



Brookings

October 26, 2015  
10:00-11:15 (30 min.)

# **Overcoming the limits to growth: – Sustainability lessons from Japan –**

**Hiroshi Komiyama**

**President, Platinum Society Network**

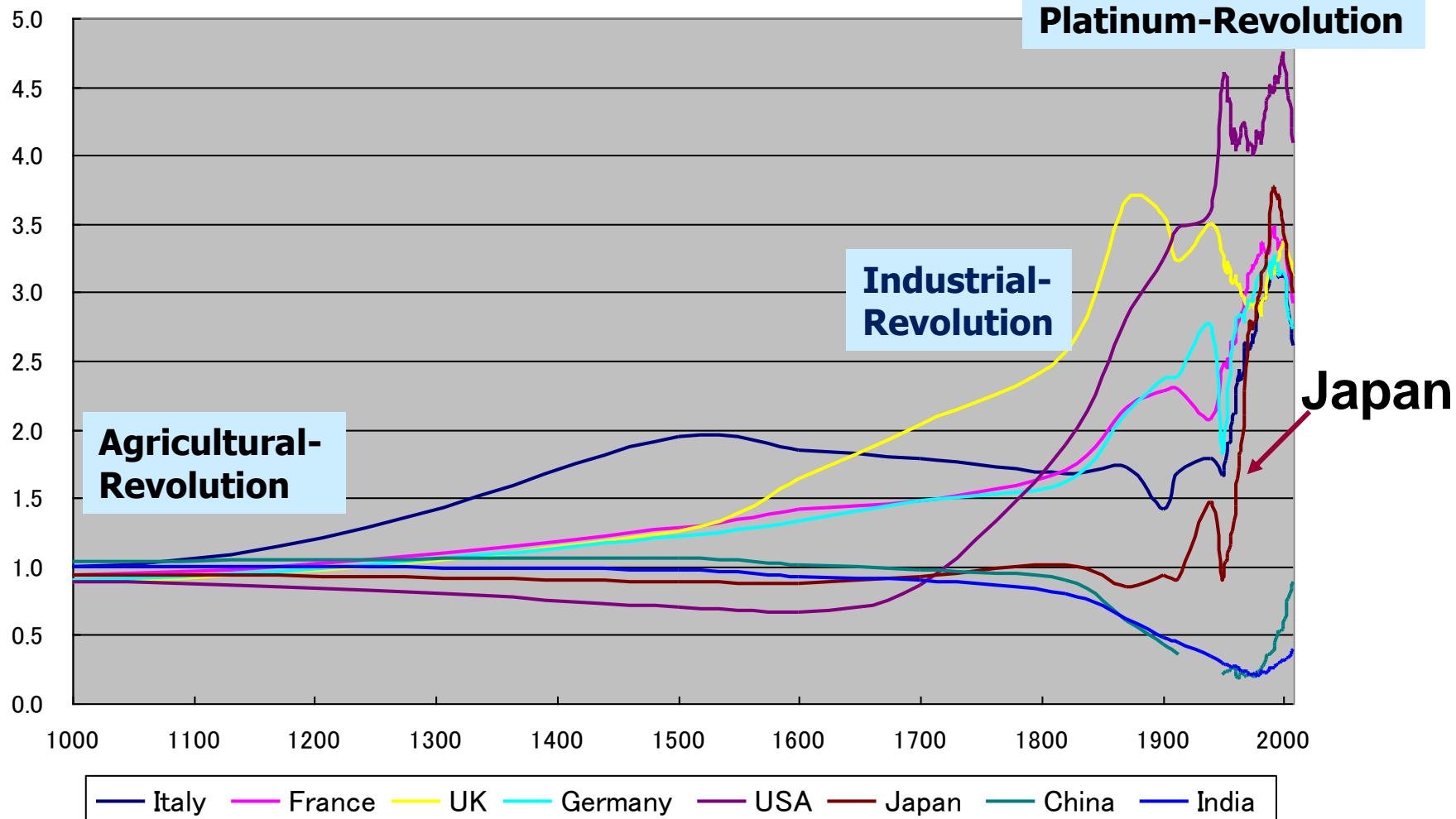
**Chairman of the Institute, Mitsubishi Research Institute, Inc.  
The 28<sup>th</sup> President, The University of Tokyo**

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- 2. What is Japan?**
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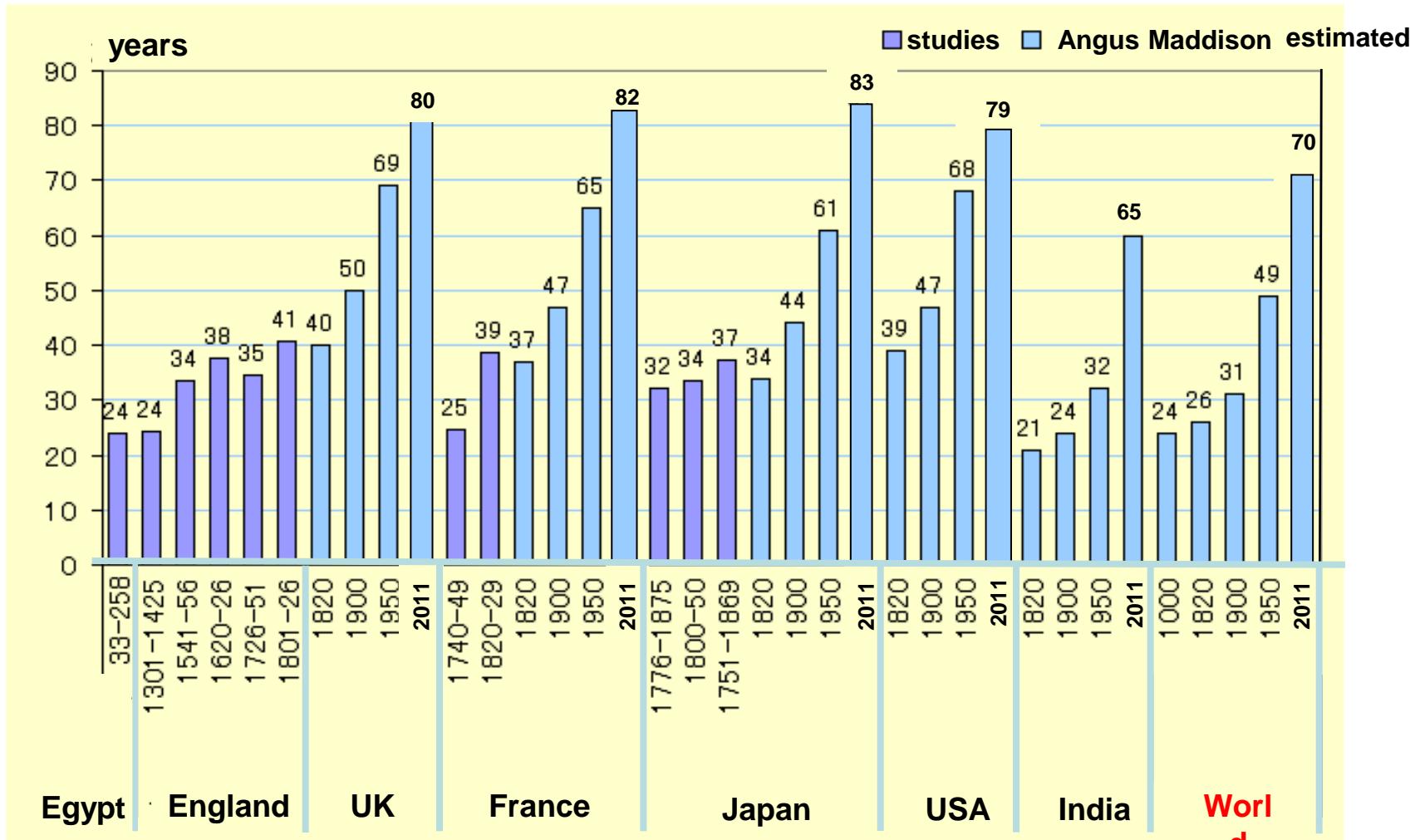
# Saturation of Industrial Revolution

Per-capita GDP of a country normalized by that of the world.



# Majority of people enjoy Longevity

The change of life expectancy in the world



source: <http://www2.ttcn.ne.jp/honkawa/1615.html>

Data of 2011 : World Health Statistics 2013 (WHO)

# Saturation on the Finite Earth

## example: car ownership

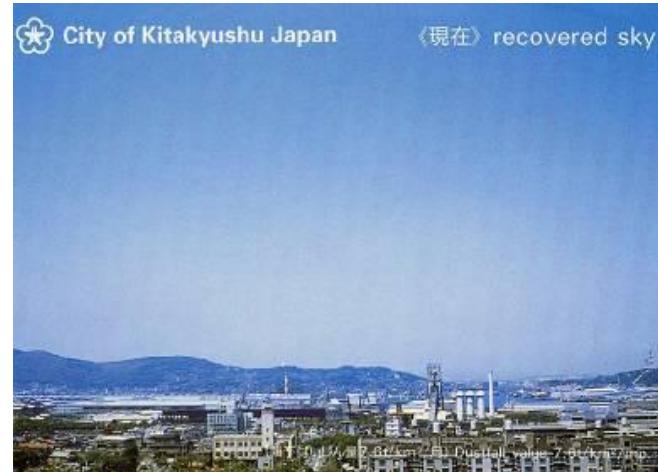
	2007		2010	
	No. of automobiles (million)	No. of automobiles per population	No. of automobiles (million)	No. of automobiles per population
<b>Japan</b>	58	0. 45	58	0. 46
<b>USA</b>	138	0. 45	119	0. 38
<b>UK</b>	31	0. 51	31	0. 50
<b>France</b>	31	0. 50	31	0. 50
<b>Germany</b>	41	0. 49	42	0. 51
<b>China</b>	32	0. 02	61	0. 05
<b>India</b>	13	0. 01	13	0. 01

2014

0.10

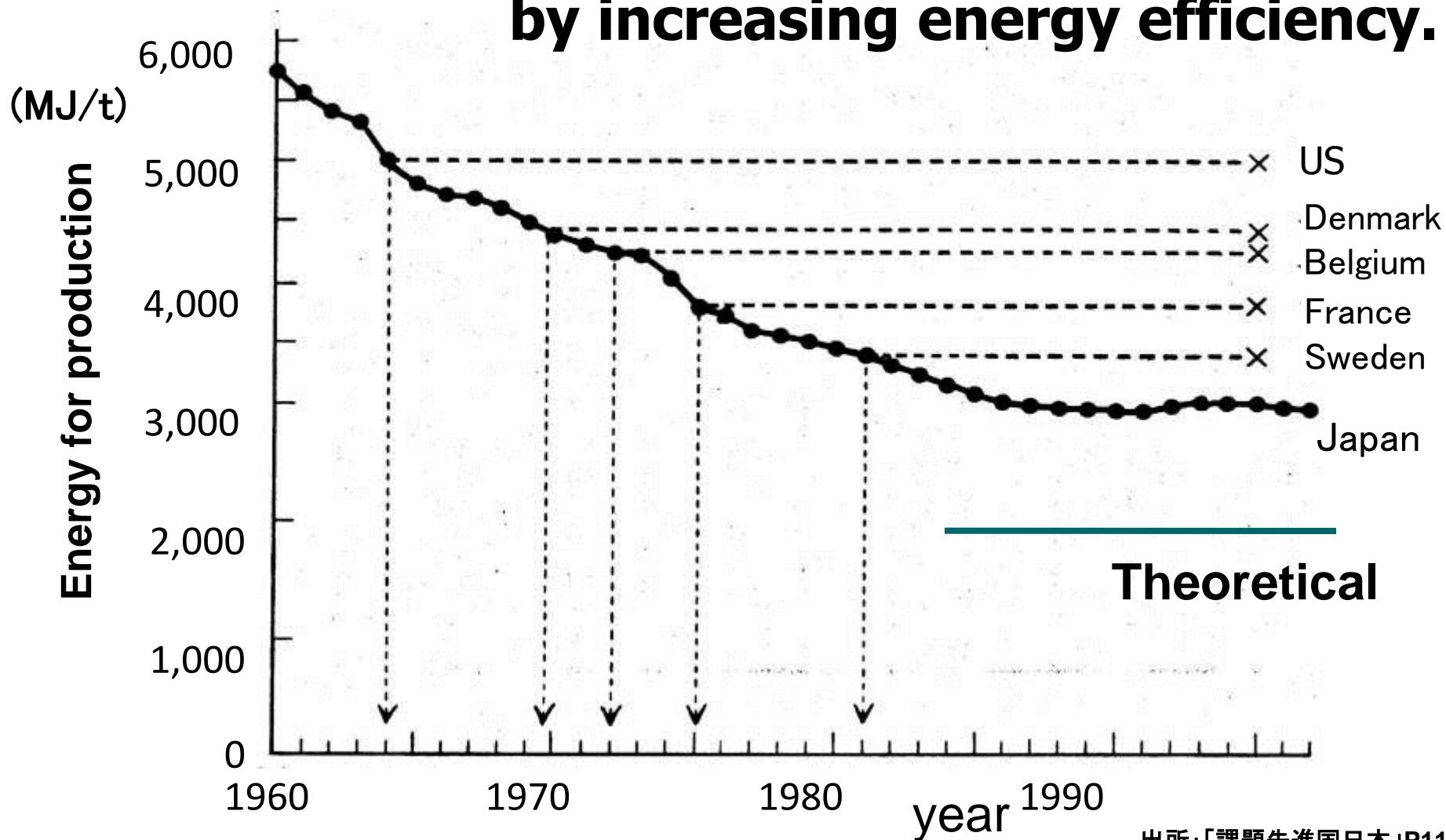
(Data) Japan Automobile Manufacturers Association,  
Ministry of Internal Affairs & Communications

## Japan overcame environmental pollution



出所:「課題先進国日本」P27(北九州市提供)

# Japan overcame energy crises by increasing energy efficiency.



Source: Japan Cement Association

出所:「課題先進国日本」P114

# What is Japan?

**One of the peaks in the world**

**Closed in Edo**

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**Meiji  
restoration**

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**Ind. Revolution in Europe vs. Spirituality in Japan**

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**Achieving high economic growth (1868~)**

**Answering pollutions (1960~)**

**Answering the energy crises (1970~)**

**Realizing the world longest lifespan (1970~)**

**2000**

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**Aging of Society**

**Japan faces challenges ahead of the world  
and needs innovations.**



# Platinum Society as a Vision of 21<sup>st</sup> century

Now, majority of regular citizens in developed countries have enough food, clothing, shelter, mobility, information, and longevity

It will not be later than mid 21<sup>st</sup> century that majority of the people in the world will own them.

What do we want under this satisfaction?

“Quality of Life”

Together with Quantity

What is the quality that we desire ?

# Platinum Society Network

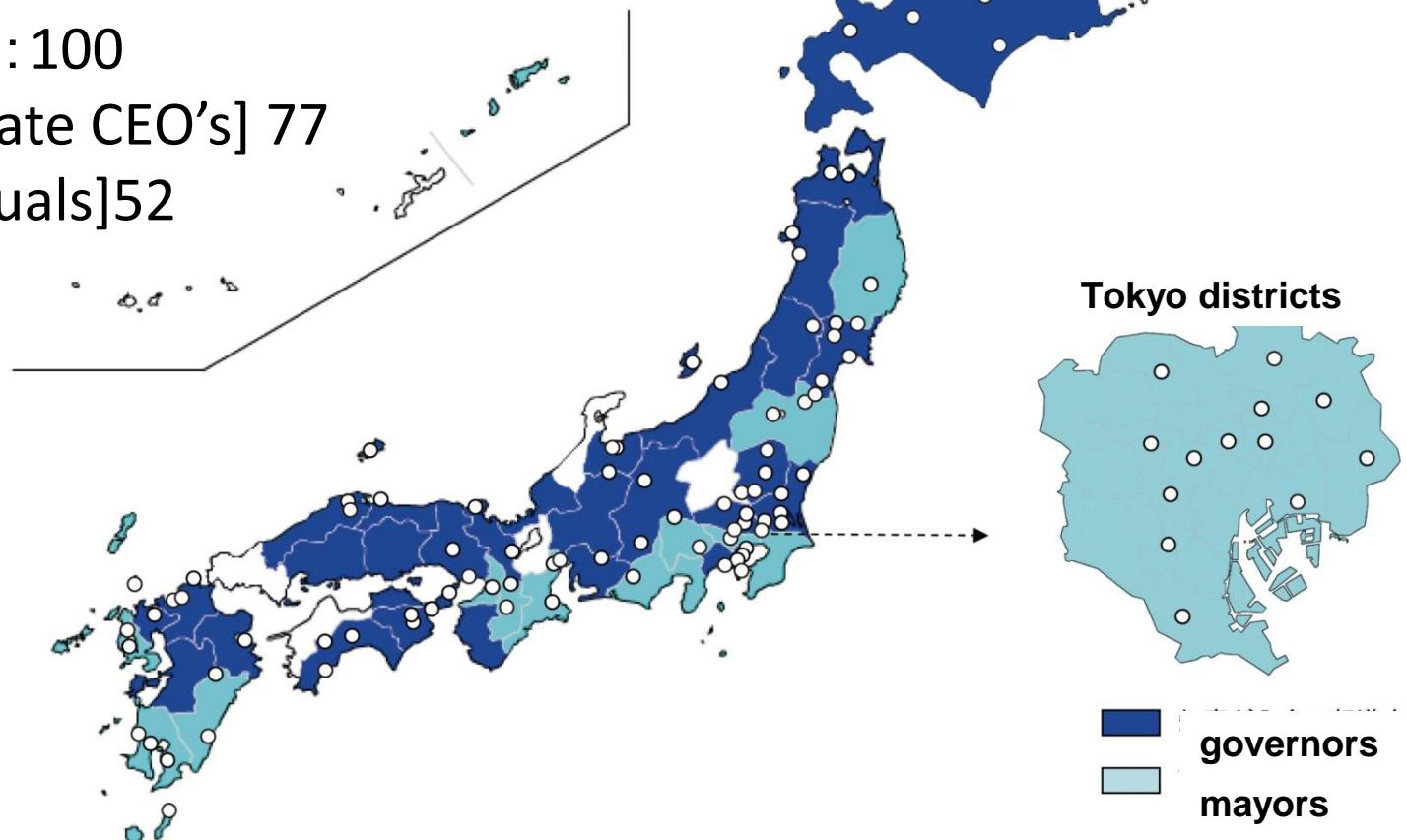
[Local Governments] 129

- Governor: 29

- Mayor: 100

[Corporate CEO's] 77

[Individuals] 52



## I started action for Platinum Society

# Necessary conditions for Platinum Society

## Ecology

- overcoming pollution
- bio-diversity
- global environment



## Richness

- culture, arts, sports
- diversity
- GDP

## Resources

- energy efficiency
- recycle
- agriculture, forestry

## Participation

- healthy aging
- lifelong learning
- multiple chances

## Job opportunities

- new businesses

**These are the seeds for new businesses**

# Ayu come back in school now

1967

present

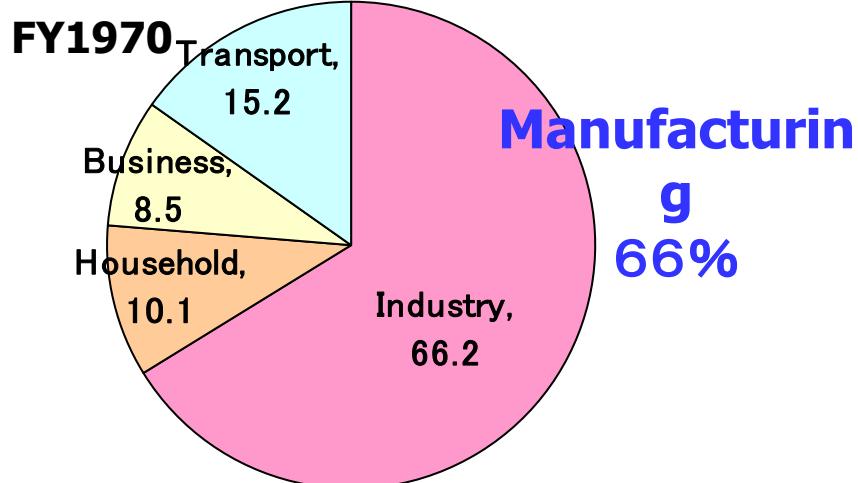
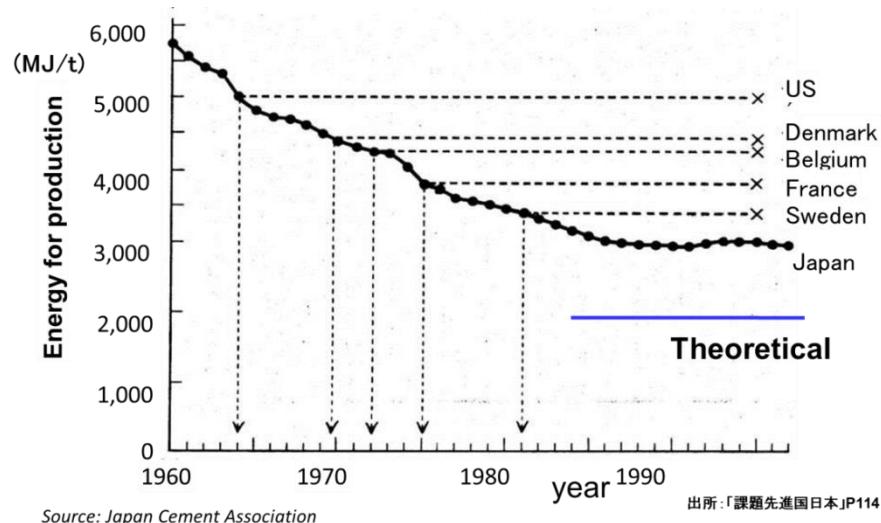


[http://www.t-yakata.com/tyh\\_dkship.htm](http://www.t-yakata.com/tyh_dkship.htm)

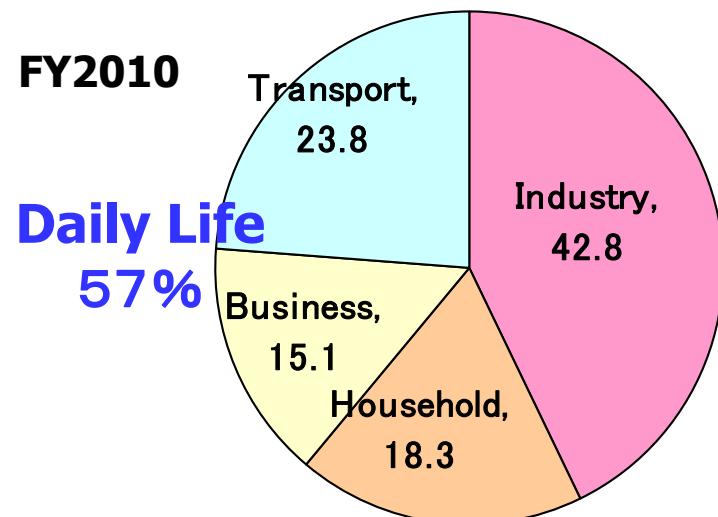
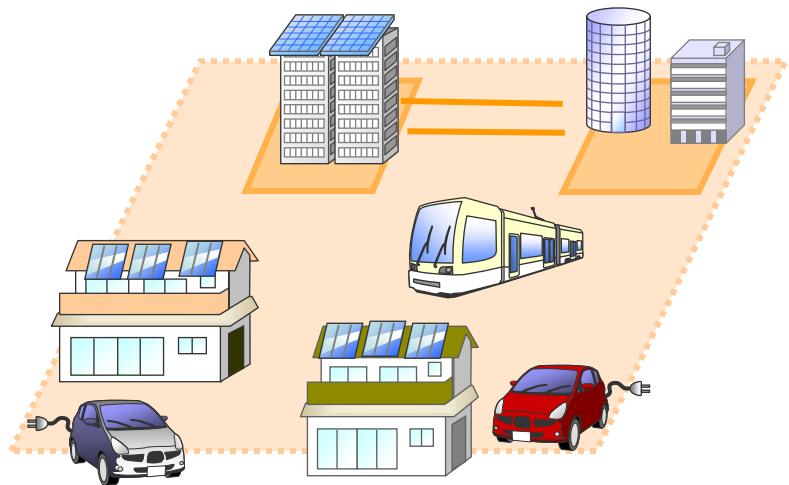
<http://www.env.go.jp/policy/hakusyo/zu/eav11/eav110000000000.html>

## Sumida river runs downtown Tokyo.

## Energy Efficiency was improved in manufacturing in 1970s

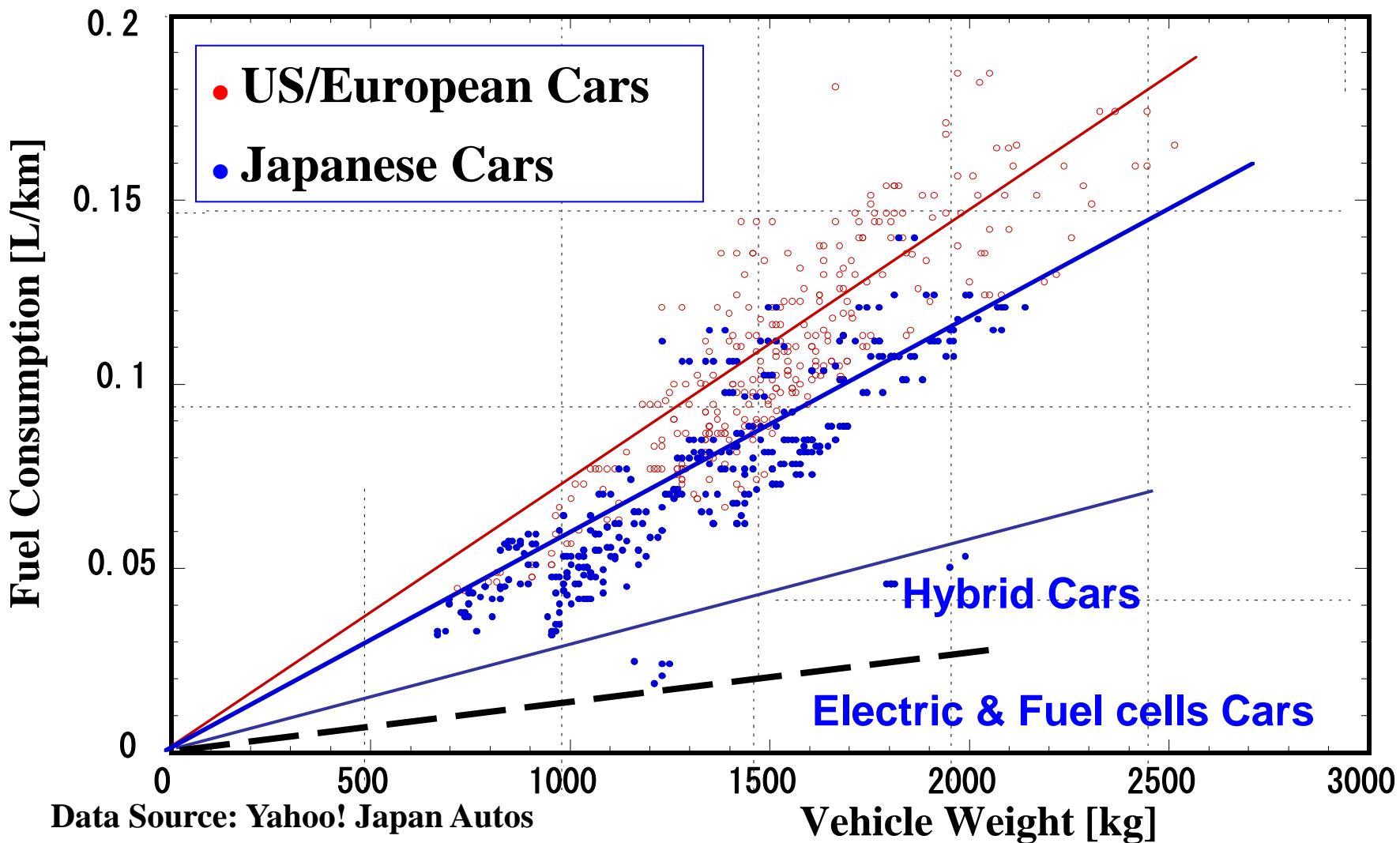


## Energy Efficiency should be improved in daily life now



**Structuring knowledge tells the future**

**Energy Efficiency of Automobiles to 8 times**



# Energy Efficiency as well as QOL

## Komiyama Eco-House



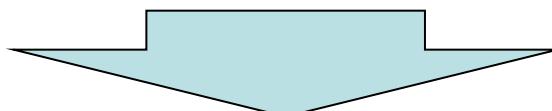
Heat Pump Water Heater: COP=4

High Insulation:  $K=1.6 \text{ W/m}^2\text{K}$

New air conditioners & refrigerator

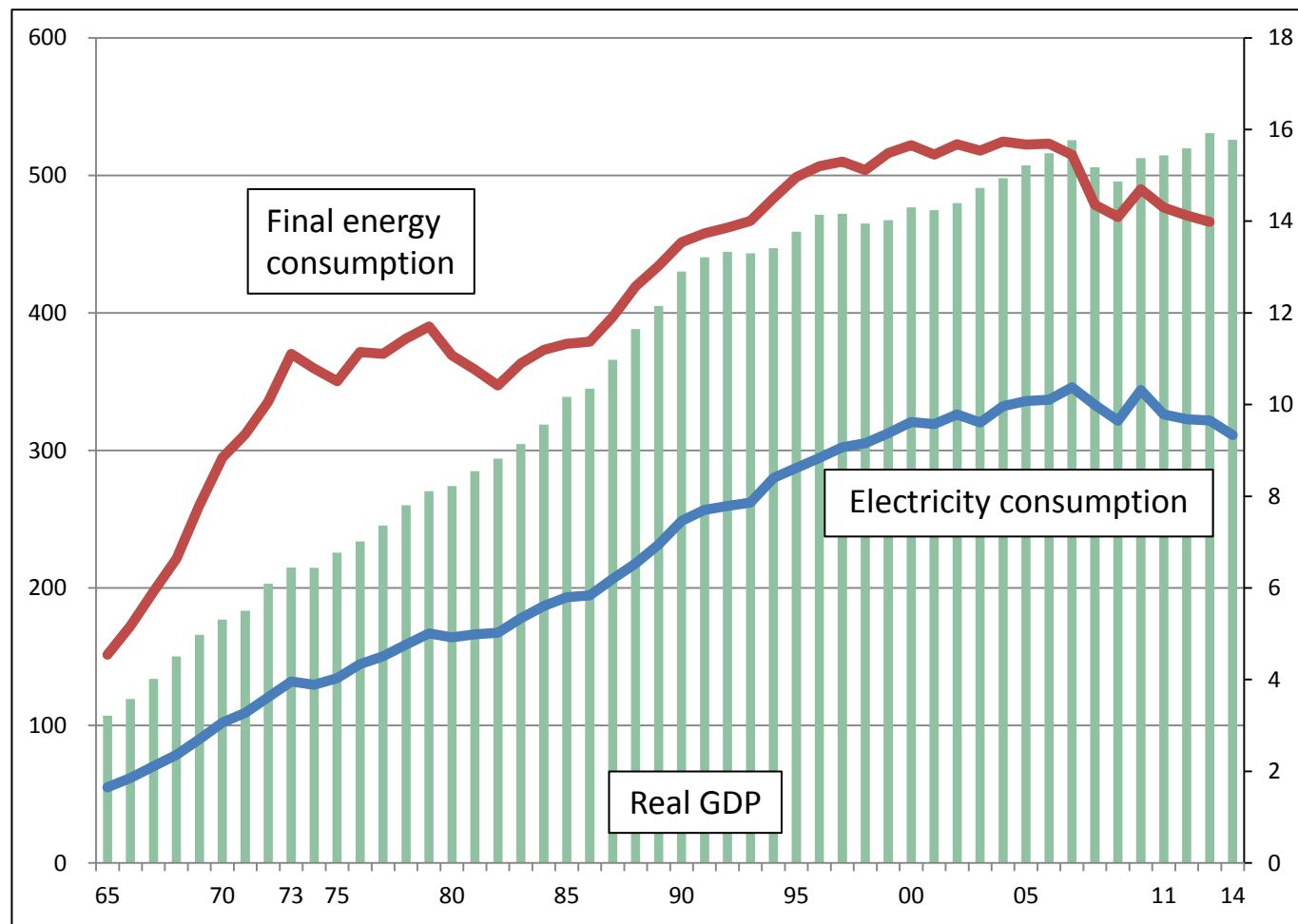
LED & efficient fluorescent lamps

Solar Power Generation: 3.6kW



Zero-energy supplied from outside  
refundable in 12 years

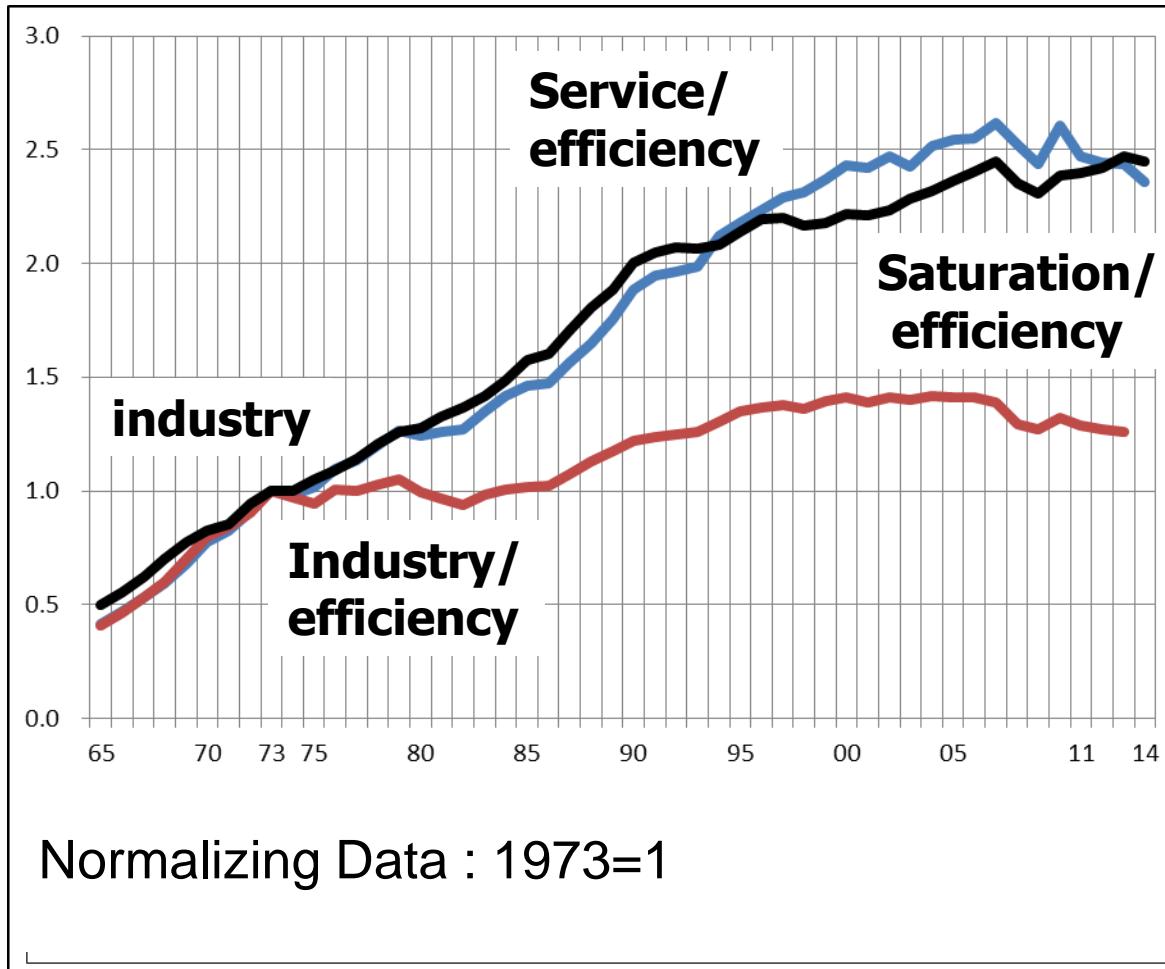
# Japan: GDP increases but energy decreases



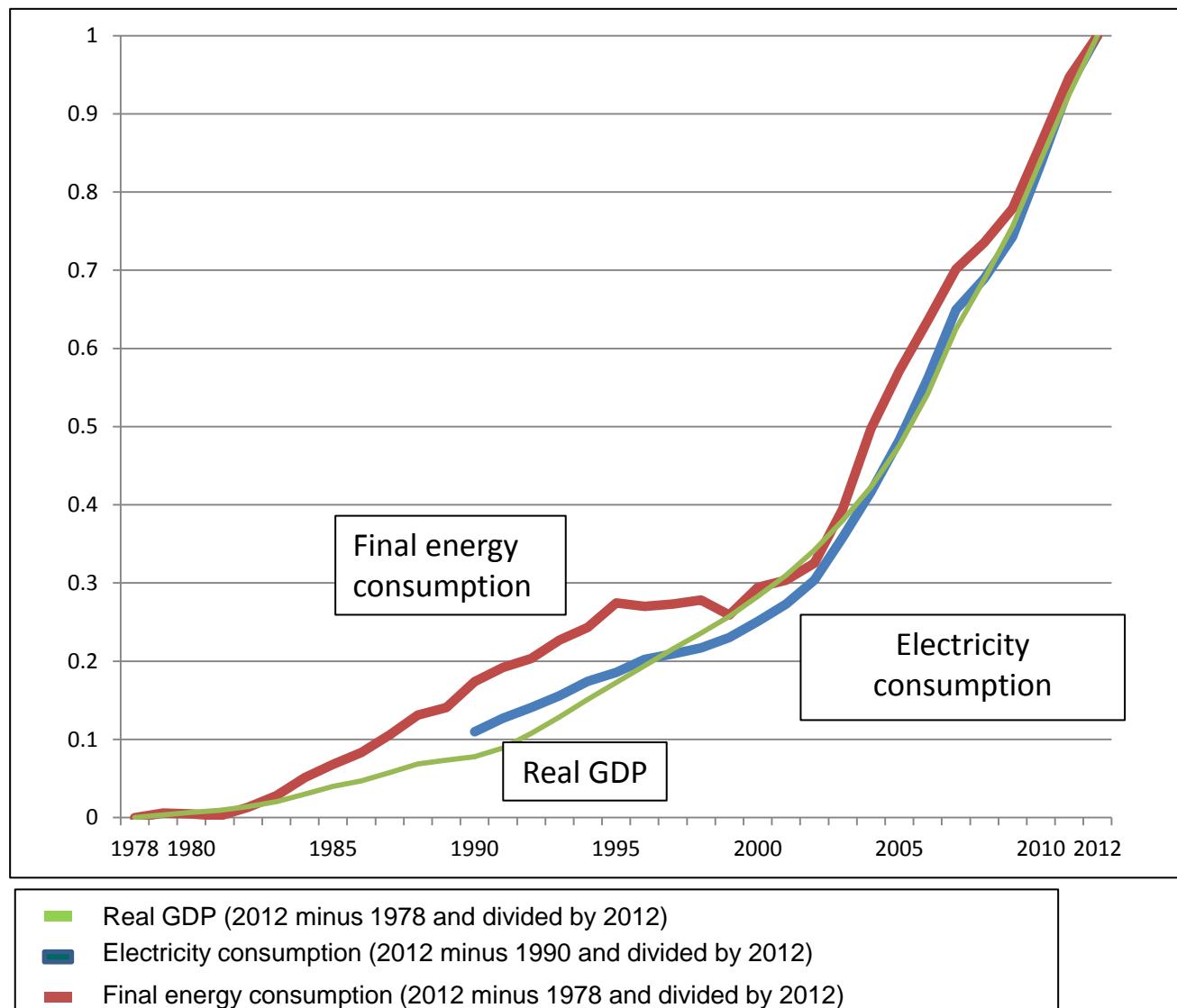
- Real GDP, base year 1973 (left scale, trillion yen)
- Electricity consumption (right scale, 100billion kWh)
- Final energy consumption (right scale, 10<sup>18</sup> J)

Copyright Japan Science and Technology Agency, Center for Low Carbon Society Strategy

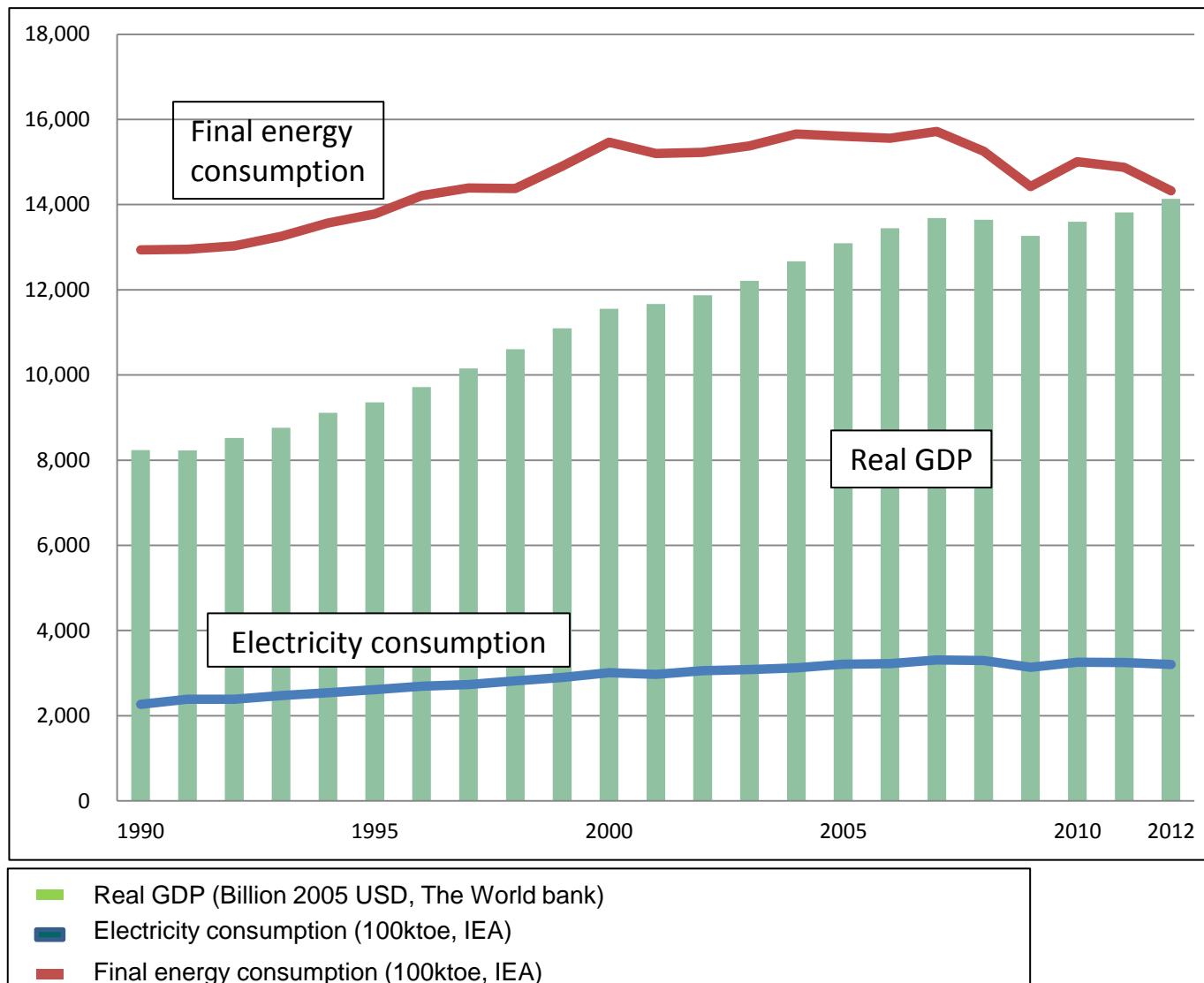
## Energy will decrease under materials saturation



# China: still developing by heavy industry

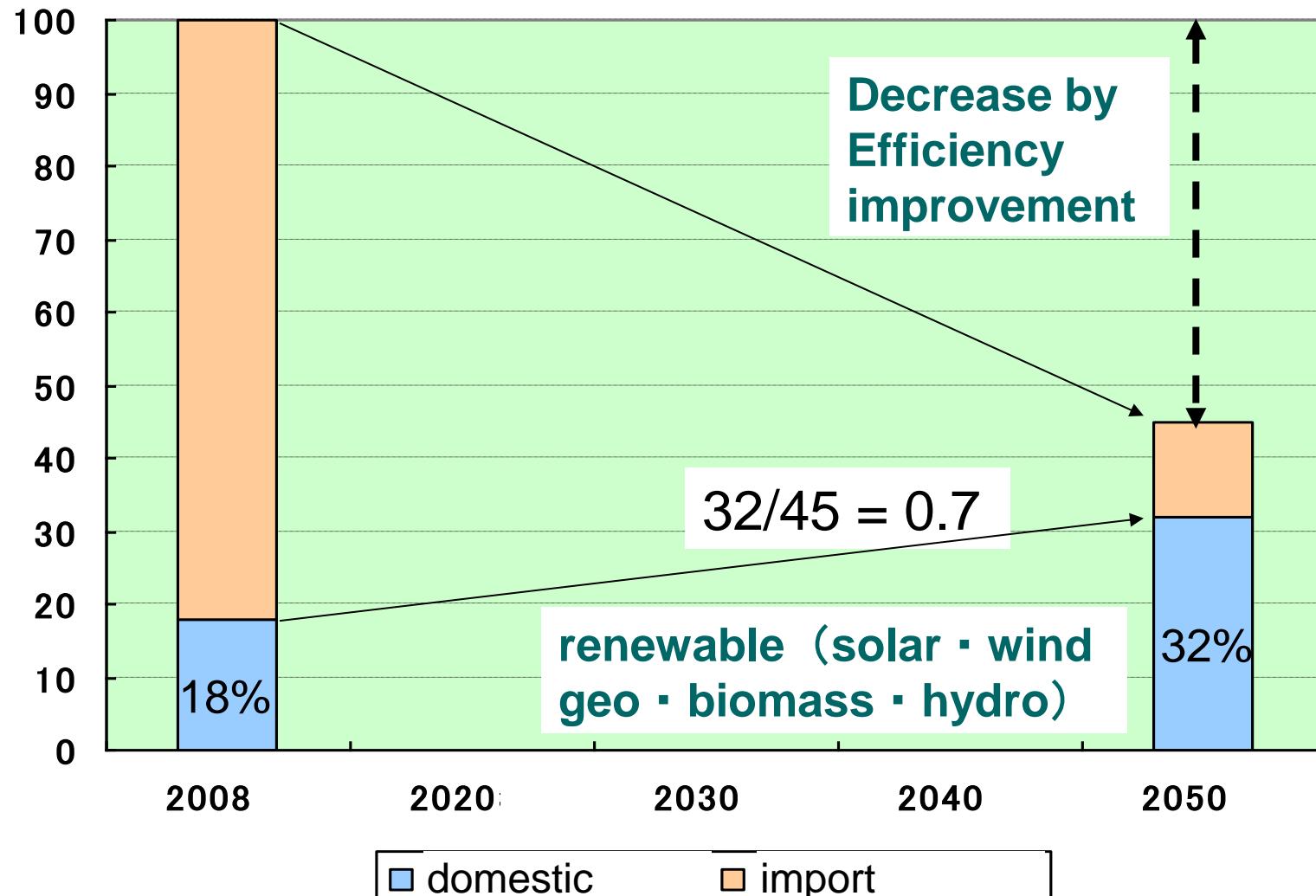


# USA : GDP increases but energy decreases



## Necessary condition for platinum society

**Energy will be Self-Sufficient in 2050 in Japan  
artifacts be saturated and efficiencies be improved**



# Renewable energy is competitive now

	Cost(yen/kWh)		Generation potential(TWh/y)
	Present	2030	
Solar	<b>16</b>	<b>6</b>	<b>&gt;400</b>
Wind (on shore)	<b>16</b>	<b>8</b>	<b>&gt;500</b>
Geothermal	<b>12</b>	<b>&lt;12</b>	<b>70<sup>*1</sup>, 500<sup>*2</sup></b>
Small hydro	<b>30(12<sup>*3</sup>)</b>	<b>&lt;12</b>	<b>70</b>
Biogas※	<b>25(15)</b>	<b>13(5)</b>	<b>20</b>
Biomass (wood)	<b>31(8)</b>	<b>12(4)</b>	<b>40</b>

Intermit-tent

Stable

Numbers in ( ) are fuel costs, \*1:hydrothermal system of over 150°C \*2:hot dry rock of over 300°C \*3:Data under implementation

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# Urban Mines supply necessary & sufficient Resources and decrease energy consumption

ratio of energy for  
reduction and melting

Iron                            27 times

Aluminum                    83 times

ratio of concentration of  
mines and mobile phones

Gold                            50 times

## Human will become free from excavation.

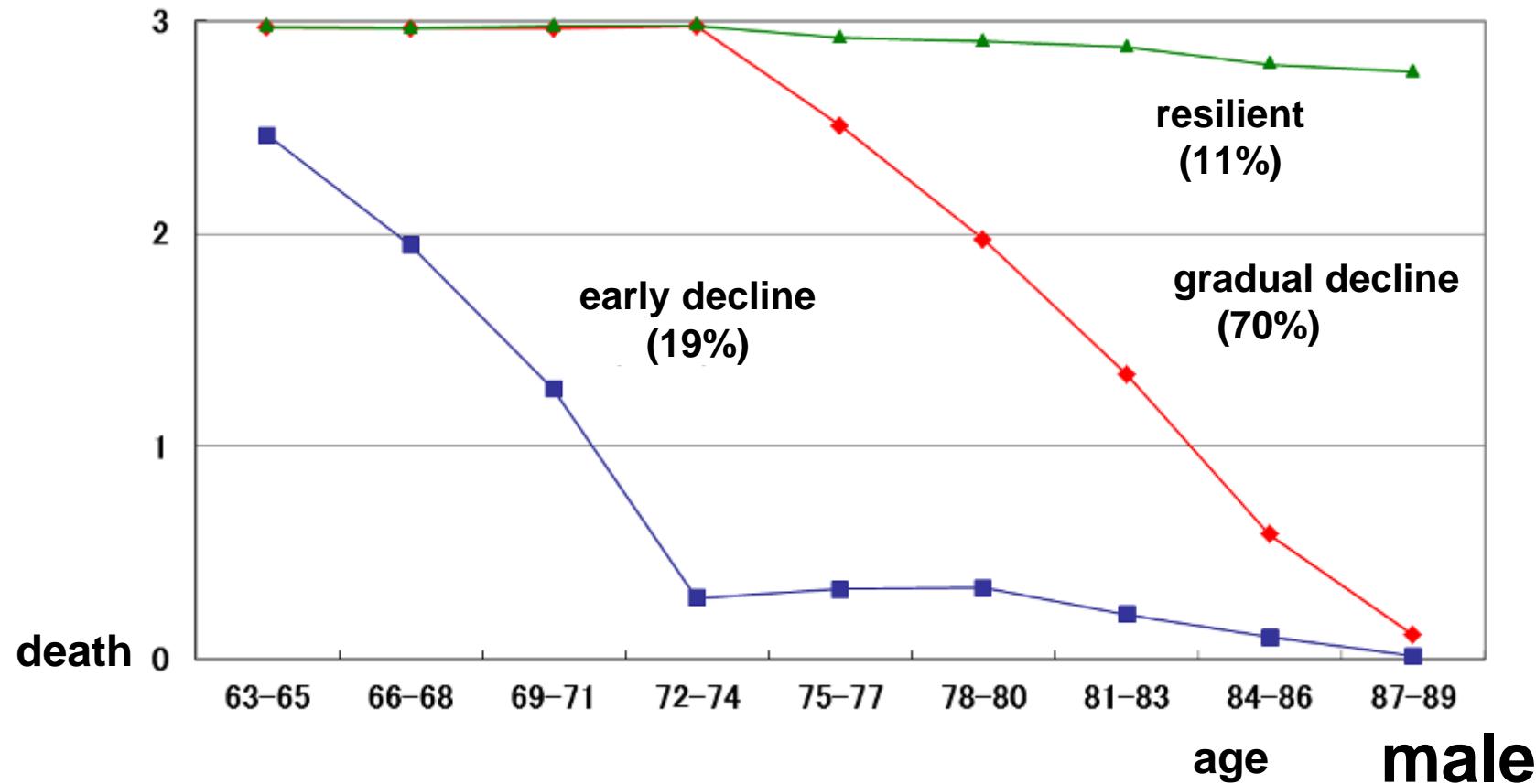
## Resource Self-Sufficient Japan at 2050

<b>Energy</b>	<b>70%</b>
<b>Mineral</b>	<b>70%</b>
<b>Food</b>	<b>70%</b>
<b>Wood</b>	<b>100%</b>
<b>Water</b>	<b>100%</b>

**This is the model of our planet in 21<sup>st</sup> century**

# Aging: Most seniors can be independent

self-support



70 year old now compare to 59 year old 30 years ago

出典) Akiyama et al. (2008) アメリカ老年学会2008年年次大会

**We can be independent only if brain survives**

**Human can be independent  
Only if brain is alive**



**HAL(for care)**  
**Produced by**  
**CYBERDYNE (JAPAN)**



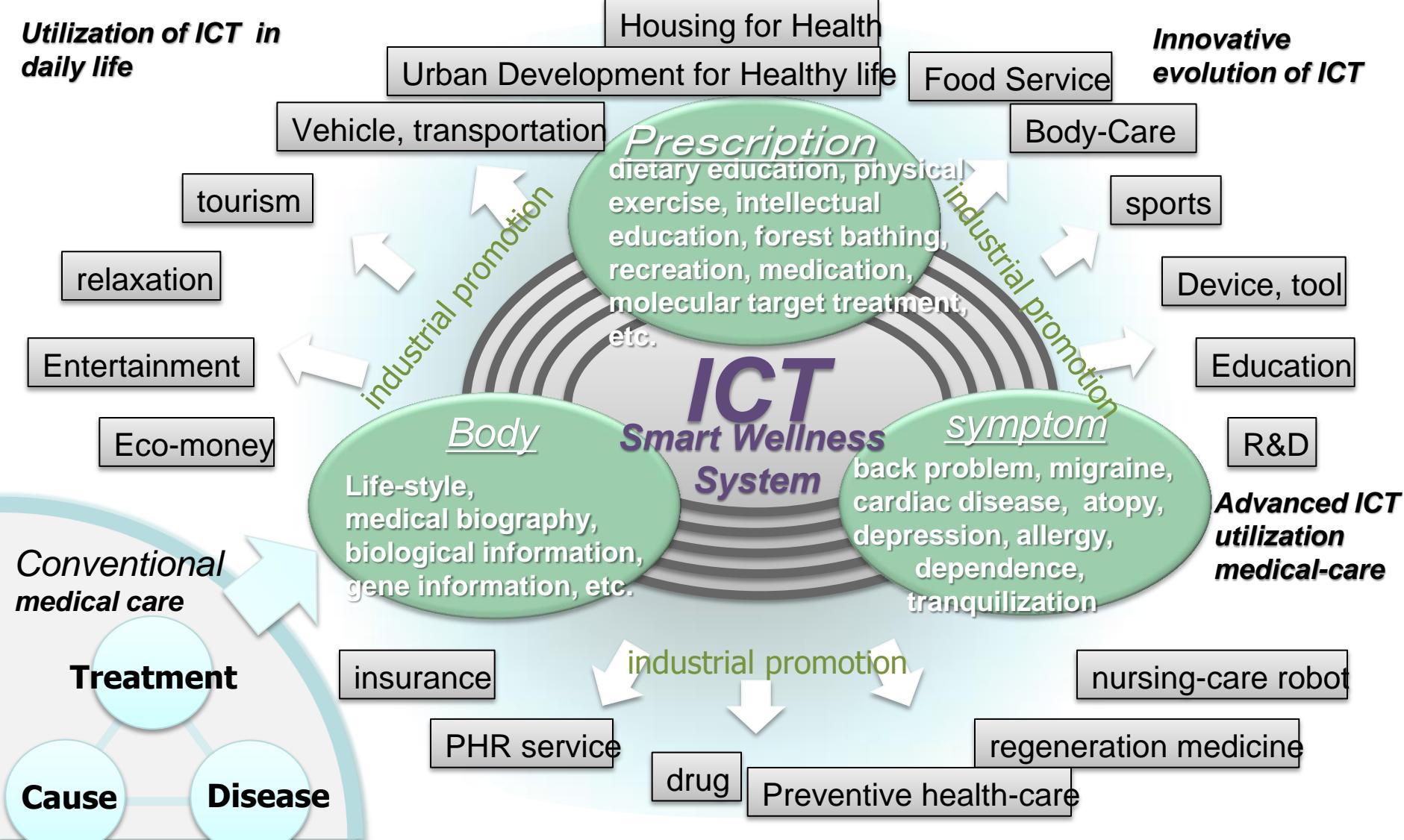
**Communication Robot - Giraffe**  
**Produced by Robot Dalen (Sweden)**



**Assistive eating device - Bestic**  
**Produced by**  
**Robot Dalen (Sweden)**

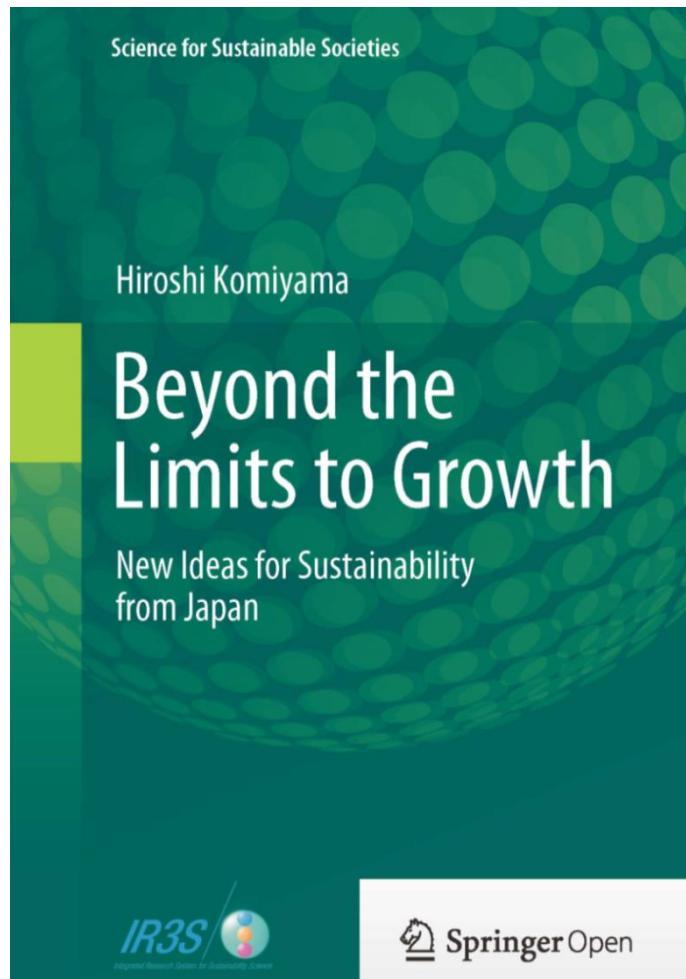
# Business Opportunities for Health and Independence

**Utilization of ICT in daily life**



ICT: Information and Communication Technology

# Action for Platinum Society is inevitable NOW!



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5. Finding a Way Out Through Creative Demand, II
6. Toward the Realization of a “Platinum Society”

*Thank you!*

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