Outcomes from Asia LCS Studies and Perspective：Leapfrog Asia

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Low Carbon Asia:
Background

- **Growing needs for establishing new global order for reducing GHG emissions**
- **How to promote developing countries, in particular developing Asia, shift to low carbon society is one of the key challenges in future climate regime.**
- **Although numerous previous studies on climate change have been conducted from sustainable development perspective, little has been done on exploring potential of integrating LCS concept into developmental paths for Asia.**

Much of Asia is in a good position to realize low-carbon development (?)

- **Low carbon technologies already available**
- **International collaboration to live in spaceship "Earth"**
- **Co-benefit of pollution reduction**
- **LCS needs leap-frog technologies**
- **Free from past high-energy technology-system**

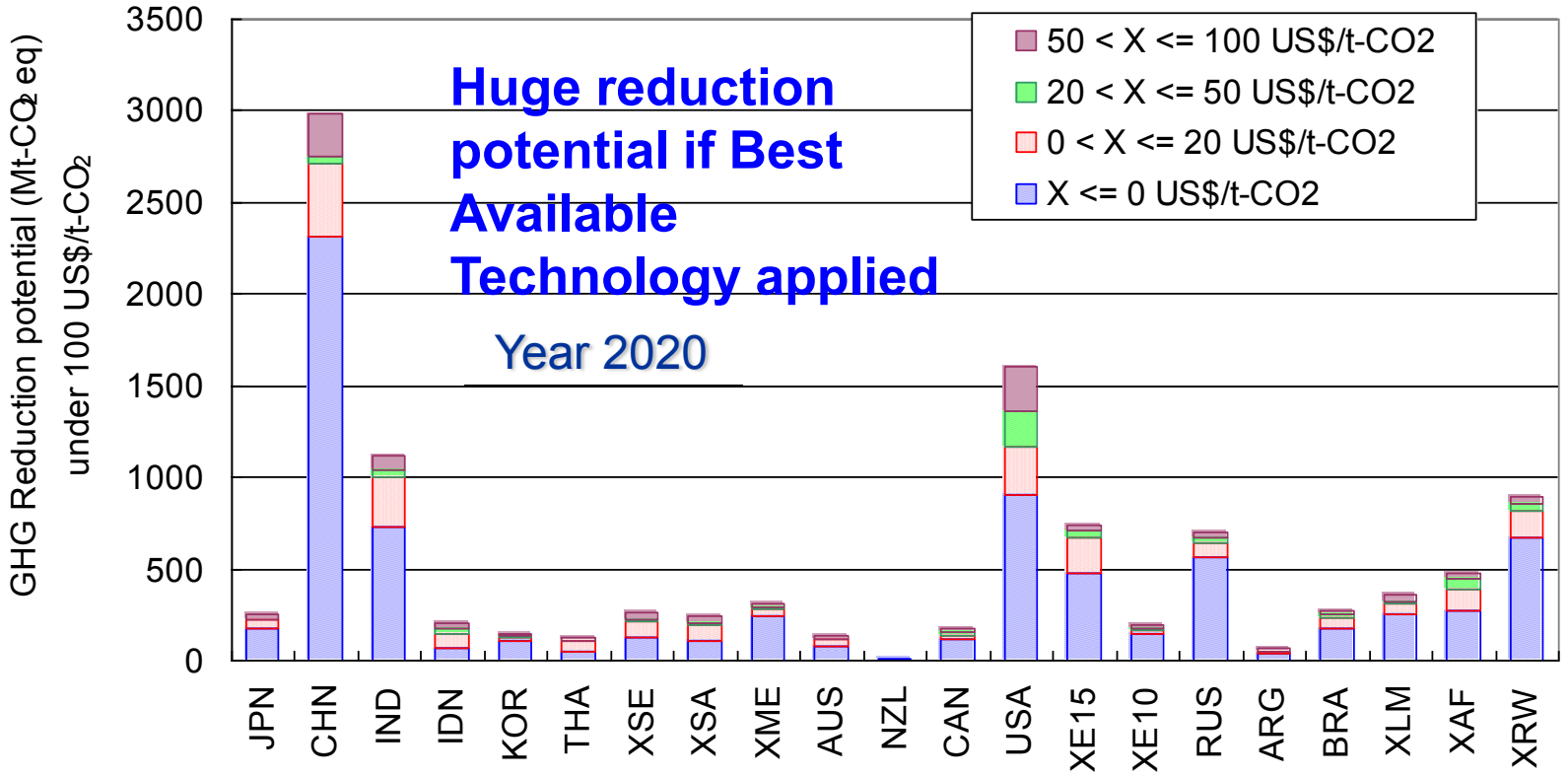
- **Plenty well-educated human resource**
- **Asian wisdom fit to sustainability**
- **High energy price trend**

- **But diversified pathway by countries?**

1. Low carbon technologies already available

Reduction Potential : Effectiveness of Technology Transfer

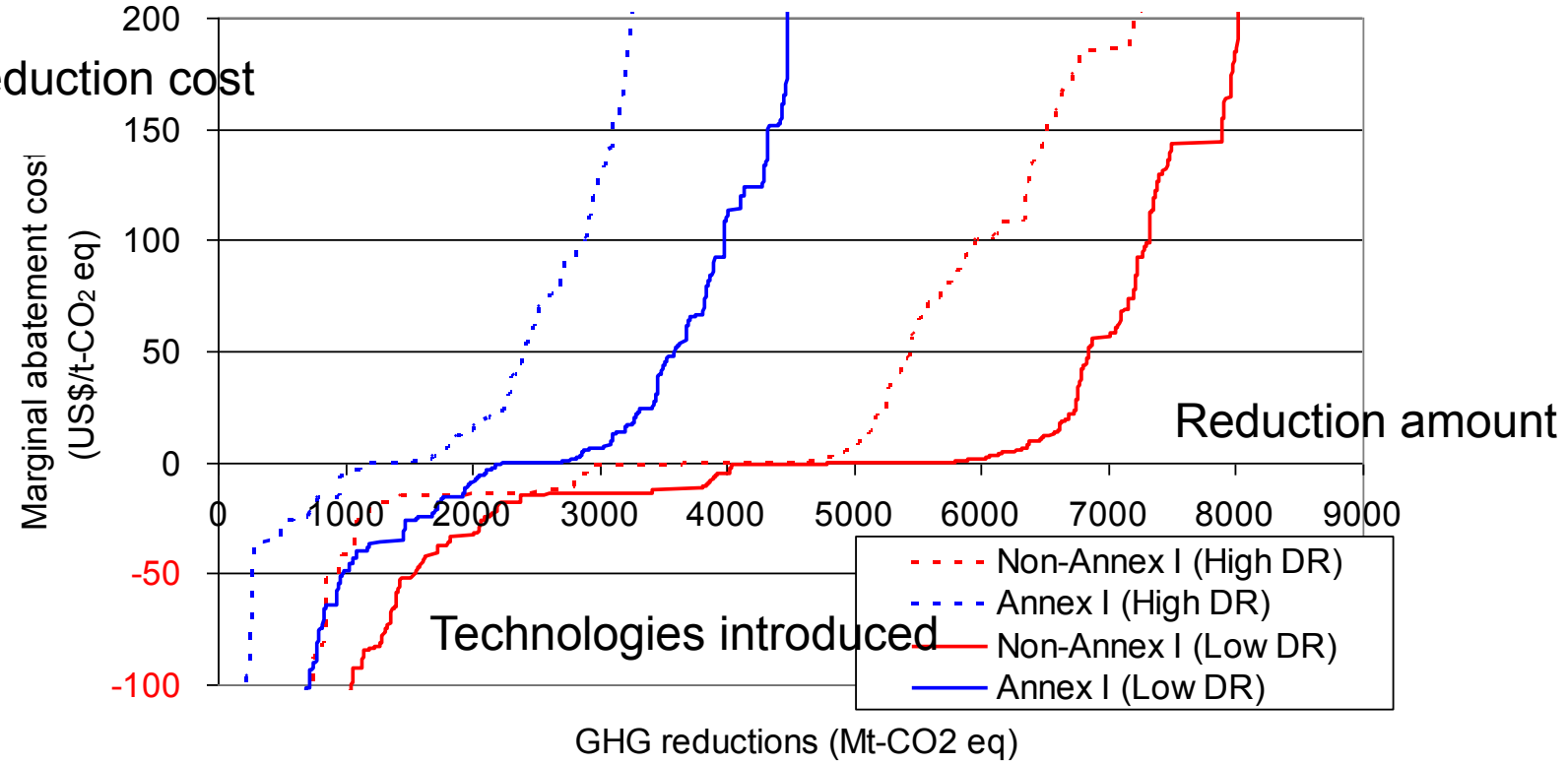
Low discount rate case（under 100US$/t-CO2)



- **China, US, India, Western Europe and Russia are major 5 regions where there are large reduction potentials, and it accounts for 63 % of total reduction potentials in the world. Top 10 regions account for about 80 % of total reduction potentials.**

Marginal Abatement Cost Curve in 2020

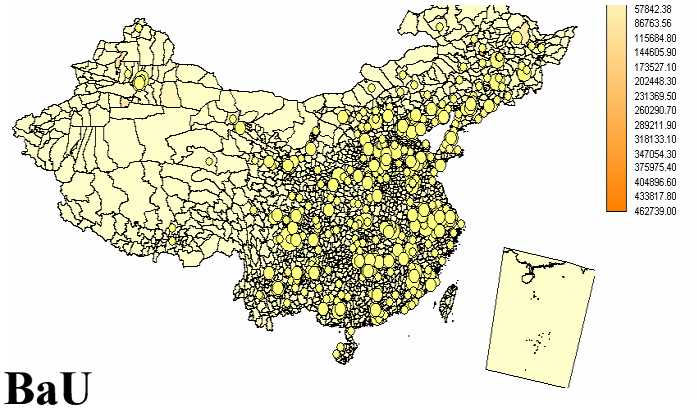
Comparison with LOW & HIGH discount rate case



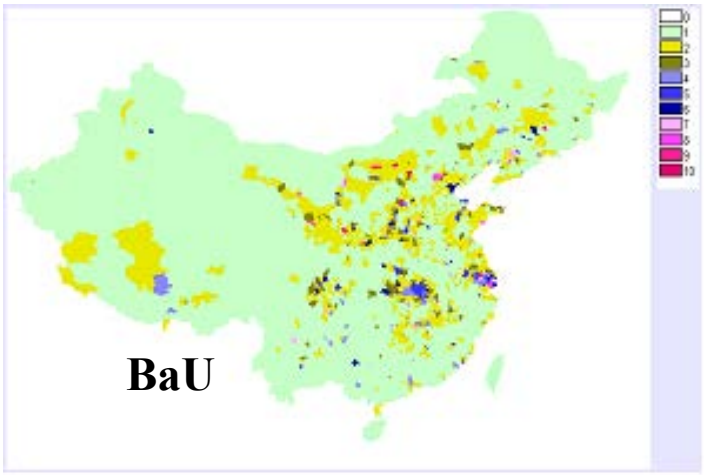
- **Estimated mitigations under the case of 100 US$/t-CO2 marginal abatement cost in 2020 are 8.7~11.3 GtCO2 eq in Global, 2.6~3.8 GtCO2 eq in Annex I and 6.0~7.5 GtCO2 eq in Non Annex I, respectively.**

3. Co-benefit of pollution control

Energy saving could reduce air pollutants and improve health impact



BaU



BaU

Policy

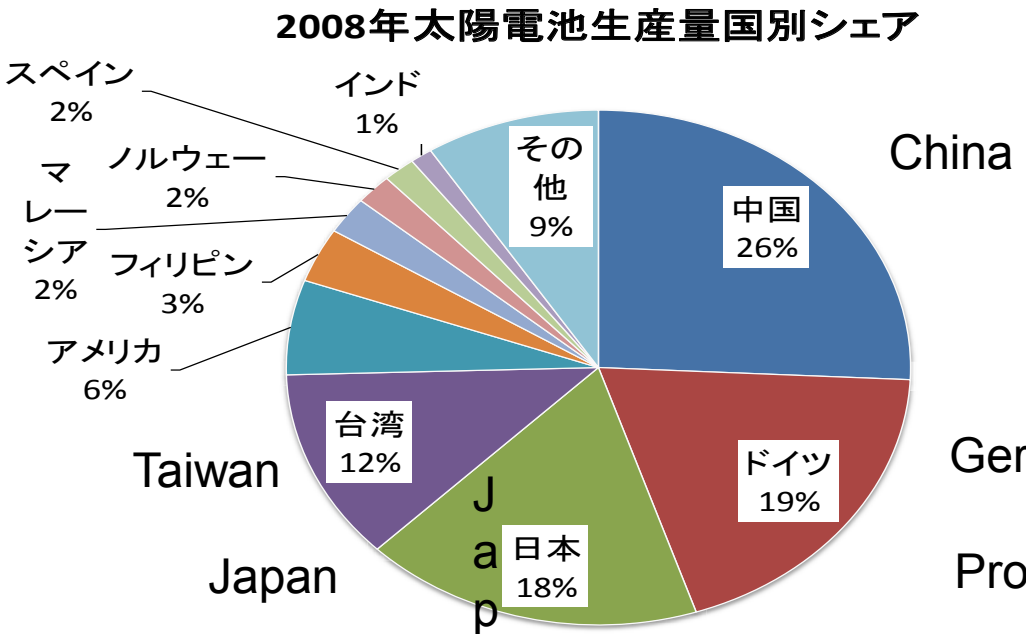
Policy

Geographical distribution of PM_{10} emissions across China in 2020 (unit: ton)

Ambient concentration of PM_{10} in urban areas of China in 2020

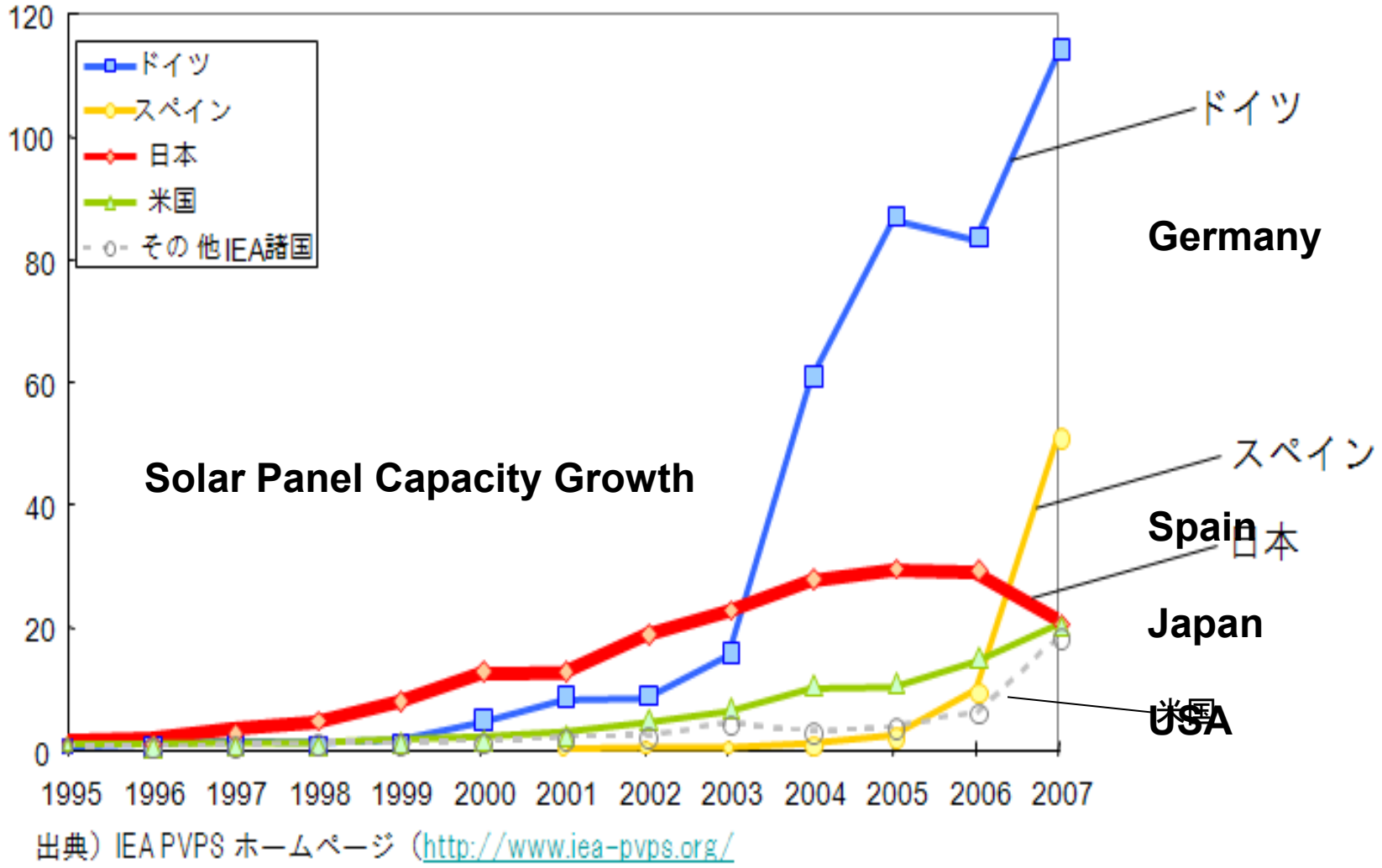
Wan Yue/ Yan Hongwei

4. LCS needs leap-frog technologies

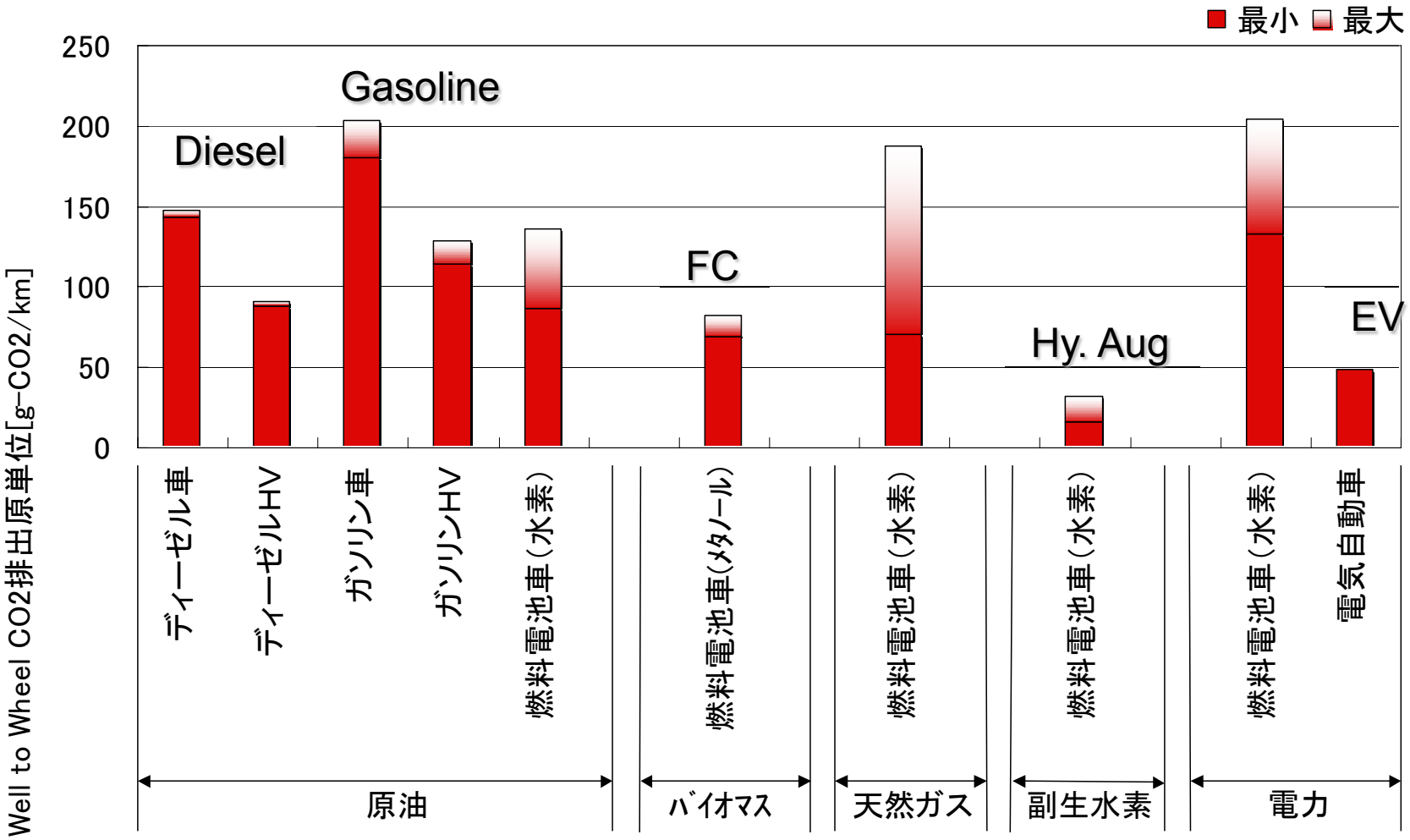


順位	1	2	3	4
2006	Japan 24.6%	China 22.0%	Germany 19.8%	USA 10.2%
	Q セル[独] 10.4%	シャープ[日] 9.7%	サンテック[中] 8.8%	
2008	China 26%	Germany 19%	Japan 18%	
	Q セル[独] 8%	ファーストソーラー 7%	サンテック[中] 7%	シャープ[日] 7%

New Energy competition : distributed energy



Technology: Projected Car CO_2 Emission/km



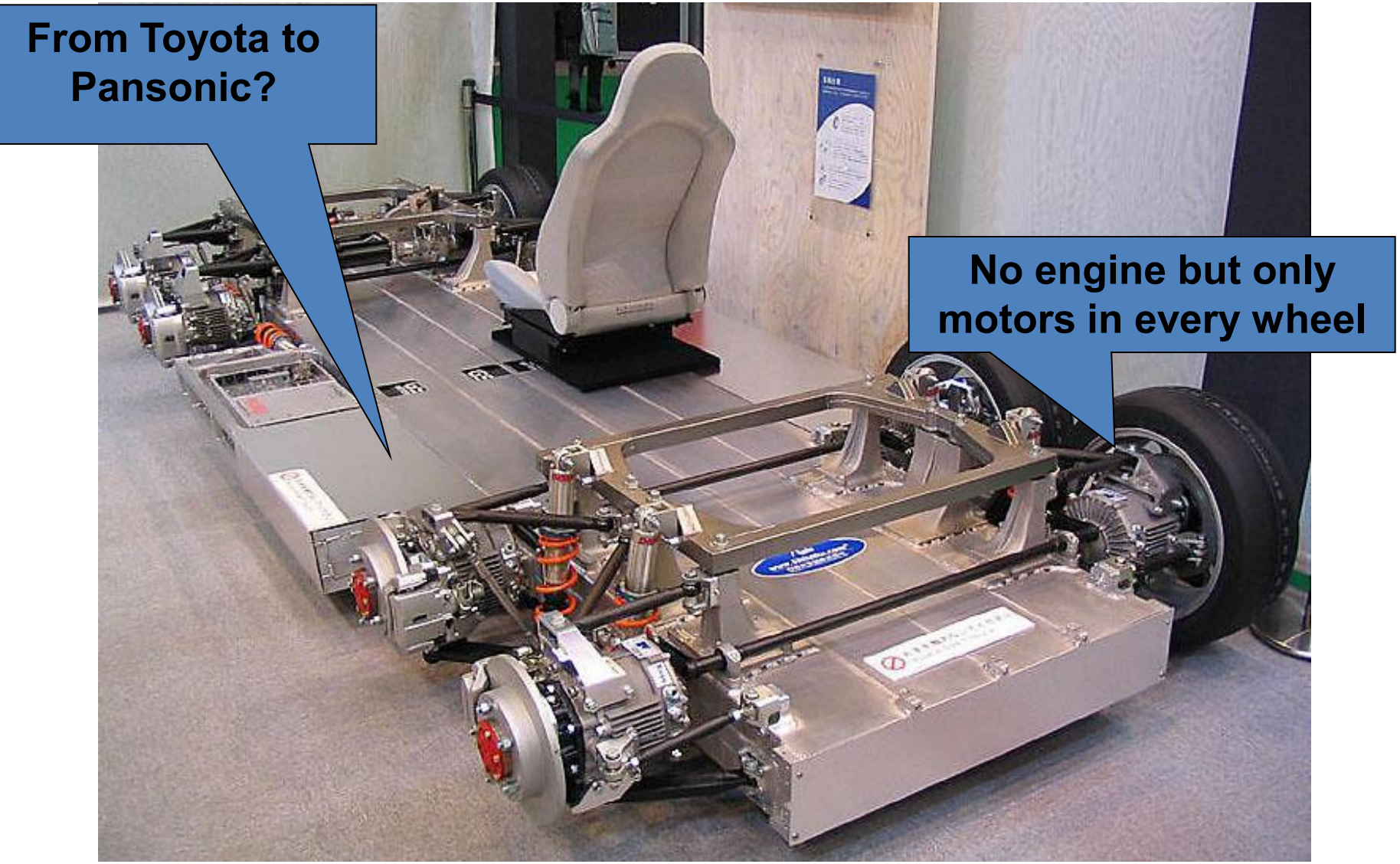
※HV：ハイブリッド車の省略形　　※電力：日本の平均電源構成
※燃料電池車：回生エネルギーを二次電池で回収　　※水素：圧縮水素を仮定

Technological leap-fogging starts now
Electric Car:

Experiences in Mobile Phone

(ELIICA) 4 PASSENGER SEDAN
370km/h MAX.SPEED

Prof. Hiroshi SHIMIZU, Keio Univ.



PLATFORM by SIM-Drive

Let's design customized Asian Eco-car

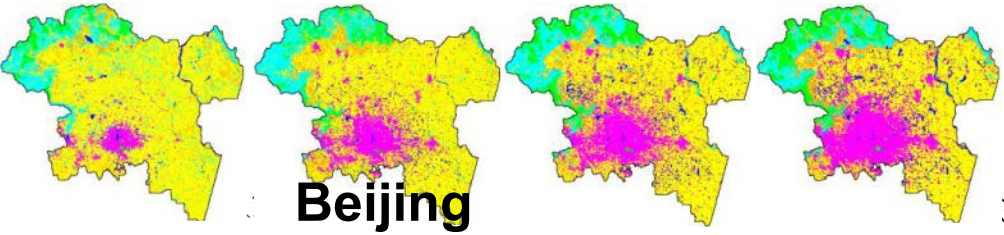
Body Panels

Lighter, wider, and flexible design, when move engine away

Body Frame

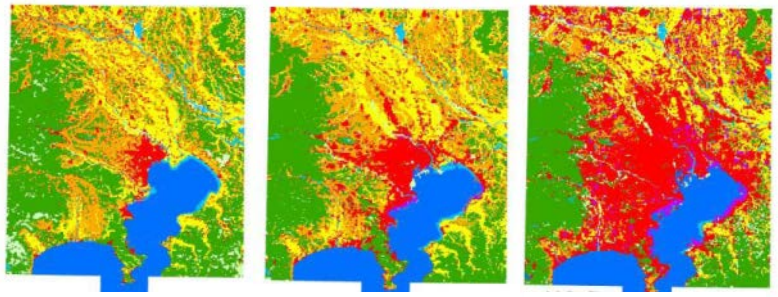
Chassis


LifeFitness
FLEXDECK



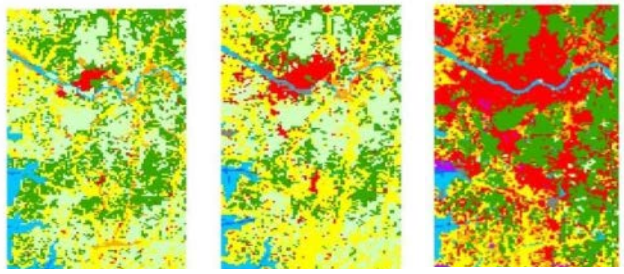
Beijing

北京1975 北京1984 北京1991 北京1997



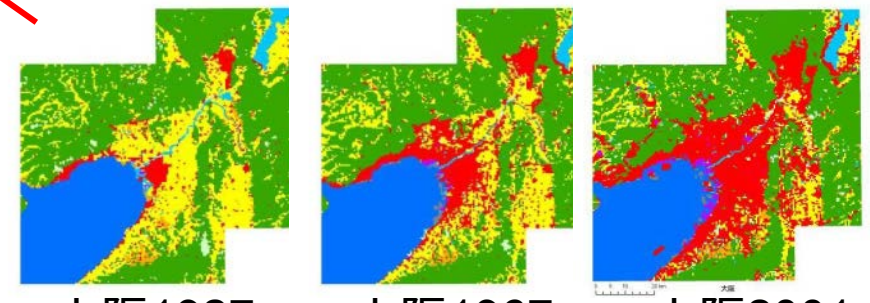
東京1927 東京1967 東京2001

Tokyo & Osaka

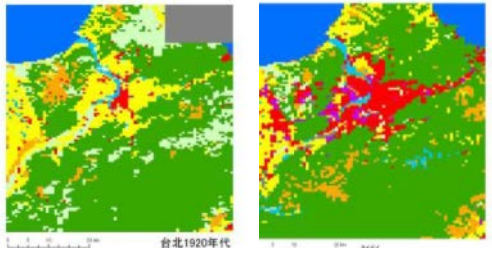


ソウル1920 ソウル1960 ソウル2006

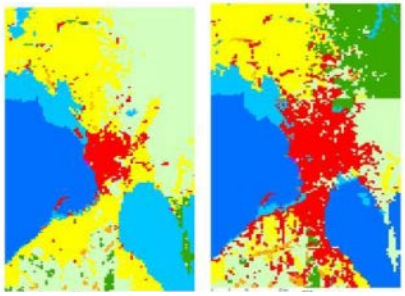
Seoul



大阪1927 大阪1967 大阪2001

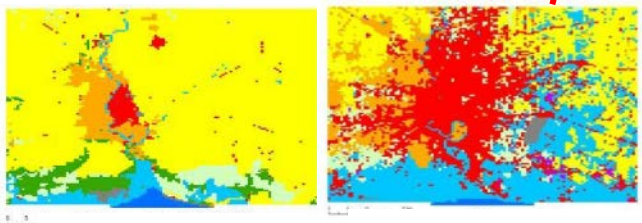


台北1920 台北2003



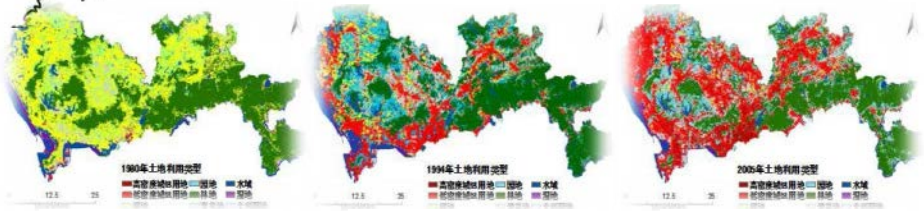
マニラ2060 マニラ2000

Manila



バンコク1950 バンコク2000

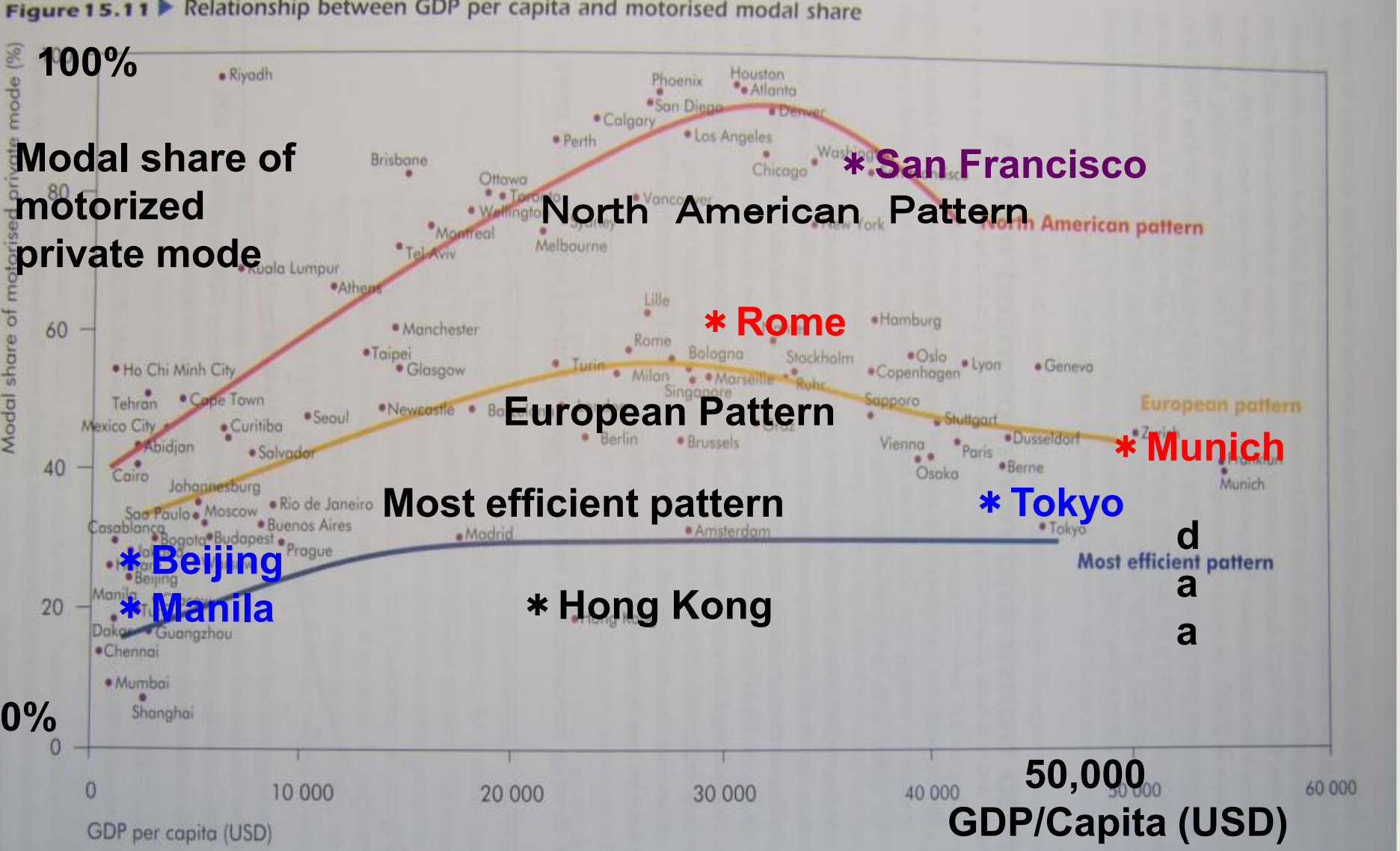
Bangkok



深圳1985 深圳1997 深圳2005

Rapidly Expanding Asian Cities

From Kaneko: 2009



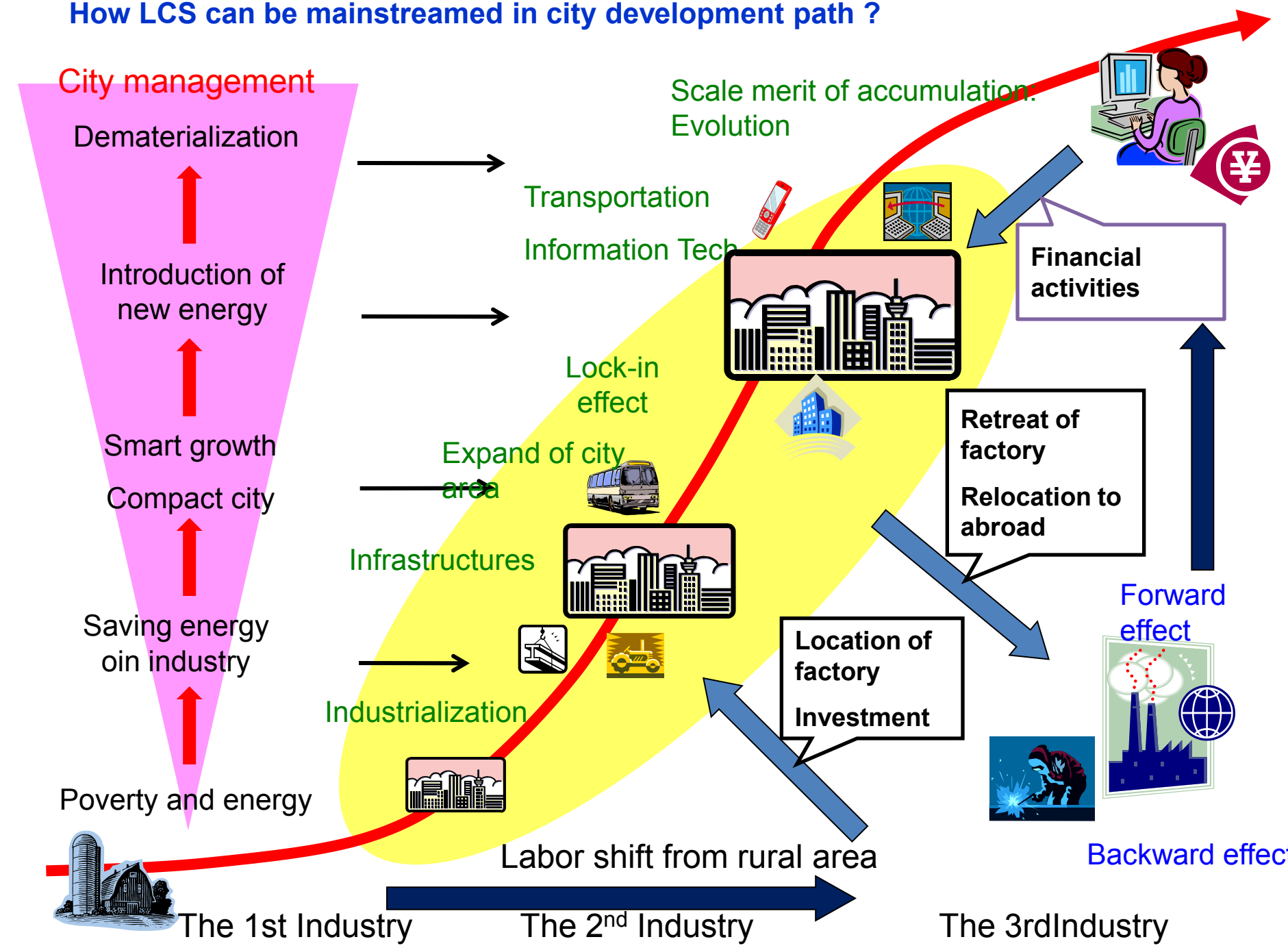
5.Free from past high-energy technology-system

Designing efficient Infrastructure

here is a wide range of modal shares for cities of similar incomes with three distinct pathways as incomes rise. If cities in the developing world invest heavily in public and on-motorised transport infrastructure, they may be able to follow more sustainable pathways.

From IEA: 2008

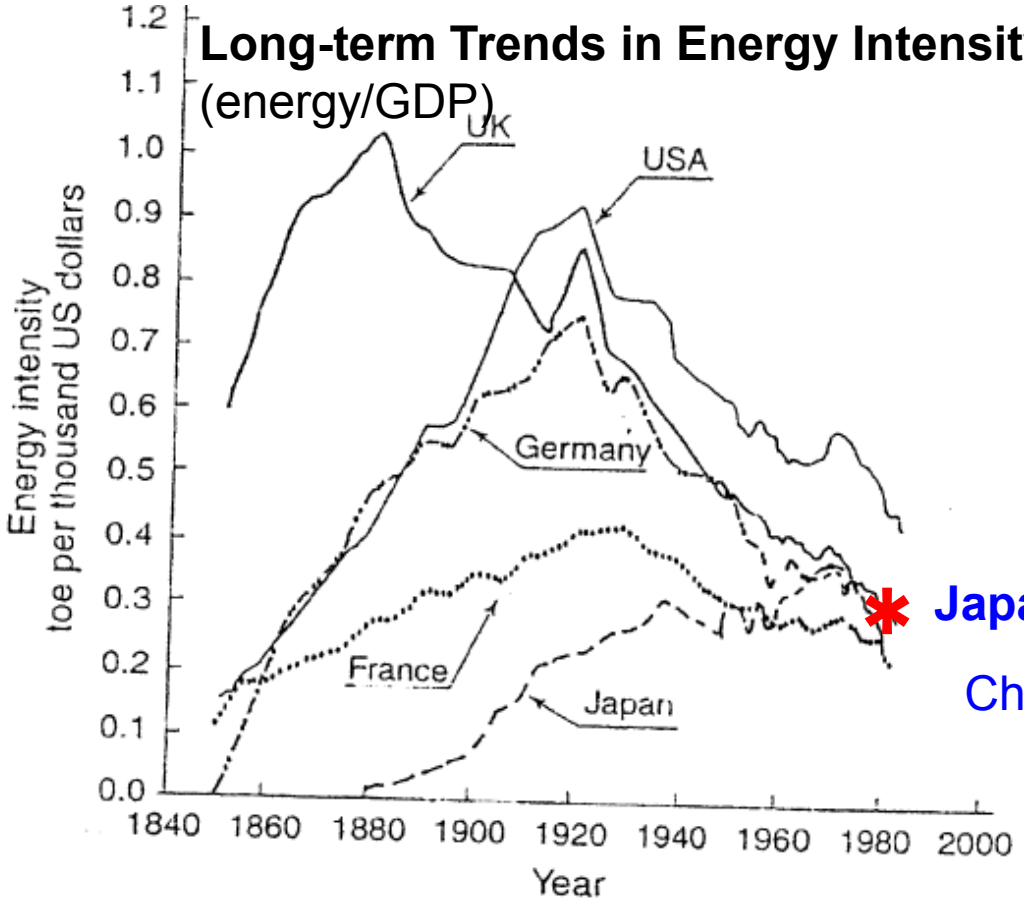
How LCS can be mainstreamed in city development path ?



6. Leapfrog Possibility in Asia

	Country	Domestic factor	External factor
Industrial Structure	India: IT Industry	Education/human resource	Soft tec. Globalization
Energy structure	Japan: Low energy intensity	Technology Rapid growth	Oil Crisis Energy security
Urban Structure	Singapore: transportation, water, housing,, Tokyo: Public transportation	Small land strong leadership Rapid urbanization	Relationship with Malaysia Before auto-age
Distributed energy	India: renewable energy, Biomass Brazil : ethanol	Poor power grid Investment, land area Sugar cane, lack of Oil	
Information	China: Mobile	Rapid economic growth, big land area, Not enough com-grid	IT technology
New Energy System	?	?	Climate Issue
Agricuture	Low energy use	Self sufficiency	Energy price

Asian Opportunity 4: Free from past high-energy-depending technology track



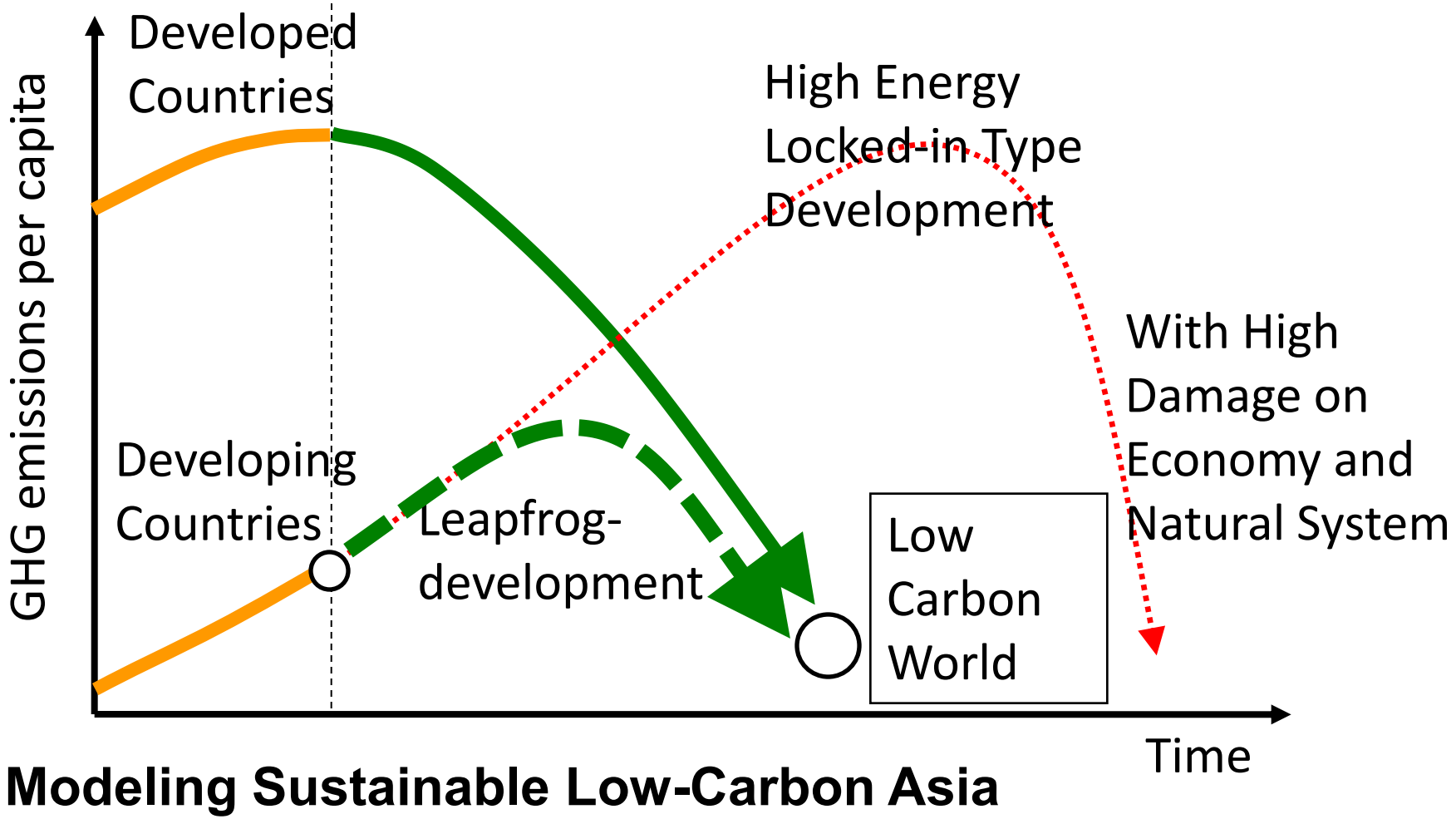
Japan's leap-frog

China ?
India ?

Possibility of Asian countries' catch-up

- **How can we facilitate technology leap flogging to promote low carbon development?**
- **What would be mechanisms (international and national, market and non market) that could facilitate those leap-floggings to low carbon technologies?**

Asian LCS scenarios study



Modeling Sustainable Low-Carbon Asia

We have just started new research project "Asian Low-Carbon Society Scenario Development Study" (project leader: Mikiko Kainuma) during FY2009-2013, funded by Global Environmental Research Program, MOEJ

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Renewable Energy
再生可能エネルギー

- Renewable energy systems can be used as stand alone or mini-grid based on

再生可能エネルギーシステムは、以下に基づいて、単独で、又は小規模グリッドで利用できる。

  - Needs assessment
    ニーズ調査
  - Provision of wide technology choice
    技術の広範な選択オプションの提示
  - Facilitation of technical back-up
    技術的バックアップの確保
  - Provision of subsidised financial system
    補助金等の資金援助の提供
  - Support existing cooperatives or promote new ones
    既存の協力関係の支援、又は新たな関係の促進

Courtesy of The National Renewable Energy Laboratory (NREL)