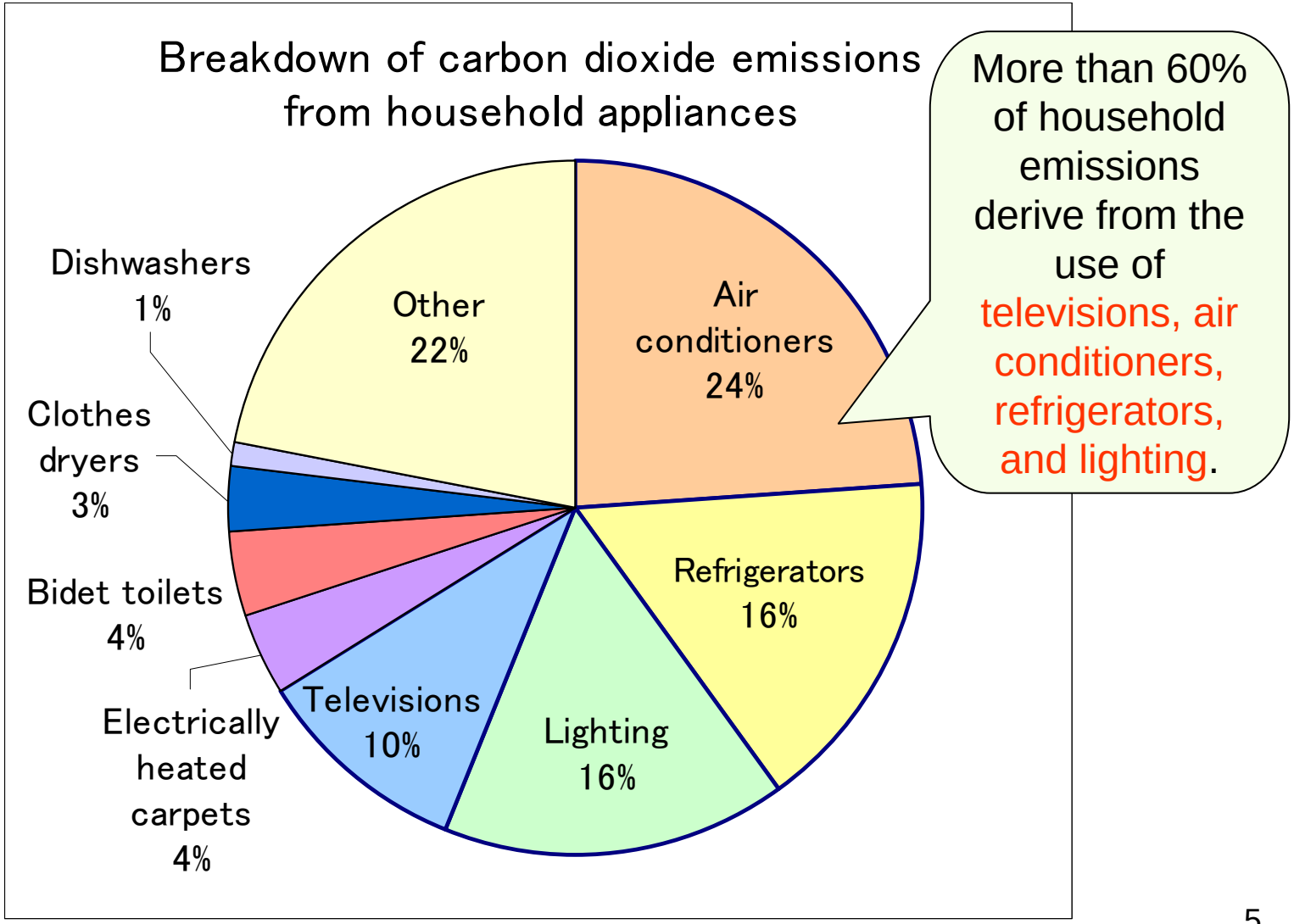
Number of participants: 371 (of which 117 were identified as providing valid responses)

Data collected: Manufacturer name, serial number, number owned, hours of use

Targeted products: Televisions, air conditioners, refrigerators, lighting, automobiles

Study methodology: Questionnaire distributed as part of the "Measure Your Household's Carbon Dioxide Emissions" project

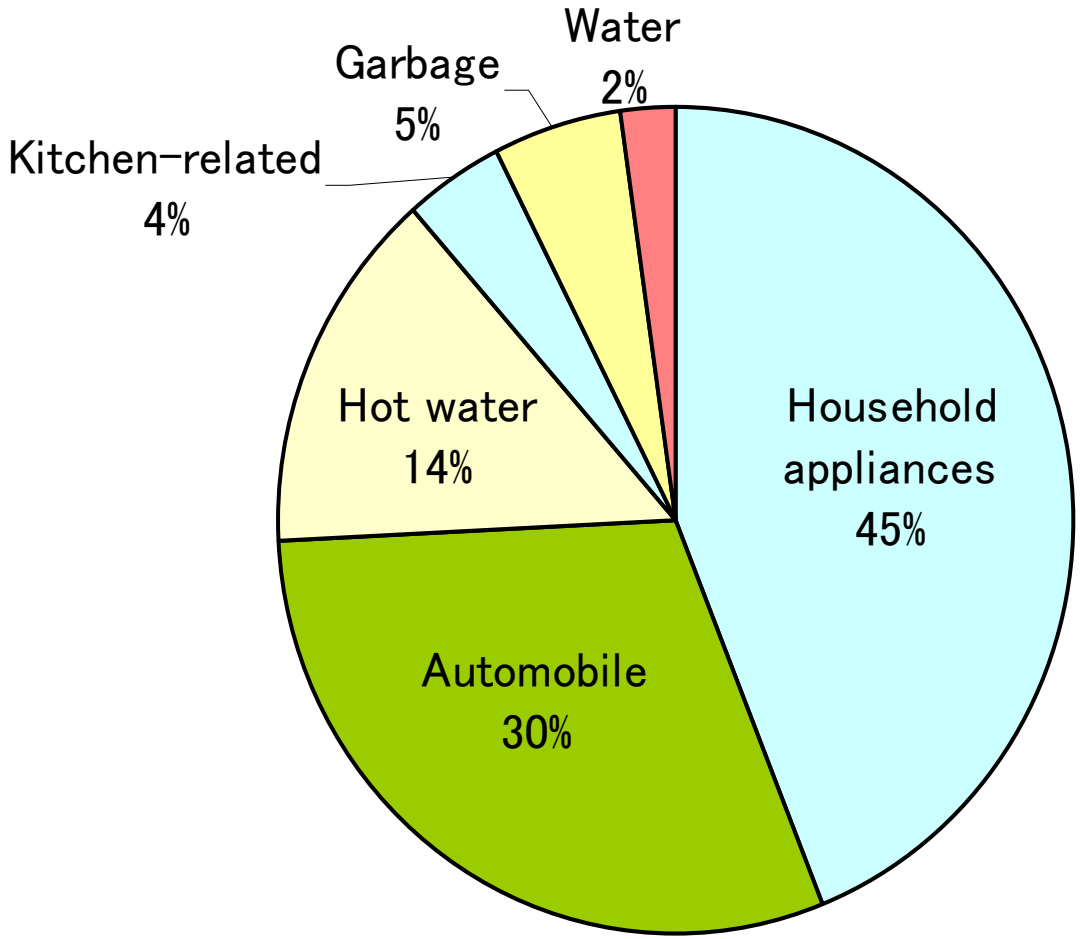
Breakdown of Carbon Dioxide Emissions



Source: Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry

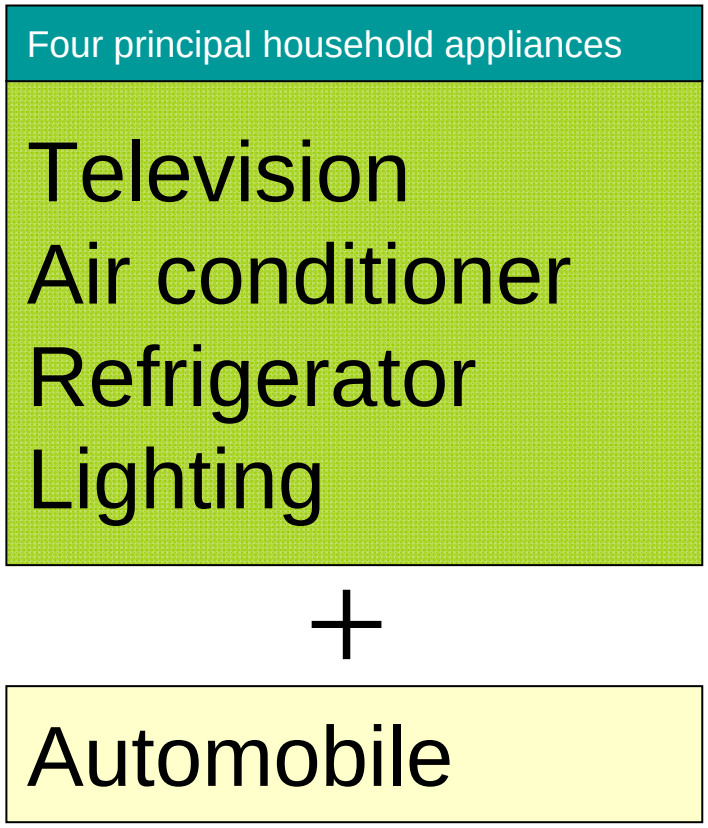
Automobile Emissions

Breakdown of Household Carbon Dioxide Emissions by Area of Use



Source: Japan Center for Climate Change Actions

Targeted Products



In short, the use of televisions, air conditioners, refrigerators, lighting, and automobiles accounts for more than 60% of total household carbon dioxide emissions.

Carbon Dioxide Emissions from Television Use

There are three types of television—tube, LCD, and plasma—and power consumption differs significantly depending on type and screen size. For this reason, we chose an energy-saving product for each size and performed a replacement simulation.

Study results for Yokohama households

Average number of televisions owned by Yokohama households: 1.6

Average daily hours of use: 6.6

Average daily hours of operation in standby mode: 17.4

Average carbon dioxide emissions per Yokohama household:

202.8 kg-CO_2

＊Formula＊

Annual carbon dioxide emissions (kg-CO_2)

= [{Power consumption of model in question (W) × hours of use per day (h/day) × 365 (days)}

+ {Standby power consumption of model in question (W) × hours of standby operation per day (h/day) × 365 (days)}] × 0.555

Average carbon dioxide emissions after replacement with newest energy-saving products:

140.1 kg-CO_2

Carbon Dioxide Emissions from Air Conditioner Use

Since the power consumption of air conditioners varies with differences in cooling capacity, we selected an energy-saving product for each cooling capacity and performed a replacement simulation.

Study results for Yokohama households

Average number of air conditioners owned: 2.36

Average hours of use: 6.9 (summer) / 2.5 (winter)

＊Formula ＊

Annual carbon dioxide emissions(kg-CO_2)

= Power consumption when cooling + power consumption when heating × 0.555

Average carbon dioxide emissions per Yokohama household:

583.9 kg-CO_2

Average carbon dioxide emissions after replacement with newest energy-saving products:

378.61 kg-CO_2

Carbon Dioxide Emissions from Refrigerator Use

Since refrigerators use electricity continuously, they are in effect used 24 hours a day. We performed a simulation based on the replacement of existing models with the newest energy-saving products as to capacity.

Study results for Yokohama households

Average number of refrigerators owned per household: 1.03

Hours of use: 24

＊Formula ＊

Annual carbon dioxide emissions ($kg\text{-}CO_2$)

= Annual power consumption of each model × 0.555

Average carbon dioxide emissions per Yokohama household:

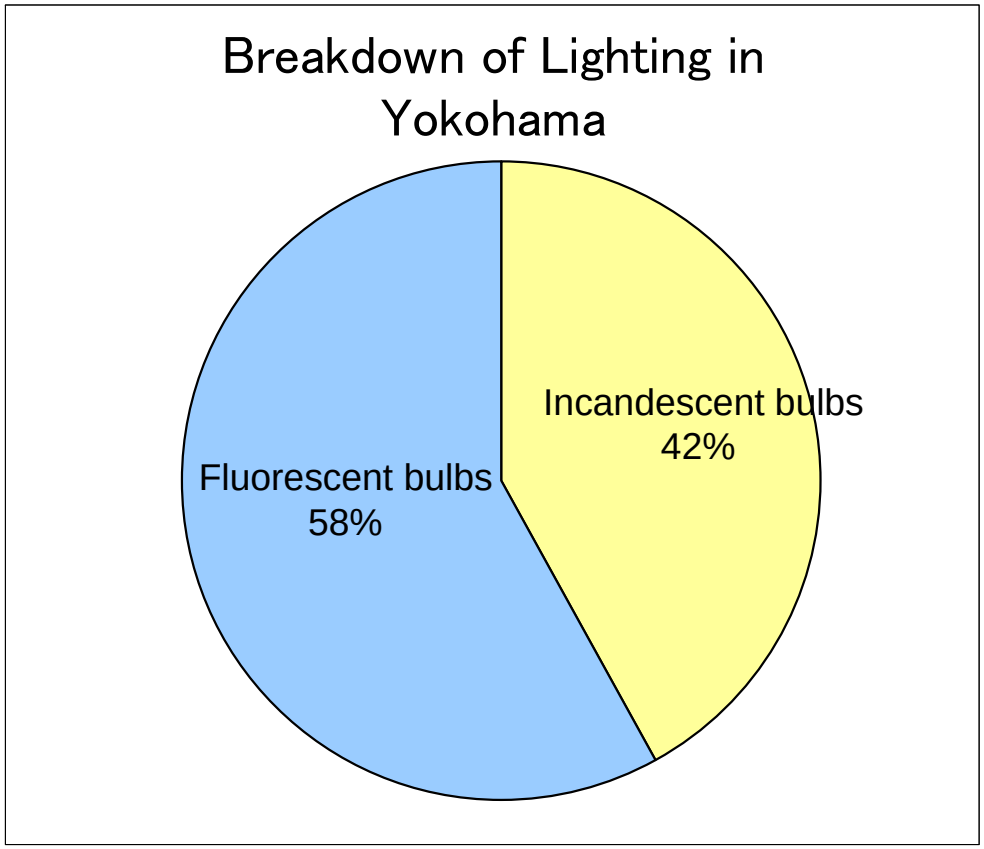
441.9 $kg\text{-}CO_2$

Average carbon dioxide emissions after replacement with newest energy-saving products:

249.7 $kg\text{-}CO_2$

Carbon Dioxide Emissions from Lighting Use

There are two types of lighting: incandescent bulbs, which consume more power, and fluorescent bulbs. Disuse of incandescent bulbs by 2012 and an across-the-board transition to compact fluorescent bulbs by then has been mandated.



The average number of fluorescent bulbs owned per household was 12, and the average number of incandescent bulbs owned per household was 9.

Annual carbon dioxide emissions from incandescent bulb and compact fluorescent bulb use in Yokohama households:

924.1 kg-CO_2

Annual carbon dioxide emissions if all incandescent bulbs were replaced with compact fluorescent bulbs:

= 528.1 kg-CO_2

Carbon Dioxide Emissions from Automobile Use

Study results for Yokohama households

Average number of cars owned: 1
Monthly gasoline consumption: 61.9 L
Average distance driven per month: 762.2 km
Carbon dioxide emissions per kilometer: 174.2 kg-CO_2/km

Average carbon dioxide emissions per Yokohama household:

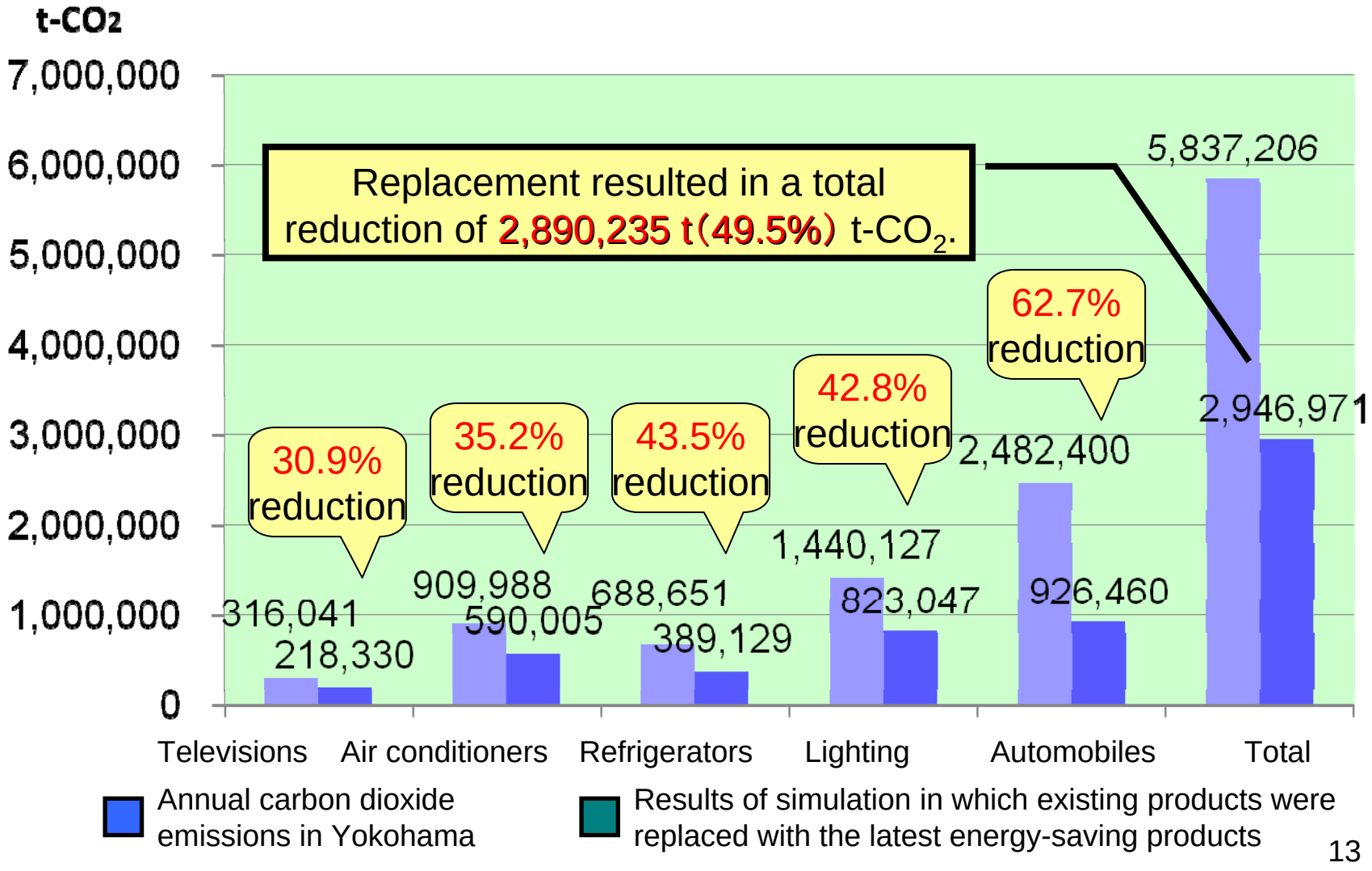
1592.9 kg-CO_2

We performed replacement simulations and compared the results for two vehicles: the Toyota Prius, a hybrid, and the Mitsubishi i-MiEV, an electric vehicle. The annual carbon dioxide emissions for each were:

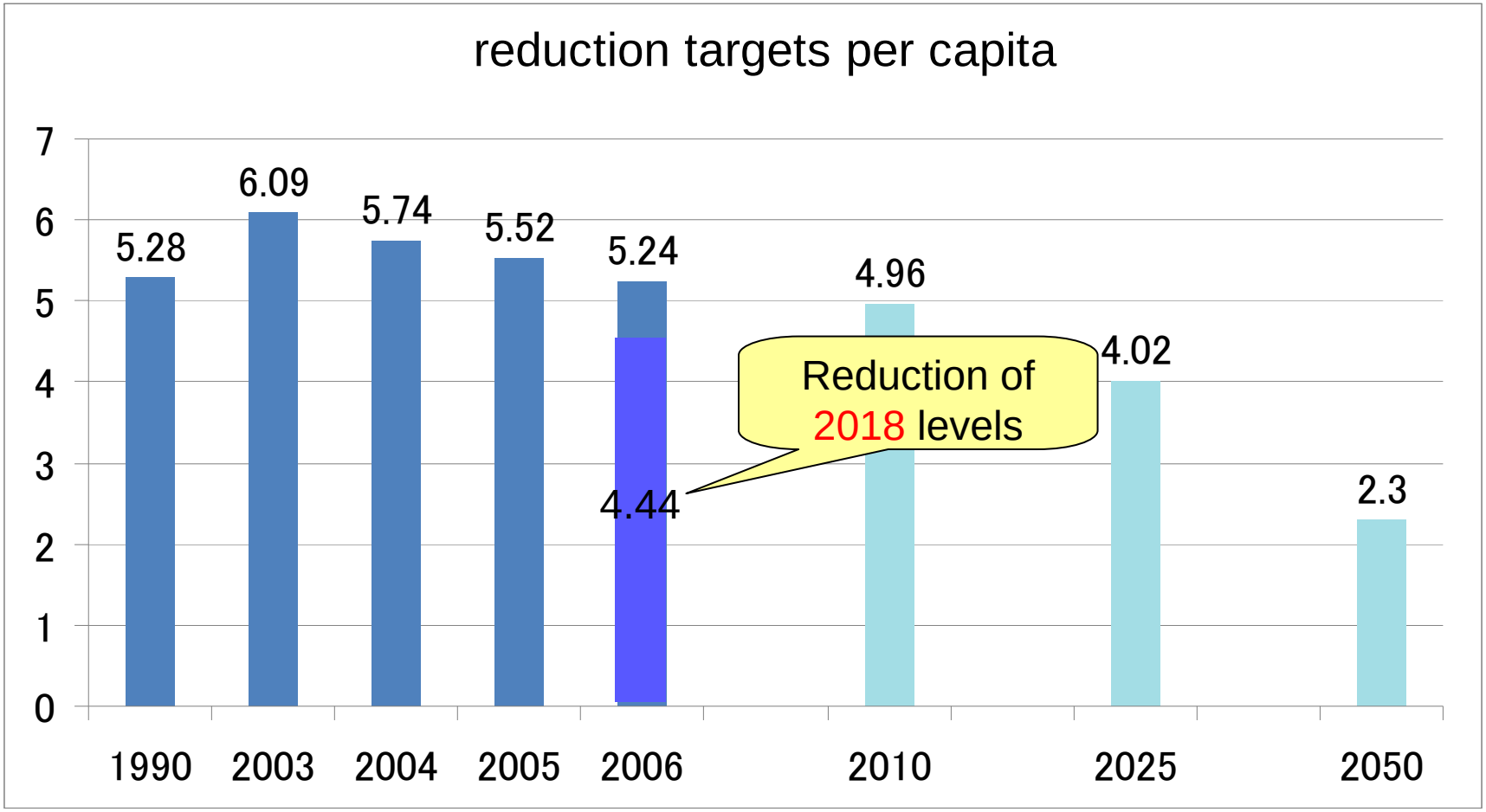
Toyota Prius:
594.5 kg-CO_2

Mitsubishi i-MiEV:
365.8 kg-CO_2

Yokohama Energy-saving Product Replacement Simulation Results



Yokohama Reduction Targets in “CO-DO30”



Source: Yokohama city Climate Change Policy Headquarters website “CO-DO30”

Survey Results

We concluded that 90% of the CO-DO30 targets could be achieved by switching to green products in FY2008.

Then how much would it cost to actually replace these products?

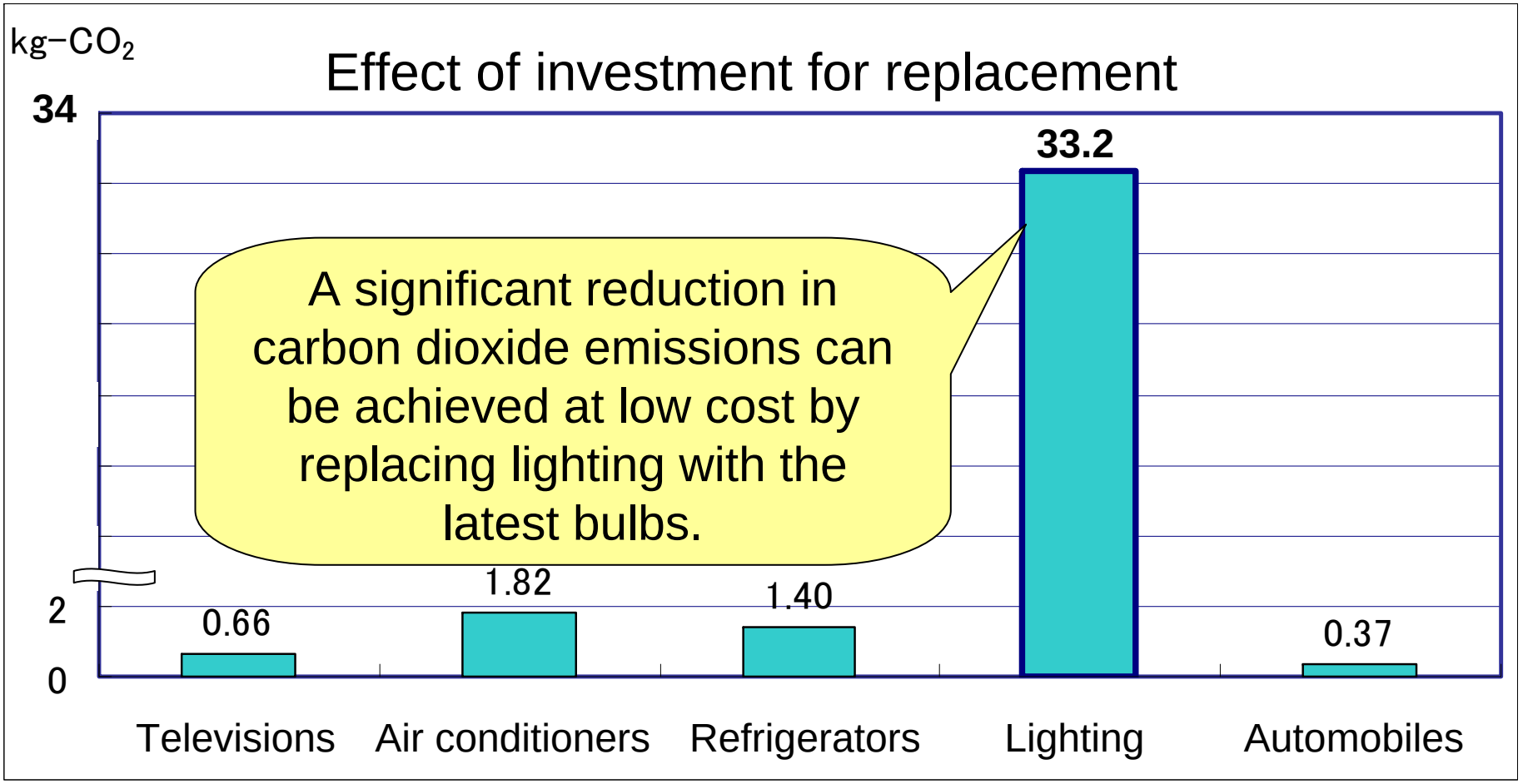
Next, we studied which product could be expected to yield the greatest return on investment if replaced.

Return on Investment for Replacement

Household appliance	Average cost of replacement	CO_2 reduction
Television	Approx. ¥95,000	62.7 kg-co_2
Air conditioner	Approx. ¥113,000	205.3 kg-co_2
Refrigerator	Approx. ¥137,000	192.2 kg-co_2
Lighting	Approx. ¥1,300	43.1 kg-co_2
Automobile	Approx. ¥2,700,000	998.4 kg-co_2

*Does not include reduction achieved through disposal.

CO_2 Reduction Benefit for Investment of ¥1，000



Study Results

- Switching to green products provides a simple way to reduce greenhouse gas emissions from households.

- Yokohama will not able to achieve its target of a 30% reduction by 2025 under the same condition. Residents need to practice green purchasing when replacing appliances, and businesses need to unleash a new surge of “eco-innovations.”

- **Start with lighting!**
  From the standpoint of return on investment, the replacement of lighting promises significant reductions in greenhouse gas emissions at low cost. Initiatives such as the Financial Subsidy for Compact Fluorescent Bulbs to Promote the Widespread Adoption of Energy-saving Appliances program currently being offered by Yokohama are necessary in order to curb greenhouse gas emissions from households sectors in Japan.

Implementing the Basic Principles of a Low-carbon Society

1. **Achieving minimum carbon: Through green purchasing!**
   It is necessary to form social systems that give primacy of place to the minimization of CO_2 emissions.

2. **Achieving simple lifestyles that facilitate rich and fulfilling lives: Through work sharing!**
   Changes in values leading to a demand for emotional fulfillment will drive a revolution in social systems, paving the way for the achievement of a low-carbon yet fulfilling society. Producers must adopt the consumer's outlook in order to revolutionize themselves.

3. **Achieving coexistence with nature: Through green jobs!**
   We must conserve and regenerate our rich and diverse natural environment, including forest and marine resources, and promote technologies that coexist in harmony with nature, including through the use of biomass in local communities. We must also provide opportunities for residents to come into contact with nature.