

Analysis for Efficient Use of Electricity in Elderly Households

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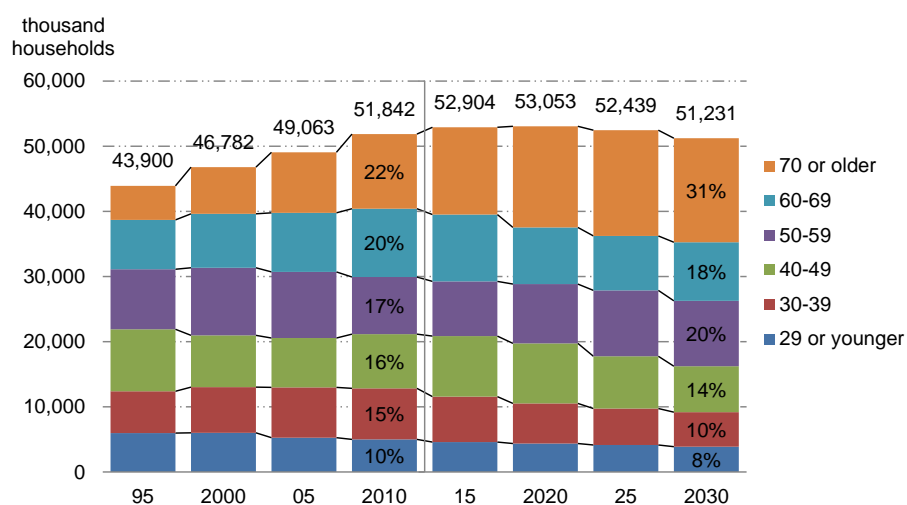
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◇Introduction

According to “Household Projection for Japan” (January 2013) by the National Institute of Population and Social Security Research, the number of households in Japan will continue to grow due to the trend away from nuclear families but the increasing number of single-person households and peak in 2019. In 2030, the number will decline to 51.23 million, close to the 2010 level (51.84 million). But the age mix of householders in 2030 will be far different from that in 2010. Households with householders aged below 50 will account for 31% of the total in 2030, a sharp fall from 41% in 2010. To counter balance that drop, households with householders aged 60 or more will capture some 50%, as Japan’s population will continue to age further.

Figure 1 Trend of households in Japan



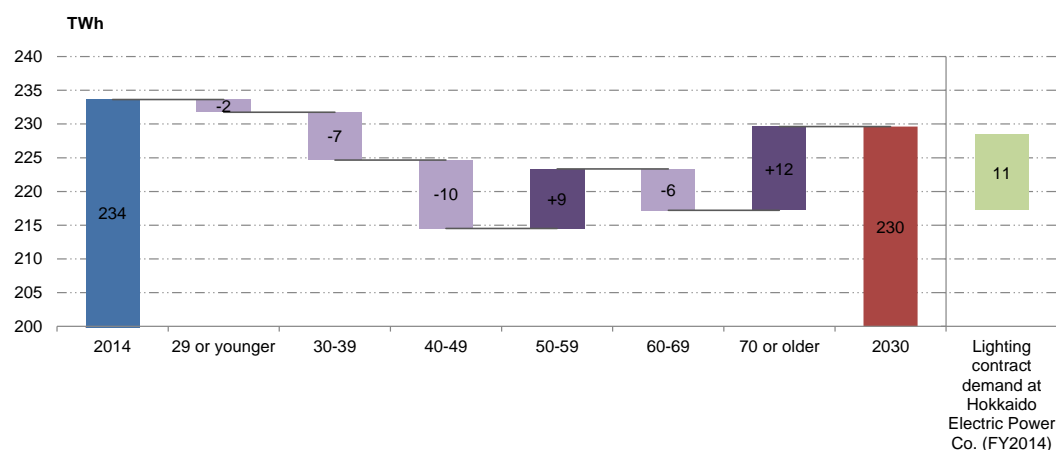
(Source) National Institute of Population and Social Security Research, “Household Projection for Japan” (January 2013)

The projection of how changes in the number of households and in the household age composition would affect future household electricity consumption¹ indicates that household electricity consumption in 2030 would decline by 4 terawatt-hours from 2014. A breakdown by age

¹ Under the assumption that a breakdown of average household electricity consumption by householder age from family income and expenditure and other surveys will remain unchanged despite income level or lifestyle changes, electricity consumption per household was multiplied by the number of households in each householder age group in the future to project the future consumption.

group shows that households with householders aged 70 or older will expand total consumption by 12 TWh, close to the 11 TWh in lighting contract demand for the entire system of Hokkaido Electric Power Co. in FY2014 and equivalent to 4% of Japan's lighting contract demand.

Figure 2 Impacts of changes in the number of households and the householder age composition (2014-2030)

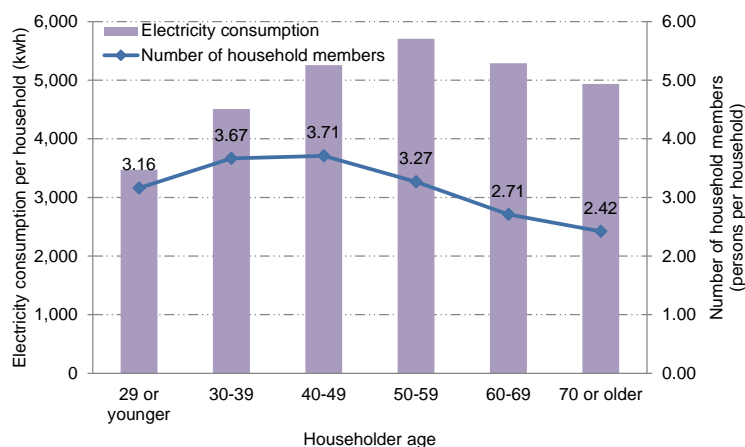


The projection, overtime, based on the simple assumption that electricity consumption per household will remain unchanged. This indicates that elderly households are important when efficient household electricity consumption is considered. The following analyzes elderly households' efficient use of electricity.

◇ **Excluding any influence of the number of members per household is excluded, per capita electricity consumption will be more for elderly people**

Among householder age groups, electricity consumption per household is the least for the 29 or younger group and the most for the 50 to 59 group. Electricity consumption for the 60 or older group tends to be less because electricity consumption is influenced by the number of members per household as well as income levels and lifestyles.

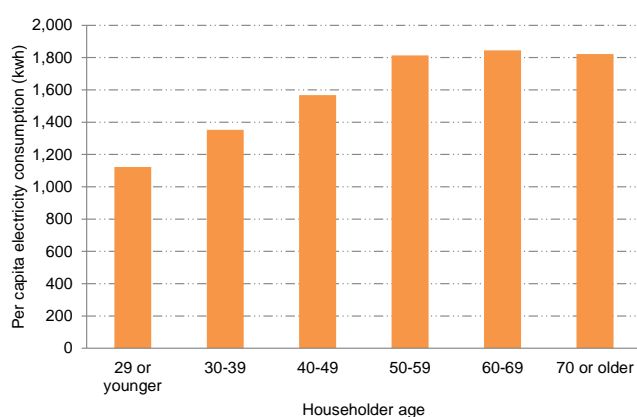
Figure 3 Household electricity consumption by householder age group and the numbers of household members (2014)



(Source) Ministry of Internal Affairs and Communications, “Family Income and Expenditure Survey” (two-or-more-person households)

Excluding the influence of the number of members per household is excluded², per capita electricity consumption will be more for elderly people. This may be partly because of rising income. Due exclusively to aging, however, the 60 to 69 group or the 70 or older group, which earn less income than younger groups, consume as much electricity as the 50 to 59 group. Electricity consumption for the 70 or older group totals 1,800 kilowatt-hours per year, 1.6 times as high as for the 29 or younger group.

Figure 4 Electricity consumption per capita by householder age group (2014)

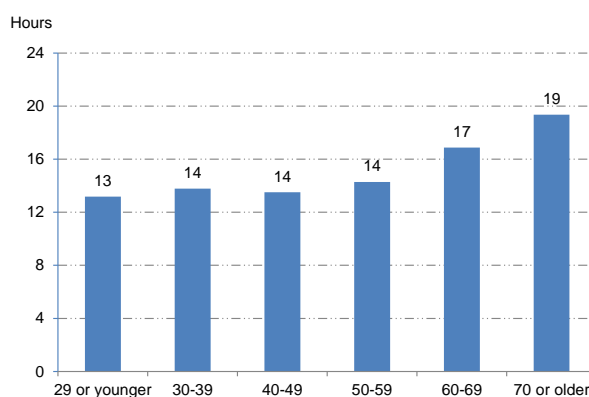


² Energy consumption in a household increase at a lower rate than as the number of household members. This means that per capita consumption declines. In order to exclude the influence from the number of household members, electricity consumption determined per capita basis.

◇ **Longer stays at home and less frequent replacement of appliances contribute to expanding electricity consumption in elderly households**

A factor behind greater electricity consumption in elderly households is that elderly people stay at home longer than younger people including job holders and students. According to the National Livelihood Survey, people aged 60 or older stay at home for 17 to 19 hours per day, 3 to 6 hours more than for younger people. In line with longer stays at home, elderly people use air-conditioners, televisions and other electrical home appliances longer, resulting in greater electricity consumption.

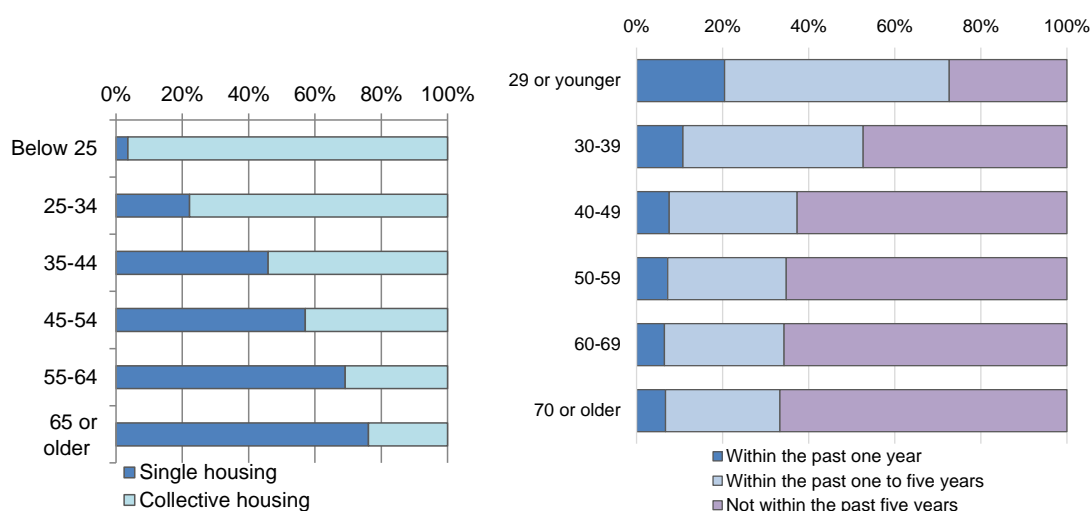
Figure 5 Stays at home (by age group)



(Source) NHK Broadcasting Culture Research Institute, "National Life Time Survey" (February 2011)

Another factor is that single-family houses account for a larger share of houses for elderly households. Parents may continue to live in their houses even after their children become independent. An elderly couple may be living in a house where three to four people can live. There may be a considerable number of elderly households of this kind. Elderly households may mostly live in their own houses, having fewer opportunities than younger households to move or purchase housing for getting employment or becoming independent. Therefore, they have fewer opportunities to replace electrical home appliances. According to the National Survey of Family Income and Expenditure, a share for those answering that they have not replaced air-conditioners for five or more years is higher for elderly people.

Figure 6 Housing broken down by age group (left) and air-conditioner replacement by age group (right)



(Sources) Ministry of Internal Affairs and Communications, “Housing and Land Survey” (2013), “National Survey of Family Income and Expenditure” (FY2014)

◇ Careful policy required to encourage elderly households to efficiently use electricity

Japan should give consideration to the aging of its population and enhance measures to encourage elderly households to efficiently use electricity. Longer stays at home and less frequent replacement of appliances, cited as factors behind increasing electricity consumption in elderly households, are closely linked to lifestyles and difficult to change. Approaches from other aspects should be taken to promote realistic measures.

For example, the promotion of home energy management systems (HEMS) can help reduce energy consumption in elderly households. Appropriate room temperature controls and fail-safe functions to prevent appliances from being left switched on may bring about great effects. According to the “Long-term Energy Supply and Demand Outlook” released in 2015 by the Agency for Natural Resources and Energy, HEMS and other energy management means could reduce household electricity consumption by 20 TWh from the Reference Scenario, producing the second greatest energy conservation effect after the promotion of light-emitting diode and other efficient lights.

Table 1 Energy conservation effects given in Long-term Energy Supply and Demand Outlook
(compared with the Reference Scenario for 2030)

	Energy savings (electricity)
	TWh
Promoting compliance with energy conservation standards and insulation retrofit for housing	10
Promoting highly efficiency water heaters	-3
Promoting high efficiency lights	22
Exploiting Top Runner and other systems to improve energy conservation performance of equipment	11
Implementing energy management using HEMS and smart meters	19
Promoting national movements	1
Residential sector total	60

(Source) Agency for Natural Resources and Energy, “Data related to Long-term Energy Supply and Demand Outlook” (June 2015)

It may be difficult to increase penetration for HEMS systems as rapidly as LED lights spread after the 2011 Great East Japan Earthquake. Instead of implementing a large-scale campaign to promote HEMS systems throughout Japan, the government should begin with HEMS promotion for elderly and other households where HEMS systems can be expected to produce higher savings. Some HEMS systems offer surveillance, crime prevention and other encouraging functions for single-person elderly households. It is important to develop services not only from the viewpoint of efficient electricity consumption but also from other viewpoints to build new business models.

Nursing care services including housekeeping services, housing with care services and housing for elderly people have expanded recently in Japan. Housekeeping services include housecleaning that can improve the efficiency of air-conditioners by washing them to help save energy consumption. The expansion of housing with care services and housing for elderly people can provide a great opportunity to promote compliance with energy conservation standards. In the future, the government should be expected to take measures from various angles for example, the government should encourage nursing care service providers to promote efficient electricity consumption in elderly households.

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