

# Infrastructure for sustainable urban regeneration: District Heating and Cooling

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[president of JASOPH]

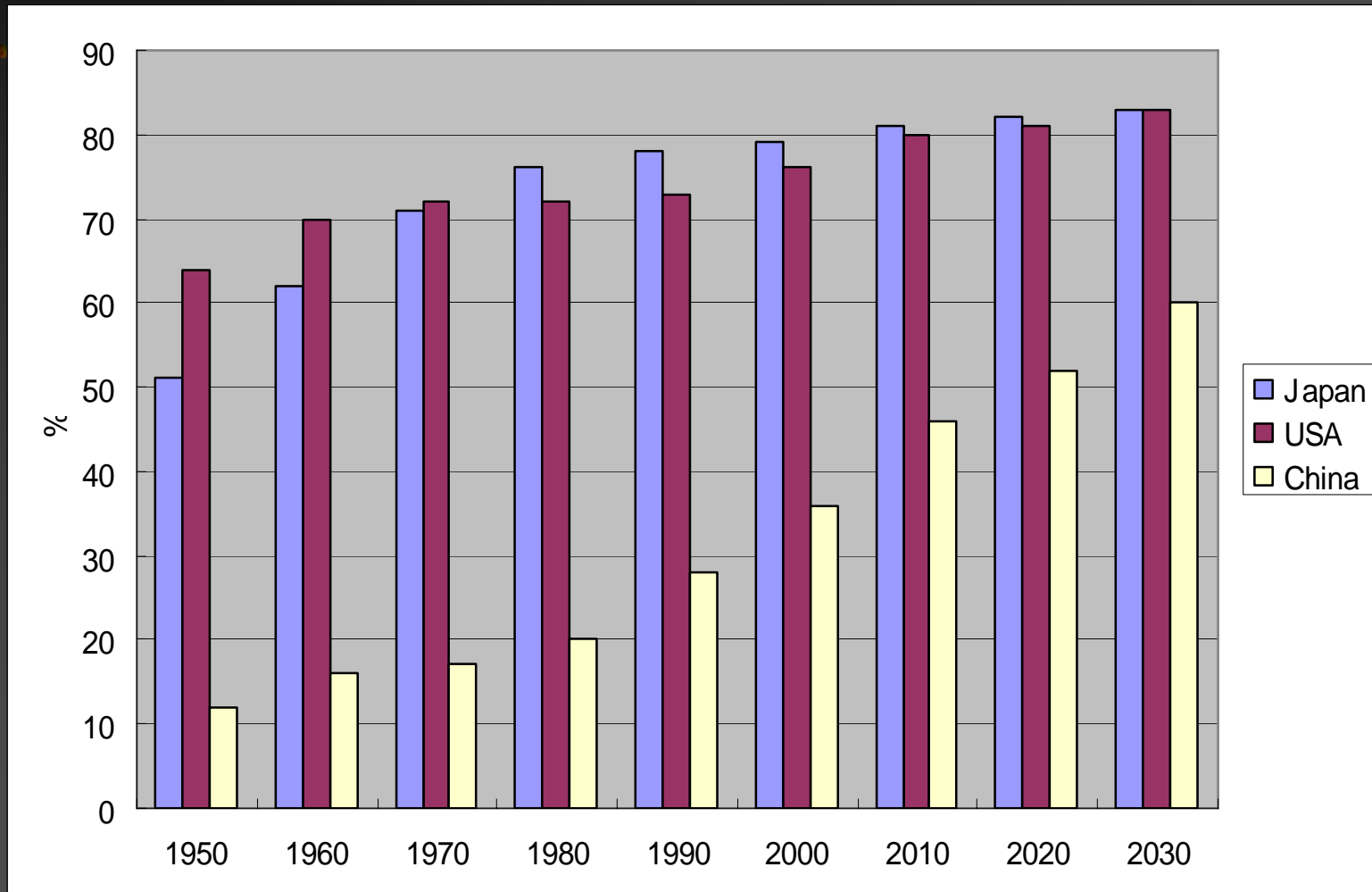
□ Sustainable human settlements for a better quality of life.

□ Sustainable building and infrastructure.



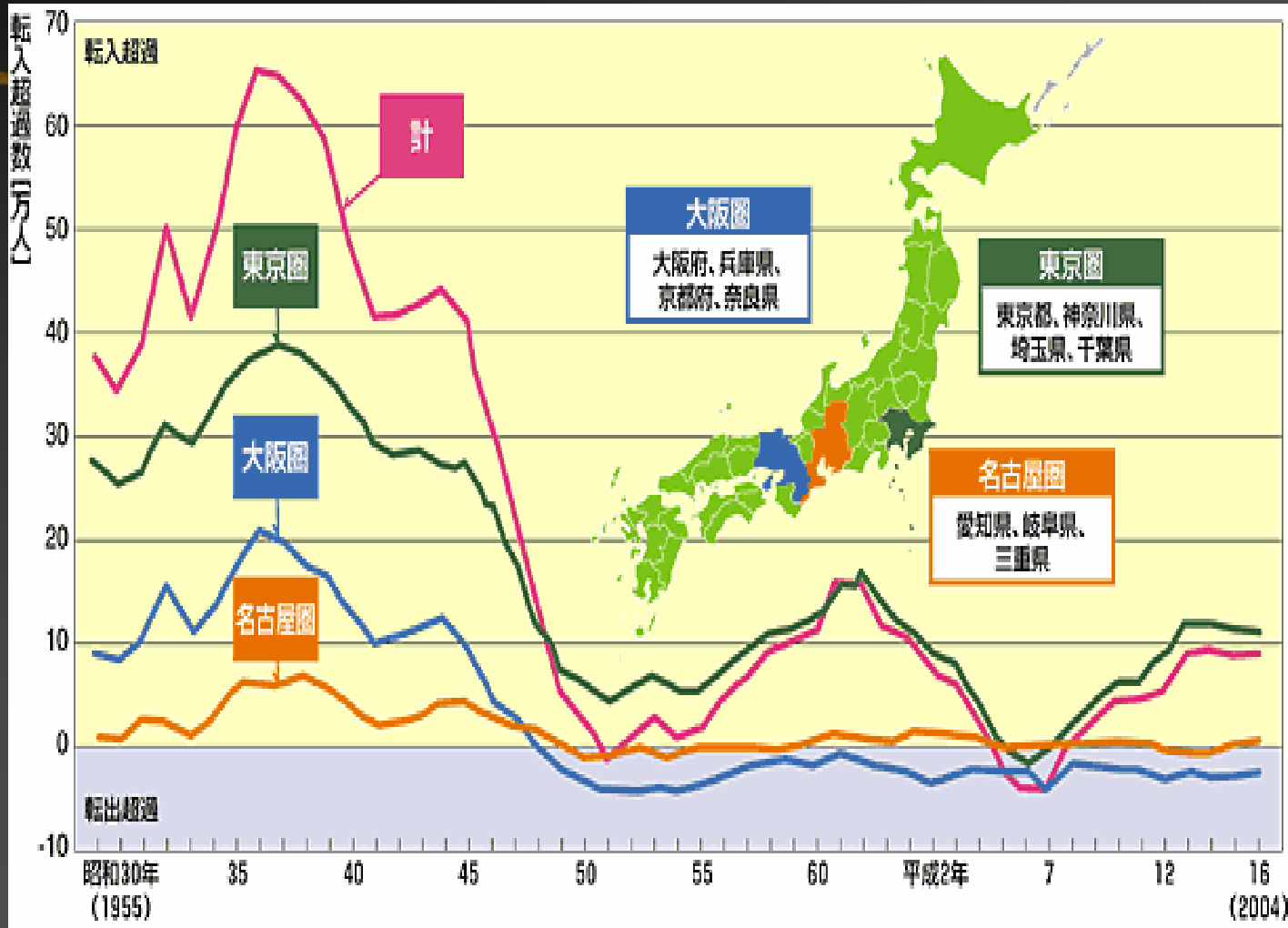
# End of urbanization

Urban population grows



# Urban migration in Japan, last 50 years

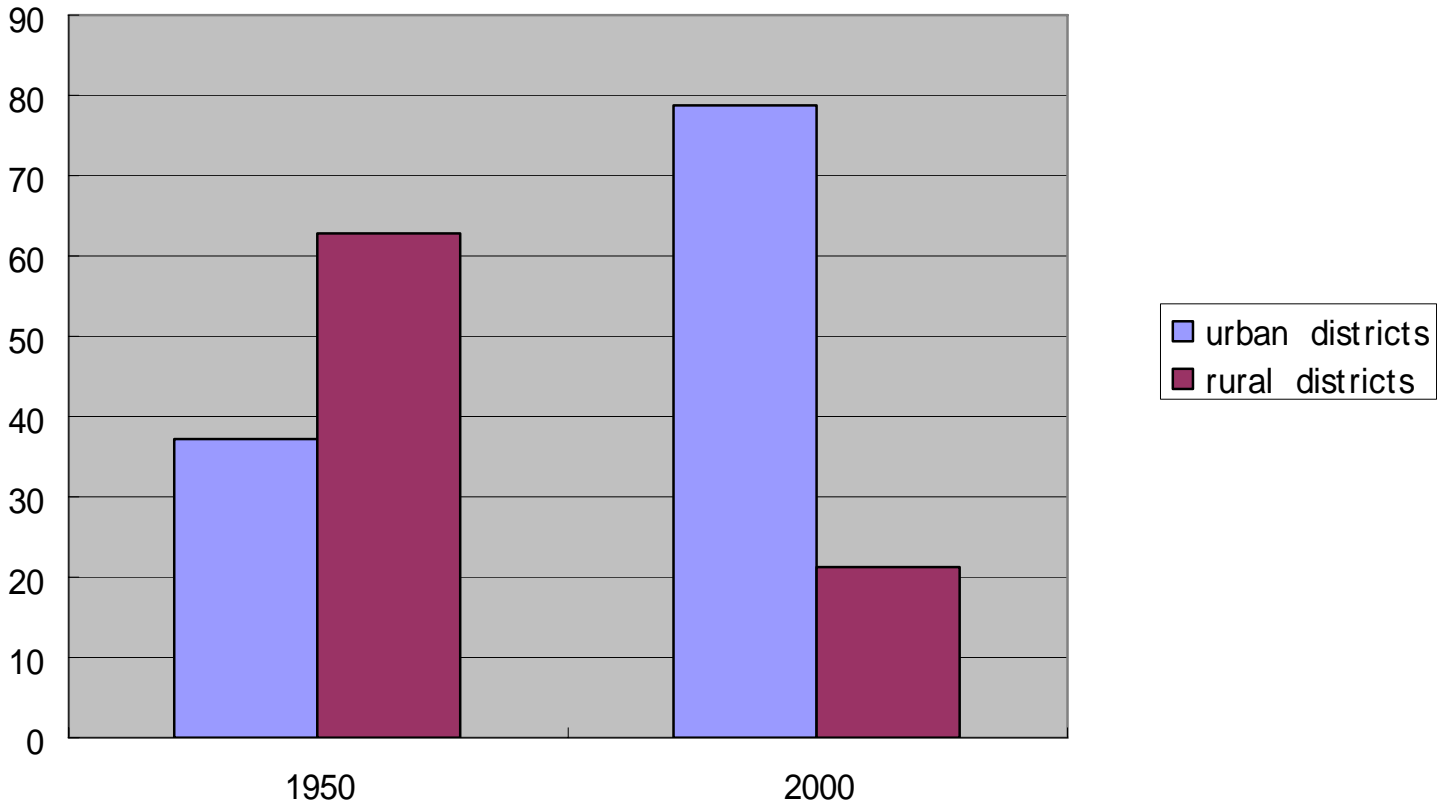
unit:10 thousand people



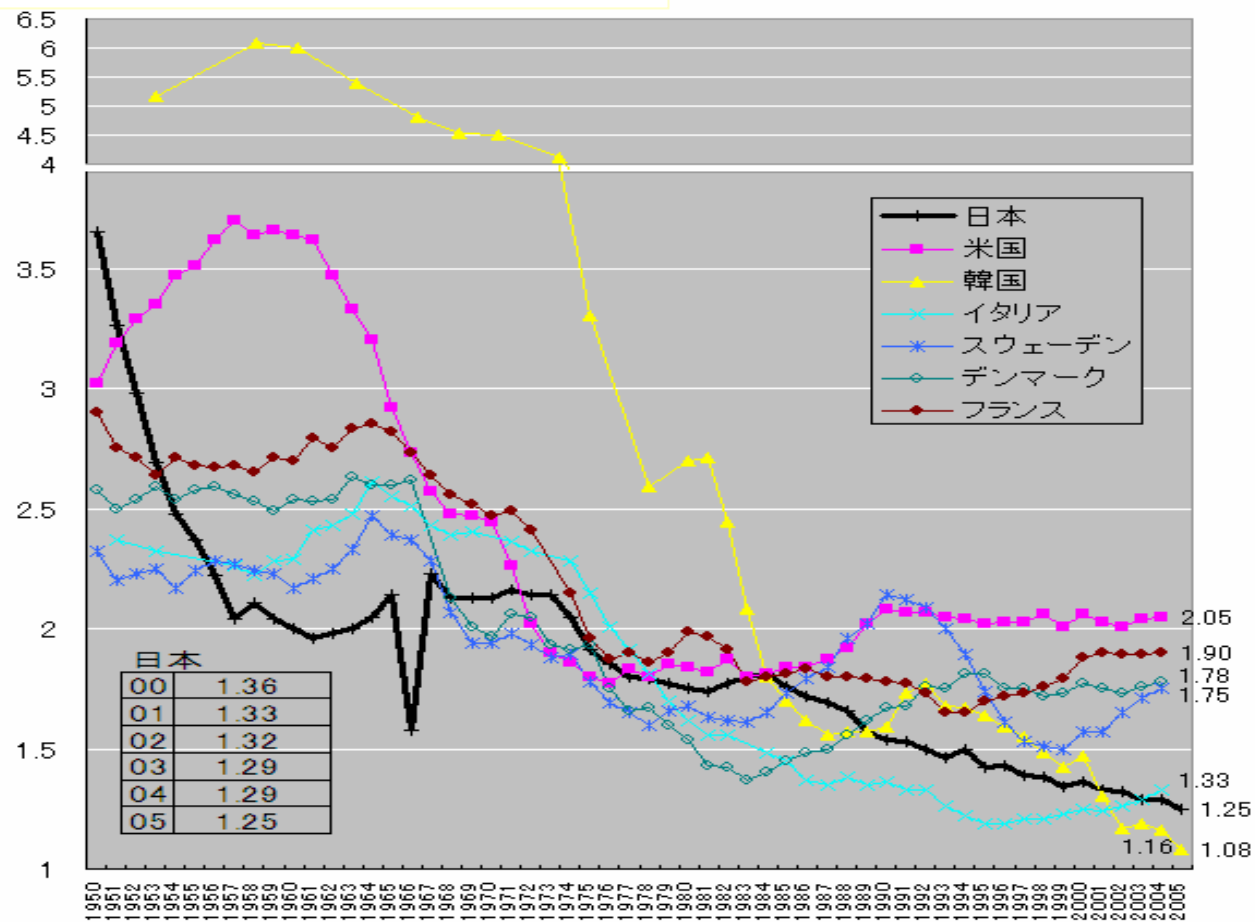
- TTL
- Tokyo
- Osaka
- Nagoya

# Population distribution among urban and rural

population distribution



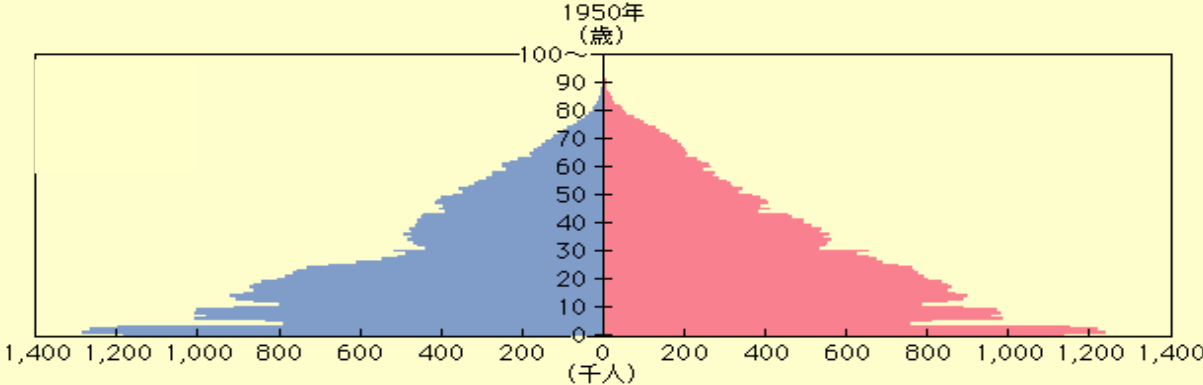
# Fertility rate



Japan  
 USA  
 Korea  
 Italy  
 Sweden  
 Denmark  
 France

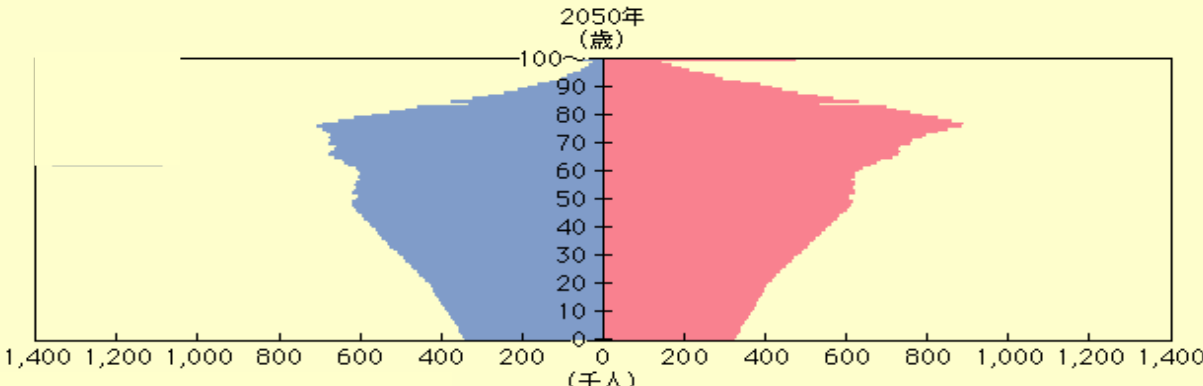
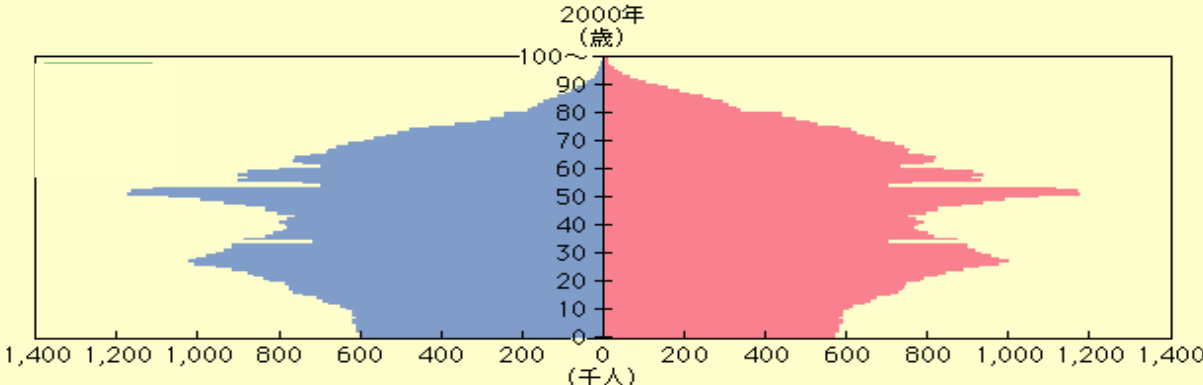
# Population pyramid

unit:thousand people

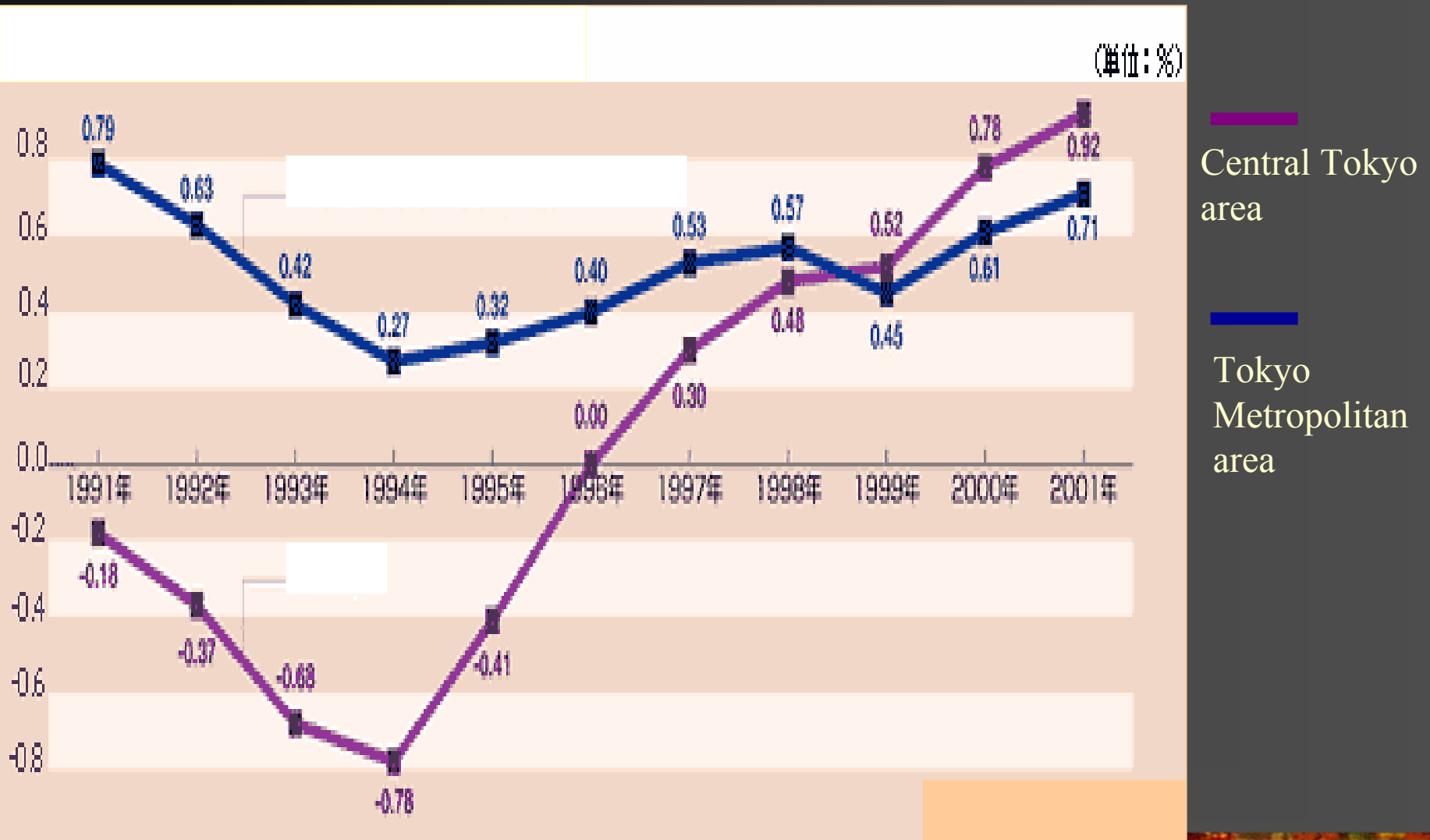


male

female



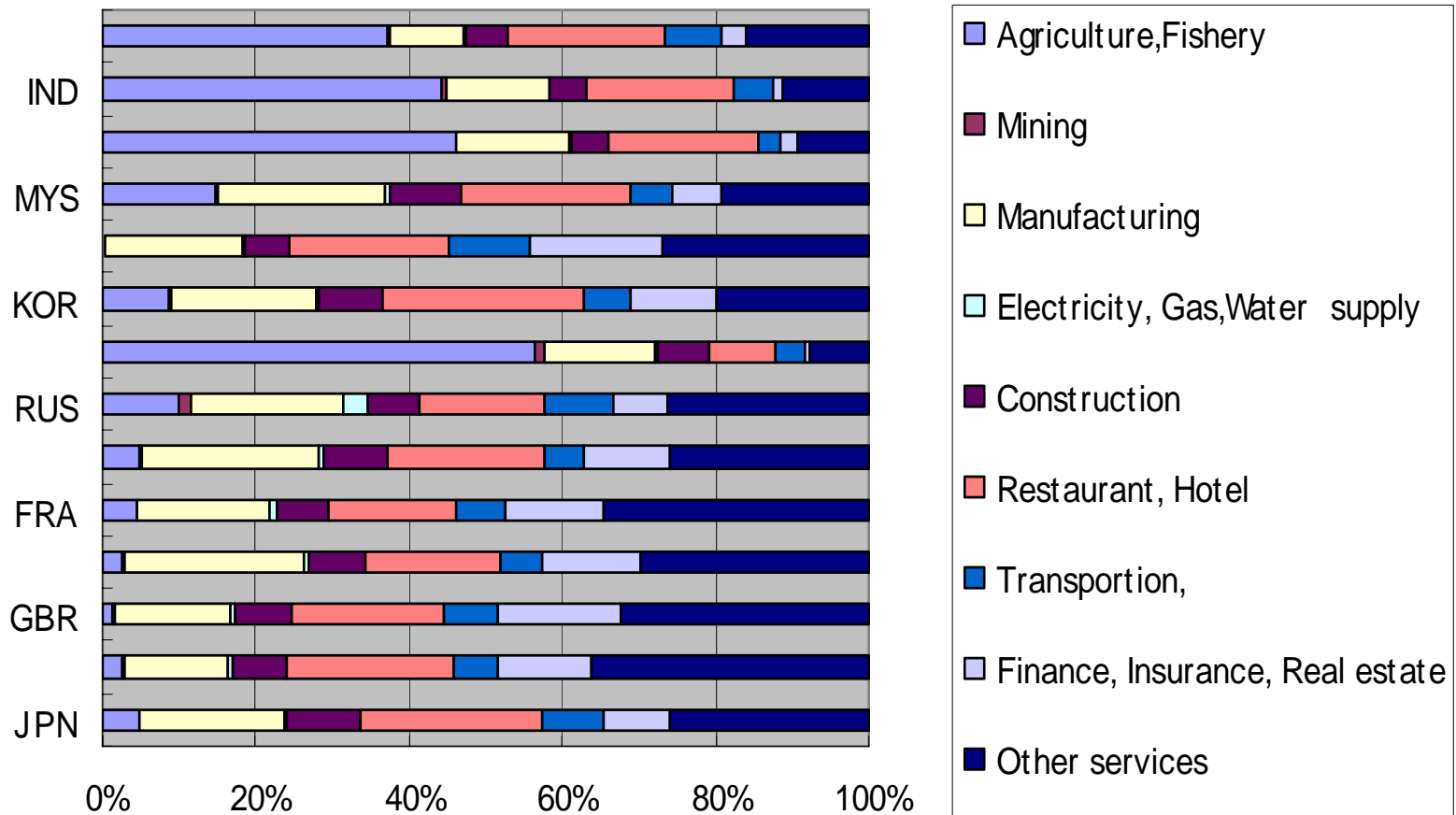
# Population distribution within Tokyo Metropolitan area moves





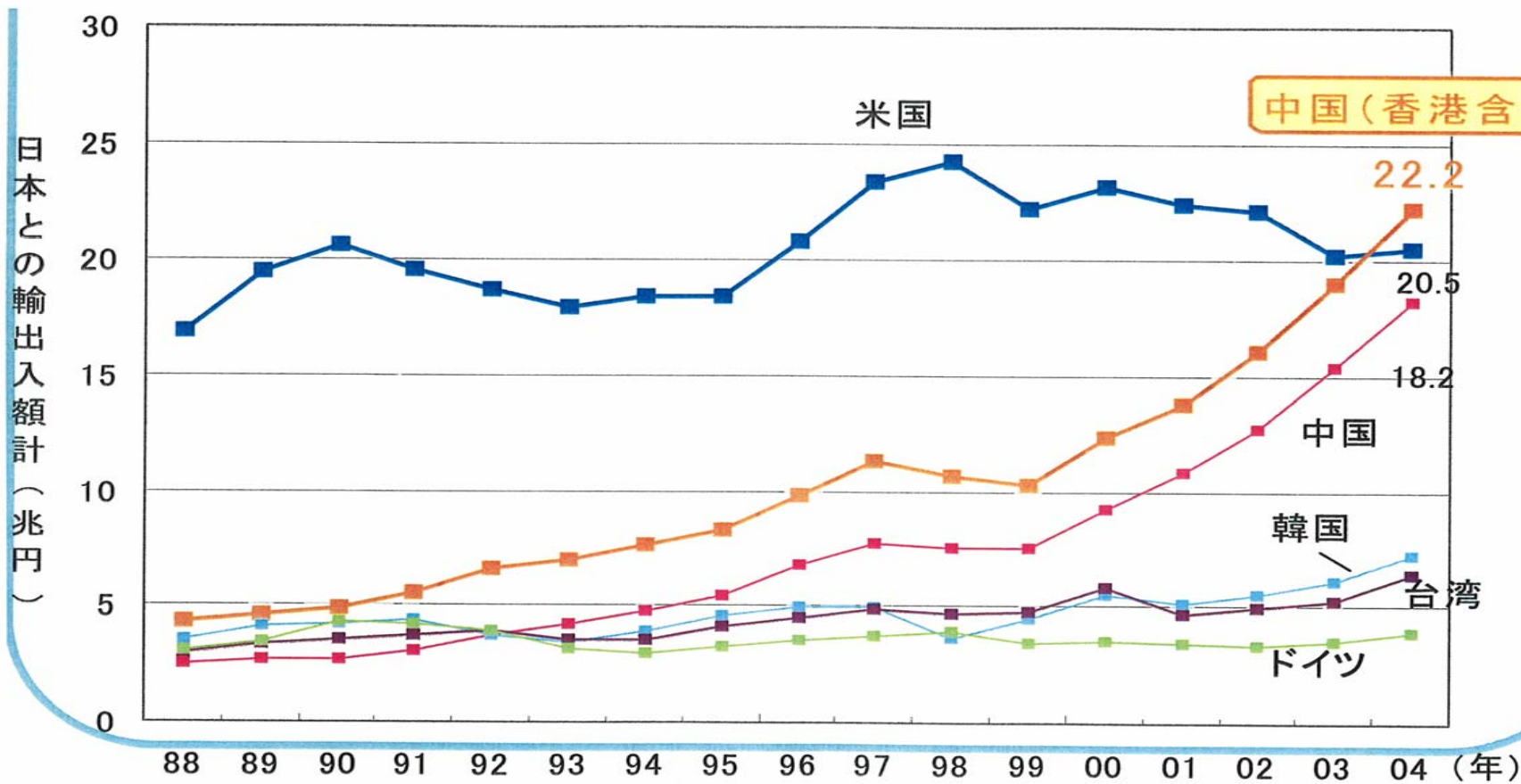
# Shift to service economies, and the urban renaissance

Employment of structure by industries 2003



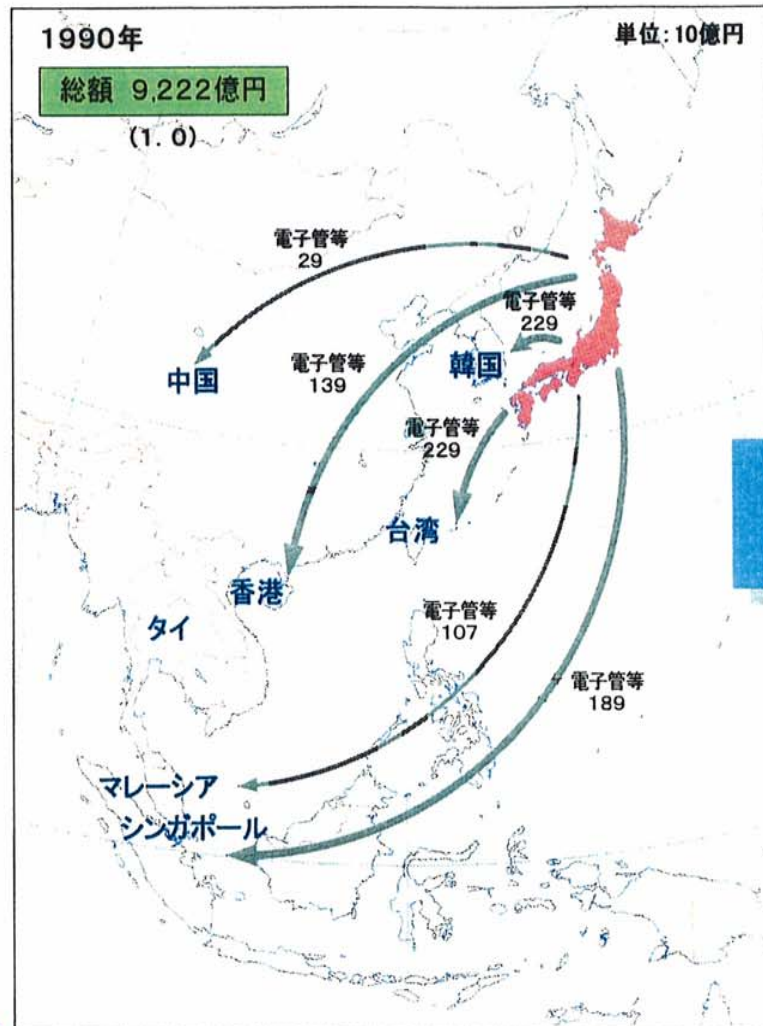
# Exports/imports Japan

unit trillion yen

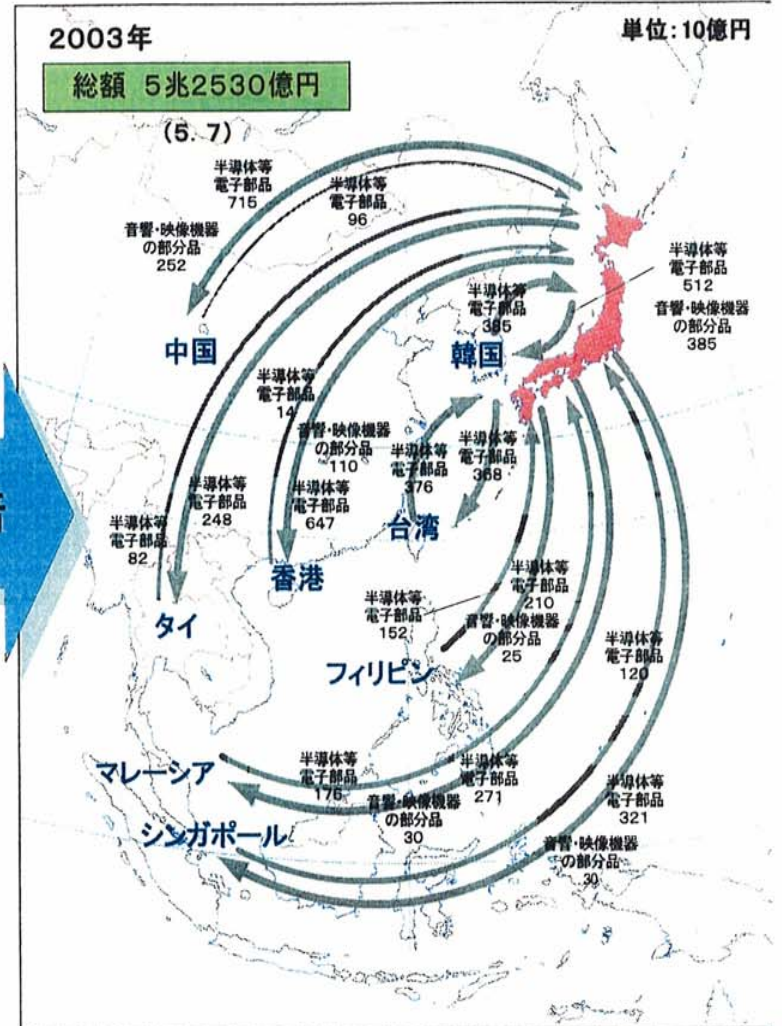


- USA
- China(include Hong Kong)
- China
- Korea

# Division of Labor among Asian Countries: electronics products and parts:1990~2003



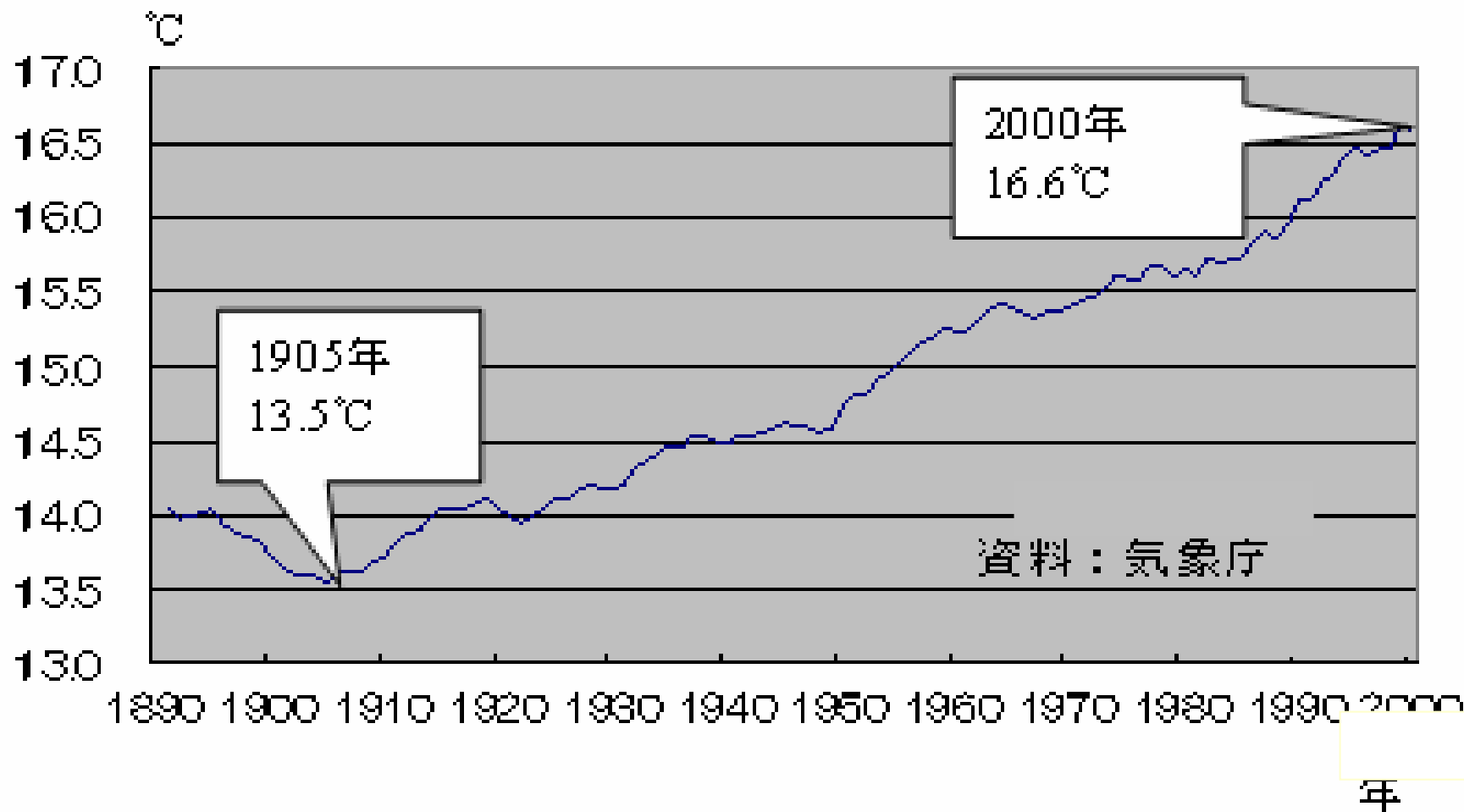
5.7倍



# Change in urban climate

Year average temperature in Tokyo

unit:Celsius



# Temperature in Tokyo 2004

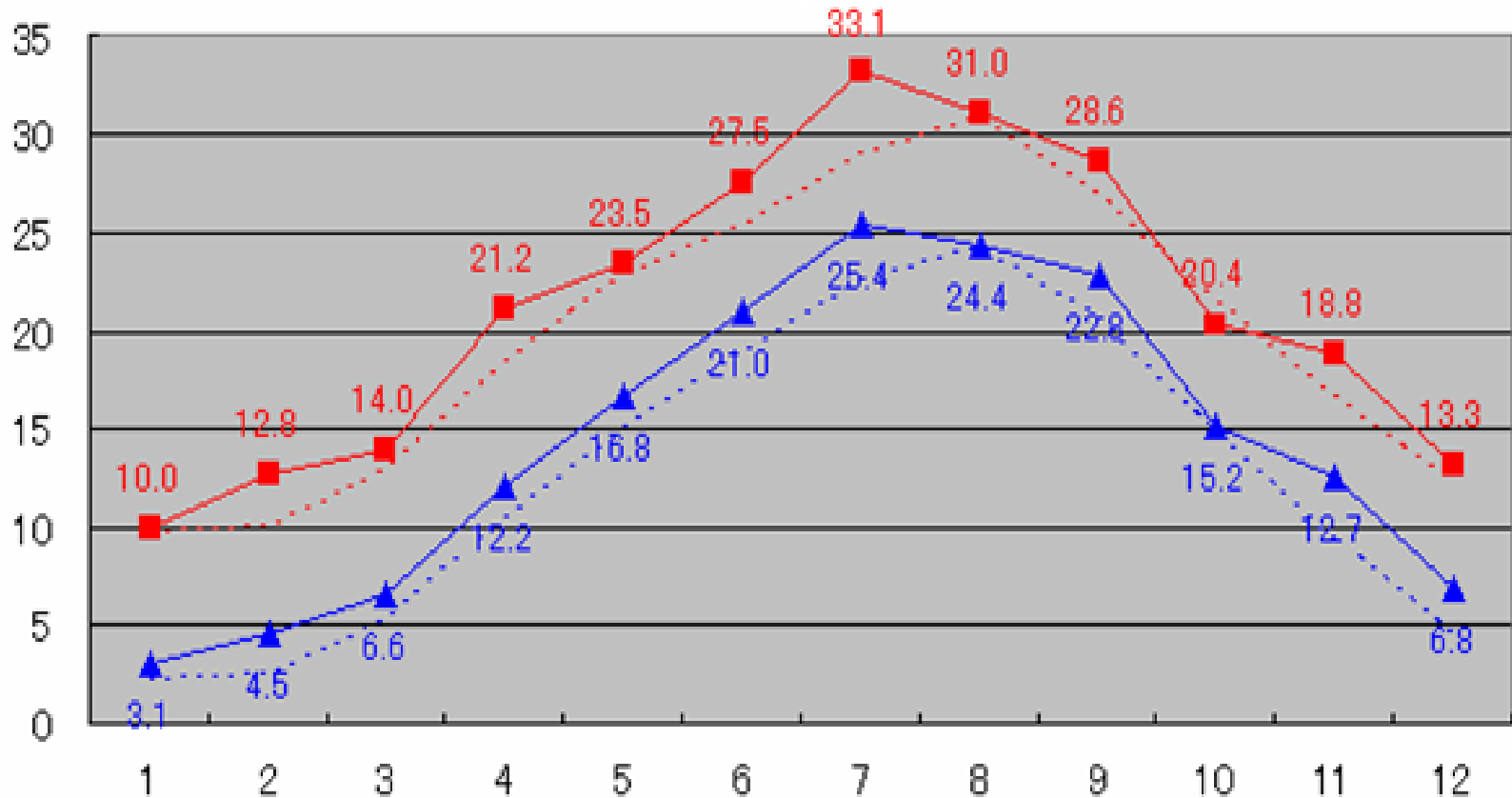
unit°Celsius

■ Monthly average of the highest

▲ Monthly average of the lowest

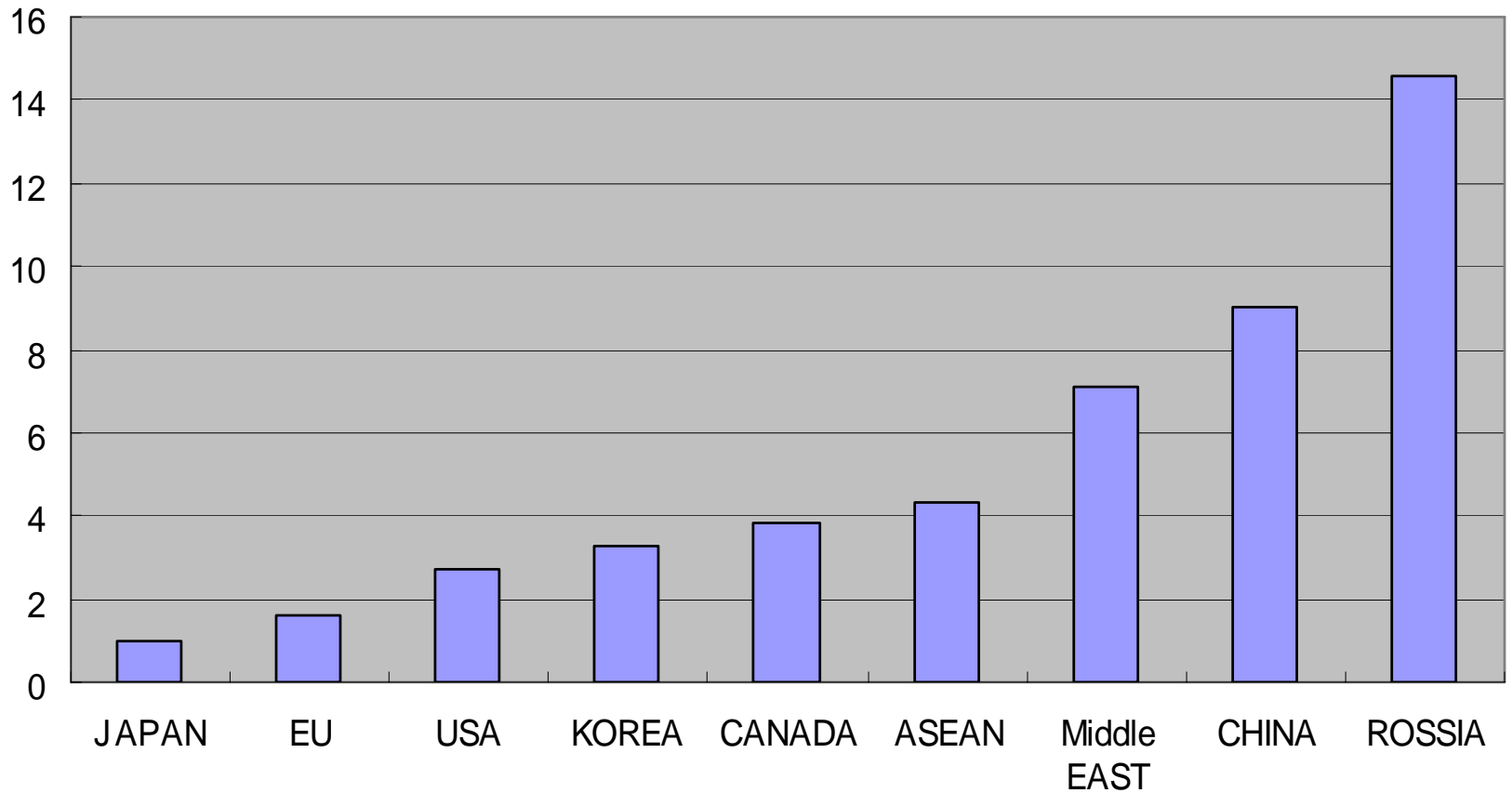
--- Average for The past

--- Average for The past



# 4 Current state of energy consumption

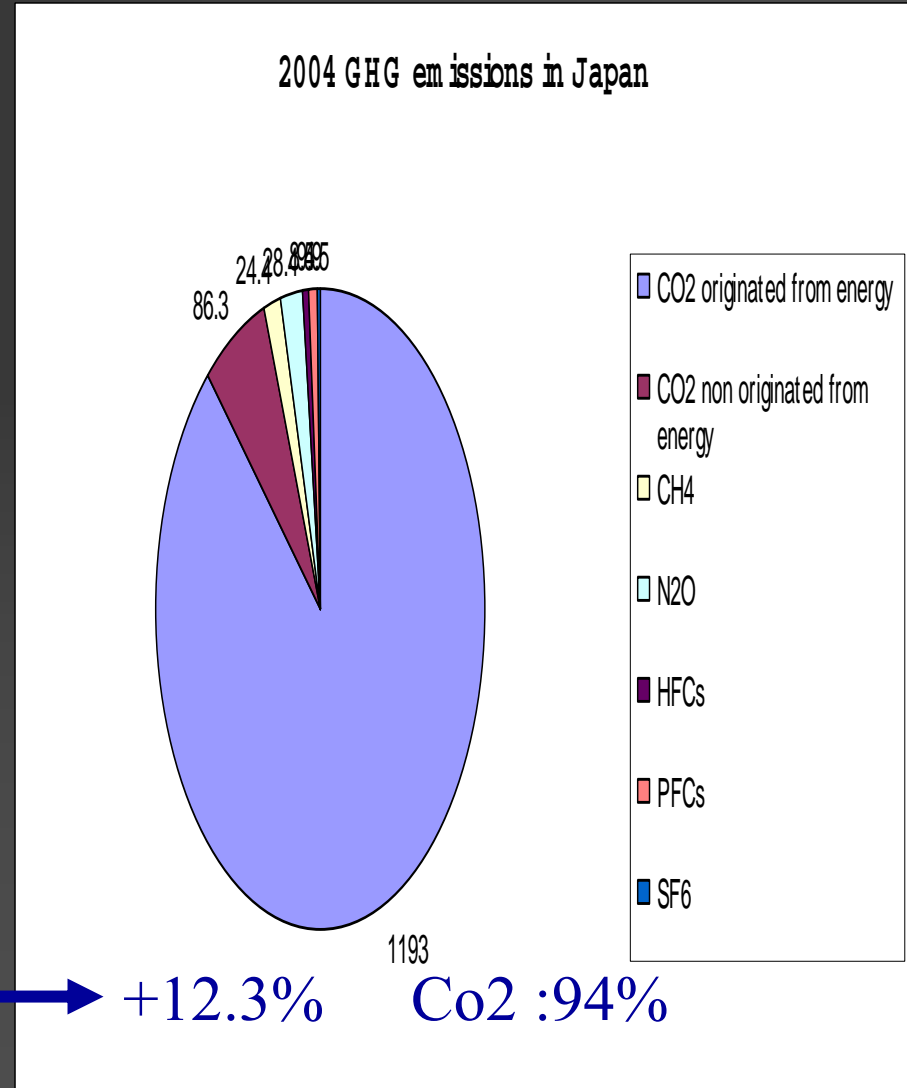
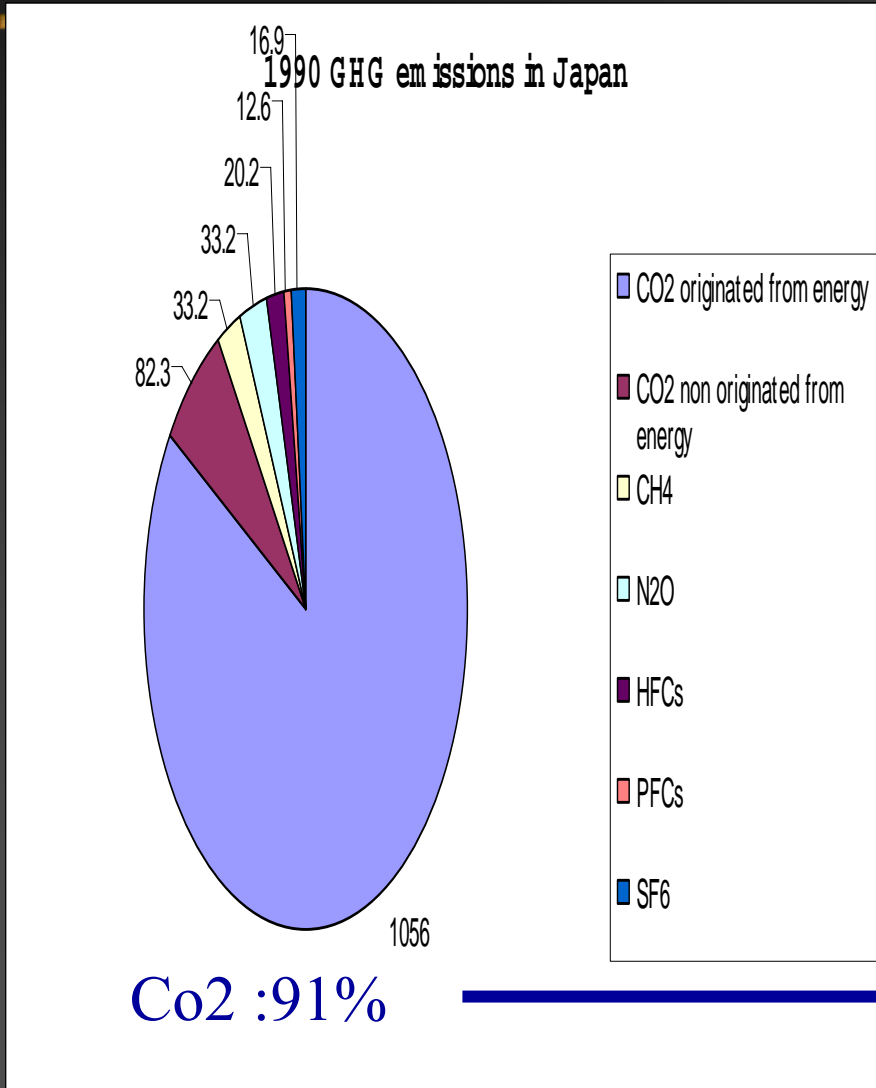
Primary energy consumption per GDP



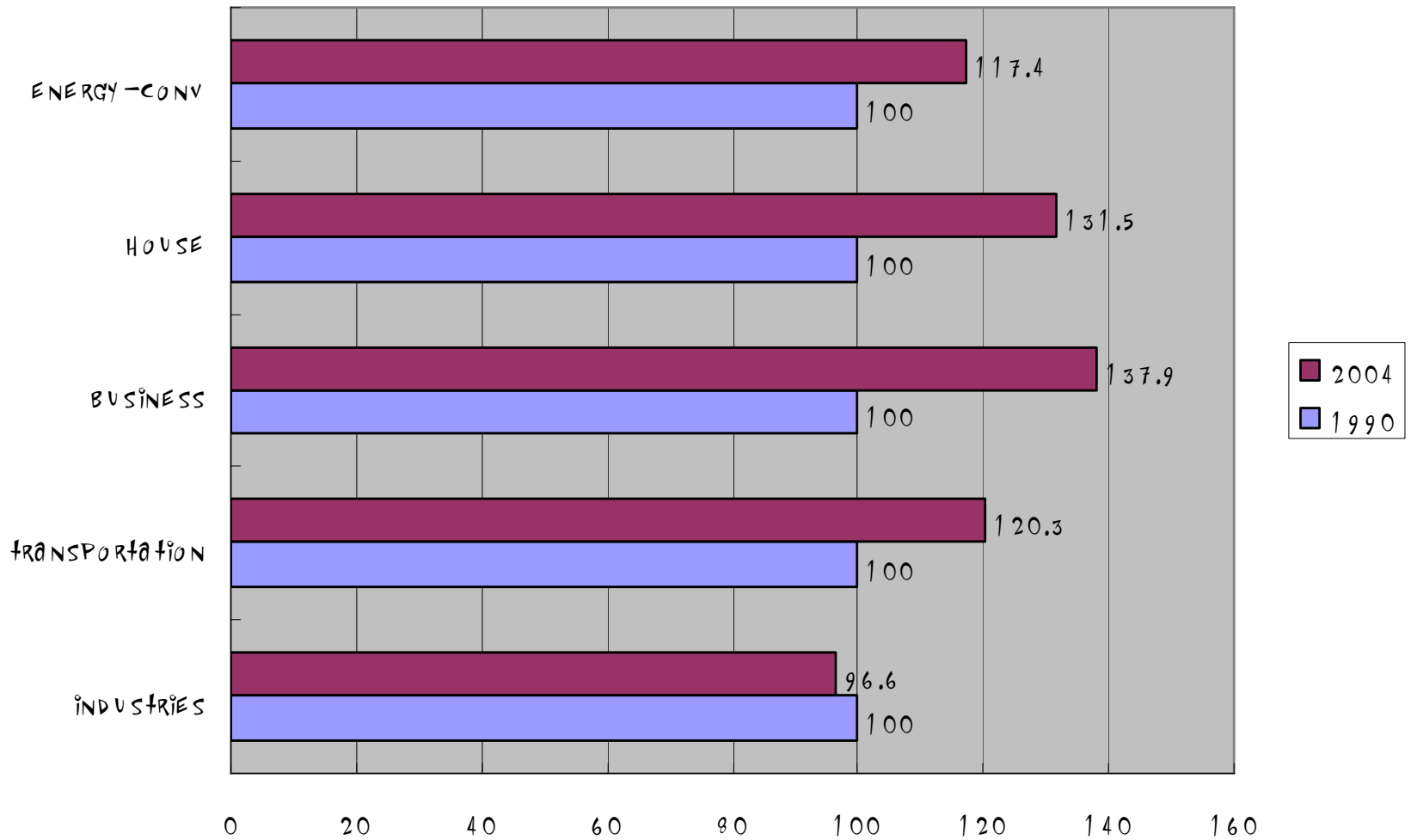
# 5 Change in greenhouse gas emissions and measures to reduce

Greenhouse gas emission: 1990 and 2004

unit: million-ton Co2



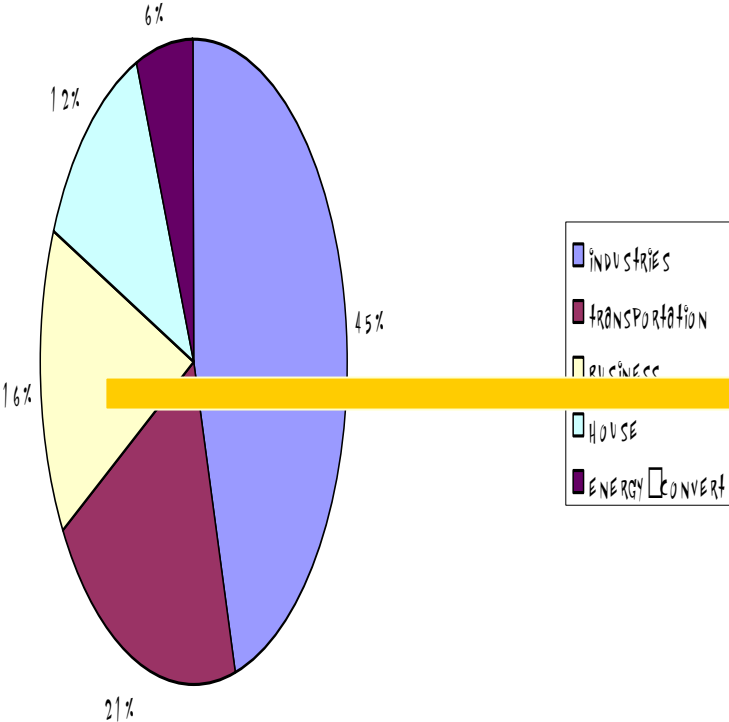
# 2004 CO2 emissions by sectors



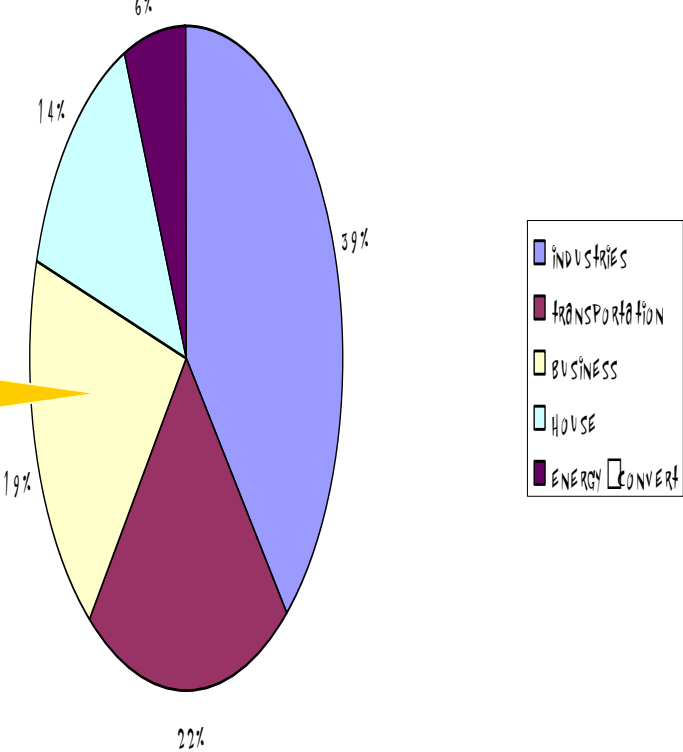


# Business sector: biggest share increase: 16% in '90 to 19% in '04

1990 CO2 emissions from energy sector



2004 CO2 emissions from energy sector



# Some of the major policies to reduce CO2 emission: Business and Household

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- Urban design for CO2 saving
  - District heating and cooling
  - Transportation design for CO2 saving
  - Intelligent transport managing system
  - Distribution system for CO2 saving
  - Introduction of new energy
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## 6. Decision of the urban renaissance headquarters




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- Measure against global warming and heat islands in urban renaissance project
    - (1) Rationalization of energy consumption and restriction of exhaust heat in urban areas
    - (2) Concentrated improvement of heat environment of the ground through greening
    - (3) Enhancement of environment performance of buildings
-

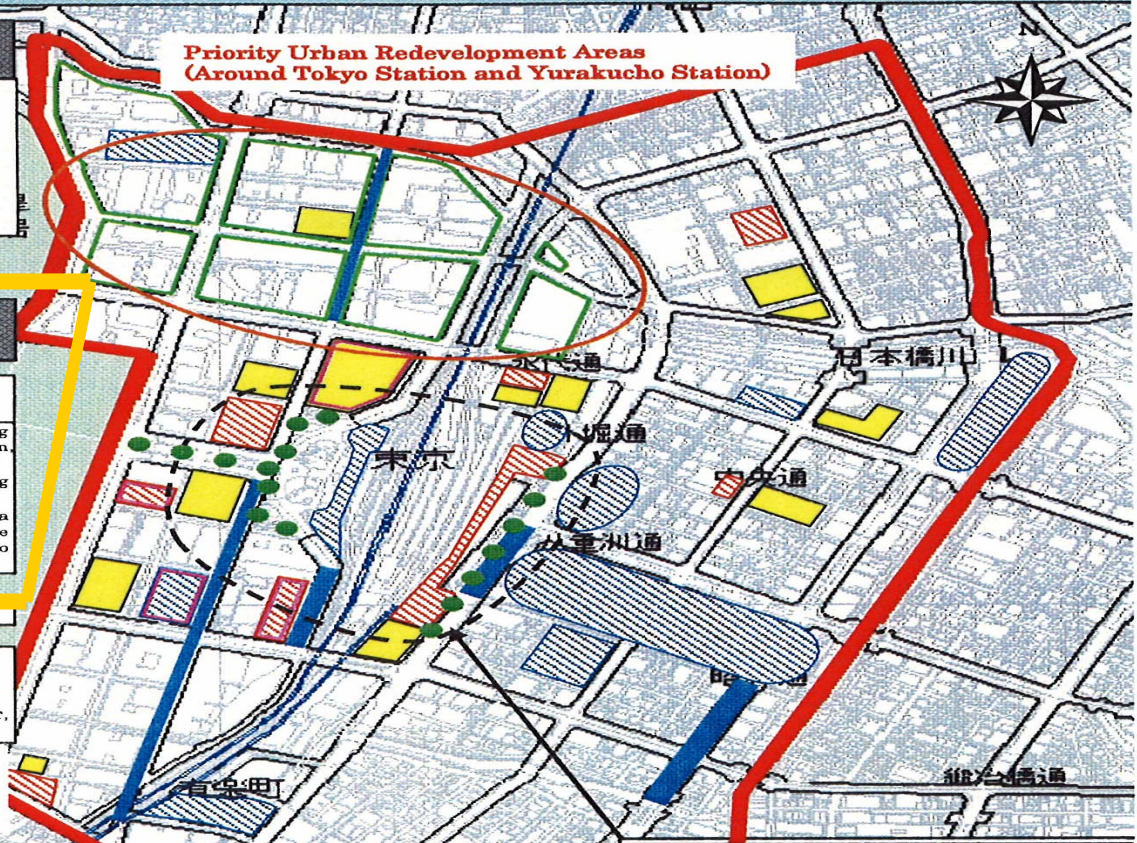
# Urban renaissance project around Tokyo station

## Around Tokyo Station

### Progress in Urban Renaissance Project




-  Concept stage or under consideration (10 districts)
-  Being implemented (about 8ha)
-  Completed (about 8ha)

### Priority Urban Redevelopment Areas (Around Tokyo Station and Yurakucho Station)



### Efforts for environment measures

#### Establishment of highly efficient regional energy system

-  Installation of district heating and cooling system, adoption of fuel cells and co-generation, etc.
-  Replacement of old district heating and cooling systems
-  Using unused energies, such as sewage, as a cooling source (during summertime) to reduce the discharge of exhaust heat into the air to zero

#### Rooftop greening, compound greening



- Of the major Urban Renaissance Project (53ha) in inner cities, 12ha have been greened.
- \* Greening of rooftops amounts to 16ha a year, or equivalent to the size of Hibiya Park.
- ※ The Tokyo Metropolitan Government assumes inner city and Shinjuku, etc. are "Heat Island Measure Promotion Areas."

#### Greening of school yards, greening of wall surfaces

- Grassing of school yards (Fiscal 2005: about 30 schools), Greening of school wall surfaces (Fiscal 2005: 5 schools)



#### Water-retentive pavement and road watering, construction of leafy-shaded roads, etc.

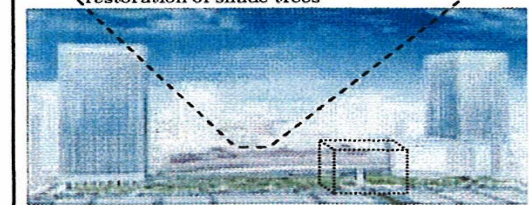
-  Shade trees (To be planted in the future)
-  Construction of water-retentive roads completed or planned
- Utilization of sewage resurgent water and subway tunnel spring water in environment measures (Fiscal 2005: Marunouchi district, etc.) (Discharge to urban rivers: Shibuya River, etc.)

#### Joint use and rationalization of transportation

- Segregation and joint recovery of construction byproduct (Inside Tokyo: 2005-)
- Joint delivery of goods by department stores (Inside Tokyo, etc.: in fiscal 2005)

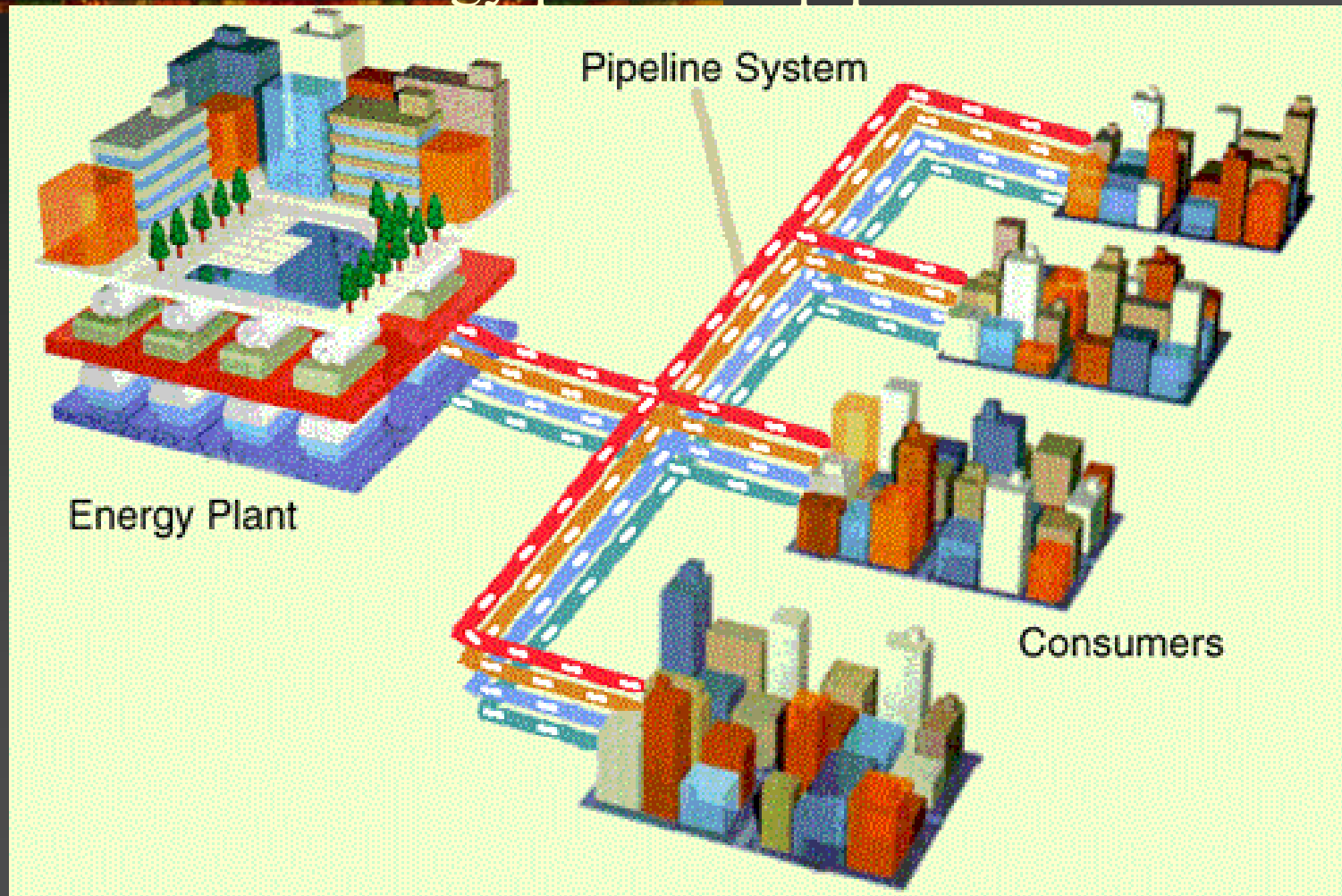


- Water-retentive pavement on Miyuki Dori (street) constructed along with the restoration of shade trees



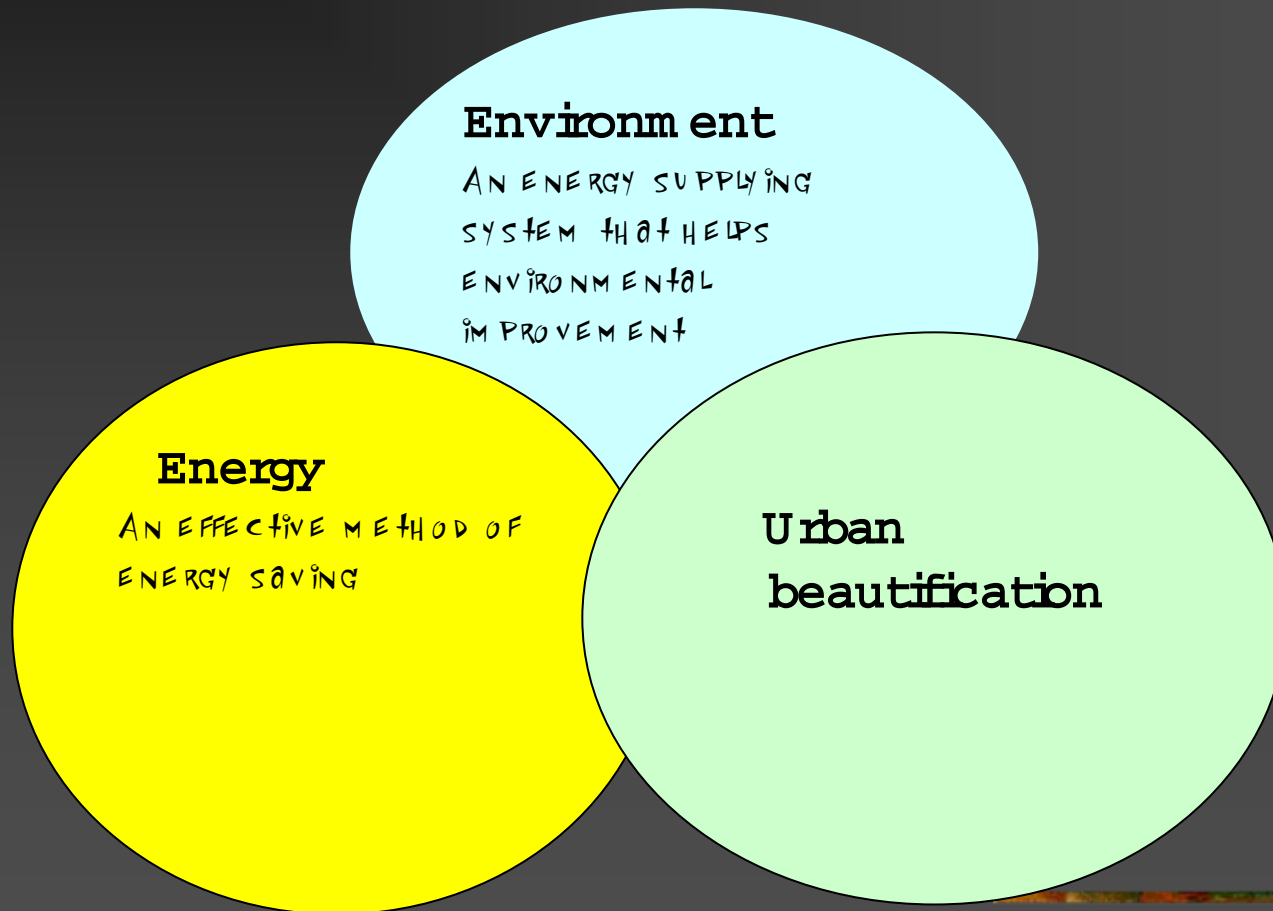
# What is District Heating and Cooling

Network of energy plant and pipelines



# Merits of district heating and cooling systems

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# 8. What are the advantages of DHC?

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Private business with public regulations

→ Heat supply business law 1972

→ Ordinance on environment preservation

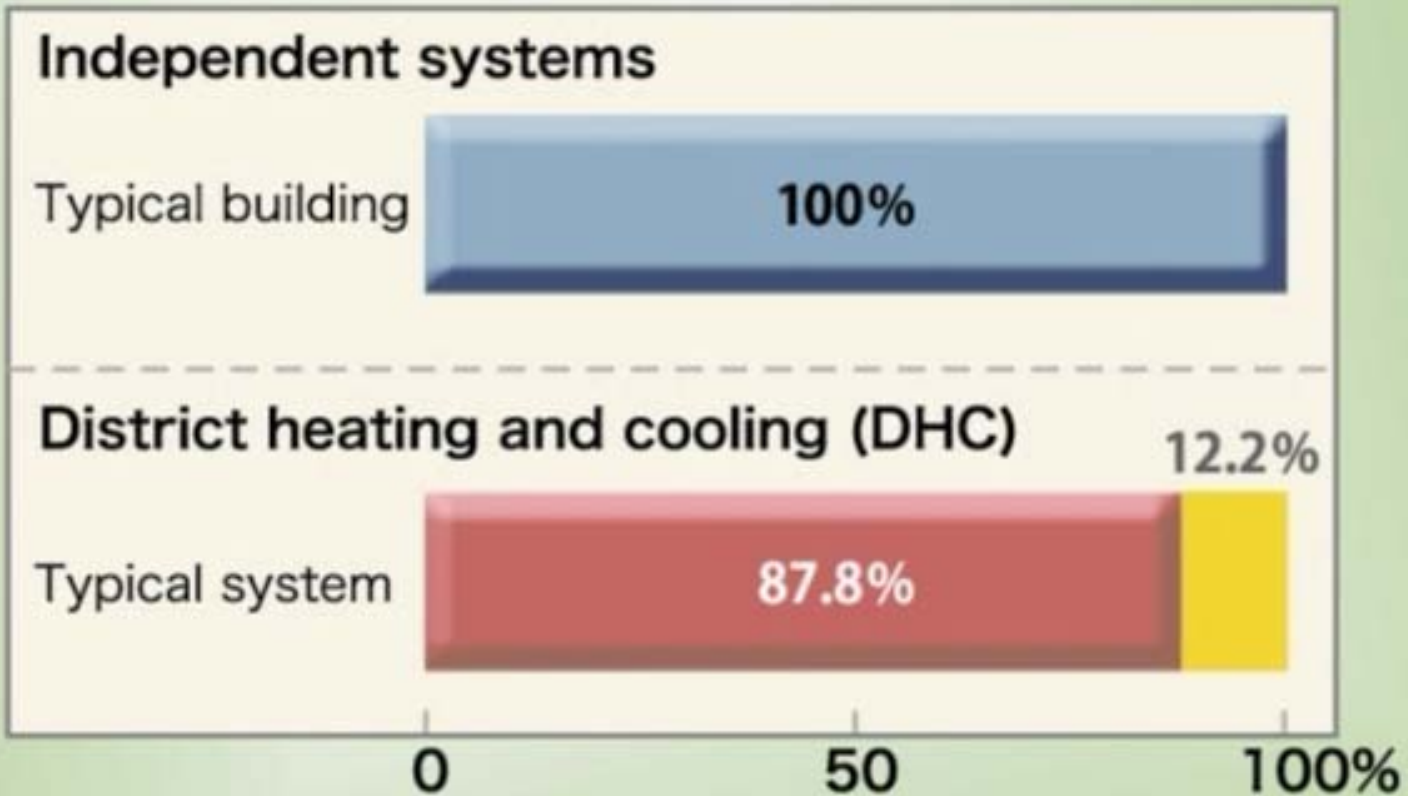
Tokyo metropolitan government 1977

→ Location for all DHC energy plants and pipelines  
is to be fixed on City Planning.

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# Energy efficiency and economical merits

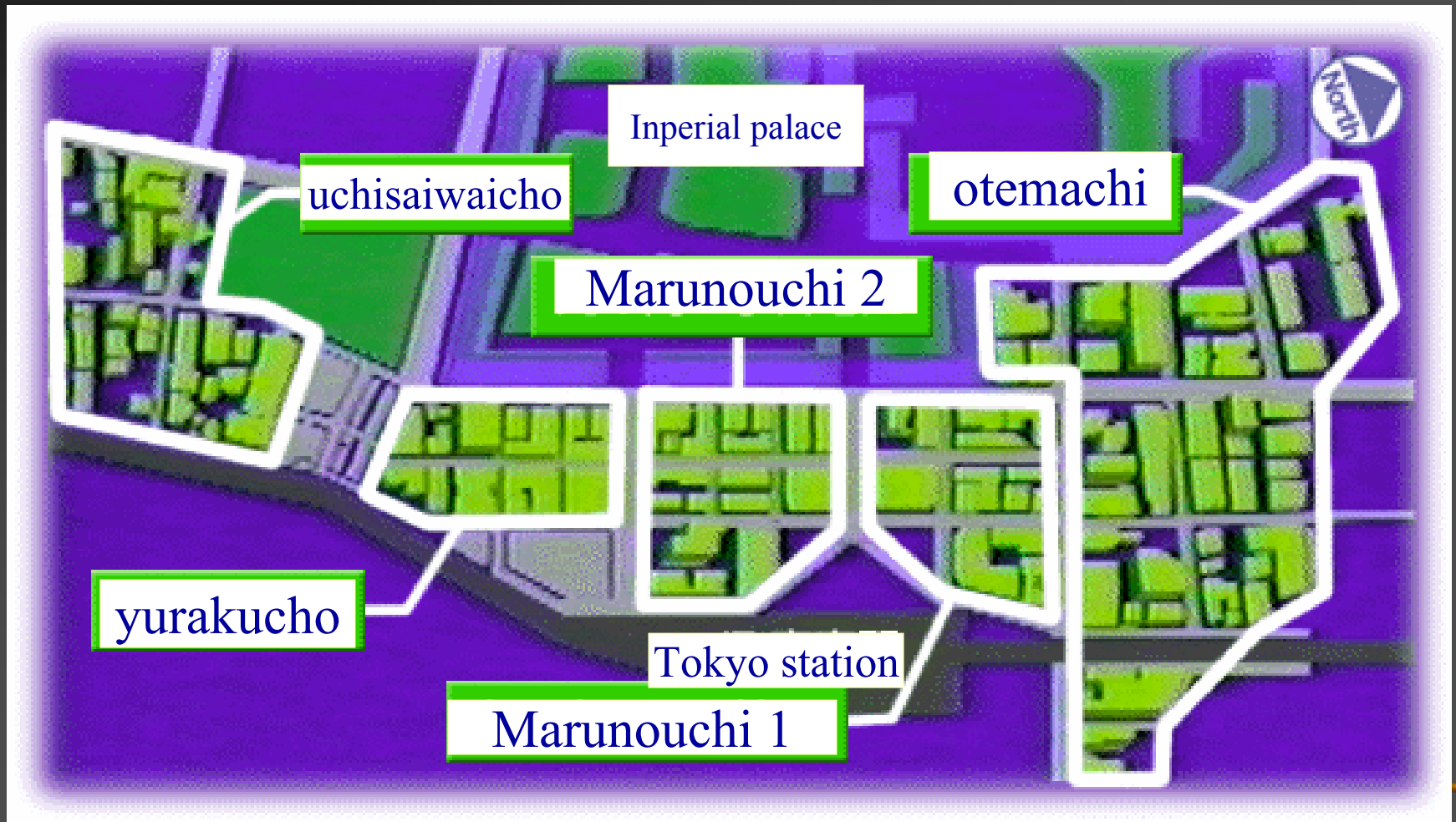
## Comparison of Primary Energy Consumption





# 9.About Marunouchi heat supply co.,.ltd.

- Business area(103ha)



# Birds-eyes view of 5 service district





- Plants and pipeline network

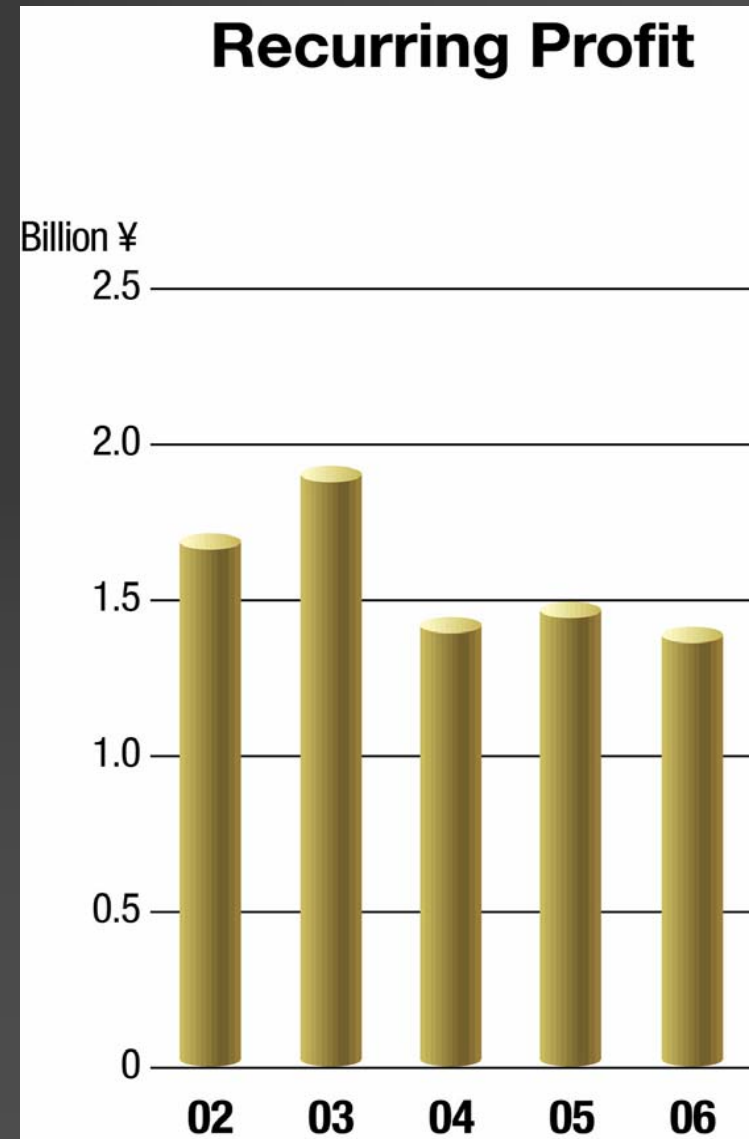
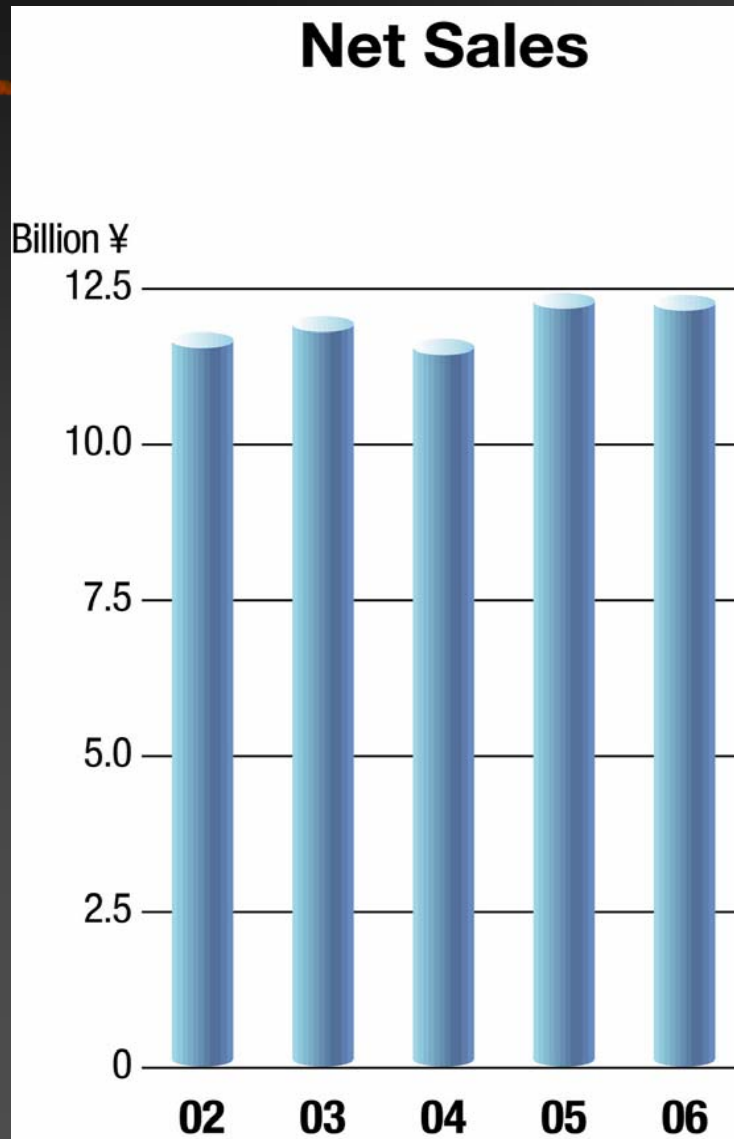
5 main plants and 10 sub plants

boiler 618t/h chiller 73,000RT

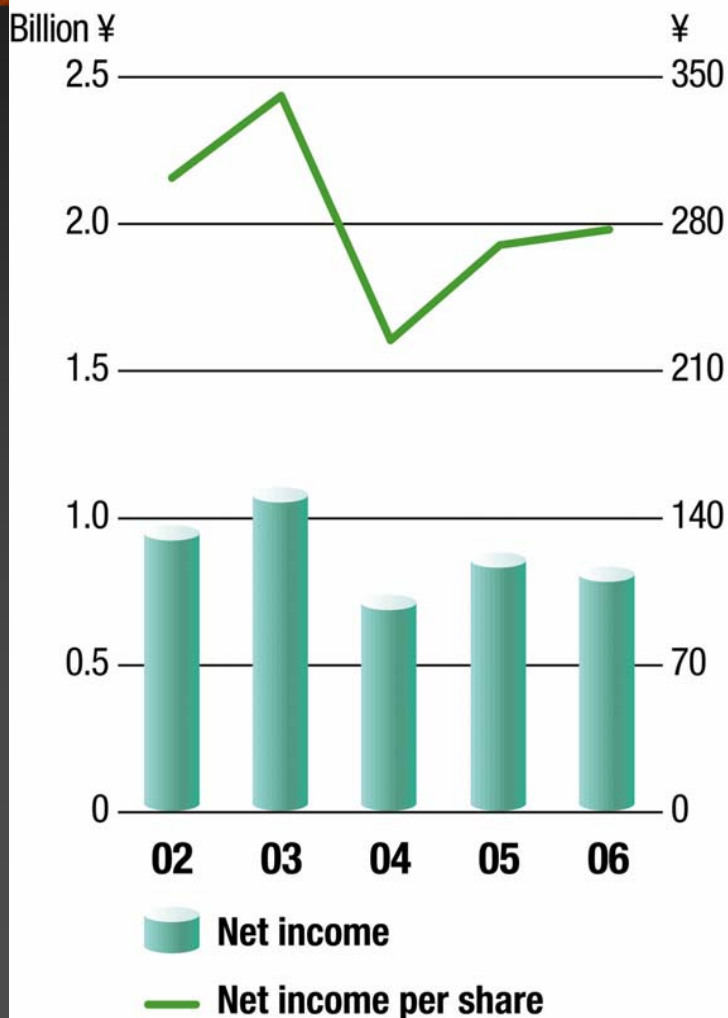
pipe line network 17.7km

# The financial outcome in the business year ended March 31, 2006

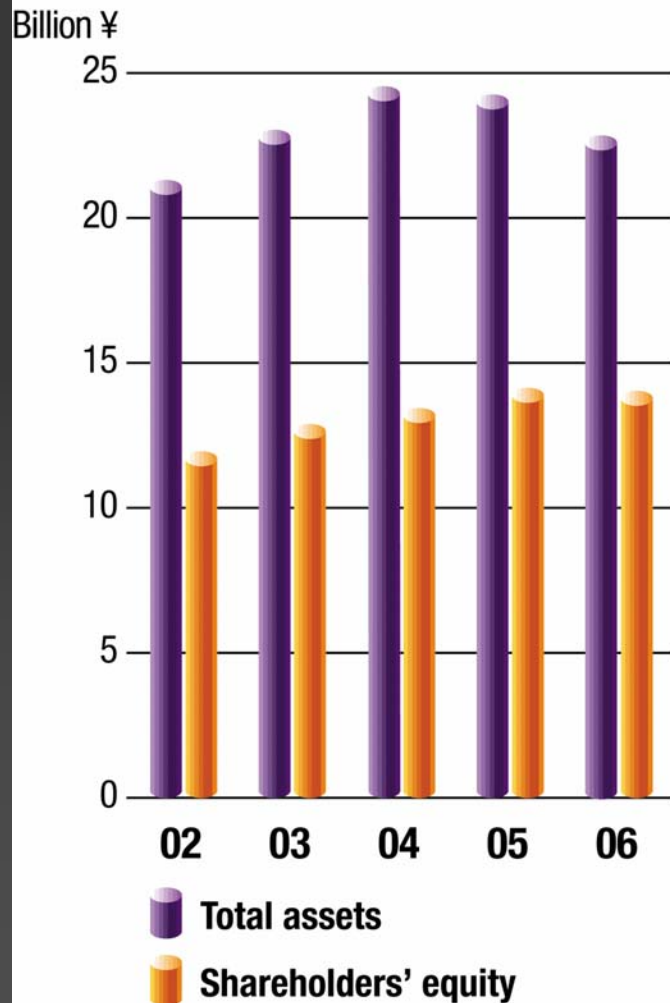
unit: billion yen



## Net Income and Net Income per Share



## Total Assets and Shareholders' Equity



# 10.Future challenges

- Establishing higher efficiency equipment
- Technological improvement of CHP systems
- Utilization solar batteries
- Fuel cells
- Utilization of unused energy sources, such as sewage
- Expanding the supply network



## Conclusion (70%)

