

The current Japanese house and Japanese home preferences

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The Japanese house and life

□ Some differences from Europe and America

Customs

- Taking off shoes
- Separate toilet and bathroom
- “*Tatami*”

✓ *After the 2nd world war, Japanese houses and people’s home life were rapidly westernized, but Japan’s natural environments and old customs still affect Japanese houses and home life.*

Natural environment

- A comparatively warm climate
 - Hot and humid summers
 - Uncomfortable of feeling
 - The rotting a wooden frame
 - Condensation and mold
- Earthquakes
- Typhoons

Japanese customs in home life

- Taking off shoes in the house
 - The original purpose is to guard wooden structure from moisture of the ground
 - The floor is a chair, and it is also a bed
 - The floor is written “床” in Kanji. “床” means a floor and a chair
 - .
- Separate toilet and bathroom
 - The bathroom is a special place to purge people’s skin and heart.
 - Many Japanese people love taking a bath.
 - We require a multi-function for DHW supply system.
- “*Tatami*”
 - The room with the tatami mat is always a Japanese-style room.
 - The tatami is a module in the construction of Japanese house.



Object	Tatami unit	Meaning	SI Unit
Area of room	“ <i>Jyou</i> ”	Area of one piece of <i>Tatami</i>	≐1.62m ²
Area of land and house	“ <i>Tsubo</i> ”	Area of two pieces of <i>Tatami</i>	≐3.3m ²
Length of window and span	“ <i>Ma</i> ”	Length of the long side of <i>Tatami</i>	≐1.82m

The housing constructions of detached house

□ **Wooden frame construction**

- Japan has a long tradition of wooden frame construction.
 - This framework is convenient to make a big opening.
 - It's free to the house planning.

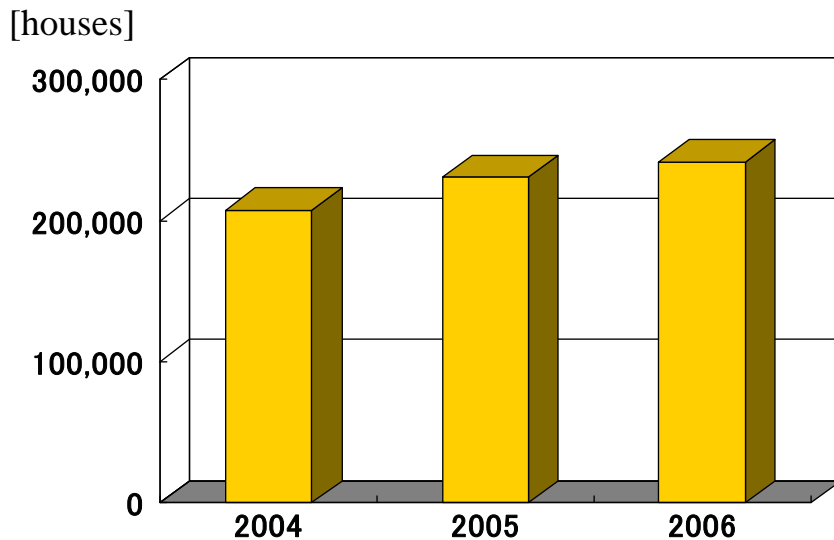
□ **Other construction**

- The other methods of construction increase recently.
 - 2 × 4
 - Panel
 - Steel frame
 - Prefab



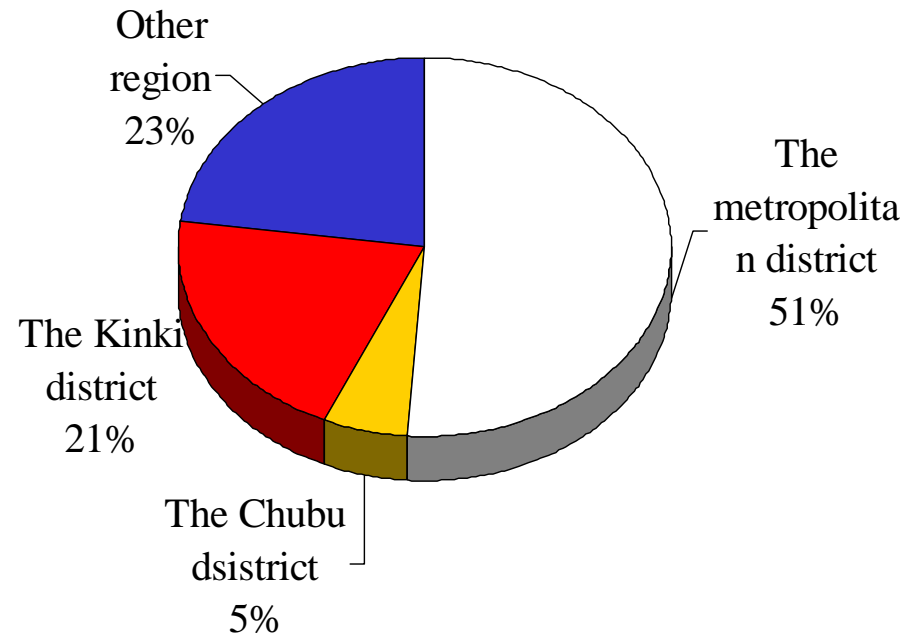
Condominiums

- Over 200,000 houses are supplied every year.



The annual number of the condominiums that started construction

- The bulk of condominiums are in the metropolitan area

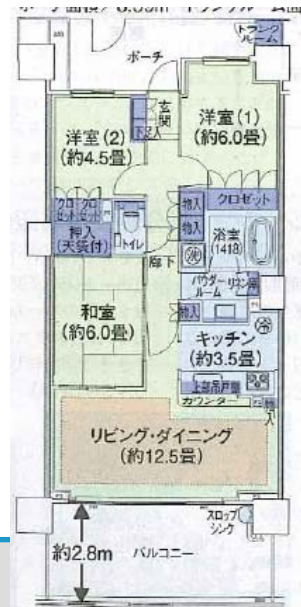


The number of the condominiums that started construction in 2006

The planning of a condominium

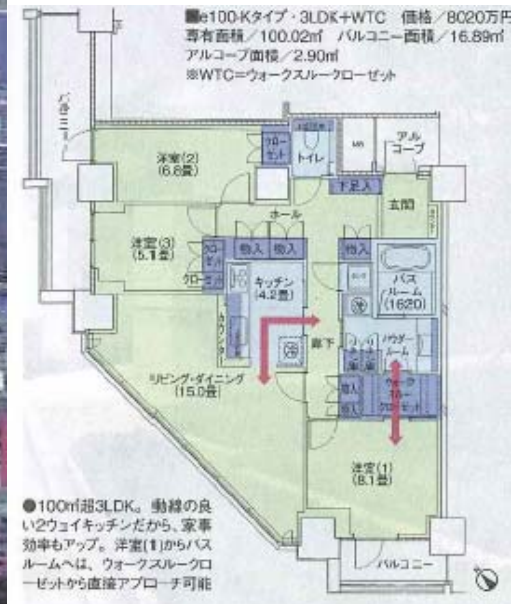
□ Common type

- These are located wide areas, from downtowns to suburbs.
- The range of the price is varies
 - The house plan below is the most standard type, and its price is reasonable.



□ Tower type

- The major location is downtown in the big city.
- The prices are comparatively expensive.



The planning of a detached house

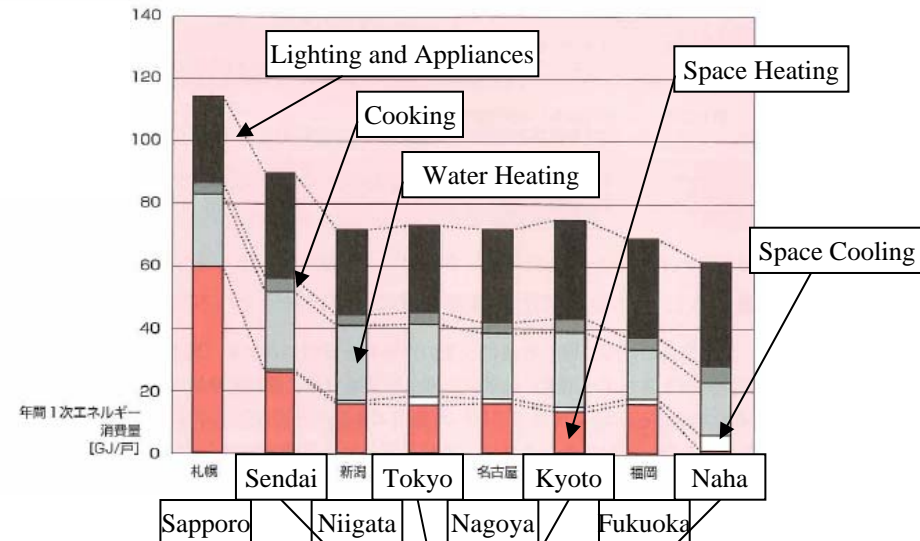
- ❑ **A detached house in a suburb.**
 - ❑ The floor area is larger than the condominiums.
 - ❑ These are located in the suburbs.
 - ❑ The most popular plan is 4 bedrooms and LDK.
 - ❑ One bathroom and two toilets also is included.
 - ❑ One or two rooms are Japanese-style room usually.



Energy consumption in residential houses

- Lighting and appliances use most energy.
- Secondly is the consumption of DHW.
- Consumption differs in the cold districts, the warm districts, the hot and humid areas.

An annual primary energy consumption of a typical JP family



The source: 自立循環型住宅への設計ガイドライン、IBEC

Vestibule (Entrance hall)

- ▣ **We take off shoes at the entrance, and most of people go in the hall in slippers.**



- ✓ *The height of 1st floor from ground level must be over 450mm by Law.*
- ✓ *The entrance hall was arranged in the south side of the house in old days. However, some rooms are put in the south side now, and the entrance hall tends to be placed in the other directions.*

Living room and Dining-Kitchen

- **After the 2nd world war, a living room was arranged in the south side (good) position of the house.**
 - In Japan before the war, the most important room arranged at the best position in the house
The most important room was a reception room that was called “Zashiki”.
- **The dining-kitchen (DK) is a room which is symbolized postwar Japanese housing.**
 - The DK was popularized by the public apartments.
- **Currently, LDK which connected DK with a living room is popular.**
 - An average area of LDK is about 30[m²].



Japanese-style room

- ❑ **A current Japanese-style room is remains of the former “Zashiki”**
 - ❑ “Zashiki” was a reception room of old Japanese house.
- ❑ **The interior of Japanese-style room was called “Shiturai”**
 - ❑ Originally, “Shitsurai” was an impeccable design. therefore it was thought that any kind of furniture spoiled interior of a Japanese-style room.
We can still watch a Japanese-style room without furniture in the old Japanese buildings, shrines or temples.



“Tokonoma”



“Nijiri-Guti”

Kitchen

- ❑ **The typical Kitchen is small**
 - ❑ In old Japan, The Kitchen was detached from a dining room and a living room. And Kitchen was located at the north side of the house.
 - ❑ In old Japan, the position of the housewife was low. After the 2nd world war, but the position and the role of the Japanese women were revised upward, and the kitchen became important positioning in the home.

- ❑ **Present kitchen is joined to dining and living**



Toilet

- ❑ The current Japanese restroom is one of the objects of the energy saving.
 - ❑ Saving water and Saving power

A common toilet



Bidet uses stored hot water

Toilet Seat heated at all times

A low-energy toilet



Remote controller

Automatically top of toilet opens

Ultra-low flush toilet

Toilet Seat instantly heats up

Bidet uses new water that is quickly heated.

deodorant fan

Bathroom

- ❑ **Japanese people love taking a bath**
 - ❑ Most Japanese prefer taking a bath than shower, except in summer.
 - ❑ The Japanese never washes a body in a bathtub except a small bathtub such as a hotel.
- ❑ **Prevention of the heat loss of the bath water is important energy saving.**
 - ❑ We don't change bath water some times in a day.
 - ❑ Therefore, reheating bath water and keeping the bath water in constant temperature are very important.



A thermos bathtub



Jacuzzi

Balcony

- ❑ **Most of detached house have Balcony.**
- ❑ **Even the high-rise condominiums have the Balcony.**
 - ❑ In not only the detached house but also the high-rise condominiums, the balcony is a dry place of the laundry.
 - ❑ Other drying space is a bathroom.
 - ❑ Bathroom ventilated dryer is popular.
 - ❑ A washing machine with the dry function by heat-pump is developed, and it is sold in a Japanese market..



A balcony of a detached house

A laundry pole



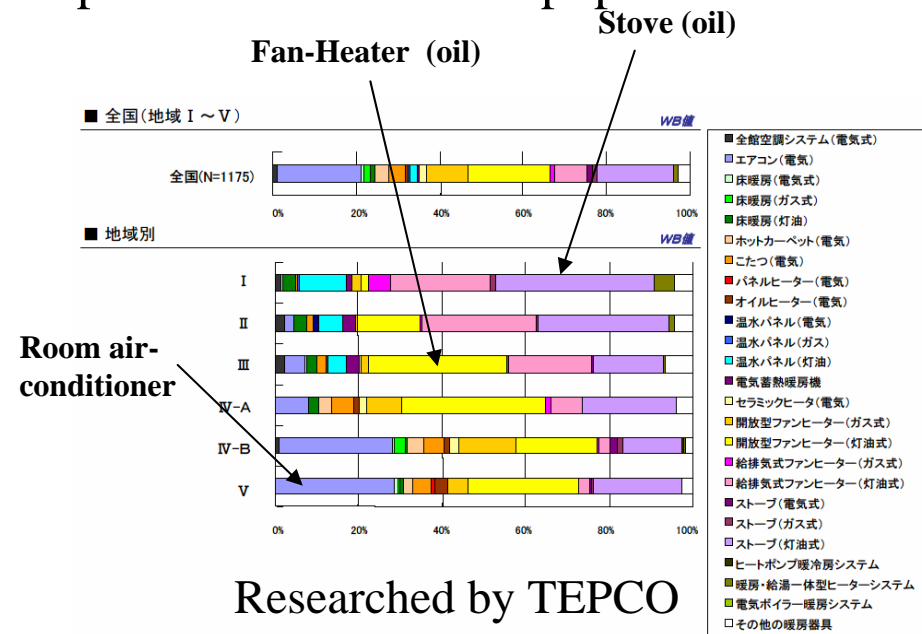
A Bathroom ventilated dryer



A washing machine with the dry function by heat-pump

Space Heating

- ❑ In the warm regions, Energy consumption is typically 18-24% for a detached house.
- ❑ the space heating is variously.
 - ❑ In the cold regions, the oil stoves and fan heaters are popular.
 - ❑ In the warm regions, the heat-pump air conditioners are popular.



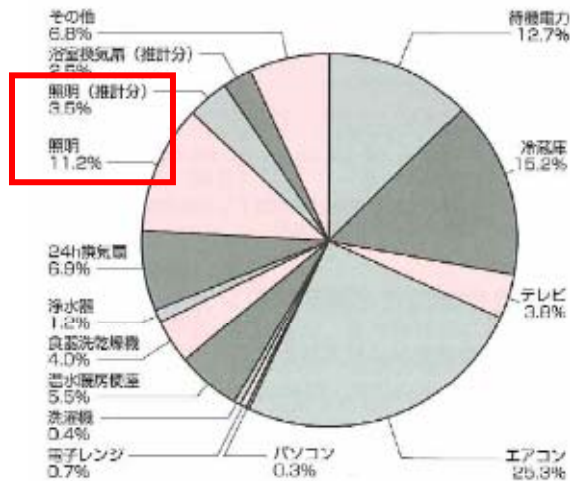
Space cooling

- ❑ **In the warm regions, Energy consumption is typically 1.6-3.5 % for a detached house.**
- ❑ **Room air-conditioner is popular.**
 - ❑ Air-to-water heat-pump air conditioners exist, but these are not popular yet.
- ❑ **The diffusion rate of the room air-conditioner is almost 100%.**
 - ❑ However, there is the actual situation that many of air-conditioners are not used for space heating.
- ❑ **The maximum space cooling load does not decrease in even a low-energy house.**
 - ❑ In the case of intermittence space cooling, the higher the insulation efficient, the larger the maximum cooling load.



Lighting

- Power consumption is typically 15 % for a detached house.
- High-efficiency fluorescent lamp has spread fairly.



Power consumption of a typical JP detached house

The source: 自立循環型住宅への設計ガイドライン、IBEC



A fluorescent lamp can be controlled its brightness by remote control.

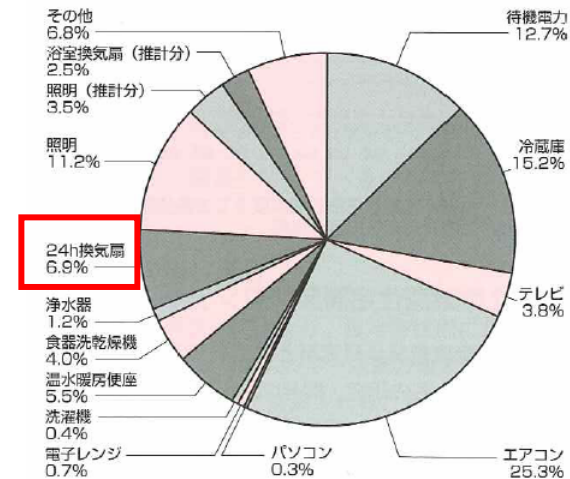
Ventilation system

- **The law obliges to set the whole house ventilation systems.**

- The air change rate is 0.5[1/h]

- **Power consumption is typically 7 % for a detached house.**

- The total heat exchangers may increase energy consumption in the warm regions.

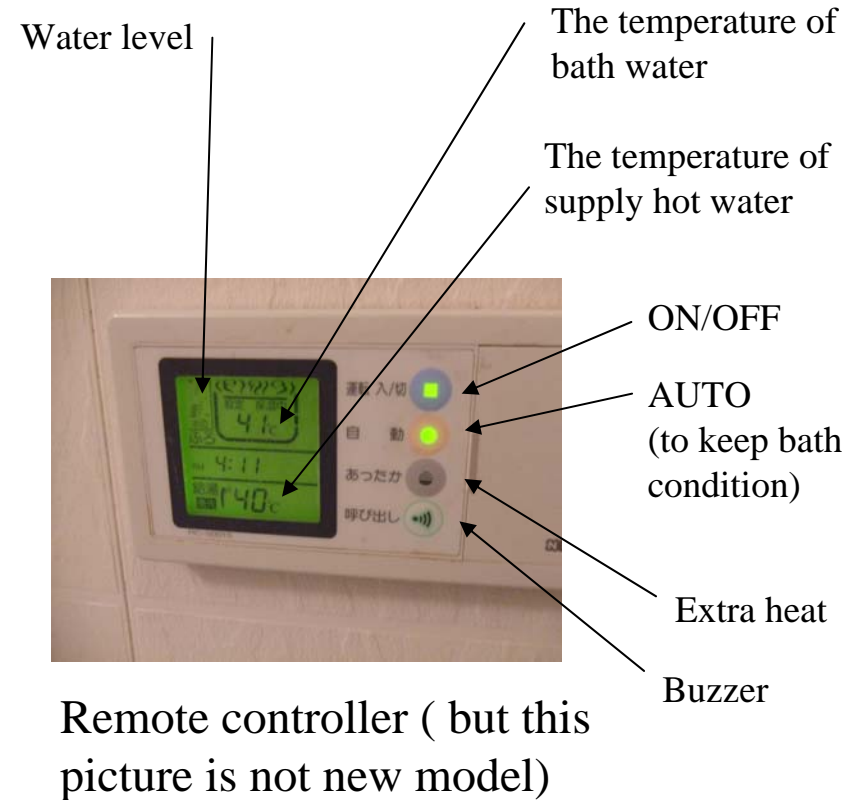


Power consumption of a typical JP detached house

The source: 自立循環型住宅への設計ガイドライン、IBEC

Domestic Water heating

- ❑ **In the warm regions, Energy consumption is typically 23-32% for a detached house.**
- ❑ **The most popular heat source is Gas.**
 - ❑ But the introduction of the CO2 heat-pump system increases surely
- ❑ **We need multi-function DHW system.**
 - ❑ A function to keep the temperature
 - ❑ A function to keep water level
 - ❑ A function to change bath water temperature
 - ❑ A function to change supply water temperature



Window

- ❑ **Japanese house's windows are comparatively large.**
 - ❑ At most of the room on the 1st floor, and other rooms facing a balcony, High height windows are used.
 - ❑ The standard of the width of windows is “Ma(間)”.
“Ma(間)” is the length of “Tatami”.
- ❑ **Japanese house's window is not window originally.**
 - ❑ At present, we use a Chinese character “窓” as a word means window. But original Chinese character was “間戸”. This word means a partition which can be opened.



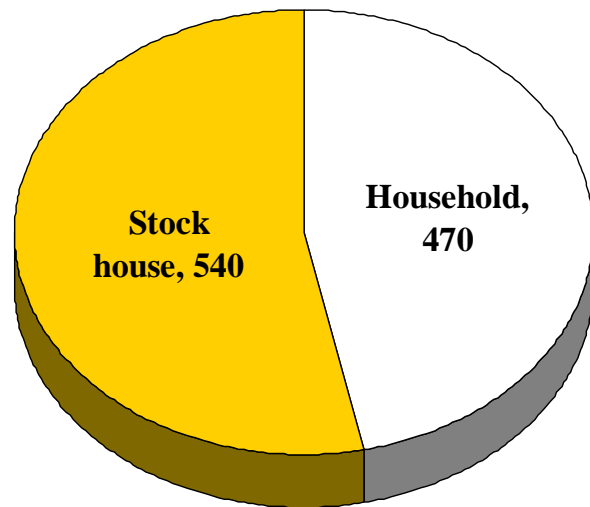
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日本の伝統的住宅

The amount of residences

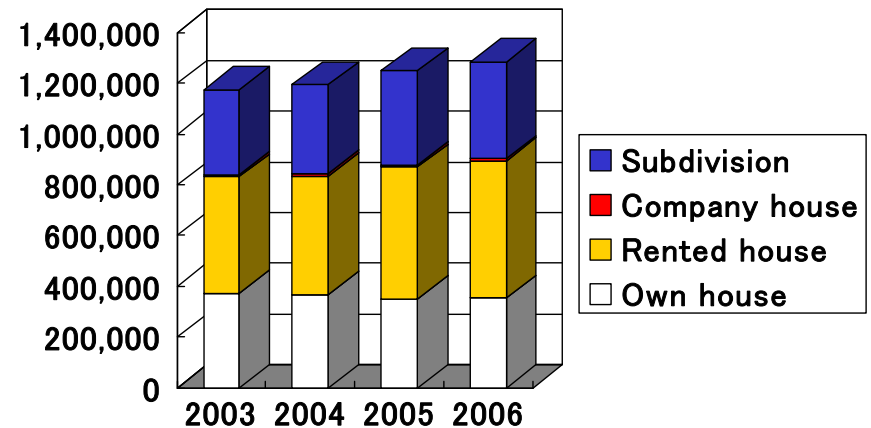
Households and Stock houses



Unit: Million

✓ *70million houses are surplus to requirements*

The annual number of the houses started construction

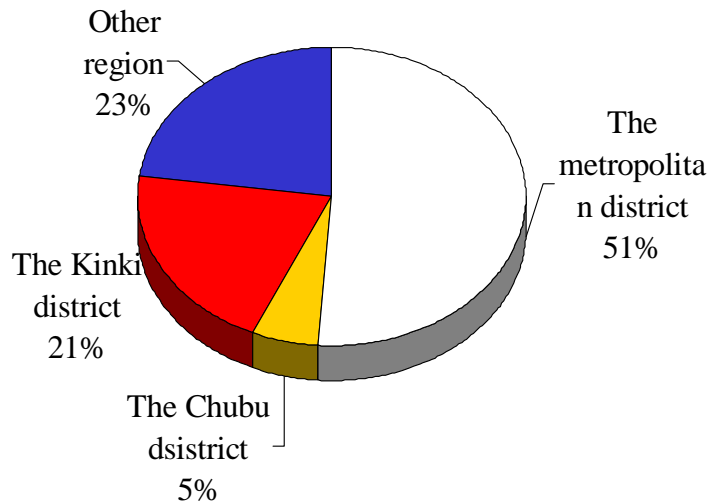


- ✓ *There are many numbers of the rented house, but there is the problem that their residential level is low.*
 - ✓ *Floor area, insulation, equipments etc.*

Other residences

□ Condominiums

- The annual number of the condominiums started construction in 2008 is 241,826 [houses]

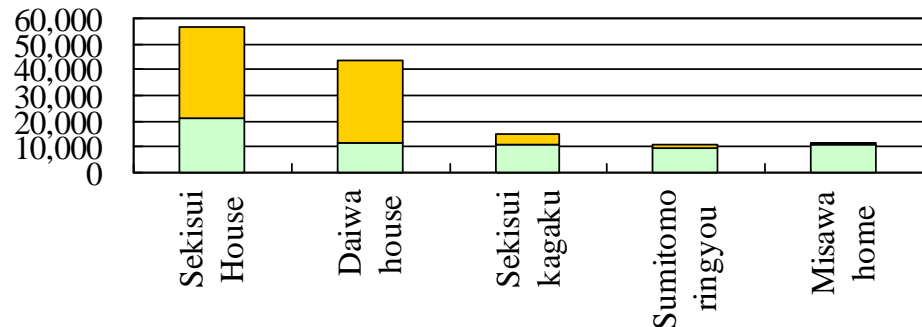


- The rate in all subdivisions is 63.2 [%]

□ Prefabricated houses

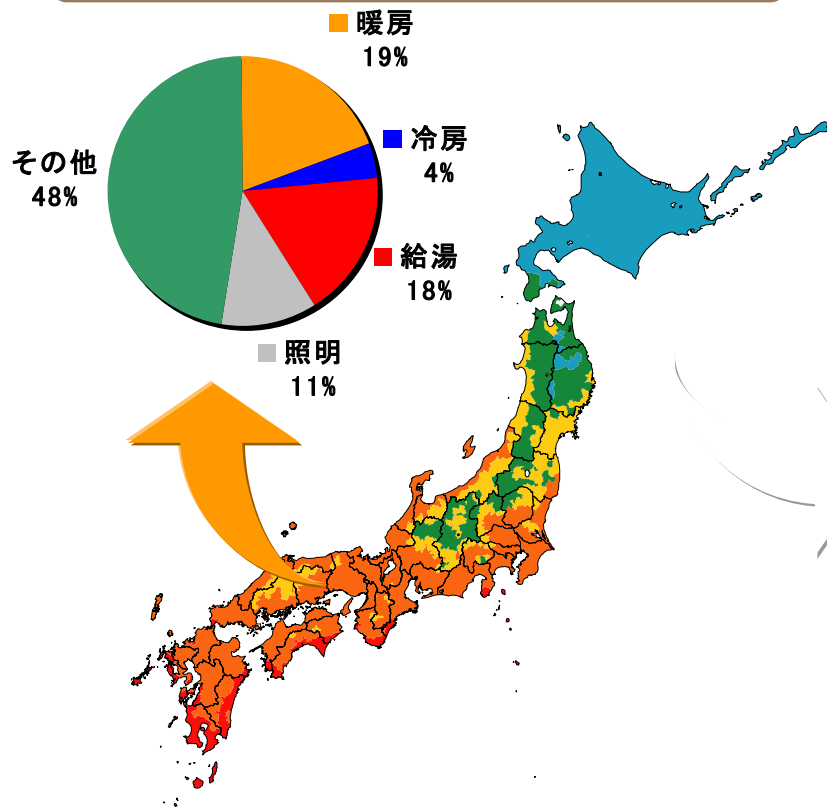
- The annual number of the prefabricated houses started construction in 2008 is 159,544[houses]
- The rate in all new residence is 12.4[%]
- These are provided by the major housing companies

The annual number of constructed house by the major company in 2006



用途別エネルギー消費

温暖地(IV地域)における
戸建住宅の標準消費エネルギー量の用途別割合[%]



- 温暖地域では暖冷房以外のエネルギー消費が全体の77%もある
- 次世代基準に代表される暖冷房エネルギーの削減政策は、もはや限界？

- 断熱以外の省エネルギー対策に期待が...
- 生活スタイル、消費者ニーズを捉えた省エネ設備が重要

寒冷地(I地域)における
戸建住宅の標準消費エネルギー量の用途別割合[%]

