



Prospects of Environmental Risks in 21st Century

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環境問題の解決とは2種類のリスクに対処し持続可能な社会を作ること

Solve Environmental Issues

=Reduce Two Kinds of Risks and Approach

Sustainable Society

- 2種類のリスク:「個々人のリスク」と「集合体としてのヒトのリスク」
- Two Kinds: (1) Risk to Individuals, (2) Risk to Long Lasting Human Being as whole

- 生態系の劣化もリスクではあるが、現時点では余り考慮されない
- Risk for Eco-System must be also considered, but.....

「リスク」とは何か

What is “Risk”?

- 専門家の考えるリスク
- “Risk” defined by Specialists
 - できごとの危なさ × 起きる可能性 × 被害を蒙りやすさ
 - Hazard × Exposure × Vulnerability

- メディア・市民団体の考えるリスク
- “Risk” defined by Media, NGO etc.
 - できごとの危なさ × 社会の不条理
 - Hazard × Social Irrationalness

Risk: Individuals or Human Race

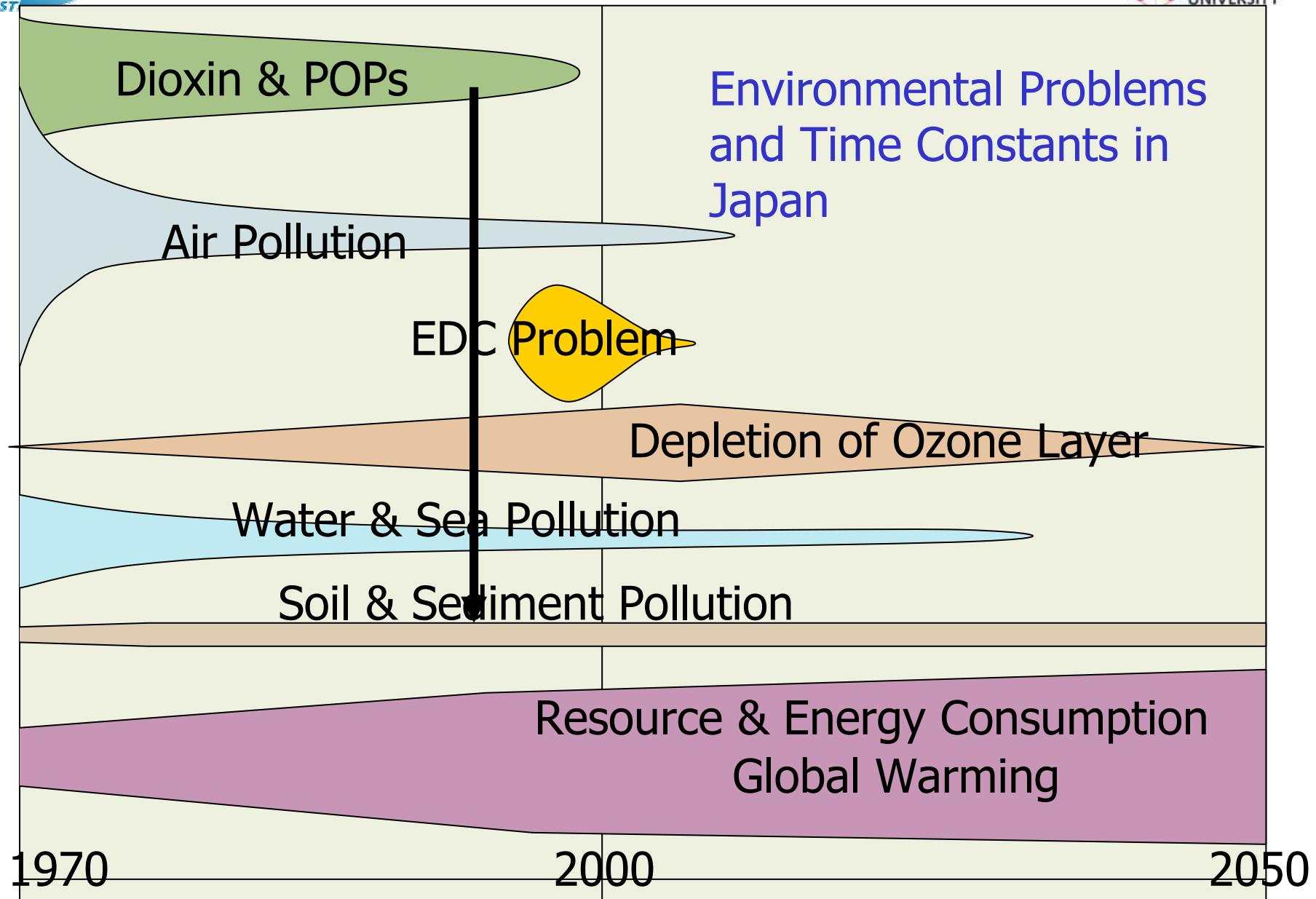
- 個々人のリスク
- To Individual
- Origin 原因
 - ローカルリスク
 - Local Risks
 - 有害物
 - Hazardous Wastes
 - 伝染病
 - Communicable Disease
- 考慮すべき要素
- Elements Considered
 - 寿命があること
 - Limitation in Longevity
- 集合体のリスク
- To Human Race
- Origin 原因
 - グローバルリスク
 - Global Risks
 - 地球の供給限界
 - Limitation of Earth
 - 地球の気候
 - Climate of Earth
- 考慮すべき要素
- Elements Considered
 - 現時点～300年後
- Sustainability

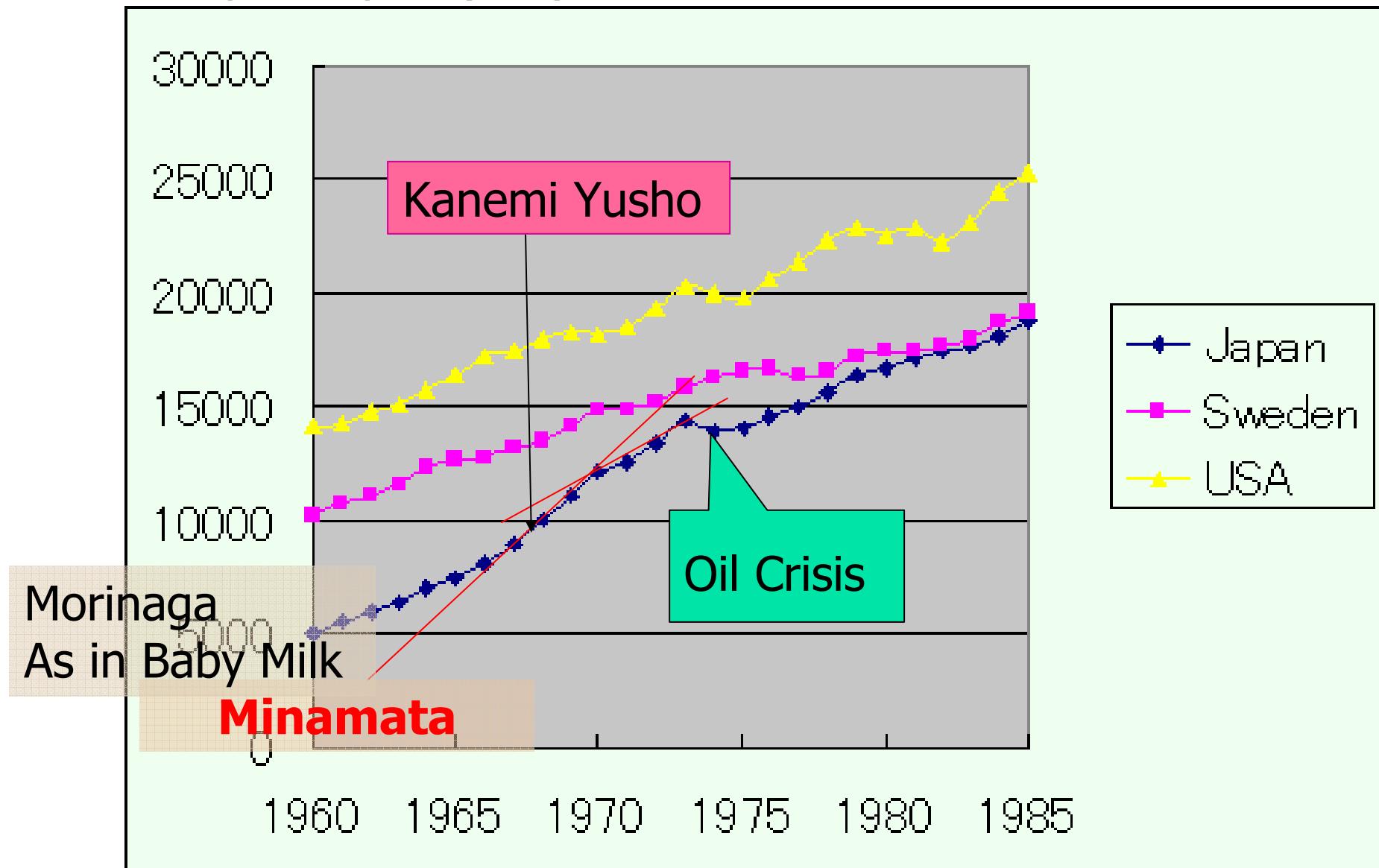


ローカルリスク Status of Local Risks in Japan

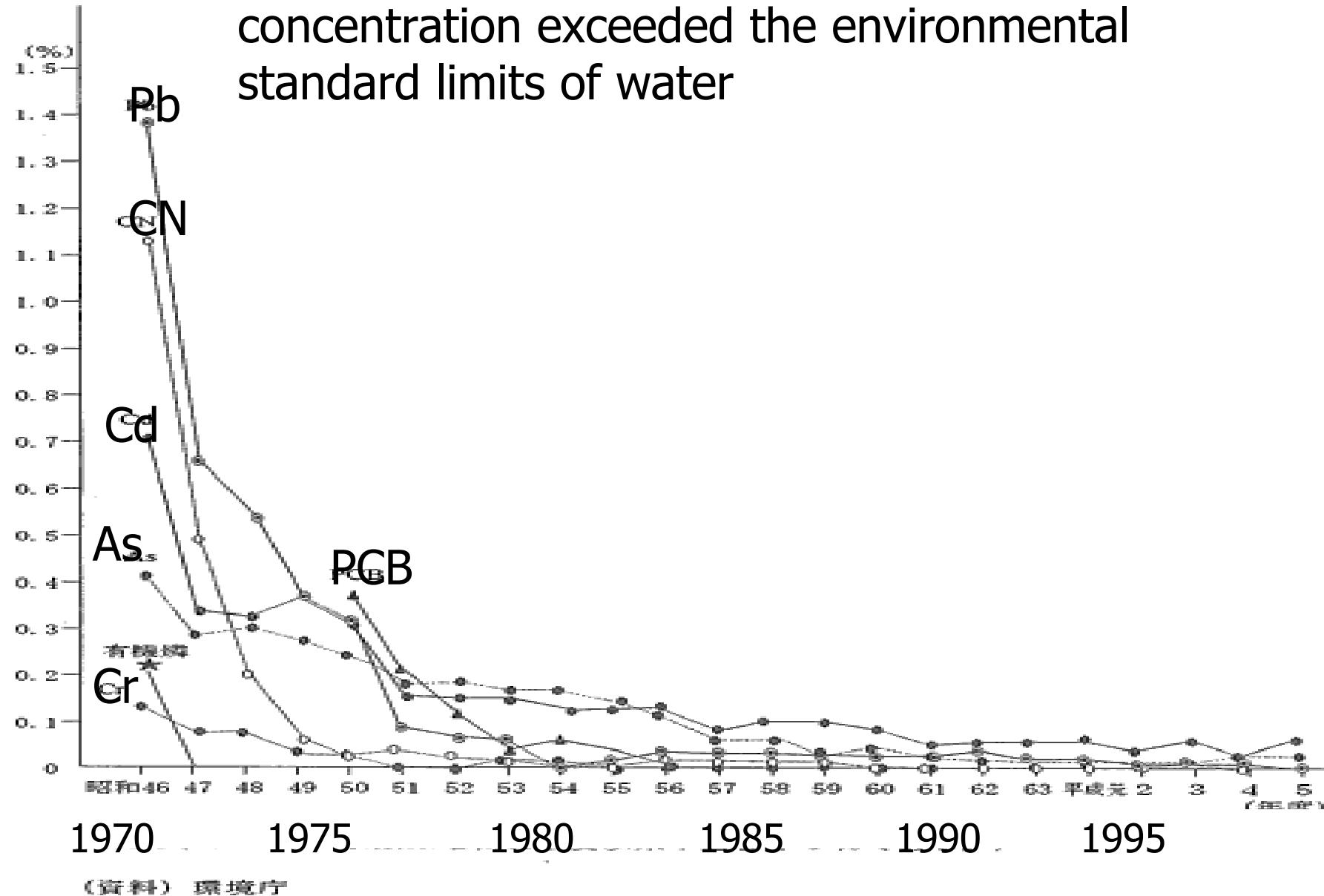
Experiences in Japan

- 1960s **Minamata & Itai-Itai** Diseases
- 1960s **Amagasaki** Traffic Pollution Issue
- 1970s POPs emission such as Dioxin and other Agrochemicals
- 1980s Illegal Dumping of Waste
- 1990s Waste Management, Recycling....
- 1997 Emission of CO₂ and GWG
- 1999 Endocrine Disrupting Compounds
- 2000- **Sustainability** Issues





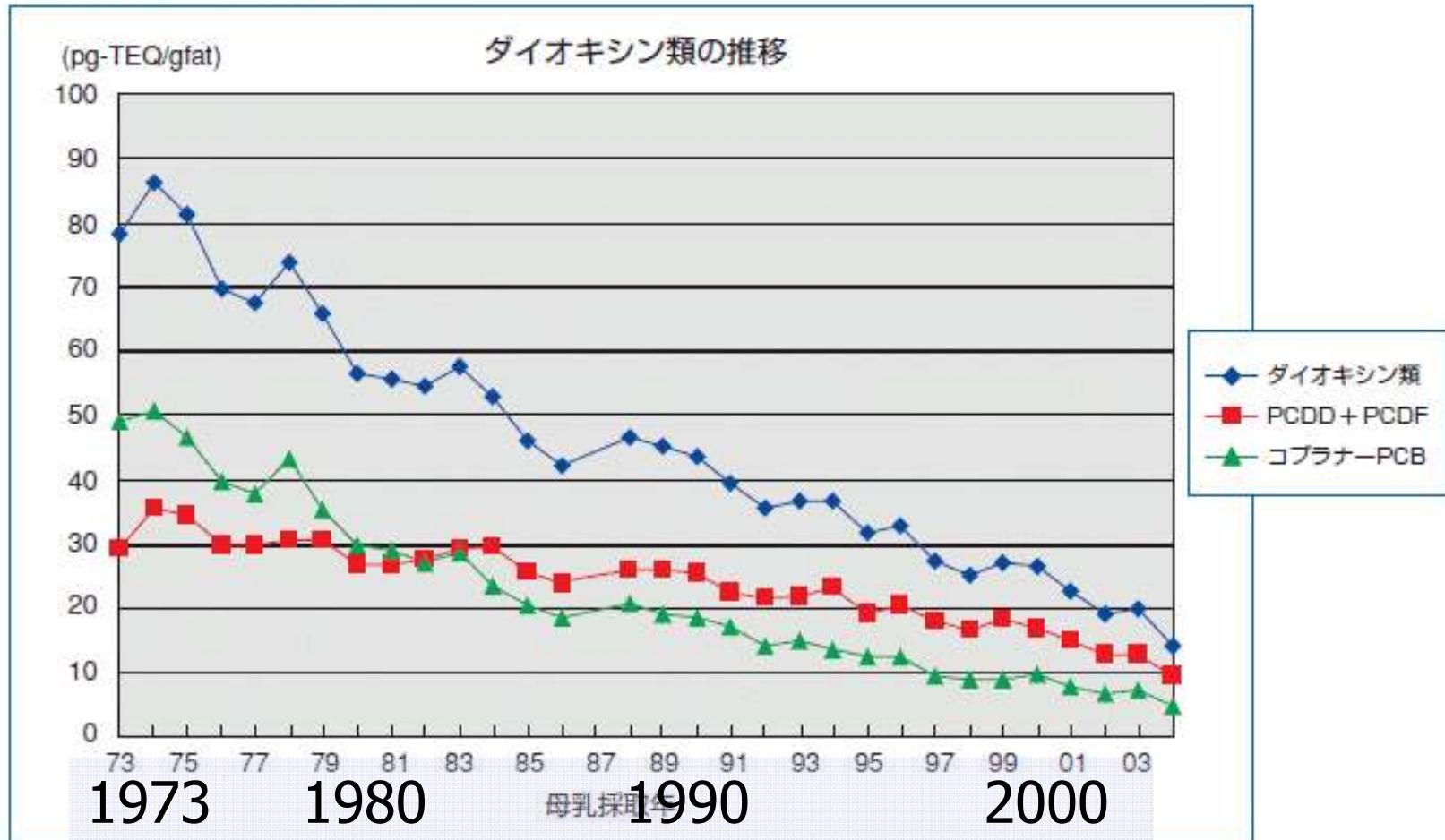
% of Points for Measurement where concentration exceeded the environmental standard limits of water



(資料) 環境庁

Dioxin Concentration in Mother Milk

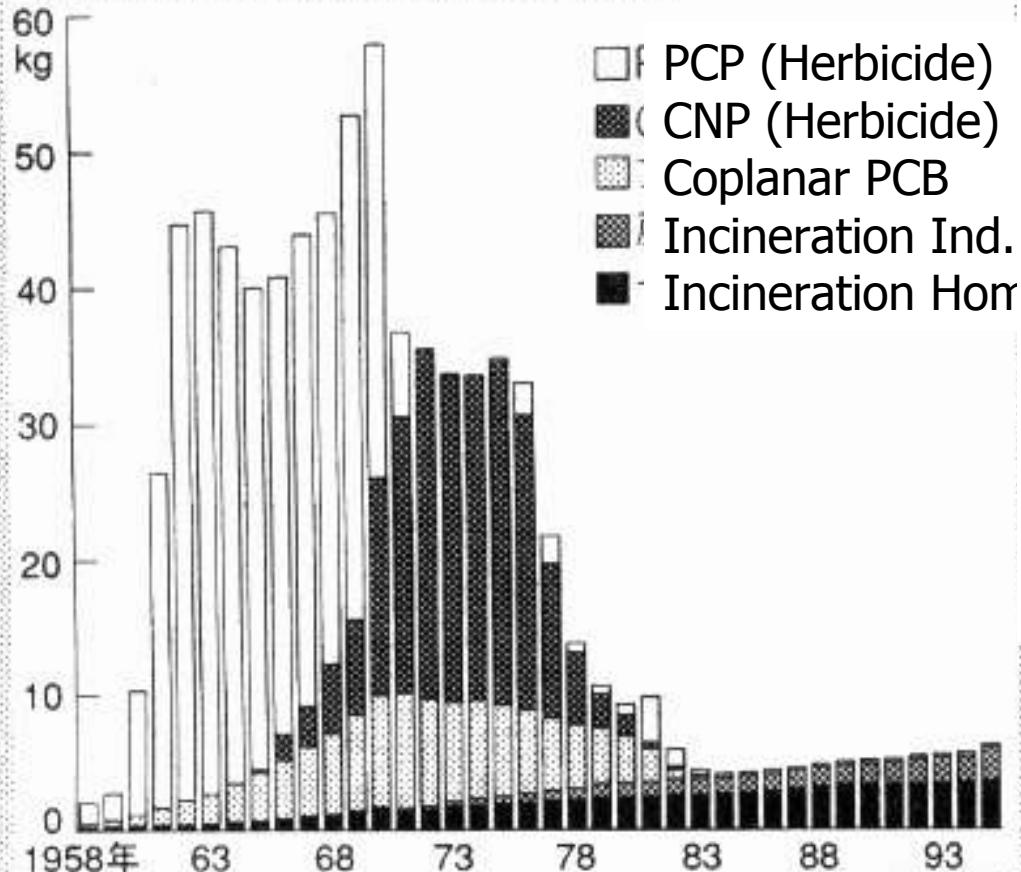
図5 母乳中のダイオキシン濃度



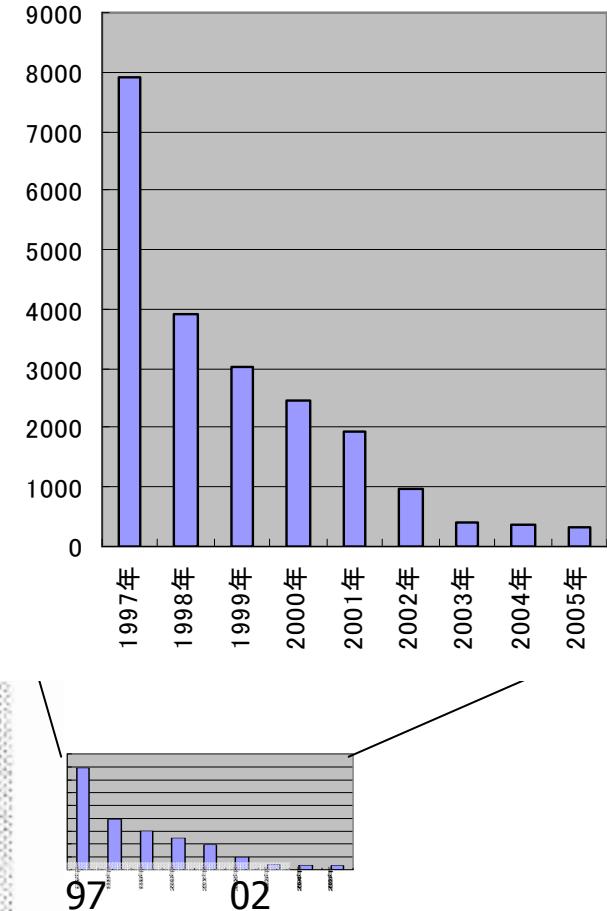
出典：平成16年度厚生労働科学研究「母乳中のダイオキシン類に関する研究」

ダイオキシン類の放出量の年変化

(毒性換算値。益永茂樹横浜国大教授の試算)

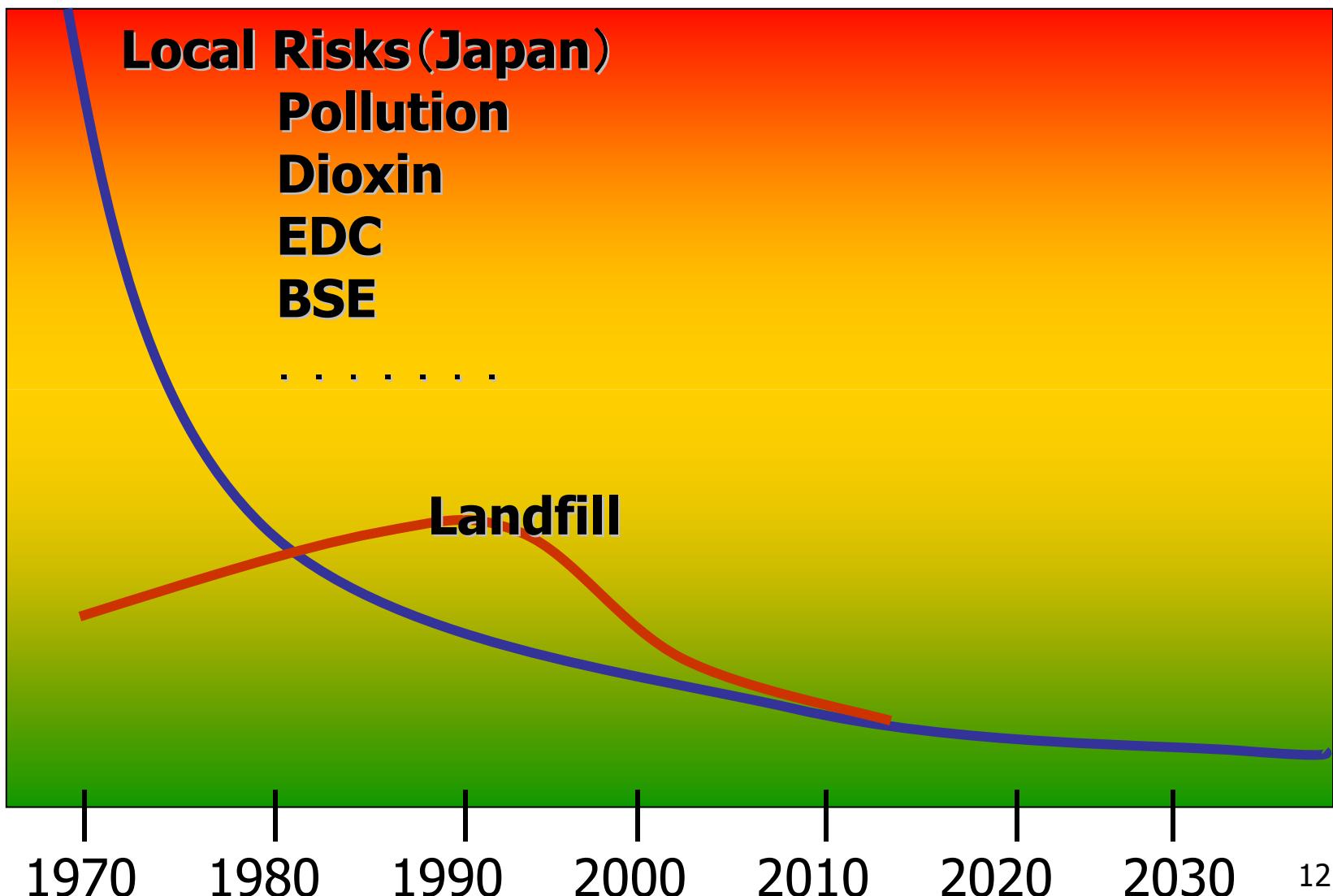


M.Of Env. Dioxin Inventory

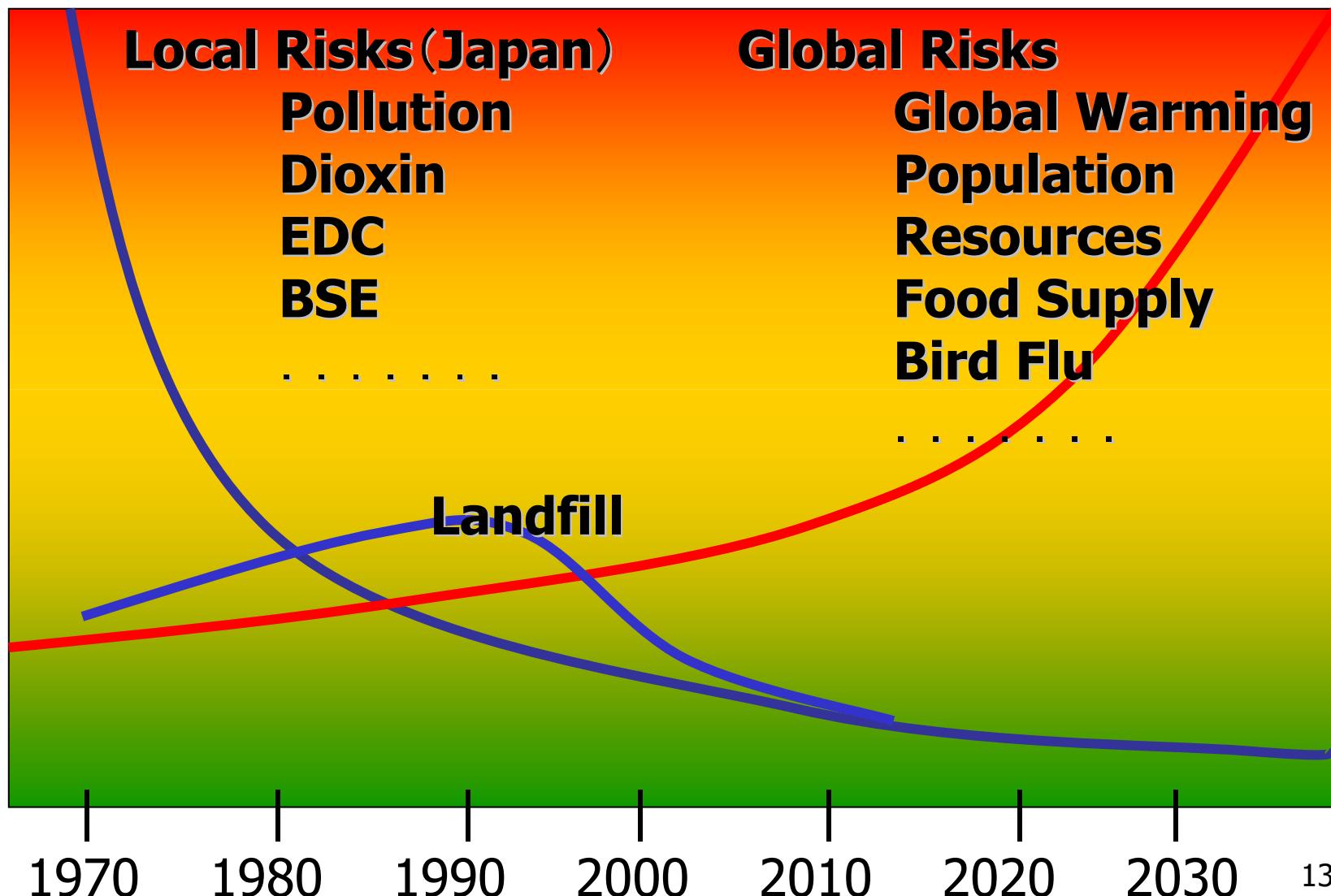


Trend of Dioxin Emission in Japan since 1958

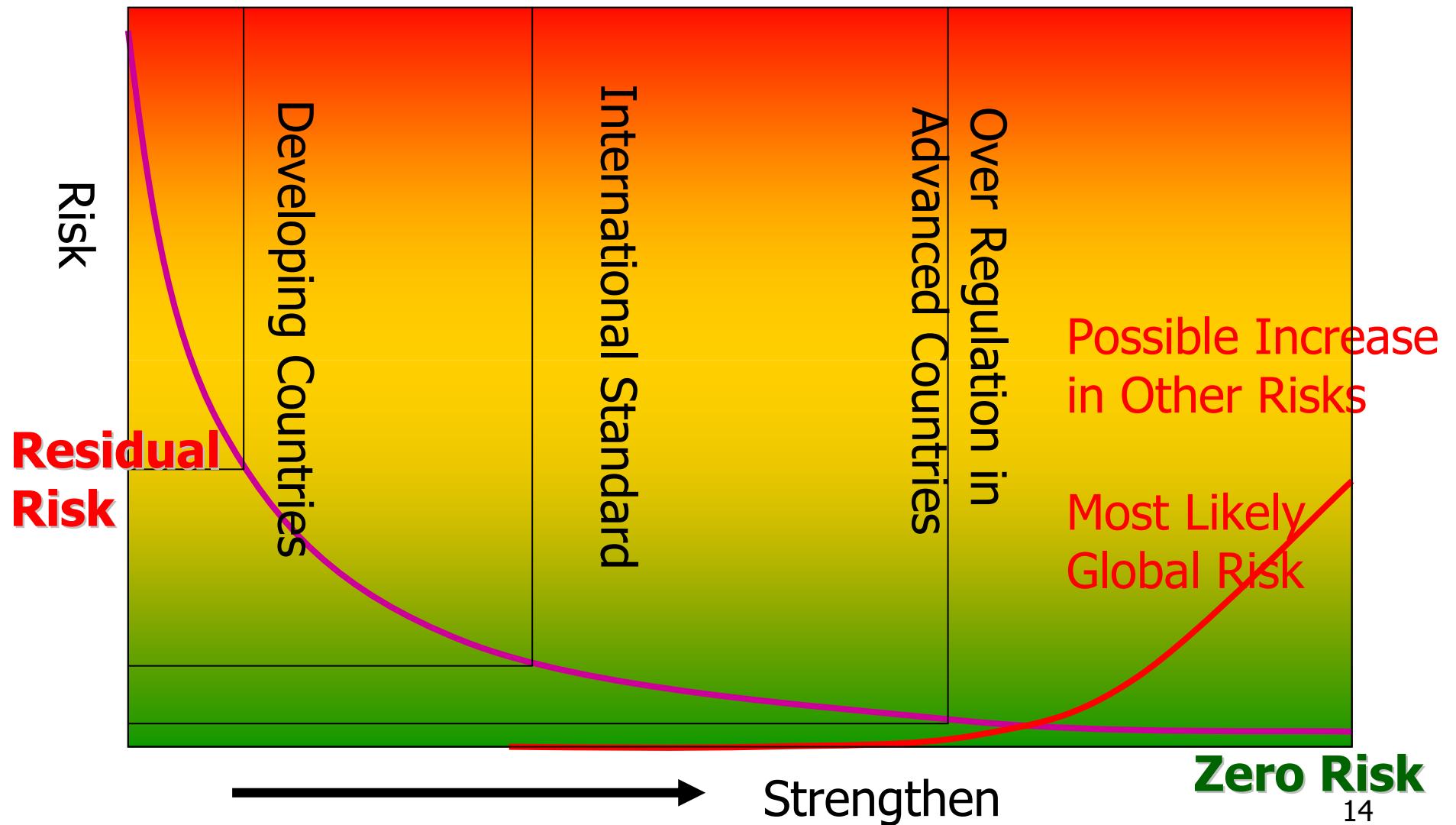
Trend in Risks – Local/Global



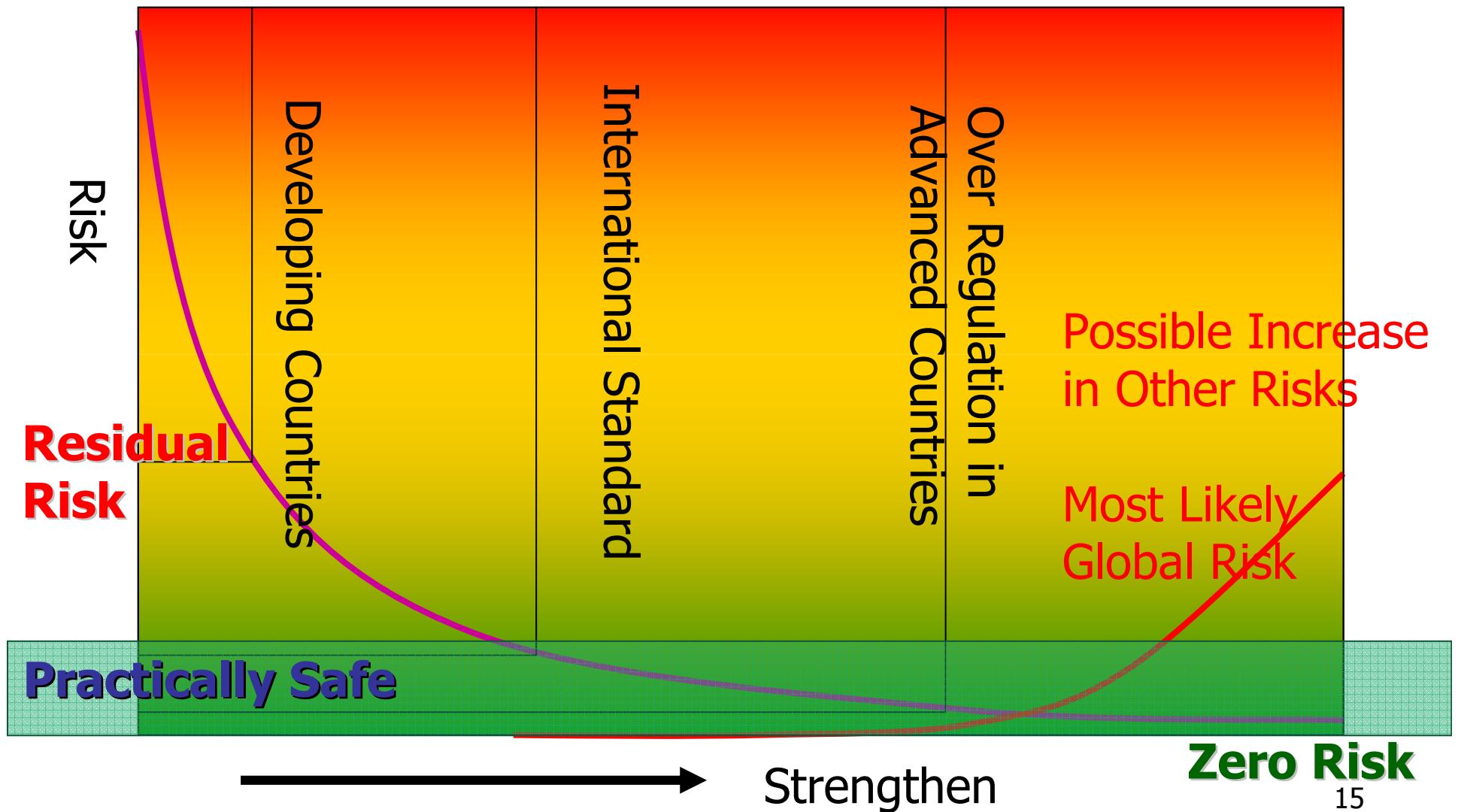
Trend in Risks – Local/Global



Reduction of Local Risks



Reduction of Local Risks





What is Sustainable Development?

Brundtland Type Definition

- "*Sustainable Development is Development that **meets the needs of the present without compromising the ability of future generations to meet their own needs.** It is not a fixed state of harmony, but rather a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are made consistent with future as well as present needs.*" (*Brundtland Report 1987*)

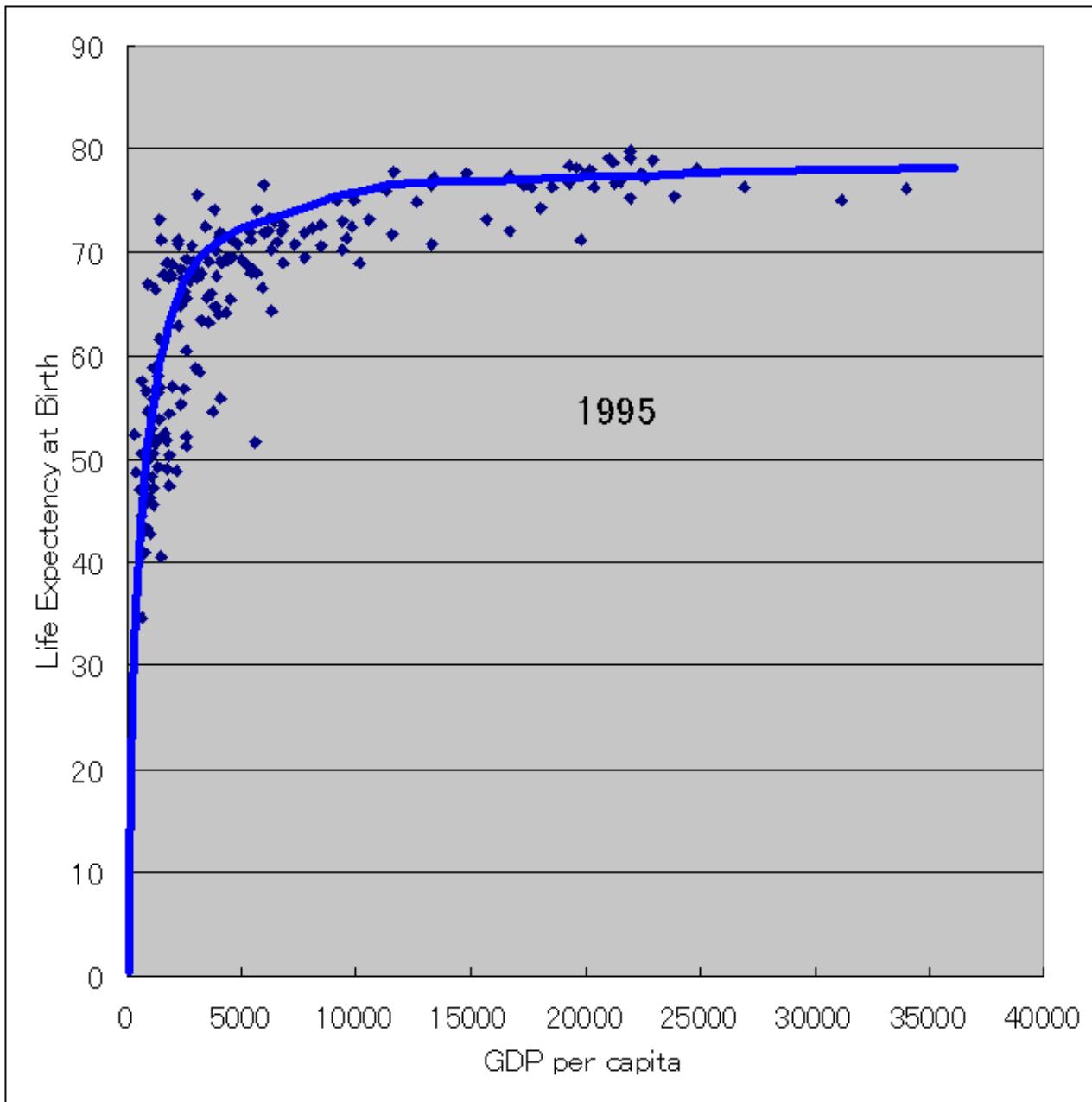
Millennium Development Goals

- The Millennium Development Goals are an ambitious agenda for reducing poverty and improving lives that world leaders agreed on at the Millennium Summit in September 2000. For each goal one or more targets have been set, most for 2015, using 1990 as a benchmark:

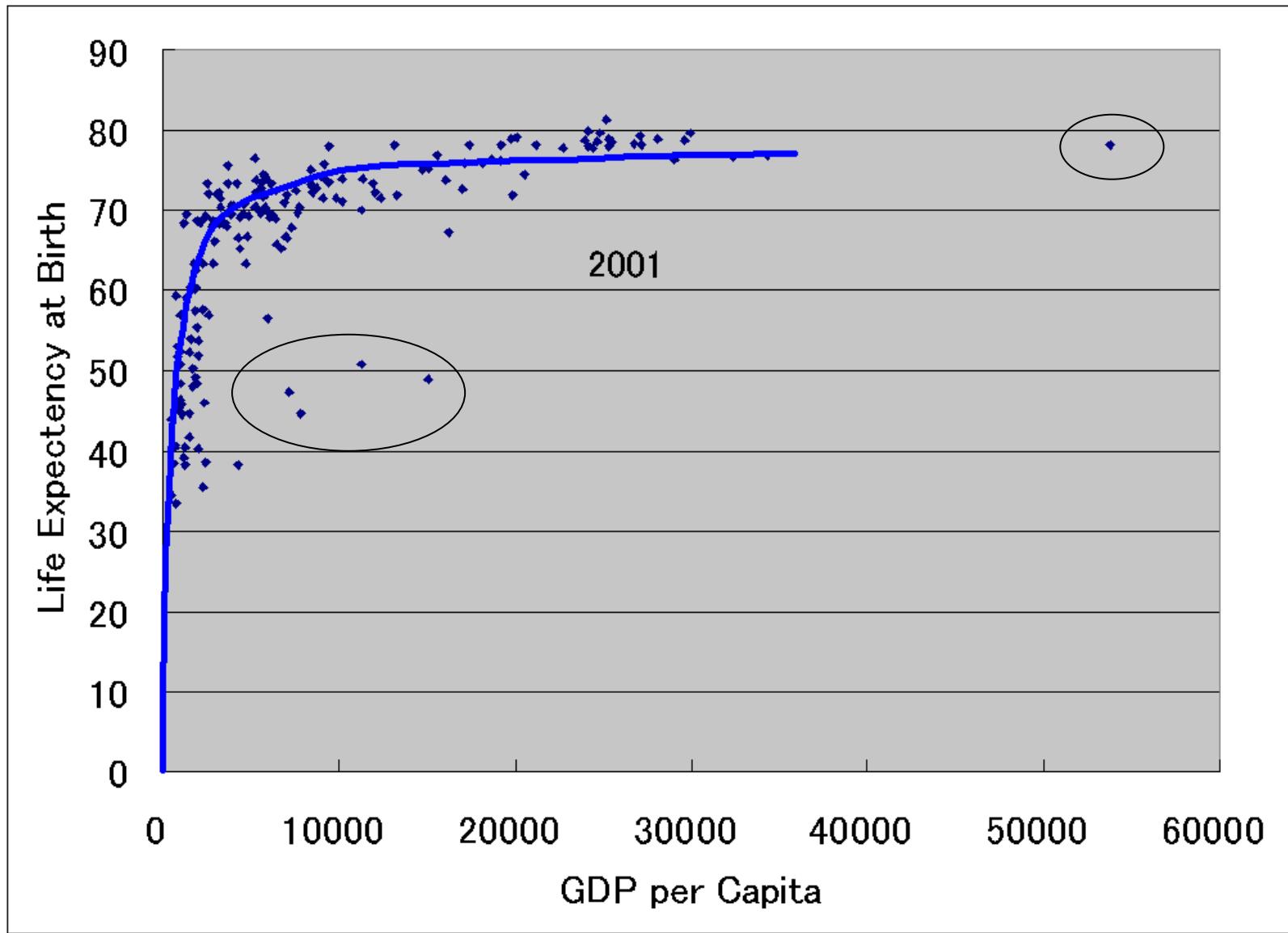
8 Goals in MDG

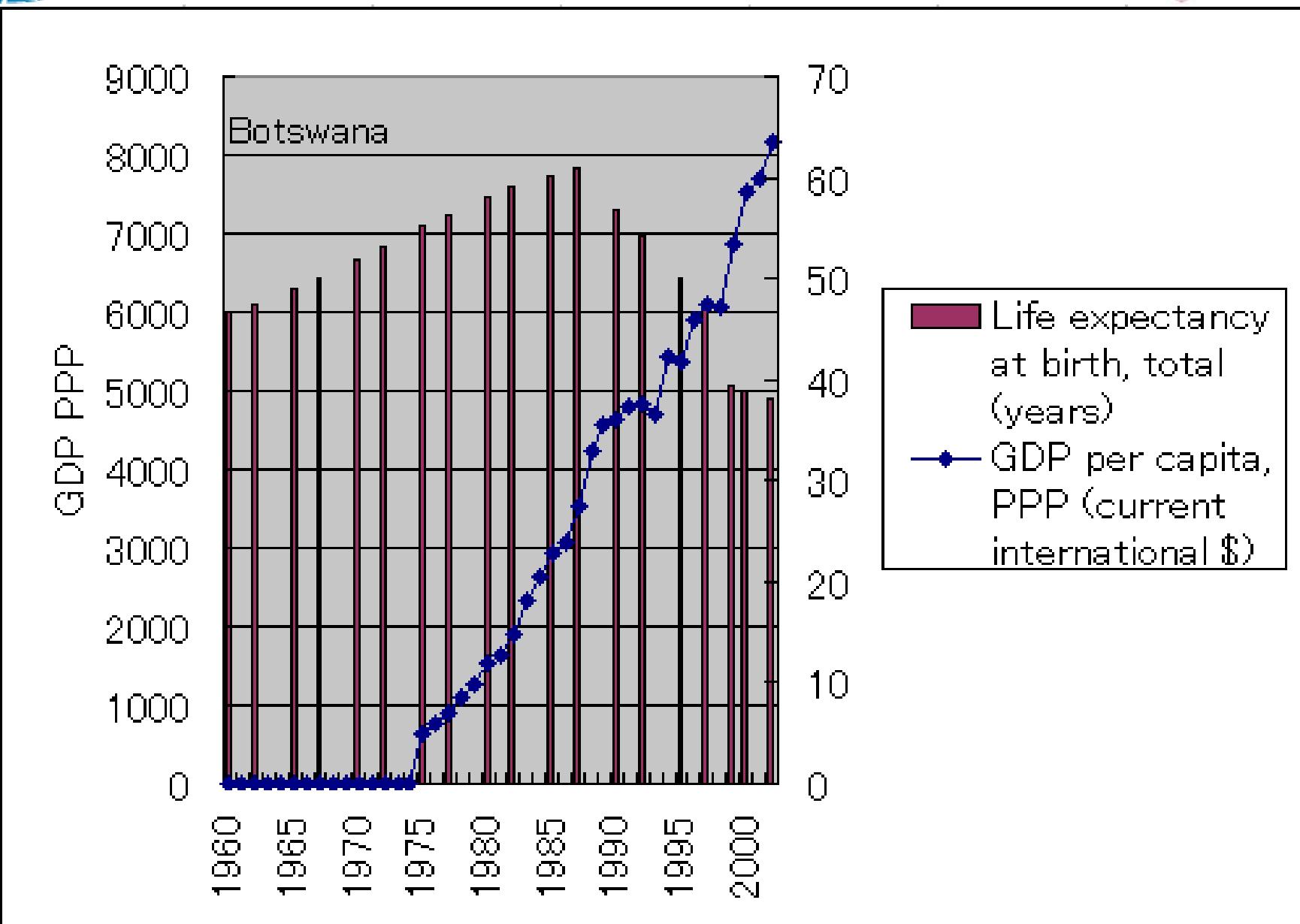
- 1. Eradicate extreme poverty and hunger
- 2. Achieve universal primary education
- 3. Promote gender equality and empower women
- 4. Reduce child mortality
- 5. Improve maternal health
- 6. Combat HIV/AIDS, malaria and other diseases
- 7. Ensure environmental sustainability
- 8. Develop a global partnership for development

GDP vs. Life Expectancy

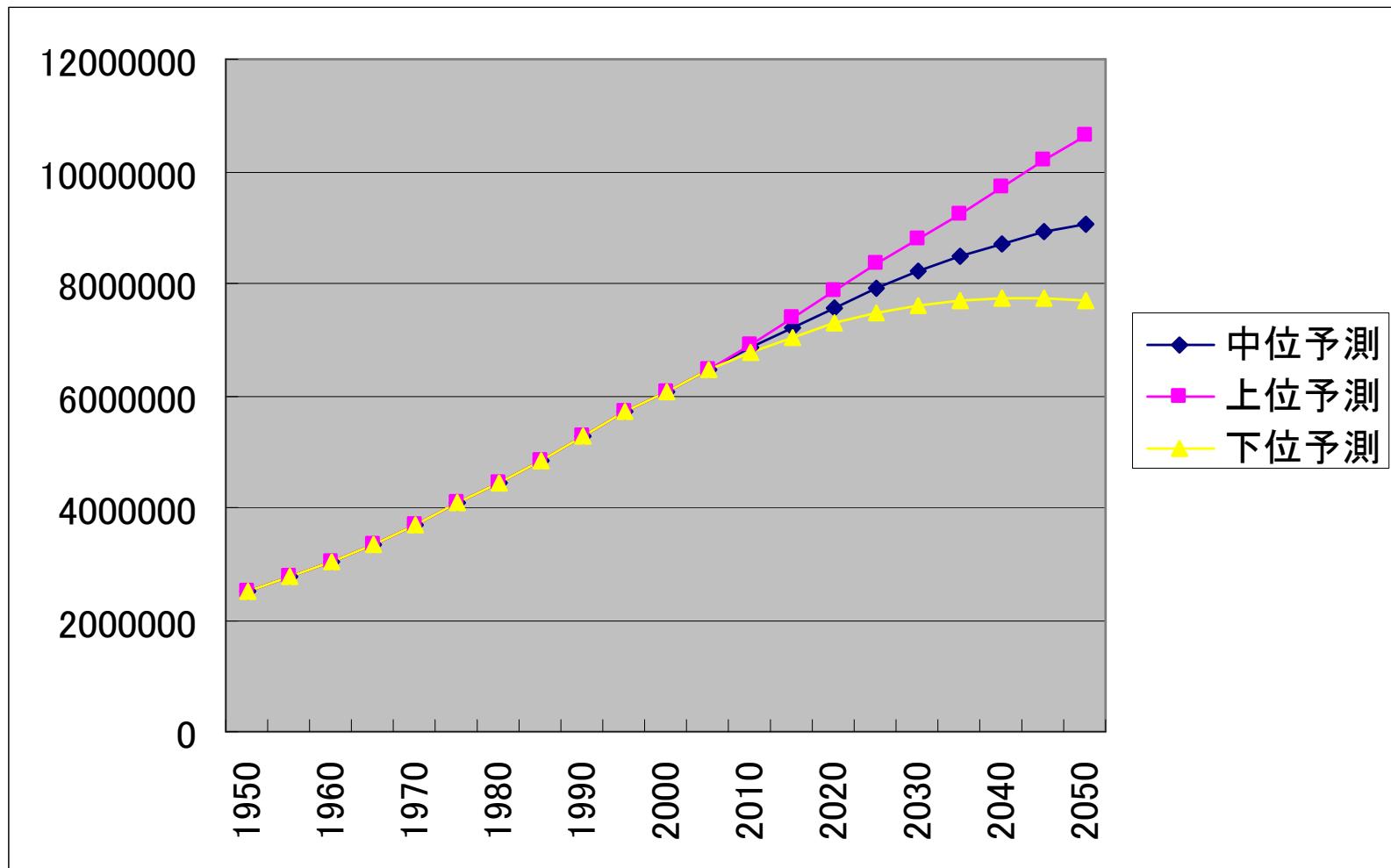


GDP vs. Life Expectancy

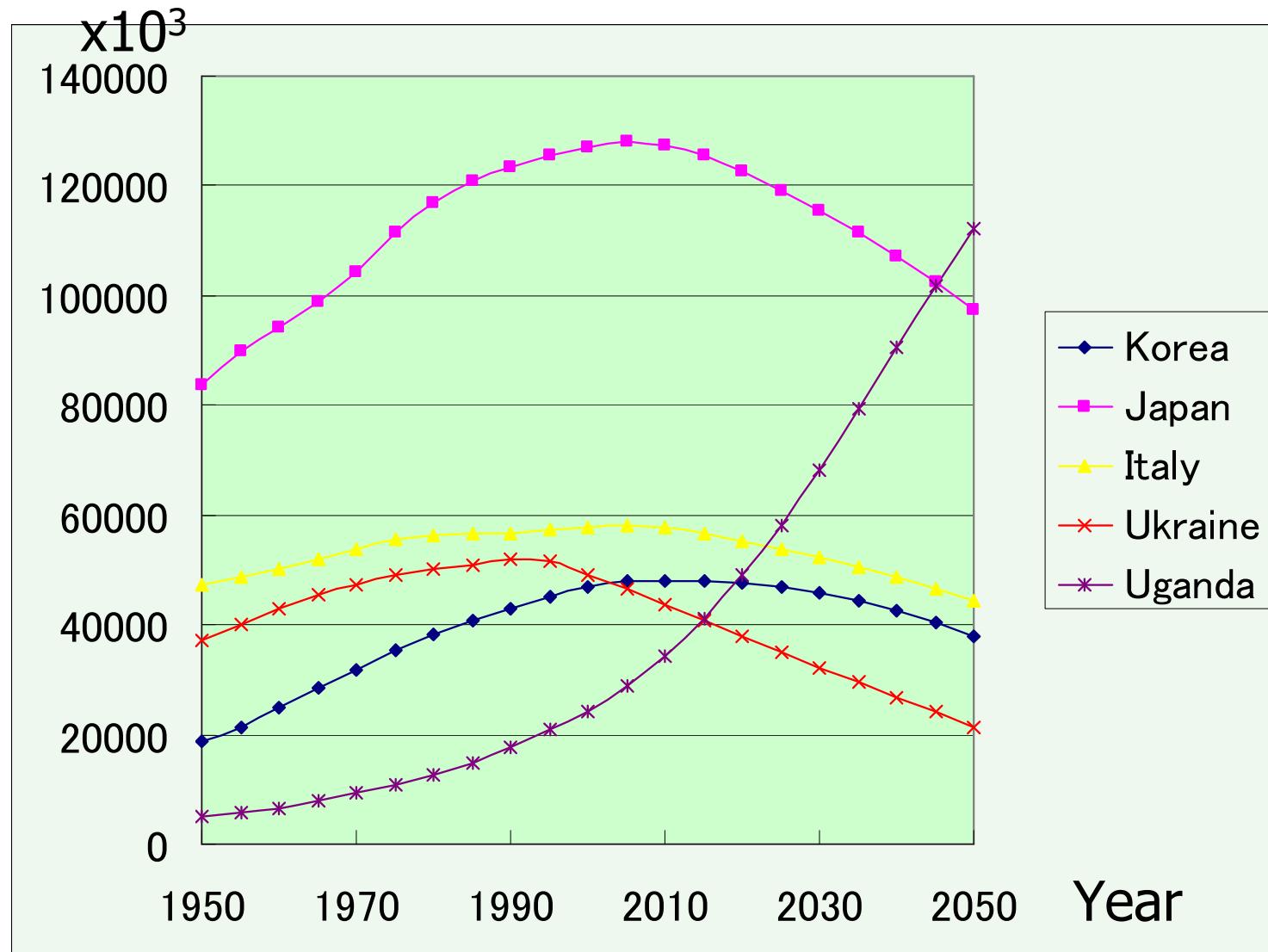


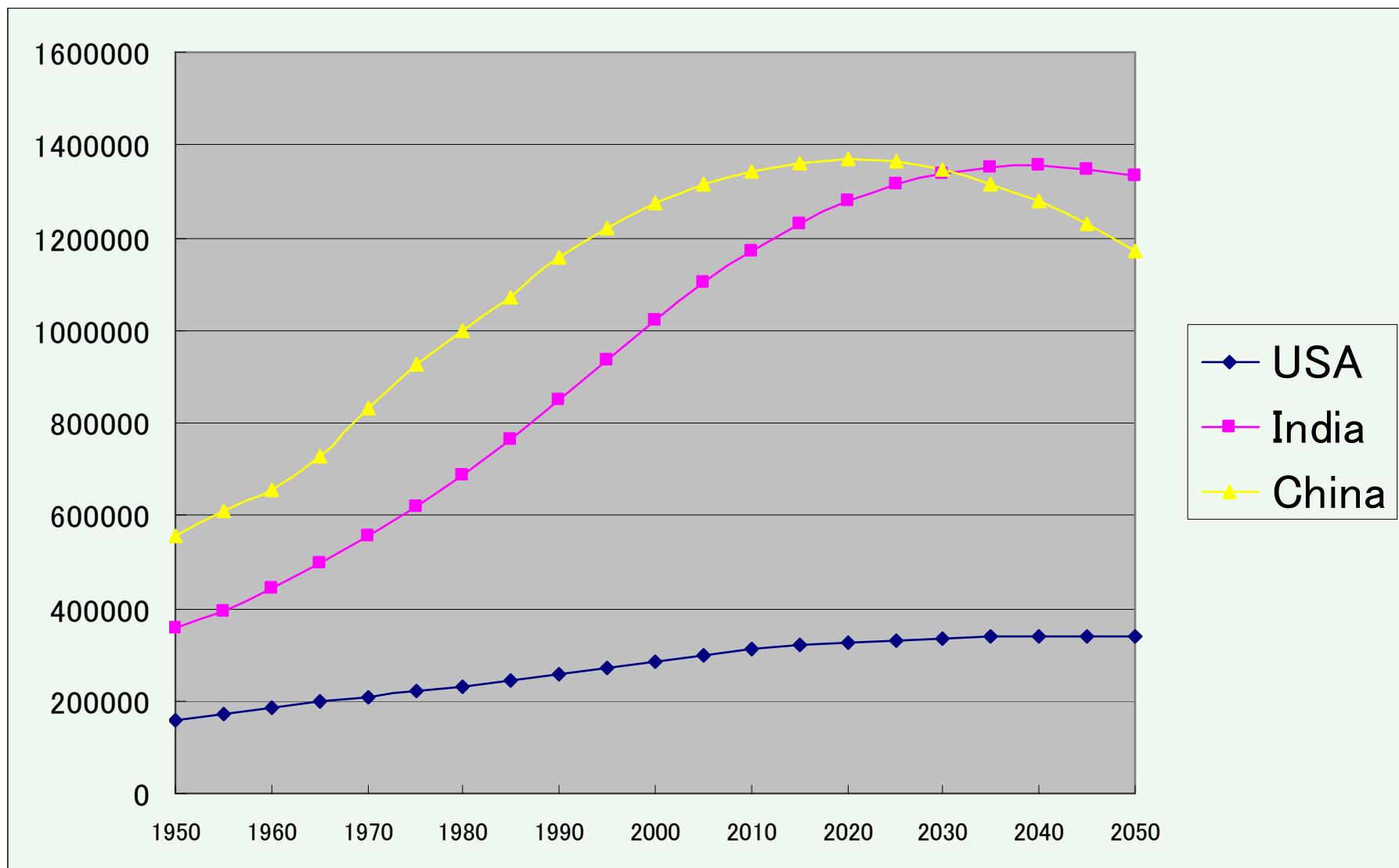


UN Population Projection



Population of Selected Countries





8 Goals in MDG

- 1. Eradicate extreme poverty and hunger
- 2. Achieve universal primary education
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- 4. Reduce child mortality
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Key Factors to Decrease Population



Global Risks

Climate Change and Sustainability

Herman Daly's Definition

Steady State Economics since 1970s

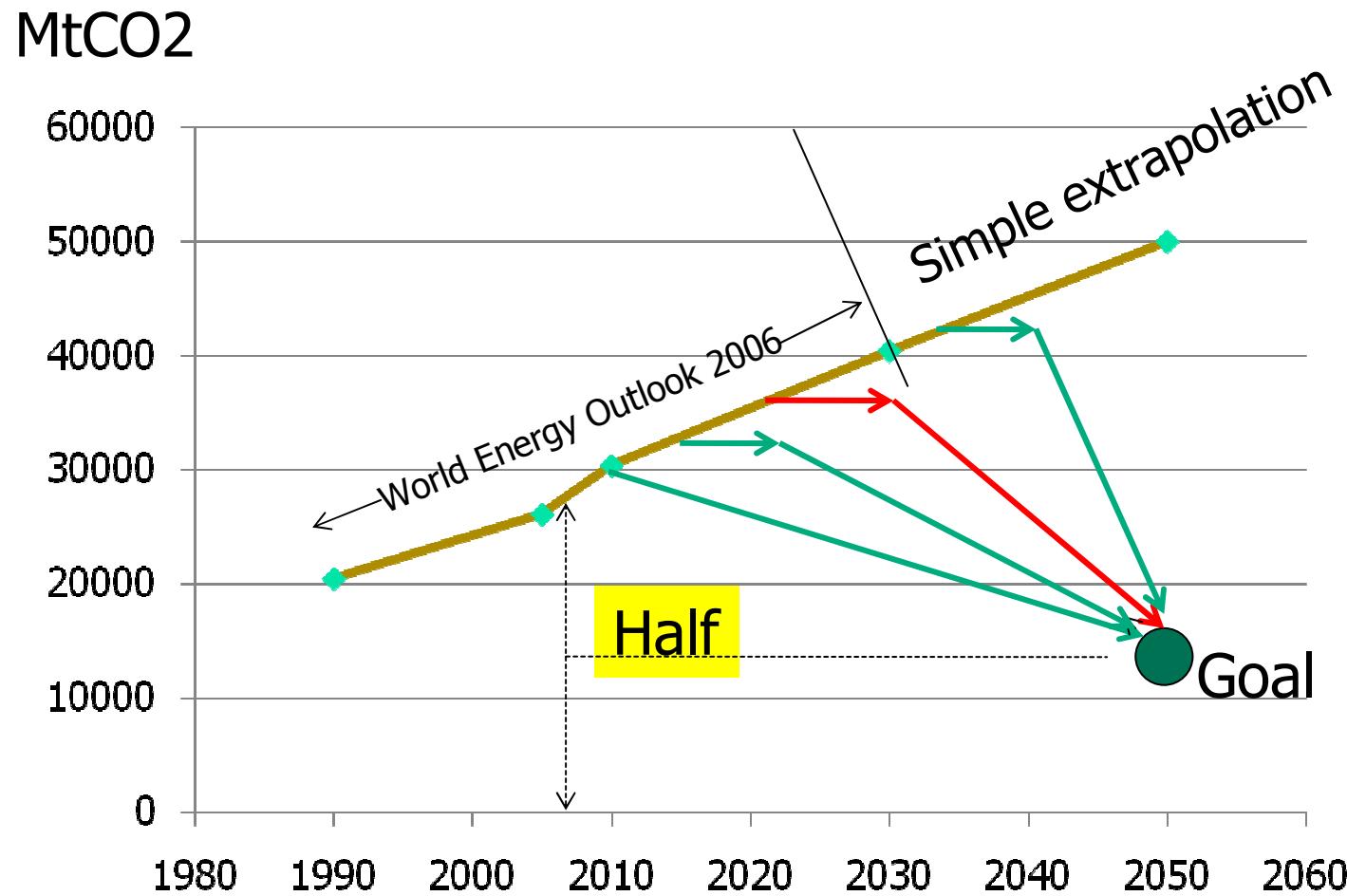
- Harvesting rates should not exceed regeneration rates.
- Waste emissions should not exceed the renewable assimilative capacity of the local environment.
- **Nonrenewable resources** should be depleted at a rate equal to the rate of creation of renewable substitutes.

Heiligendamm G8 Summit

June 8-11, 2007

- In setting a global goal for emissions reductions in the process we have agreed today involving all major emitters, we will consider seriously the decisions made by the European Union, Canada and Japan which include at least **a halving of global emissions by 2050.** (GHG)

Schematic Drawing up to 2050



Inertia of Society

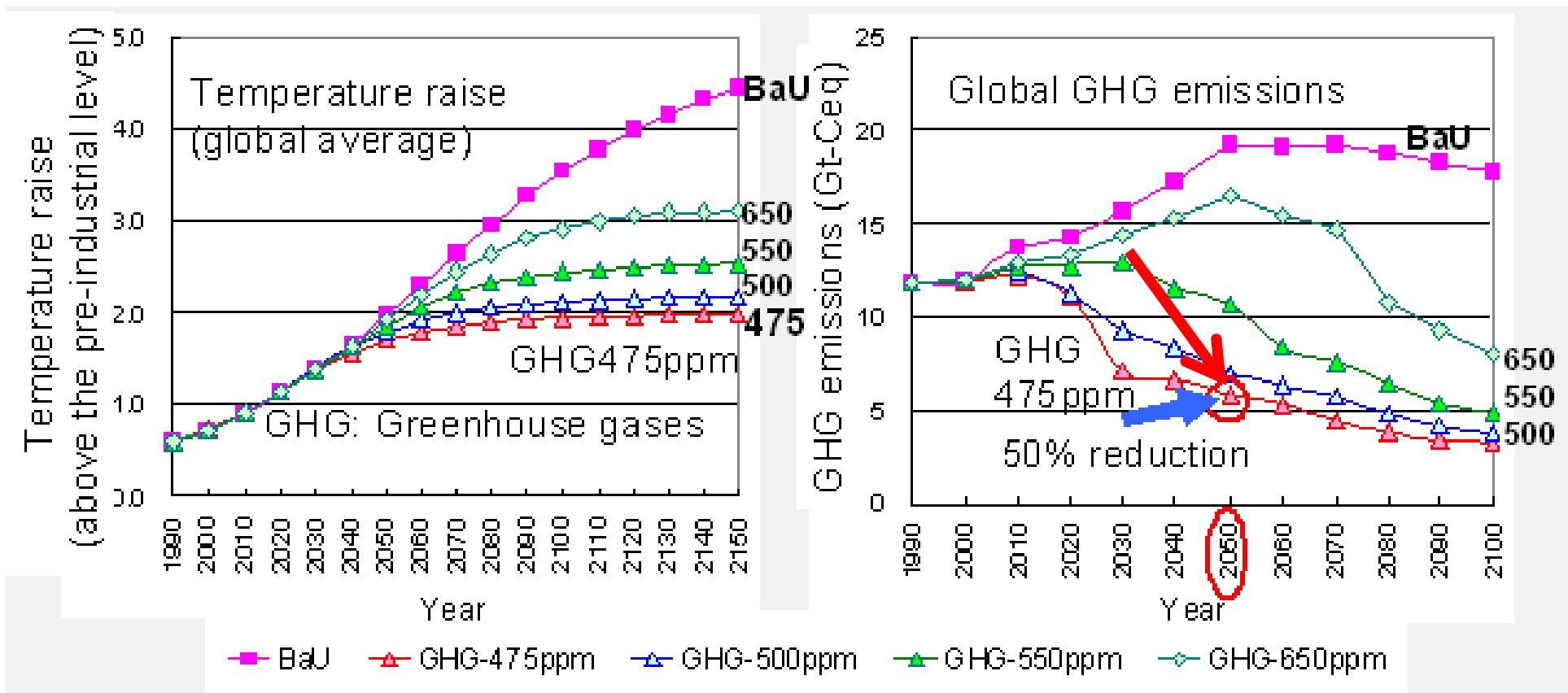
Time Constants to Change

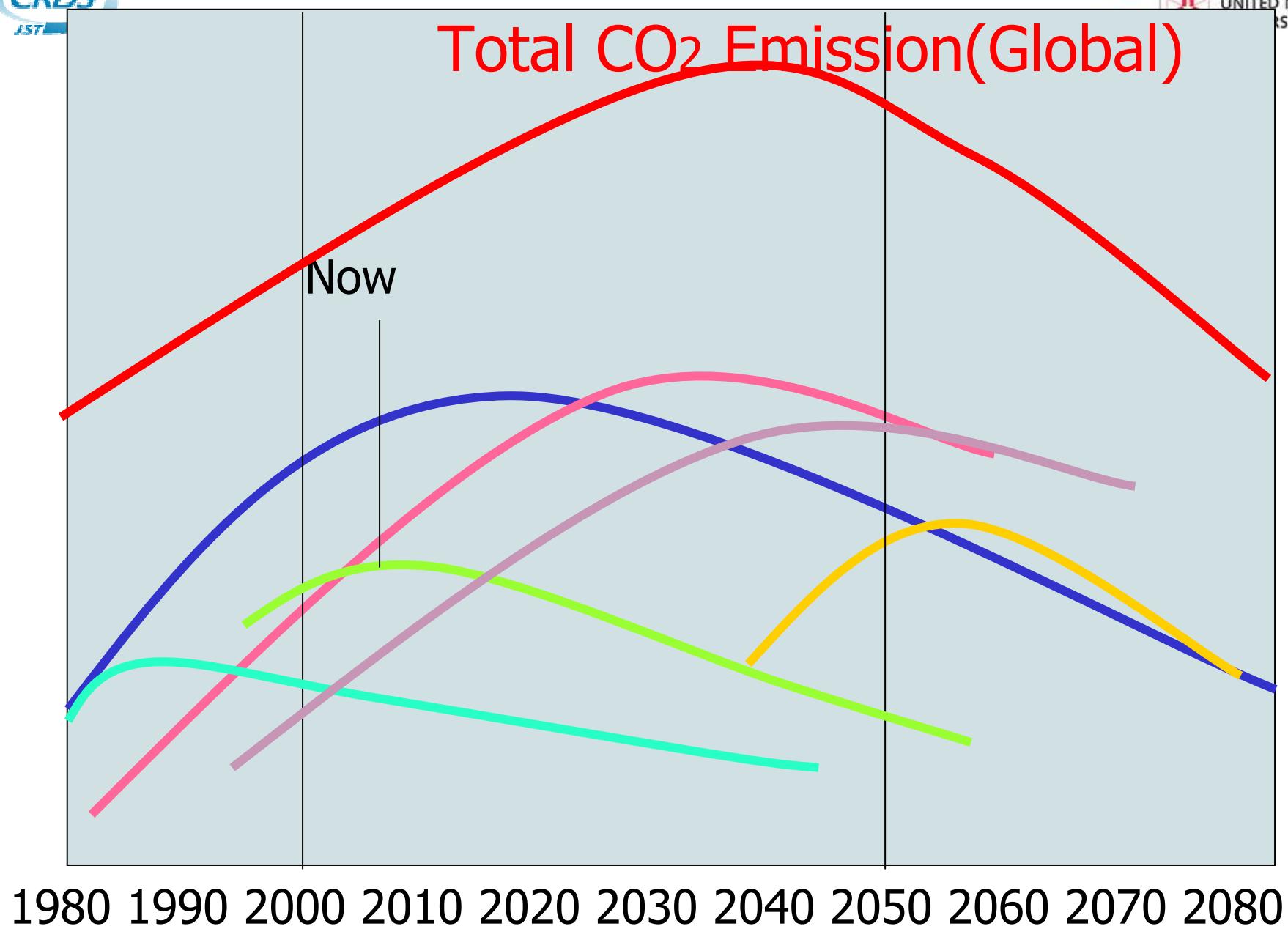
- Life Time of Infrastructure $\doteq 100$ Years
- Life Time of Buildings $\doteq 60$ Years
- Life Time of Production Plants $\doteq 30$ Years
- Life Time of Automobiles $\doteq 15$ Years
- Life Time of Consumer Durables $\doteq 12$ Years

- Time to change Social Systems.
- Persistency of “Mindsets of People”.

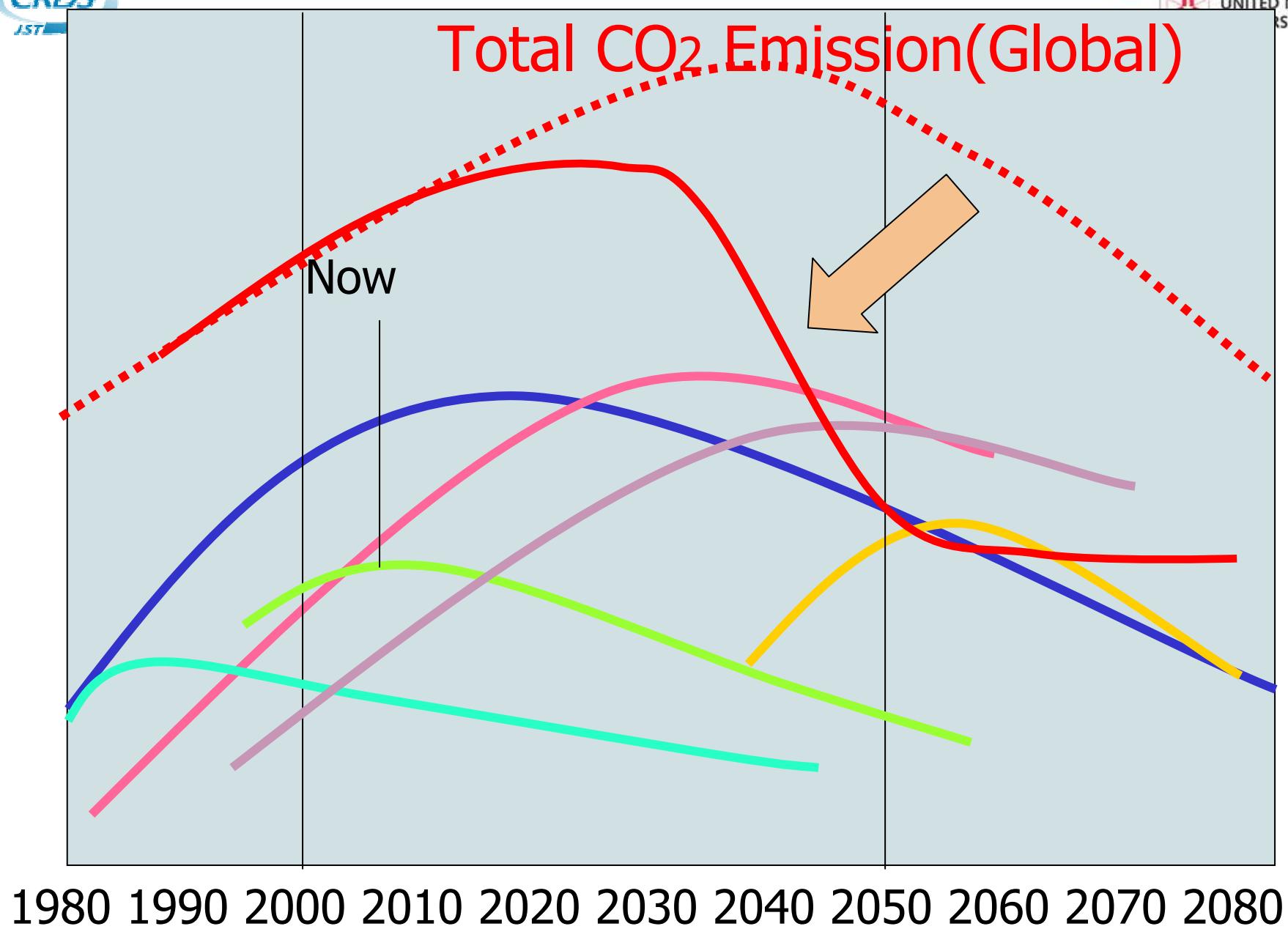
475ppm – 国環研によるシナリオ

475ppm GHG Scenario by NIES

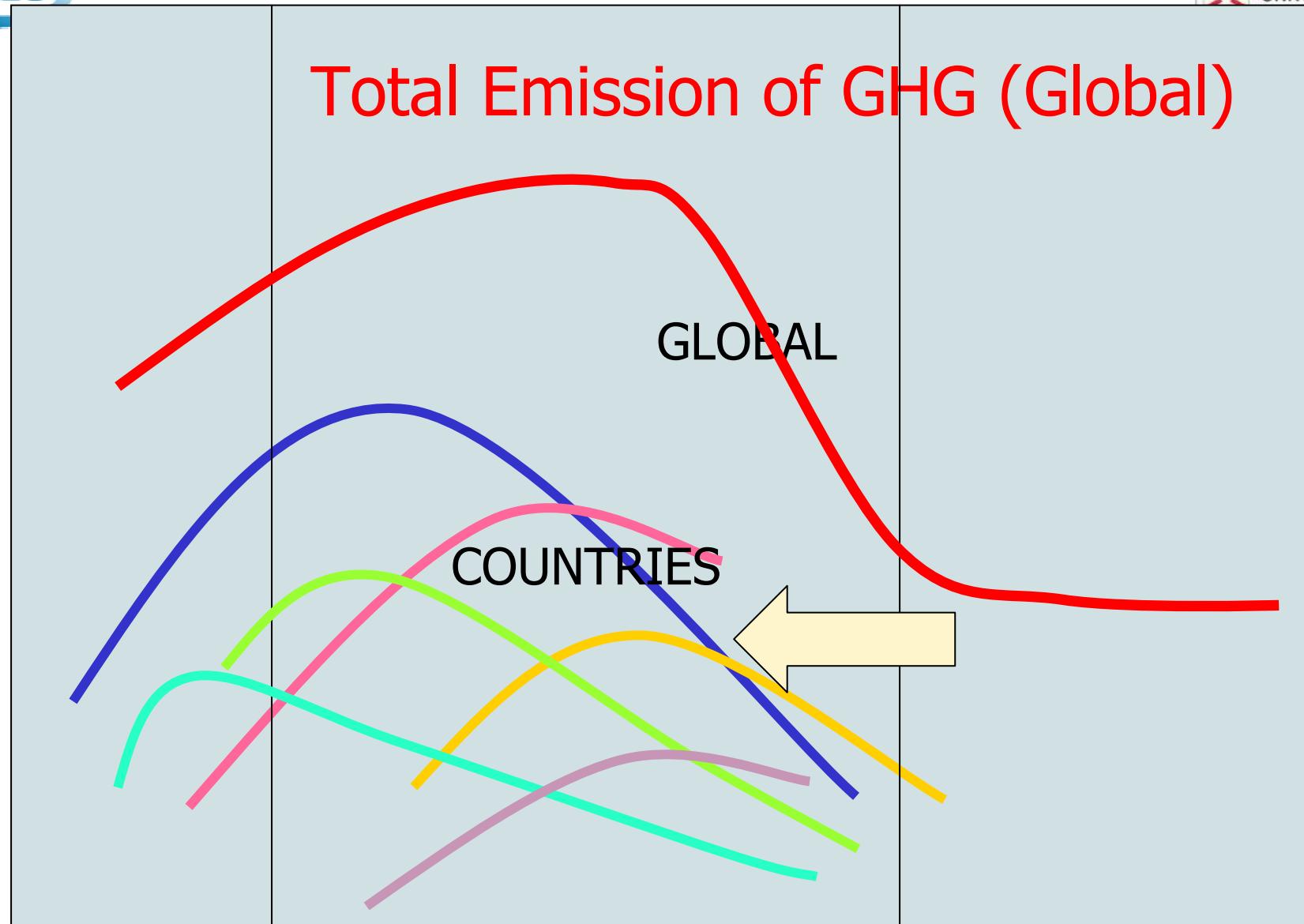




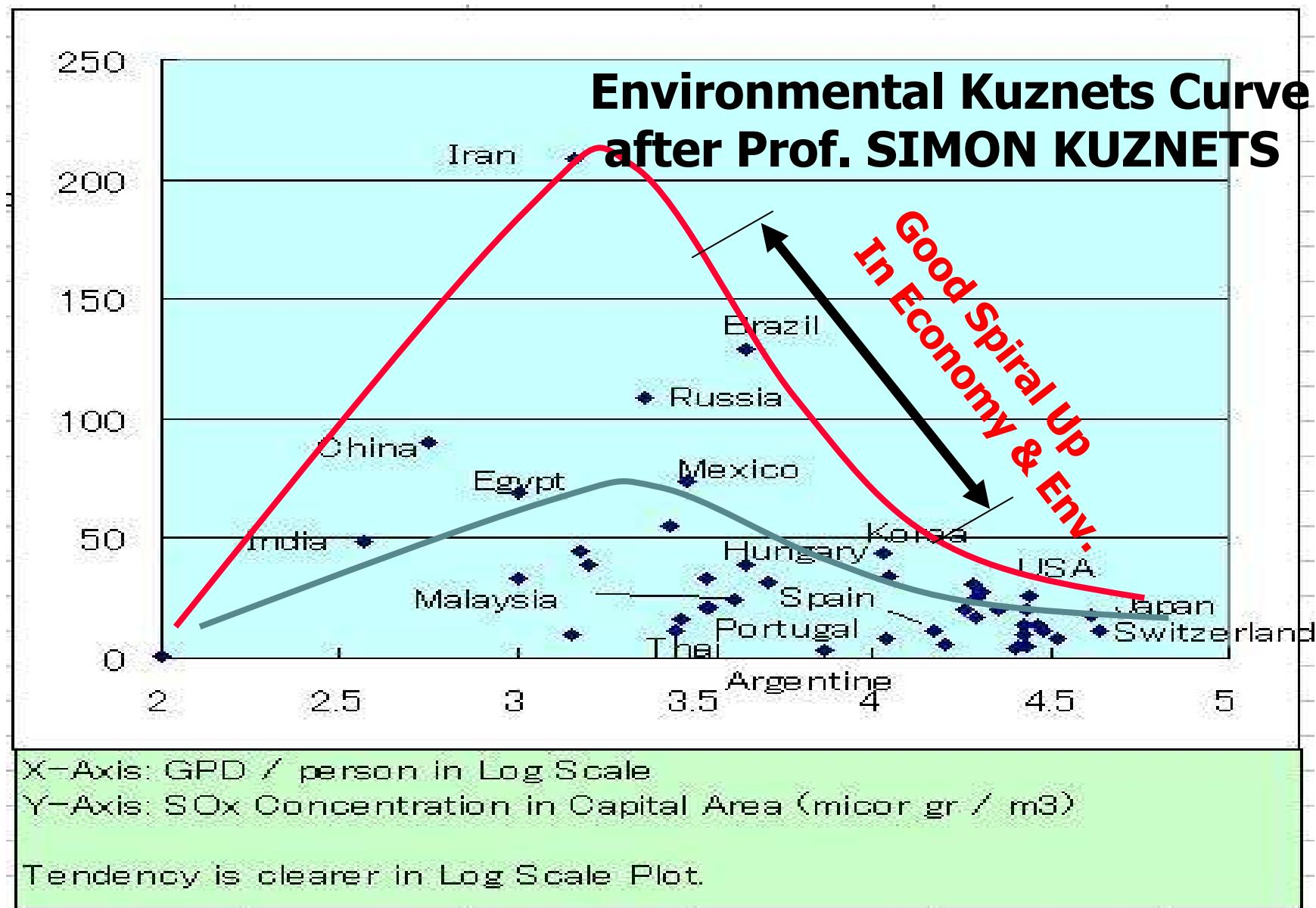
1980 1990 2000 2010 2020 2030 2040 2050 2060 2070 2080



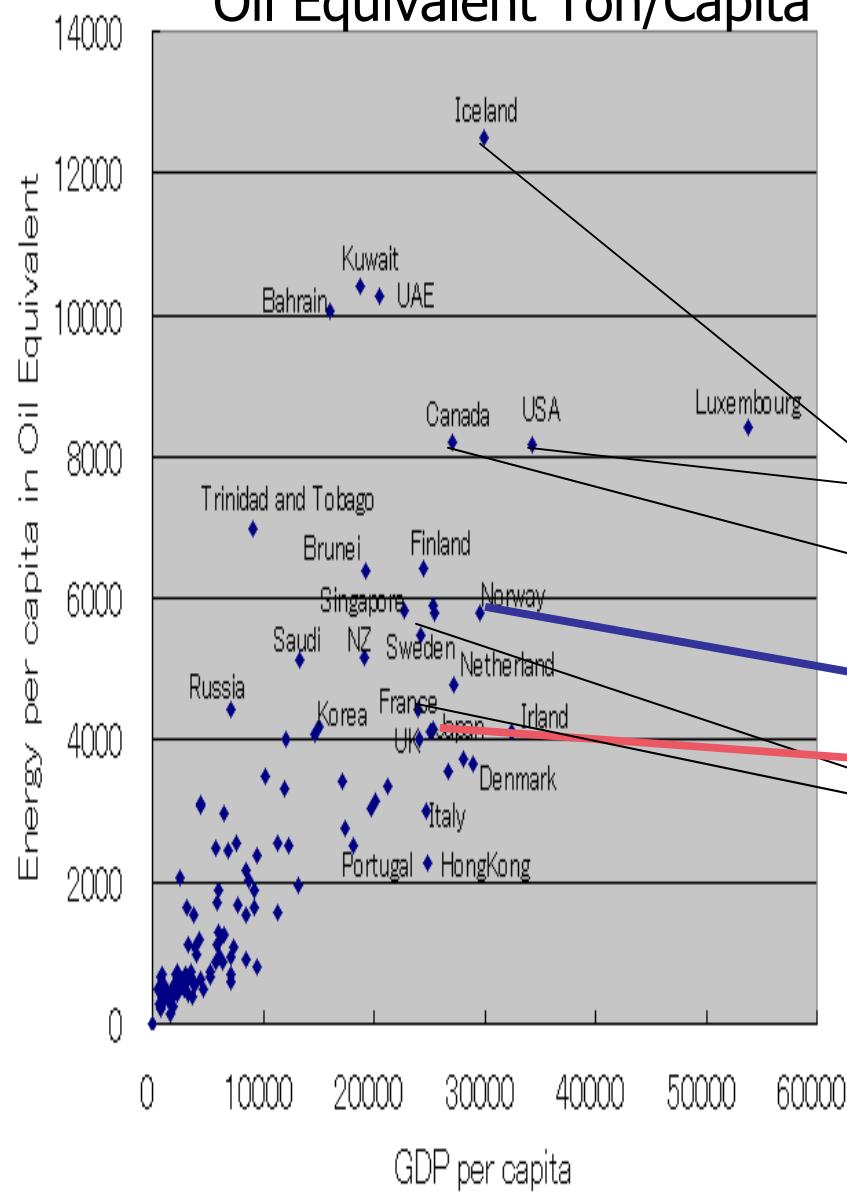
1980 1990 2000 2010 2020 2030 2040 2050 2060 2070 2080



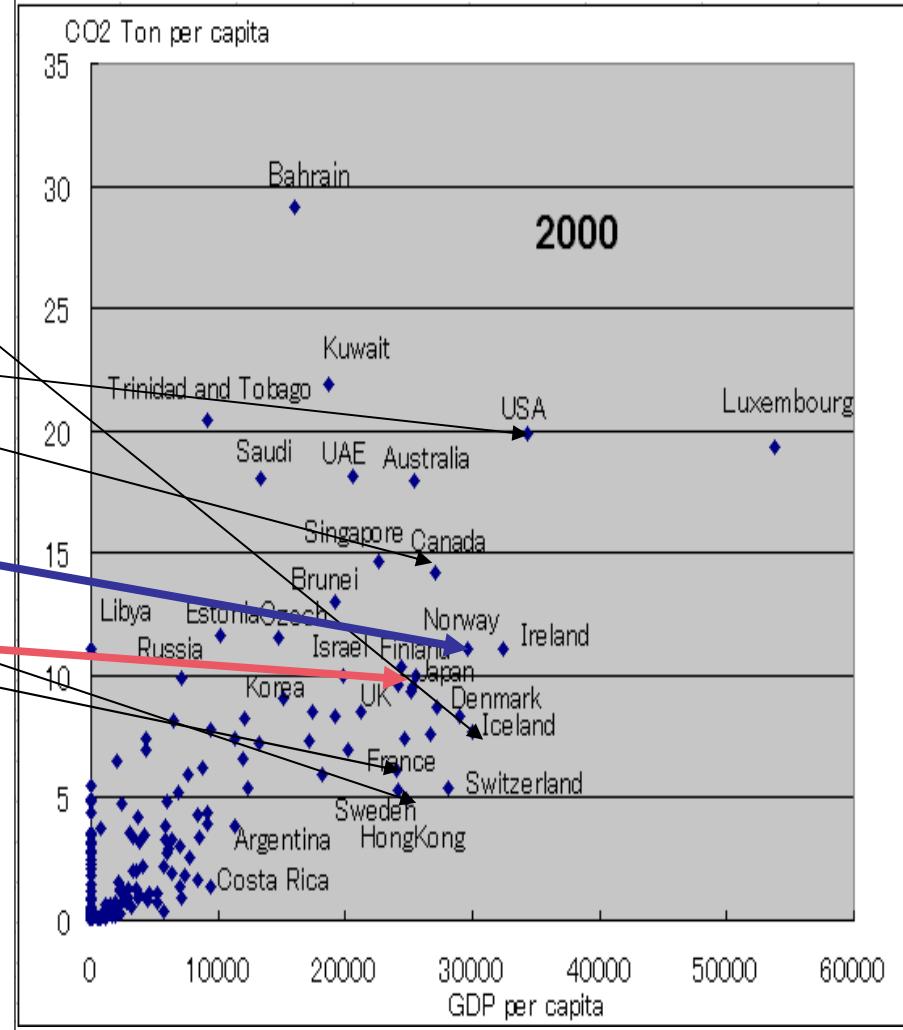
1980 1990 2000 2010 2020 2030 2040 2050 2060 2070 2080

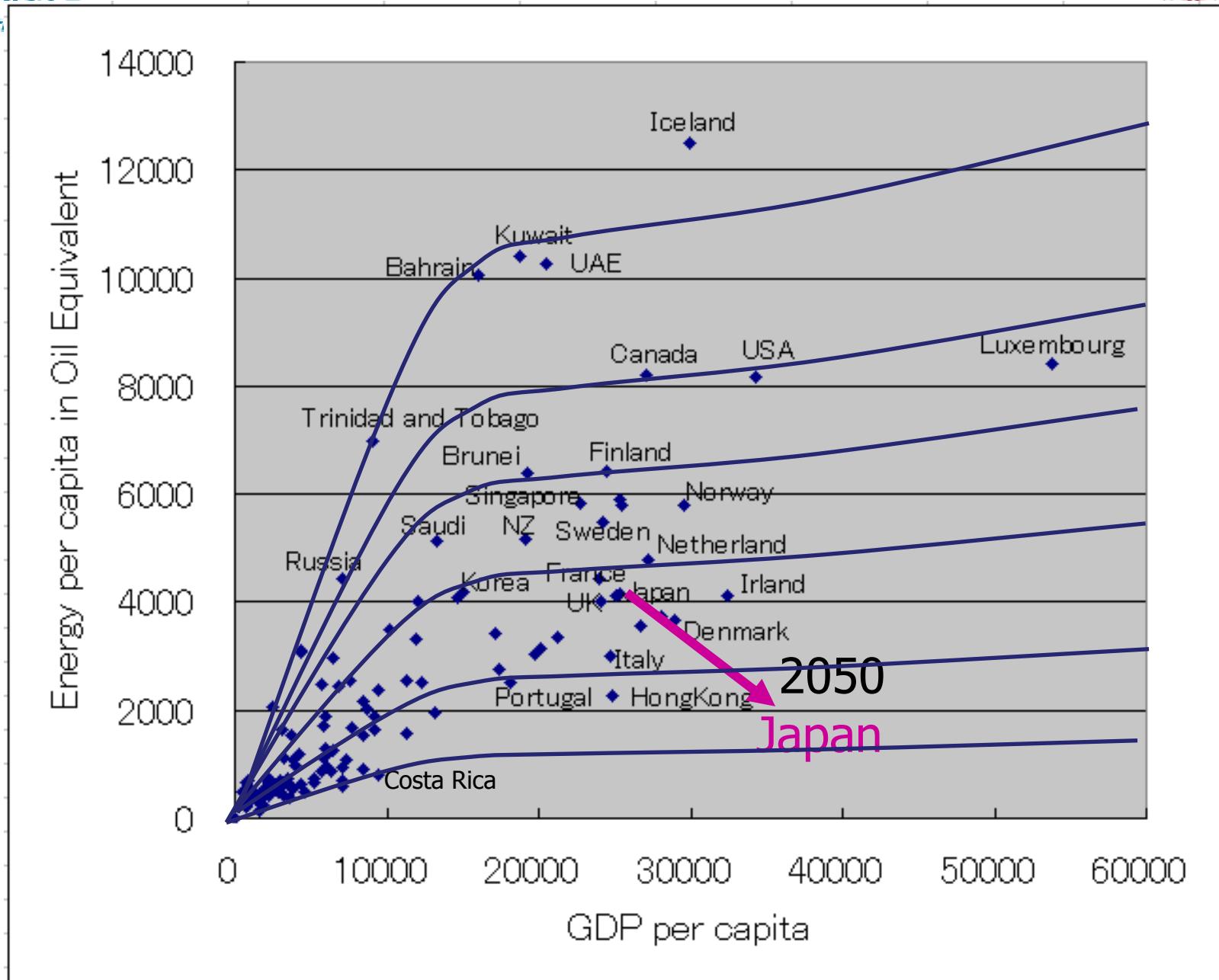


Energy Consumption Oil Equivalent Ton/Capita

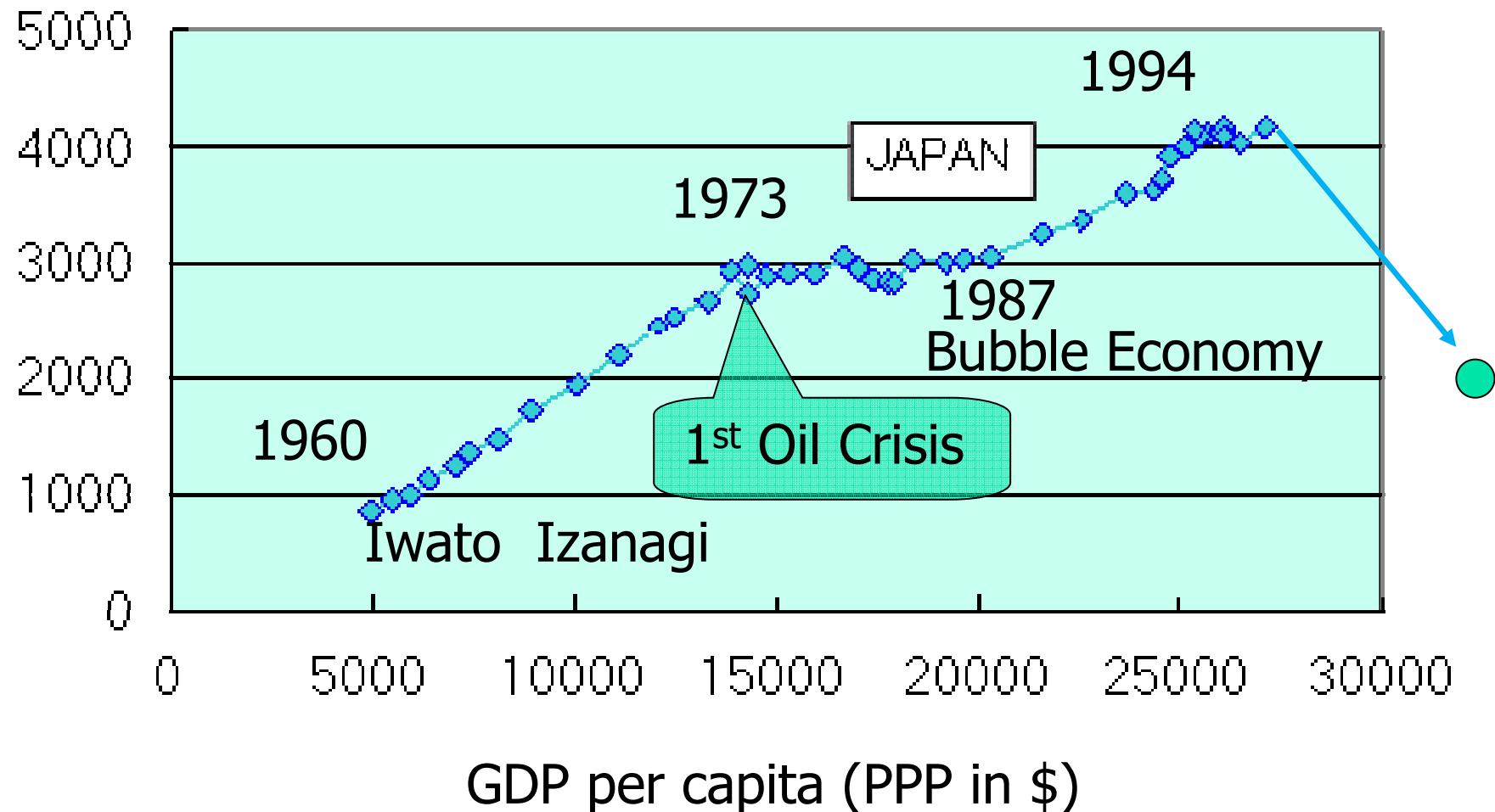


CO2 Emission Ton/Capita





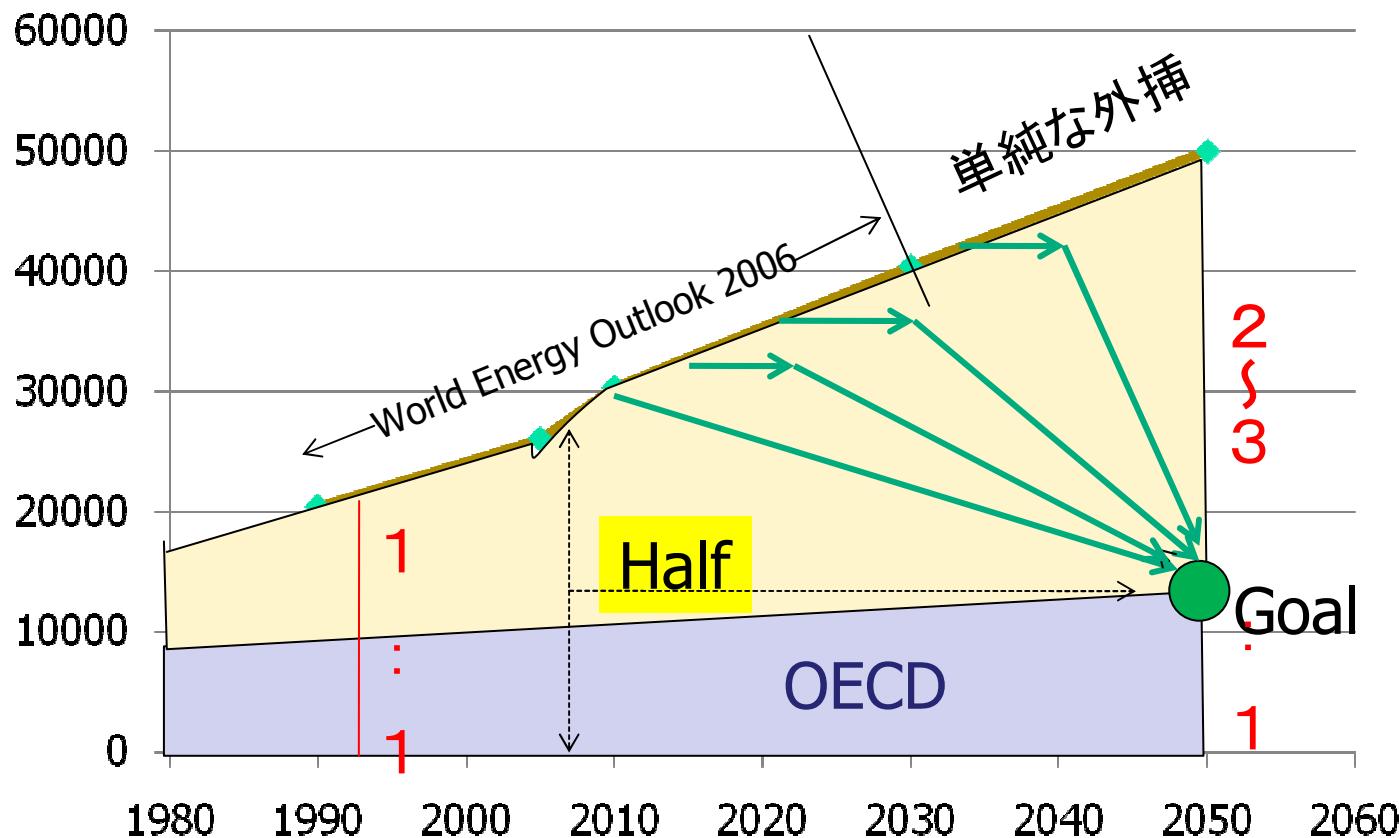
Energy Consumption Kg Oil Eq. per capita



2050年までの道筋

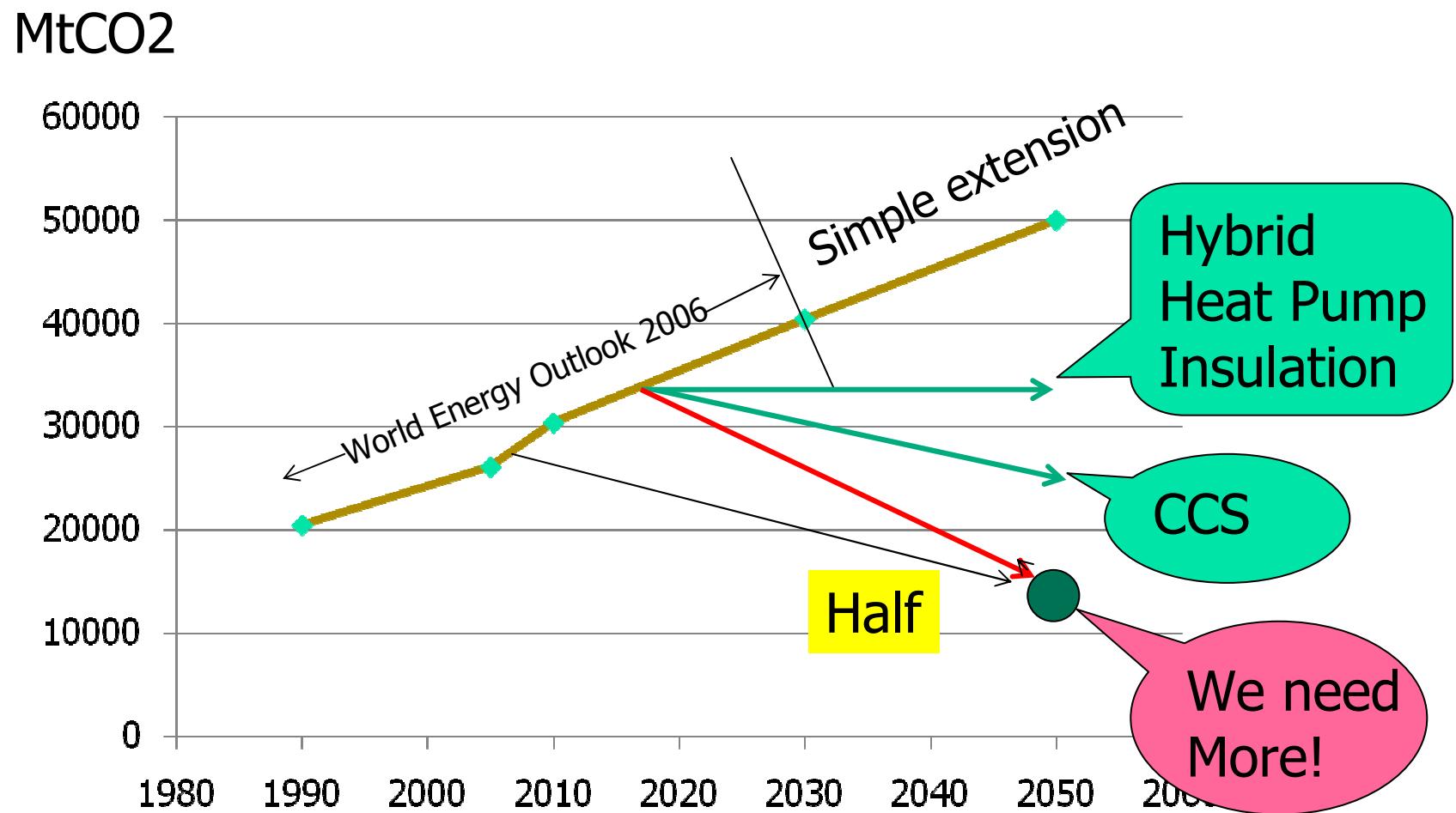
Schematic Drawing up to 2050

MtCO₂

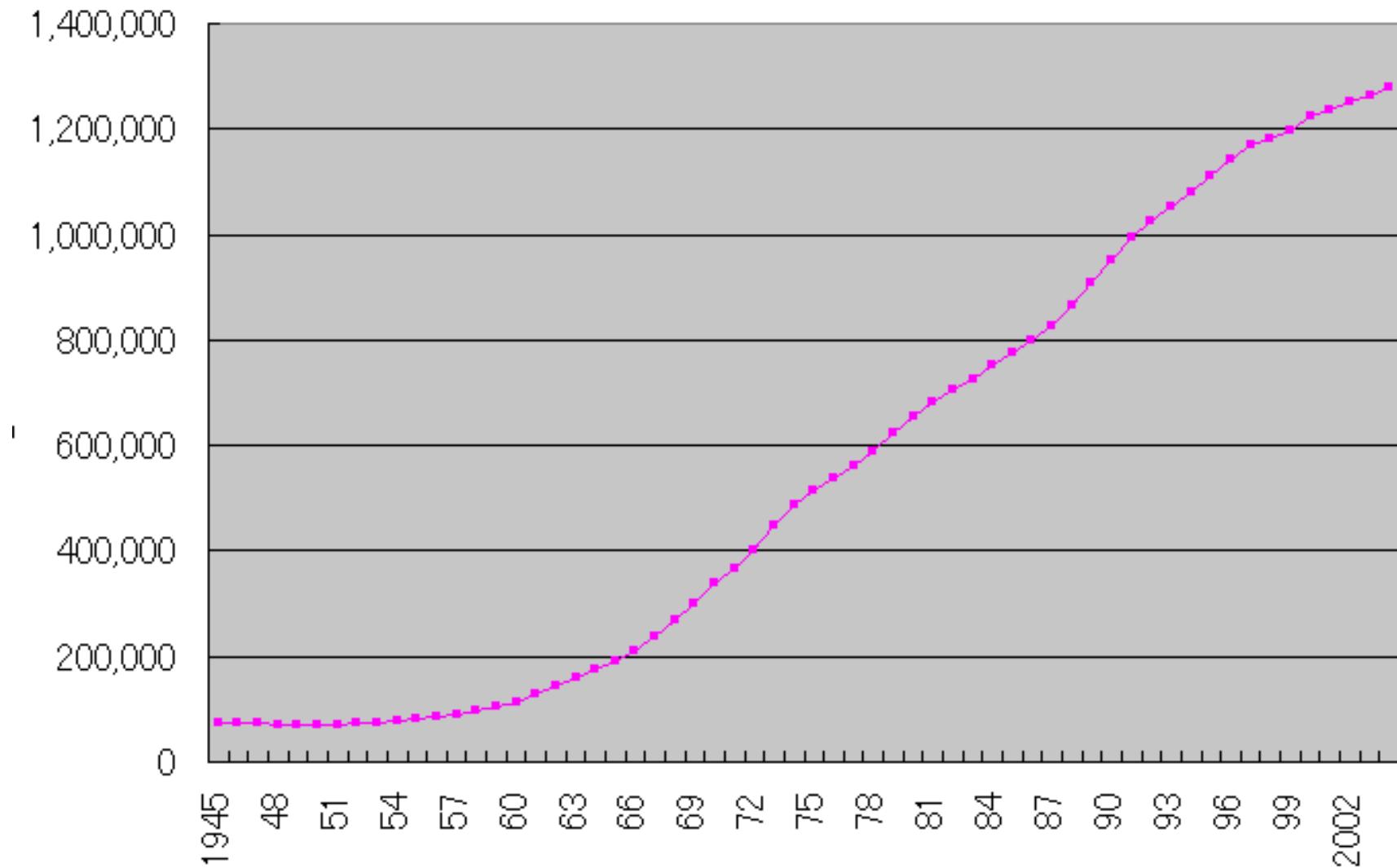


Impossible to Reach the Goal even Emission from OECD=0
Reduction in Developing Countries = Key Factor

Schematic Drawing up to 2050

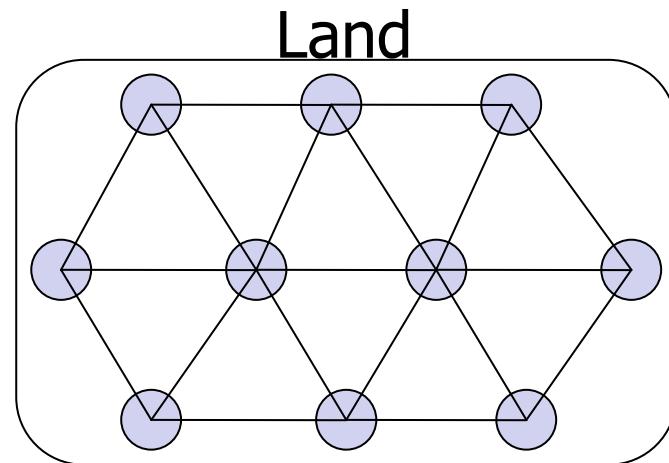


Stock of Steel in Japan kton

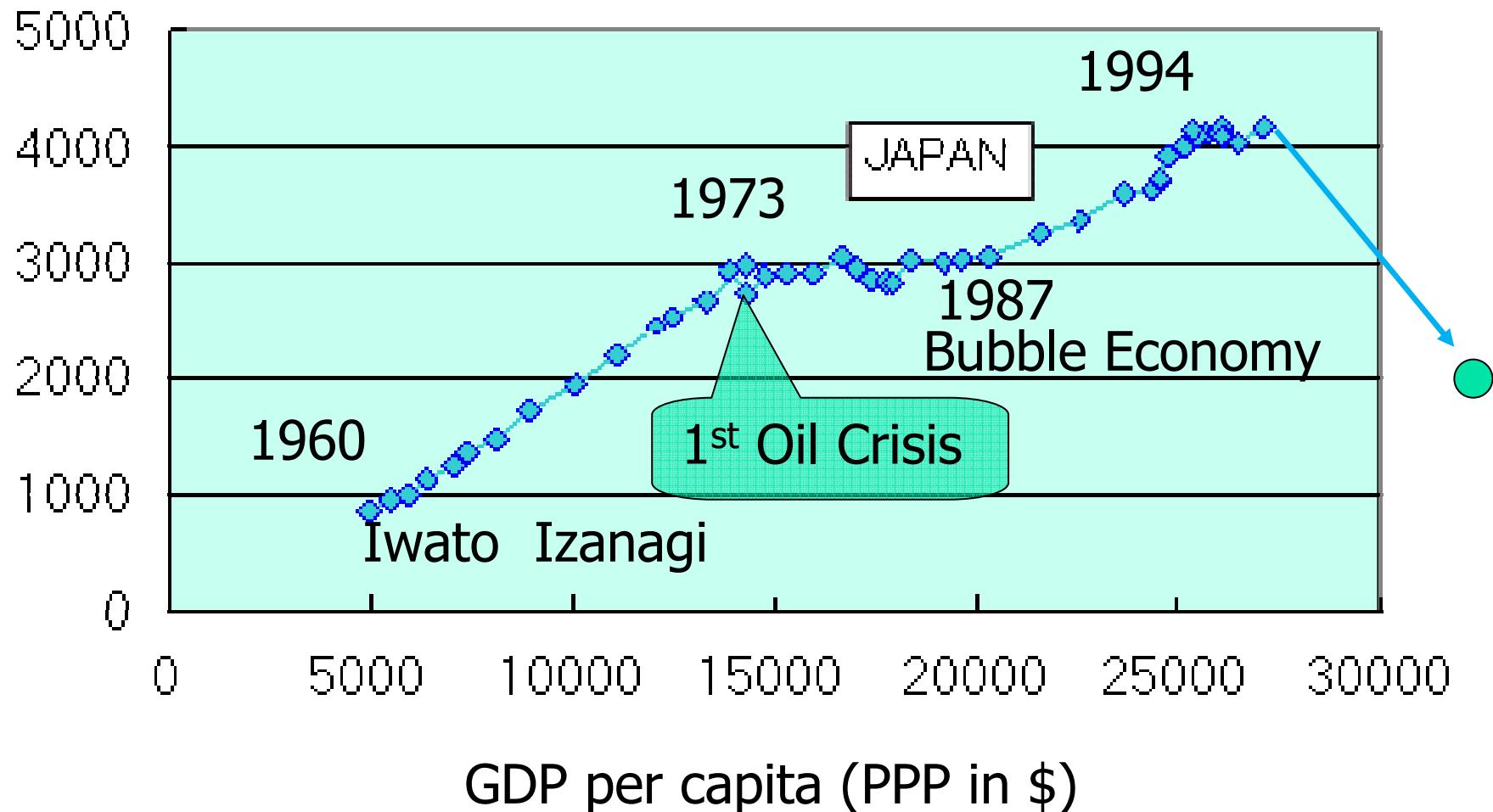


Western Civilization : Grid Type

- Electric Power Grid
 - Express Way
 - Bullet Train
 - Sewage System
-
- Impossible to Realize this type of Development in Whole World.
 - Too Expensive, Too Much Resources

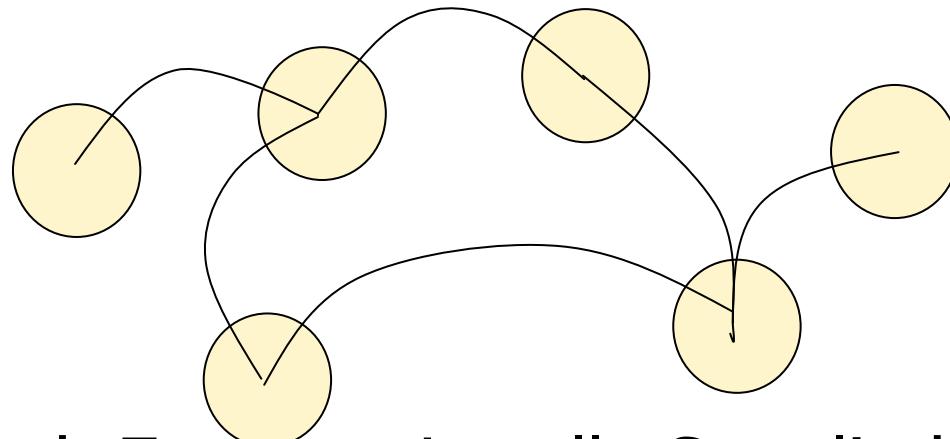


Energy Consumption Kg Oil Eq. per capita



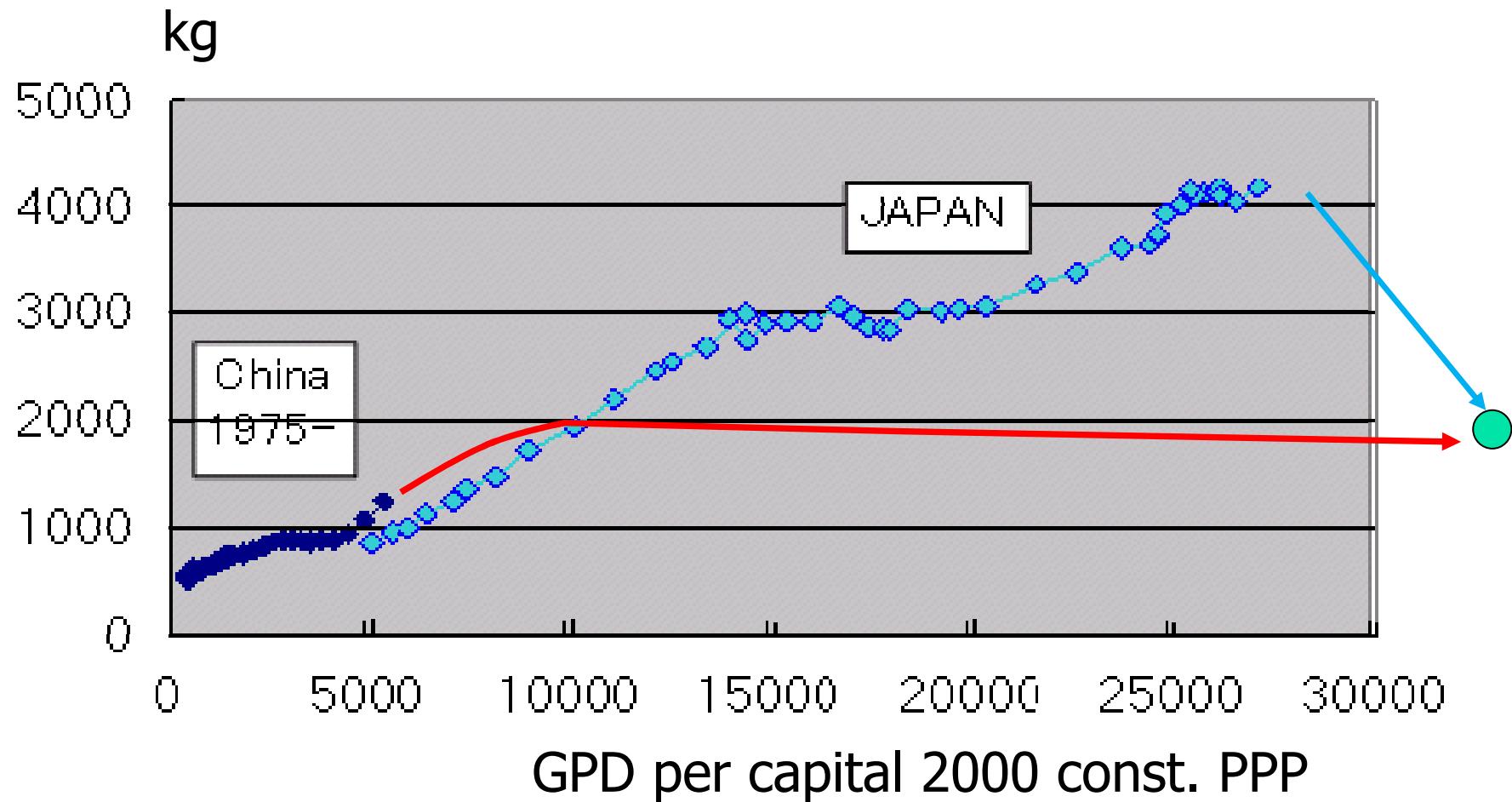
Alternative Type of Civilization ?

- Locally Self Sufficient but Connected by Information System



- Food, Energy : Locally Supplied
- Basic Generic Products such as Steel, Automobiles, Home Appliances : Transported by Railroad Freight Train

Different Type of Civilization in China and others



Energy Consumption Kg Oil Eq. per capita

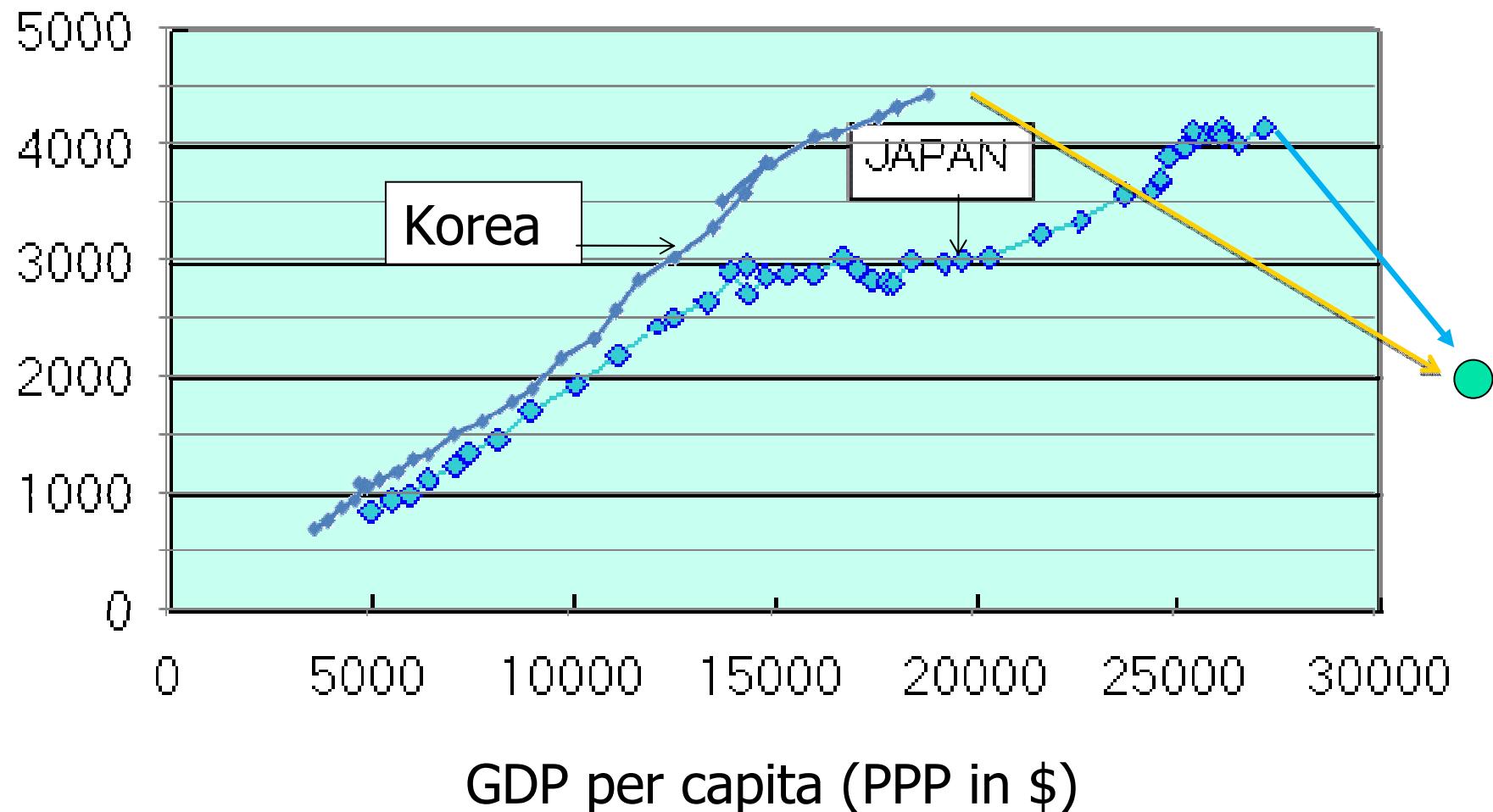
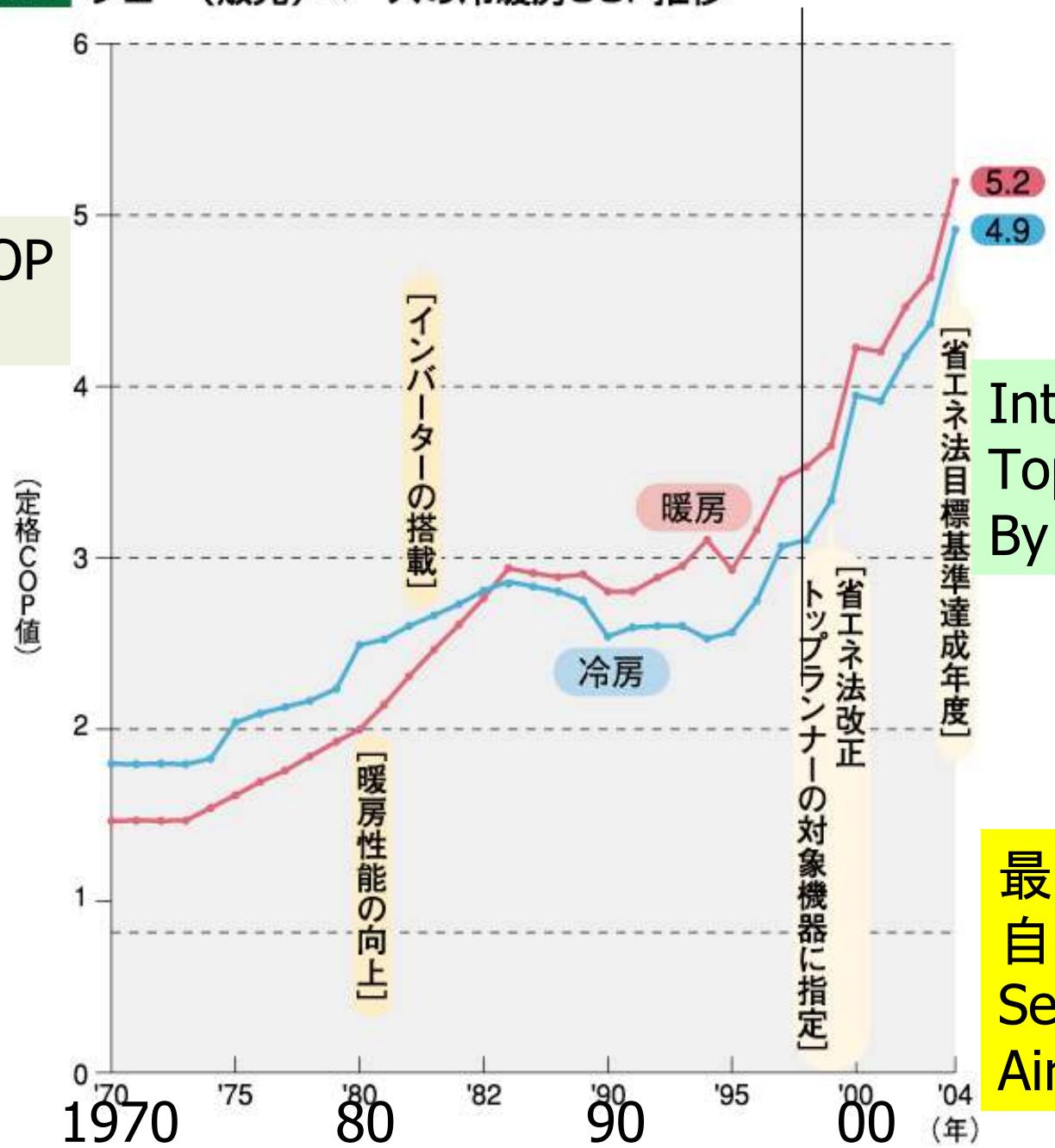


図2 フロー(販売)ベースの冷暖房COP推移

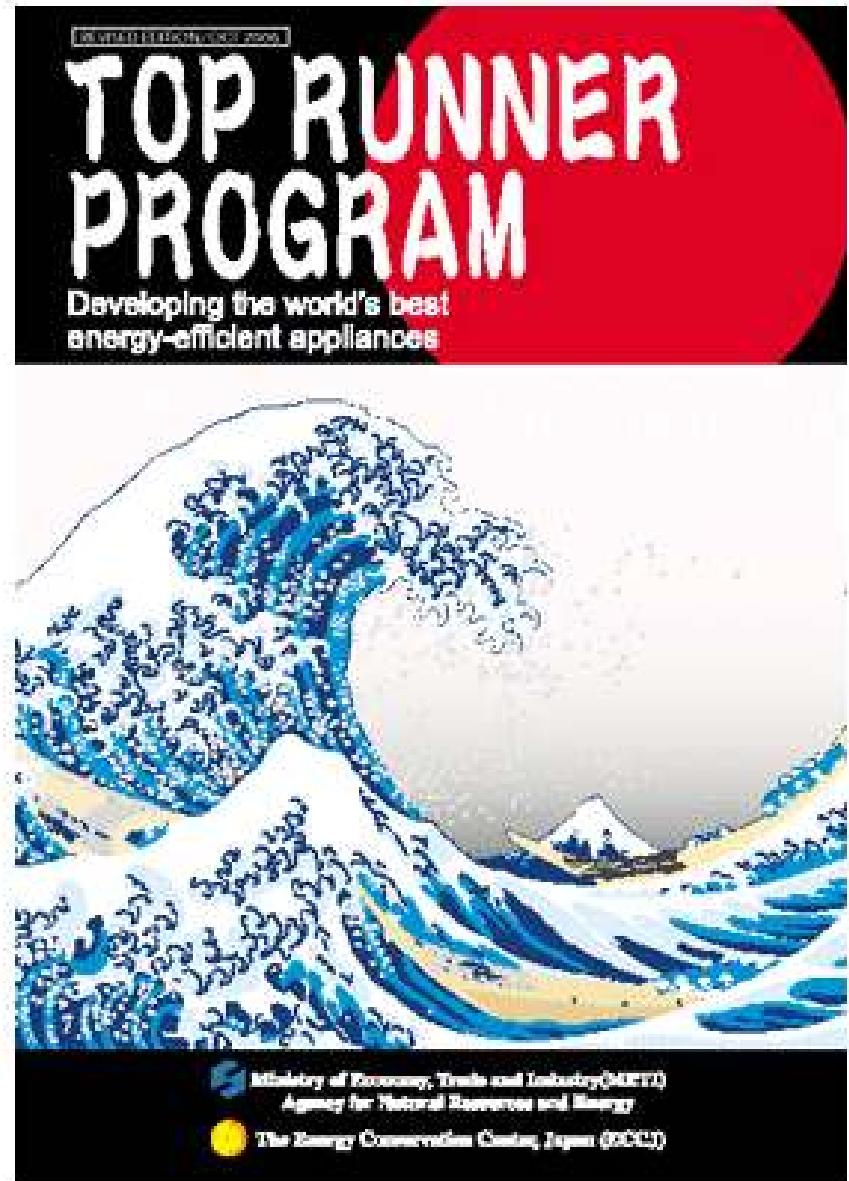
Trend in COP 効率係数



Introduction
Top Runner
By METI

最近では、
自動お掃除
Self-cleaning
Air conditioner

出所：(株)住環境計画研究所調べ

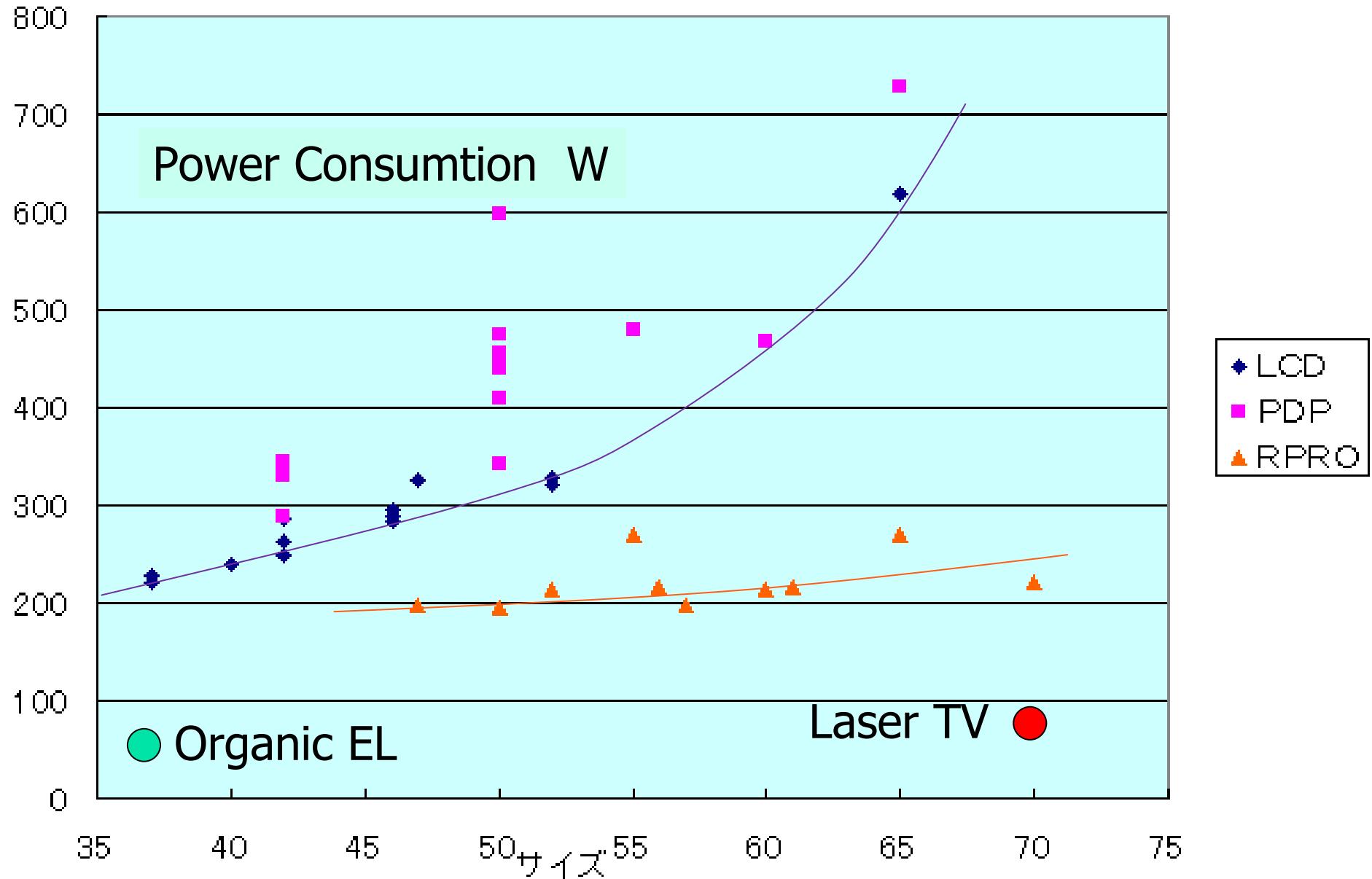


Developing the World's Best Energy-Efficient Appliances
(Japan's "Top Runner" Standard)
REVISED EDITION/OCT 2006

世界最高の省エネルギー機器の創出に向けて
(日本のトップランナー基準改訂2006年10月版)

Air Conditioners
32 categories
With Comparable Products
Such as
Cooler Cooler/Heater Twin
Small Sized ,,, etc.

Power Consumption of Flat TV

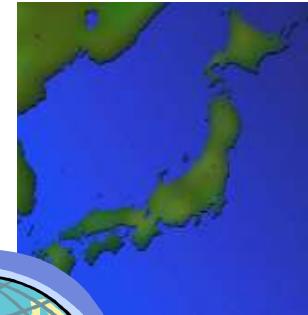
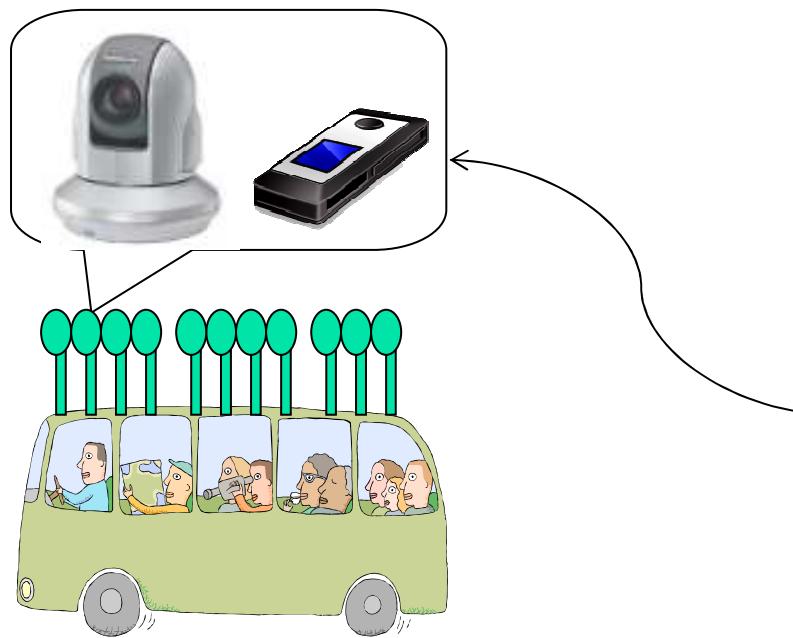


4 kinds of Contribution by IT

- 1. **Stop using Paper**: use digital media.
- ex. paper based directories to Yahoo/Google
- 2. **Stop moving people**: move information.
- 3. **Show CO₂ emission visually**: change mind set of people.
- 4. **Stop serving everywhere**: limit service only for time/places with real needs.

Move Information Instead

- TV Conference
- Virtual Sight Seeing
- Limited in function -> Not popular

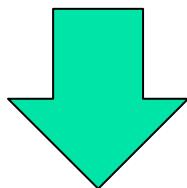


Provide service only for real needs

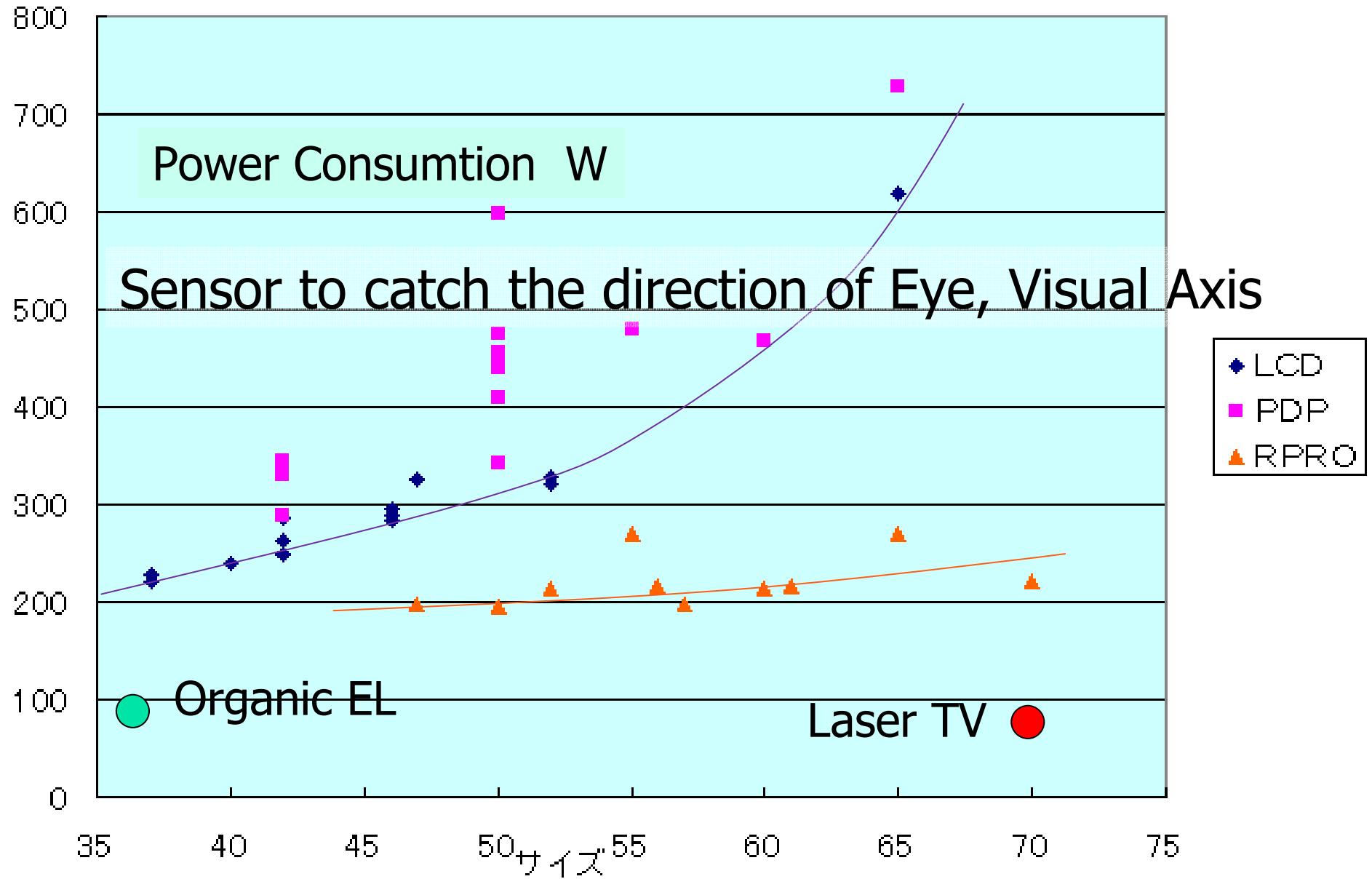


Within only 6 sec.
temperature reaches
optimum level.

- Central Heating System: Common in US or Europe
- Comfortable temperature where and when needed by IT tech.



Power Consumption of Flat TV



Optimum Transportation

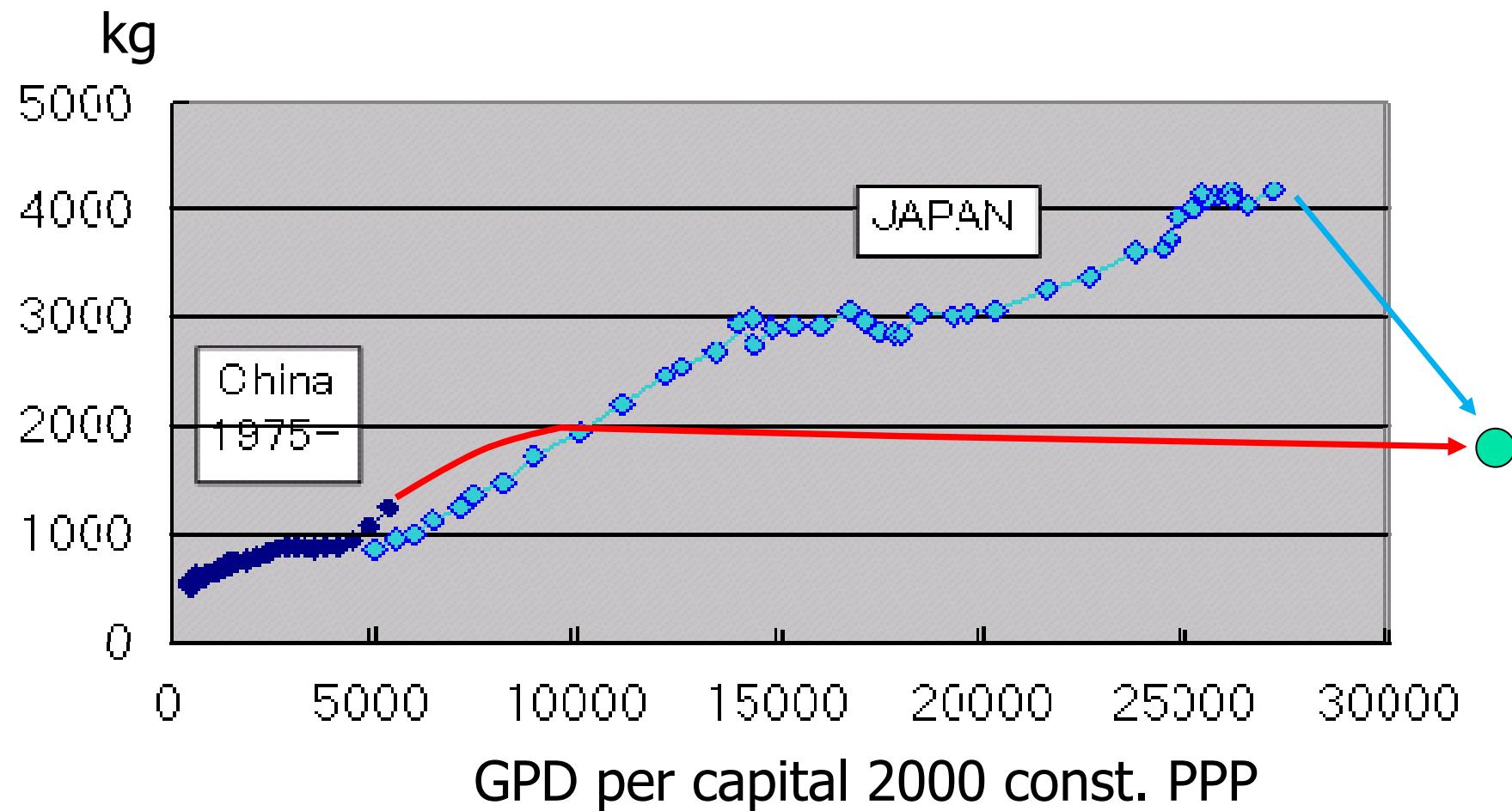
EVs ready for connection



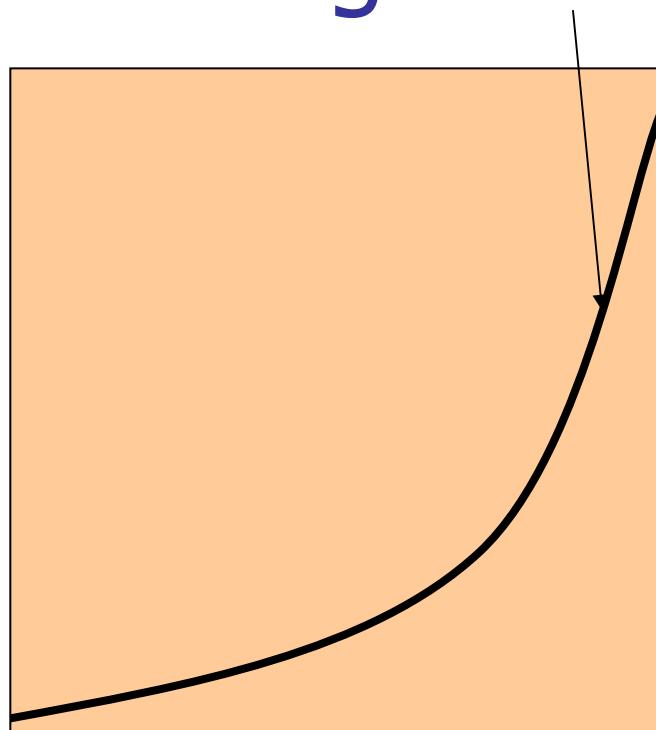
Usually only for two persons with range 30km

Power
Generation
Unit with
Solid Oxide
Electrolyte
Fuel Cell
with Gasoline

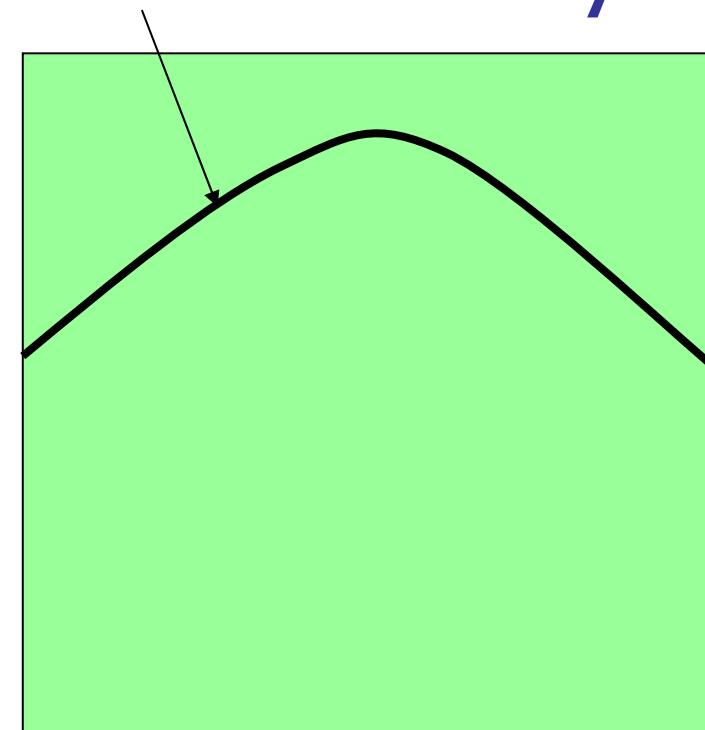
Different Type of Civilization in China and others



Images: 20th and 21st century

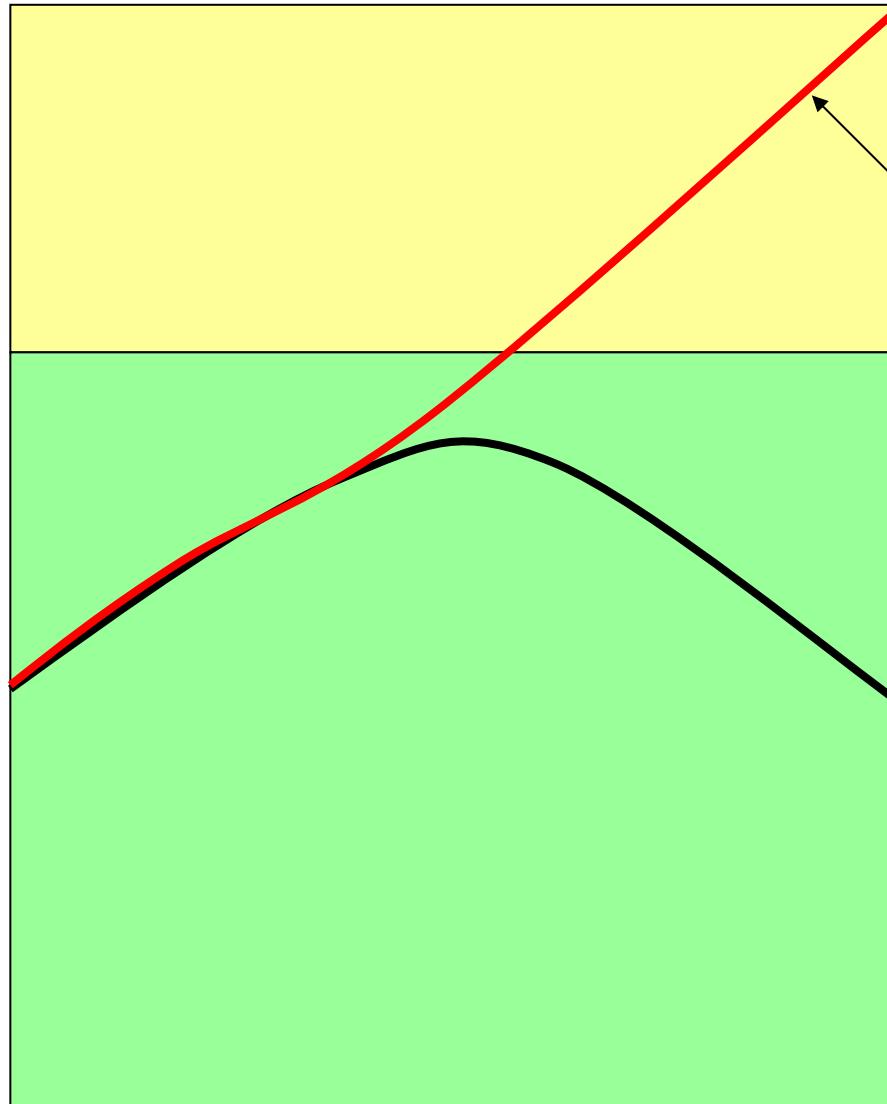


Economical Growth
Resource Acquisition



Population, Consumption

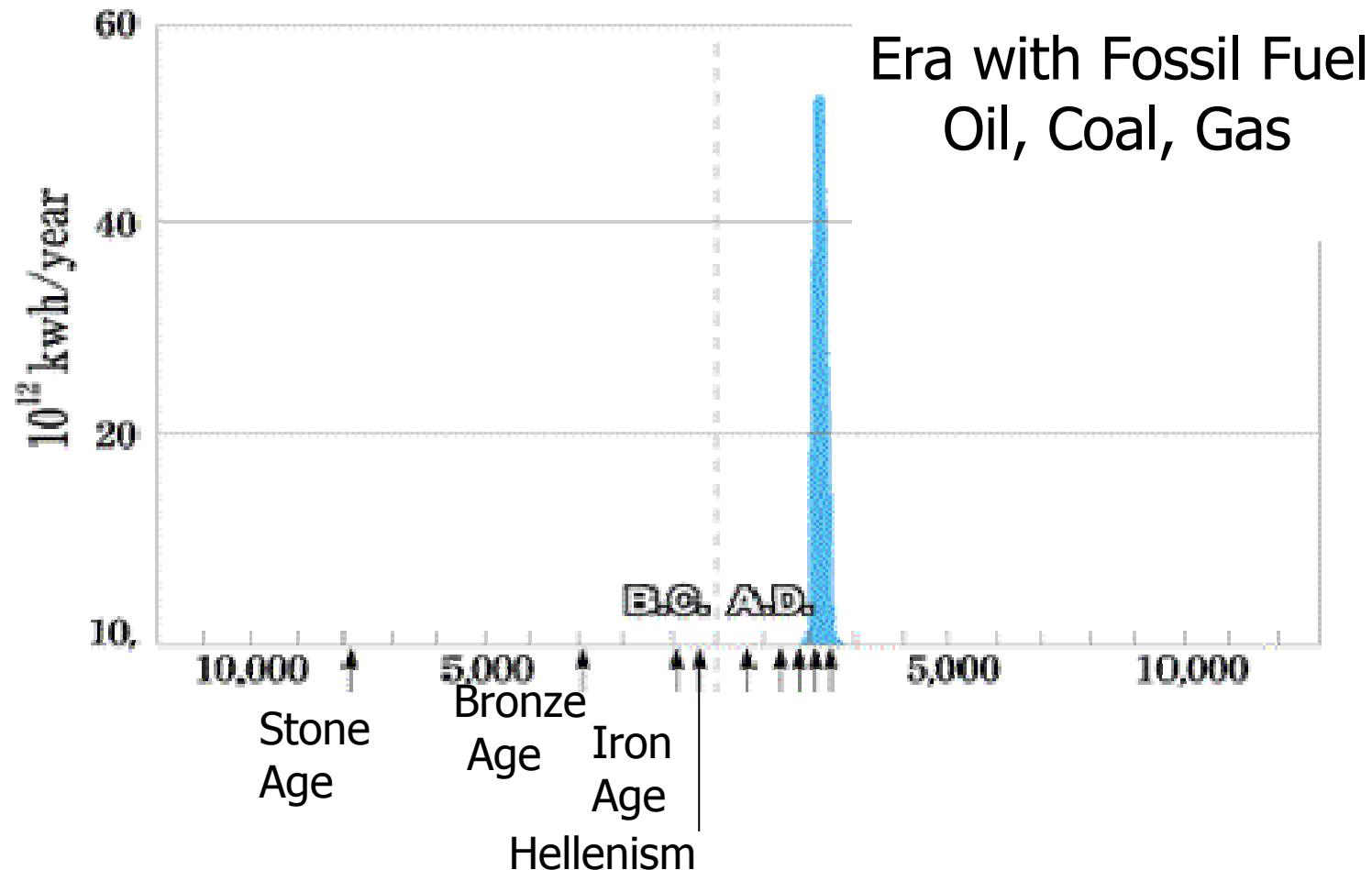
Premium Products



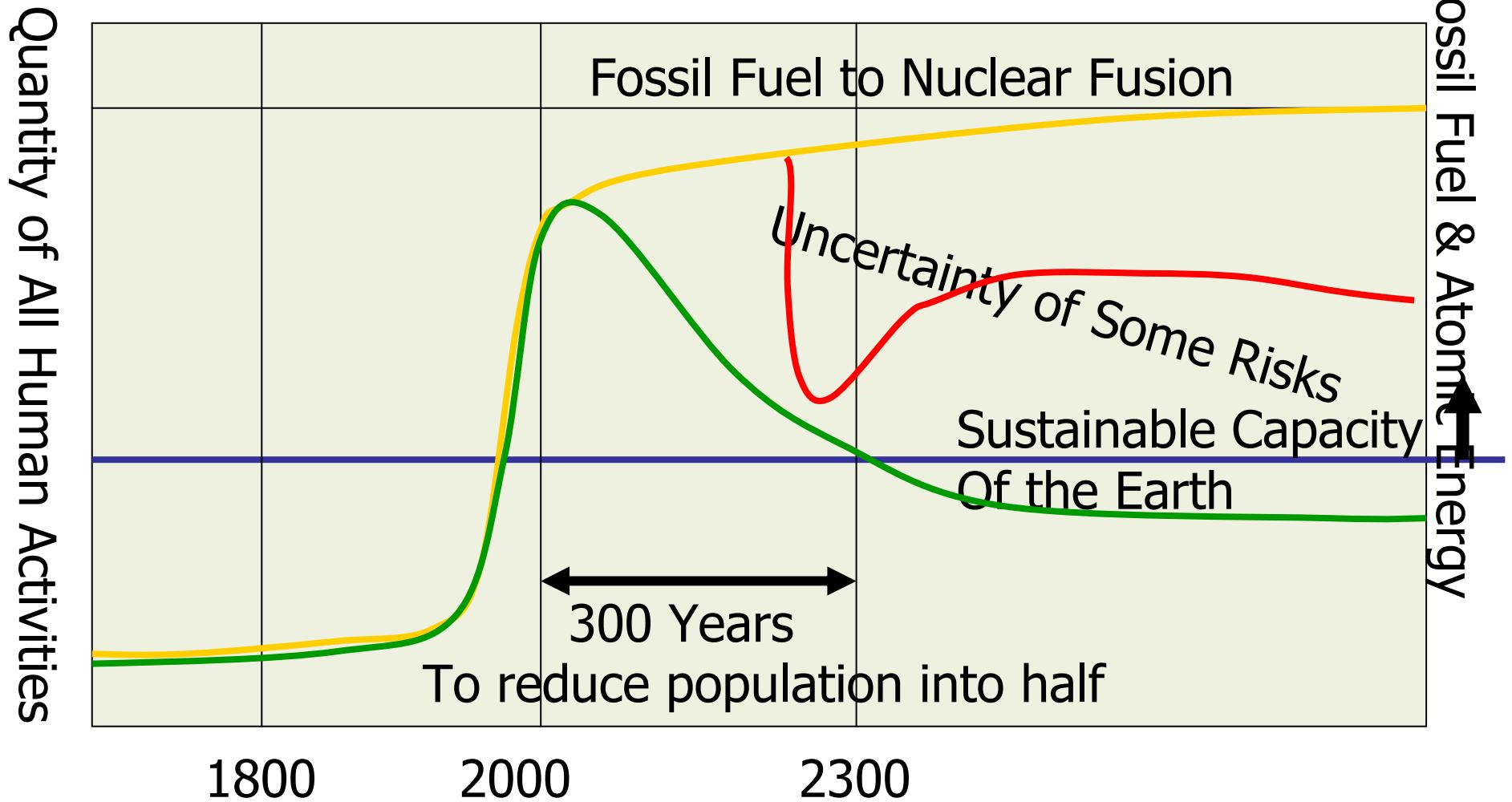
Value
can be
extended.

Population,
Consumption

Long Term Trend of Oil Consumption



Conclusion : Two Scenarios



International Politics already changed the course in 2007

- Stern Review in 2006
 - Without any measures for GW → GDP down 5-20%
 - All measures will cost only 1% of GDP.
- Al Gore's Movie "Inconvenient Truth"
- 4TH Report by IPCC
- Heiligendamm G8 Summit



What will happen at G8 Summit in Toyako?