Circular economy policy of China: Role of policy research towards a shift from institution building into implementation

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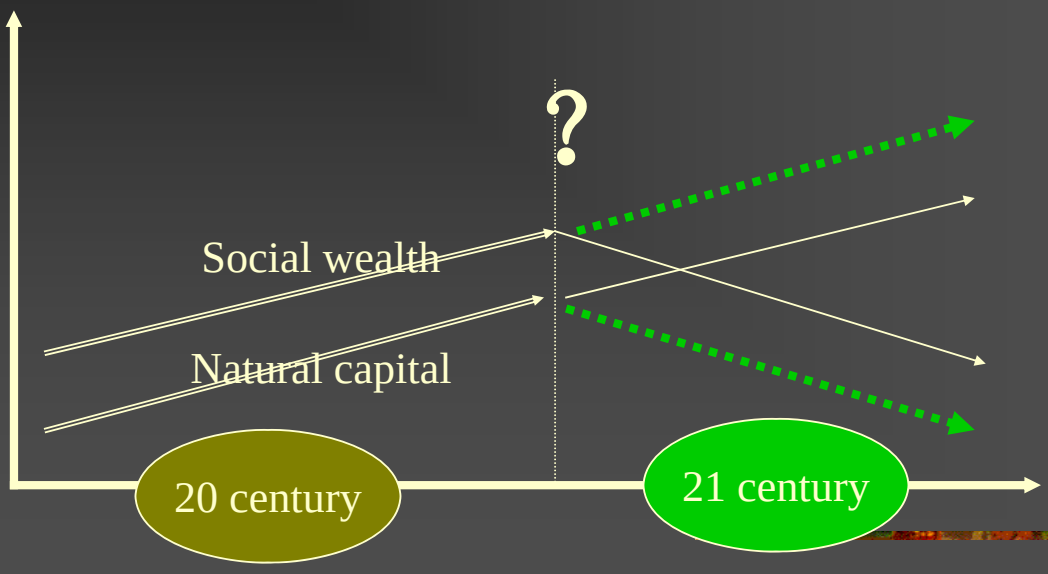
Three questions that we should pay attention

- Target：（know-why）
  - Link development with environmental protection
- Mission:（know-what）
  - Whole life cycle: from source to end-of-pipe treatment;
  - Whole system：from production to consumption
  - Whole space：from on-site control to regional level
- Implementation：（know-how）
  - From planning to implementation
  - From governmental leading to the whole society participation

1.Why applying circular economy in China

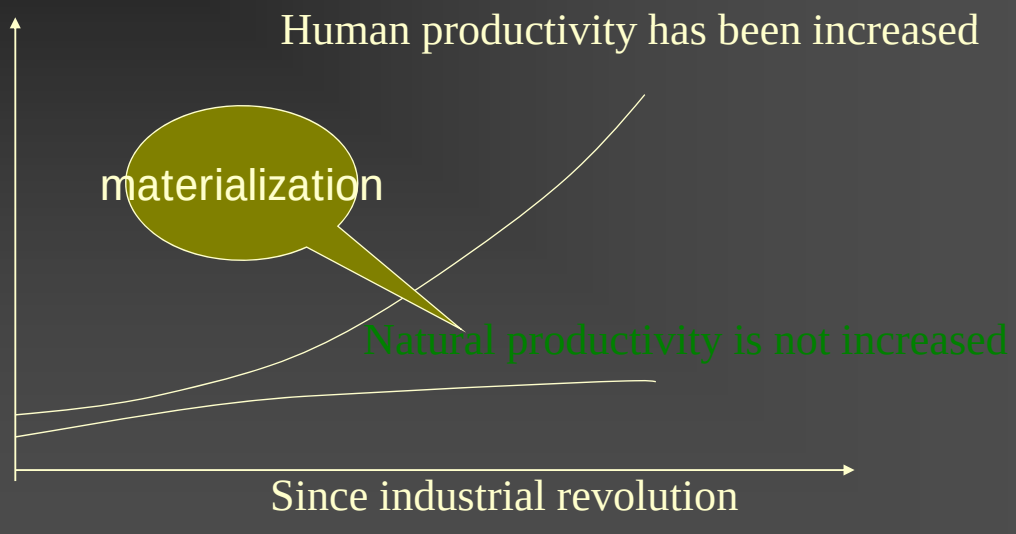
Scenario choices for the human being in 21 century



Development model in 21 century

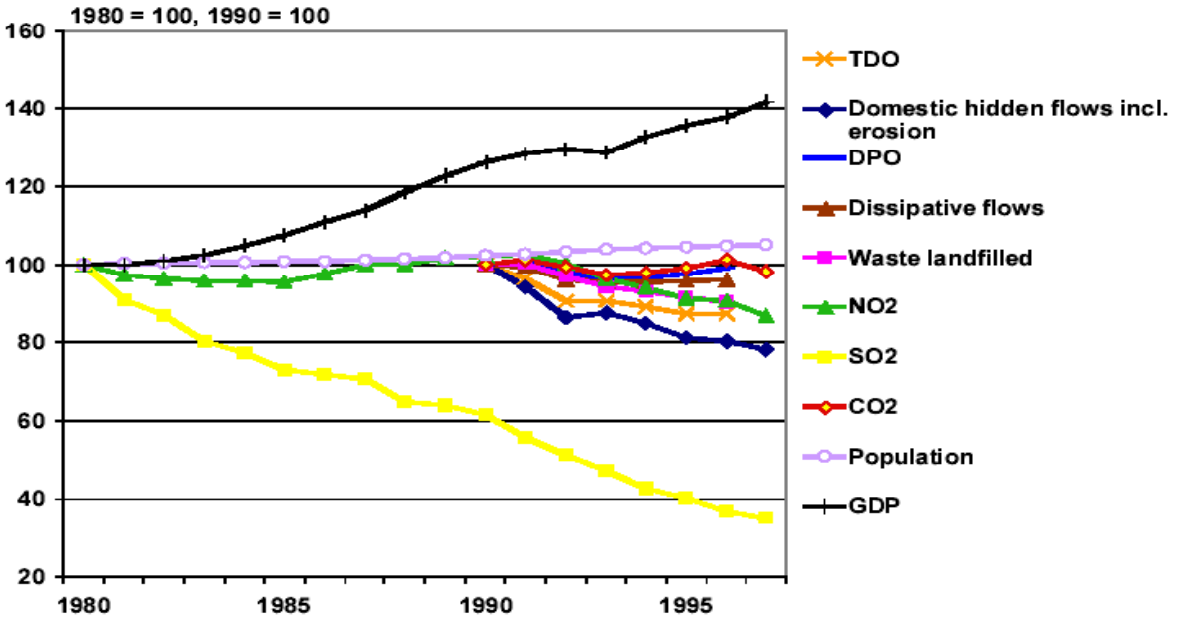
- Natural resource is decreasing.
- Human resource is increasing, which means more consumption.
- Therefore, the principle of development is to increase the human's productivity so as to replace the decreasing natural resource.
- The development model should be to reduce consumption, while increasing the overall eco-efficiency.

From increased human productivity to increased natural productivity



Dematerialization roadmap in Europe

Figure 6.2: Population, GDP, material ouputs to the environment and respective indicators: EU-15 1980-1997, indexed.

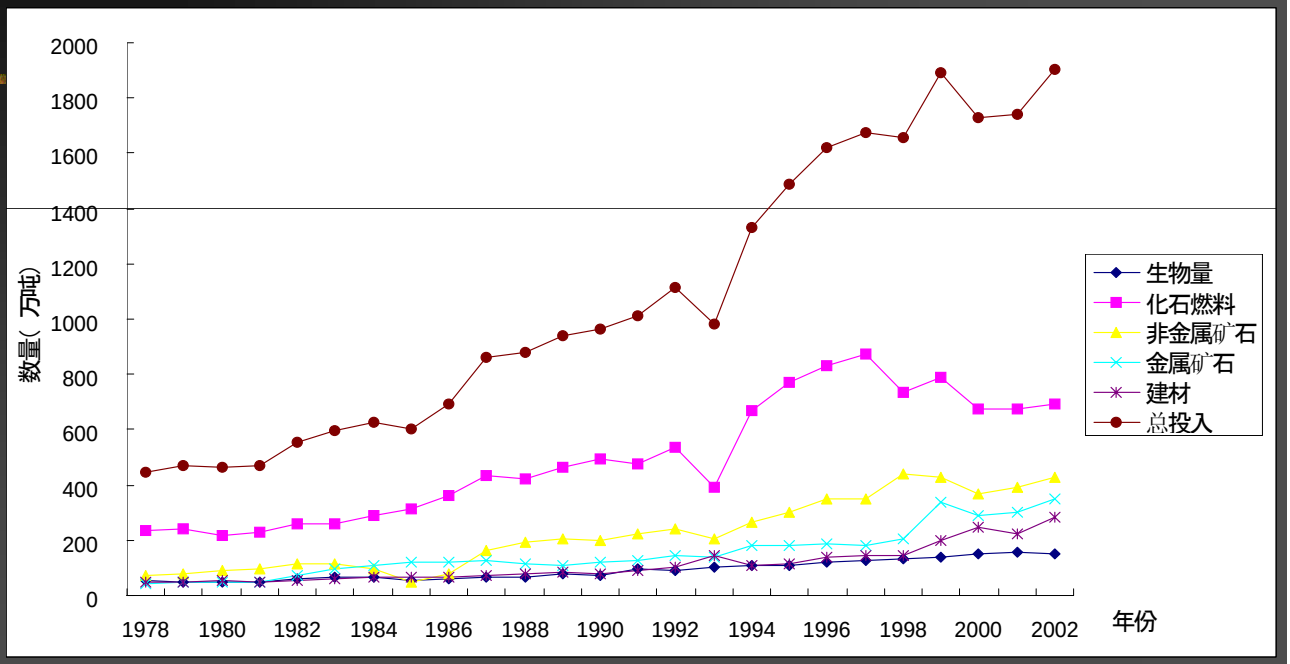


Substantial decreasing of SO2 emission

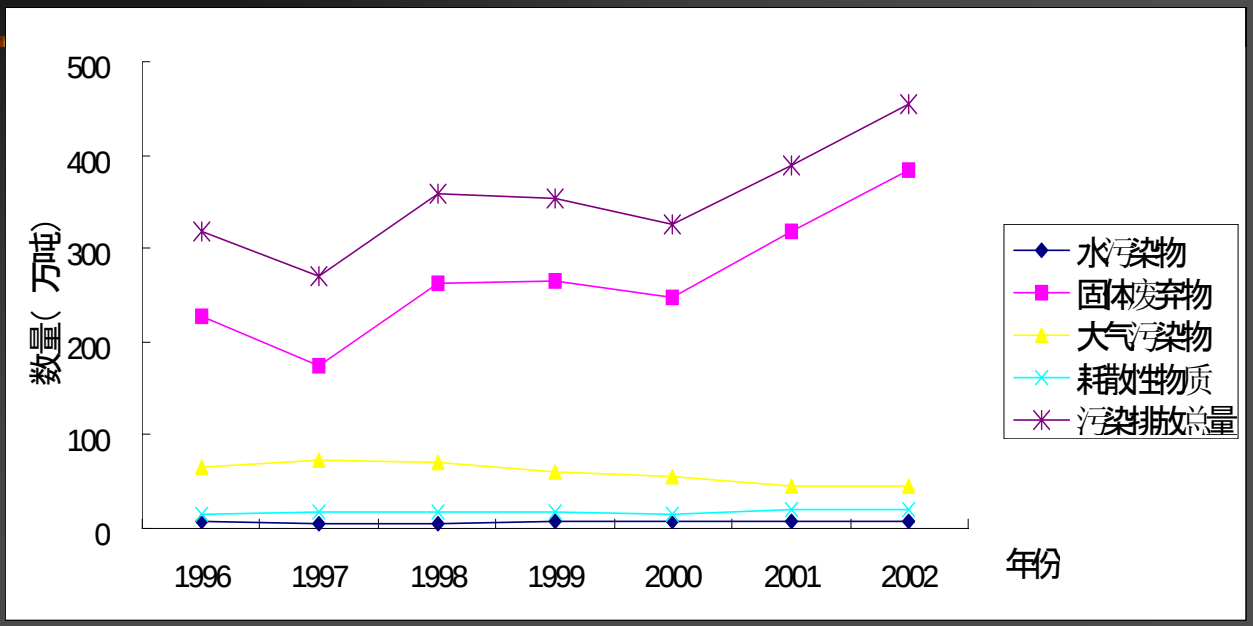
Materialization in China

- The increasing GDP relies on increased consumption of natural resource.
- The increasing GDP results in increasing pollution.
- If keeping current model, then both natural resource consumption and total pollution will increase substantively.

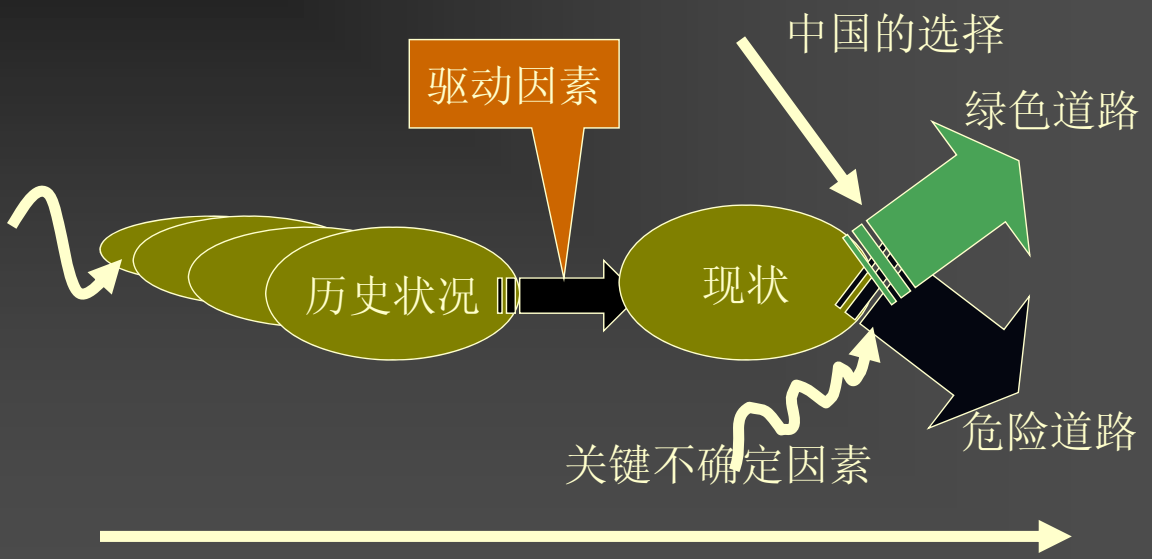
Resource consumption in China



Total pollution in China



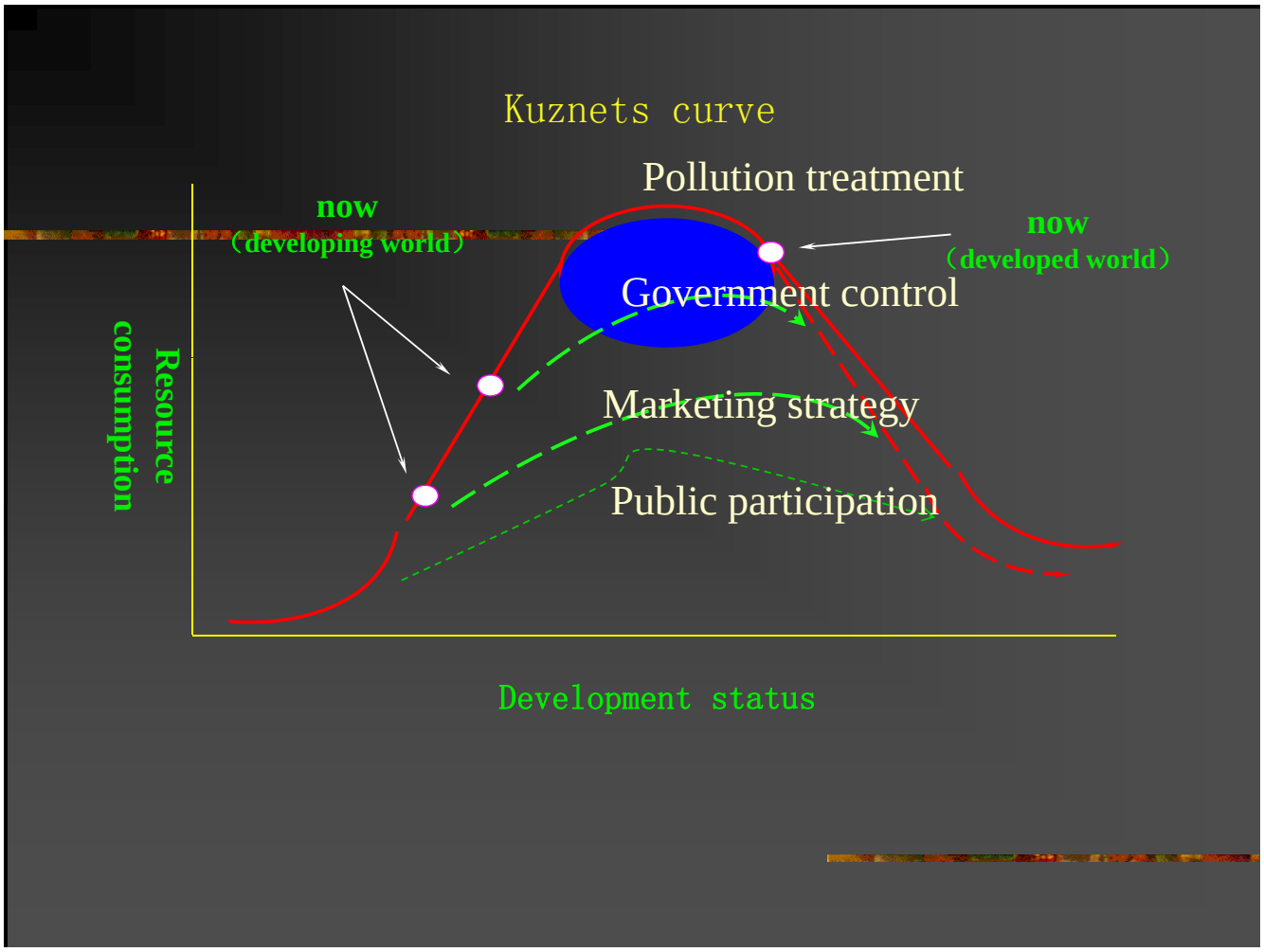
Scenario analysis for China's future



The impact of materialization on China

	pop	GDP pp	Environmental pressure
2000	1.2B	800USD	
2020	1.4B	3000USD	4~5 times
2050	1.5B	10000USD	

- Until 2020：
  - Population increased by 10%
  - Economy increased by 300%
  - Environmental pressure increased by 400-500%



Policy Implications

- There cannot be unlimited growth in population (P) and affluence (A) if the goal is the reduction of total impact (I).
- Strategies for averting global collapse will not only require far-reaching technological innovation and significant efficiency improvements but also the stabilization of and ultimately reductions in both population size and per capita affluence.

Policy options for preventing environmental and societal collapse

- Global collapse can only be avoided by simultaneously stabilizing population size and affluence while at the same time employing the most eco-efficient technologies.
- Sustainability can only be achieved if policies are developed and enacted which (a) rapidly reverse population growth, (b) improve technological efficiencies in order to reduce matter-energy throughput rather than supporting more economic growth, and (c) promote the transition to a steady-state economy in which per capita affluence is stabilized.

Reverse population growth

- Increasing education for women, thereby delaying the age of marriage as well as providing increased opportunities for entering the labor force and becoming financially independent.
- Making reduced fertility economically advantageous by providing financial incentives for small families and disincentives for large ones.
- Providing social security and universal health care in order to reduce dependence on adult children.
- Changing cultural norms with regard to ideal family size.

Improve efficiencies to reduce matter-energy use

- Capping schemes could be applied to limit the total use of renewable and non-renewable minerals and fuels.
- A maximum extraction rate (i.e., depletion quotas) for non-renewable minerals and fossil fuels could be agreed upon to assure the availability of these limited resources for future generations.
- Placing a maximum limit on the use of renewable and non-renewable resources would signal scarcity and result in commodity price increases, which, in turn, would stimulate technological innovation including efficiency improvements.
- Increasing the price of mineral and energy resources via taxation is probably the easiest way to reduce their overall use and simultaneously encourage technological innovation while avoiding rebound.
- If removal of perverse subsidies and internalization of externalized costs are unable to reduce overall resource use, it will be necessary to implement some type of ecological tax to further increase the price of minerals and energy.

Stabilize affluence at sustainable levels

- The transition to a sustainable society with a smaller per capita ecological footprint would be greatly accelerated if there were policies to maximize happiness and well-being instead of material affluence and per capita GDP.
- Effective methods of reducing material consumption to sustainable levels include the dissemination of information on ways in which needs and desires may be satisfied, including the aspiration for higher social status, in non-materialistic ways.
- An individual might be considered to be of higher social status based on a happy and a harmonious family life, extensive community service as well as charitable contributions and activities.

2.What to do in China?

The whole green process

- Green extraction (mining);
- Green procurement;
- Green manufacturing;
- Green marketing;
- Green consumption;
- Reverse logistics;
- Green treatment.

Three principles of CE(3Rs)

减量化 Reduce → 再利用 Reuse → 再循环 Recycle

Source control

减少进入生产和消费过程的物质量，从源头节约资源使用和减少污染物的排放。

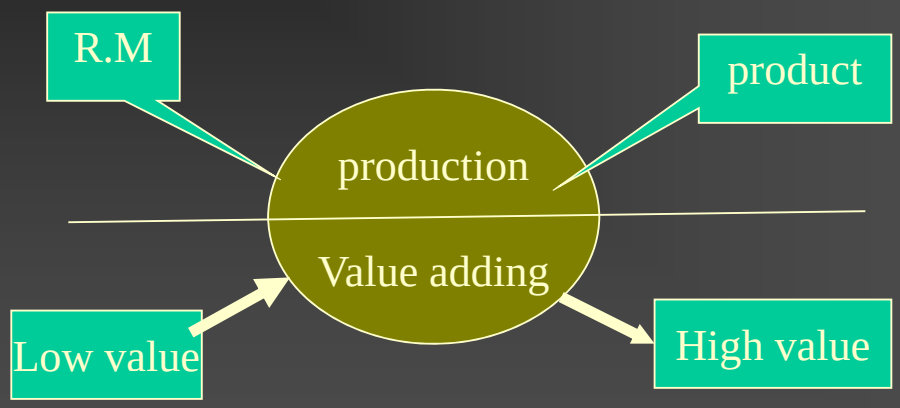
Process control

提高产品和服务的利用效率，要求产品或包装以初始形式多次使用，减少一次污染。

End-of-pipe control

要求物品完成使用的功能后重新变成再生资源。

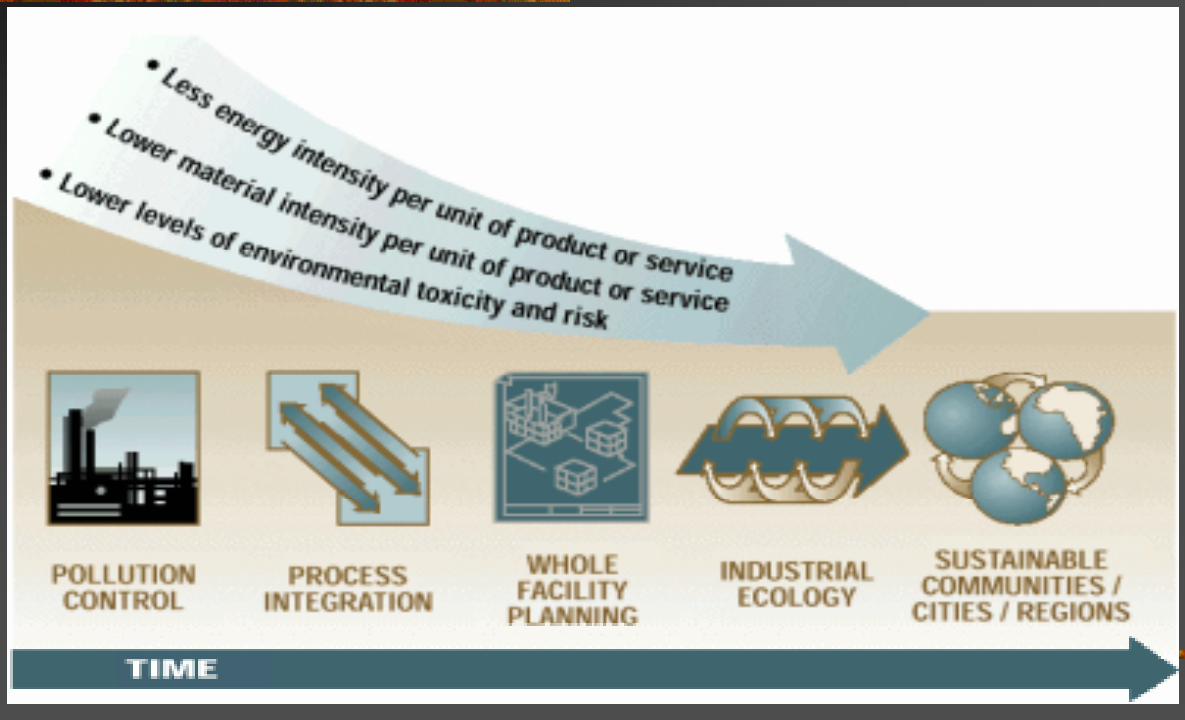
Combination of production and consumption



From one site to the region

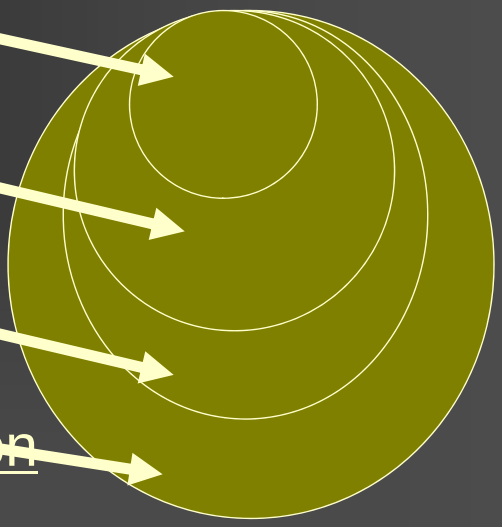
- Company level: cleaner production and zero emission
- Industrial park level: EIP
- Community level: sustainable consumption
- City level: scavengers and decomposers
- Regional level: eco-industrial network

From one site to the whole system



Space relation for circular economy

- Zero emission firm
  - (production)
- EIP
  - (supply)
- Circular community
  - (consumption)
- Circular economy region
  - (integration)



3.How to implement CE in China

National programs

- Energy saving and emission reduction;
- National circular economy demonstration projects;
- National eco-industrial park projects;
- National cleaner production projects.

Circular Economy Promotion Law

- Effective from January 1, 2009;
- The Law is formulated for the purpose of facilitating circular economy, raising resources utilization rate, protecting and improving environment and realizing sustained development.
- People's governments above county level shall establish a goal-responsibility system for circular economy promotion and take measures with respect to planning, finance, investment and government procurement, etc. to promote circular economy.
- Enterprises and institutions shall establish a sound management system and take measures to reduce resource consumption and the generation and discharge of wastes, and improve their recycling and resource recovery level.
- Citizens shall have a better sense of resource saving and environmental protection, consume reasonably and save resources.
- The circular economy development plan shall include objectives, applicable scopes, main contents, major tasks and safeguard measures, as well as indexes for the rates of resource production, recycle and resource recovery, etc.

Circular Economy Promotion Law

- Totally 58 items;
- All the county leveled governments and above should set up their own targets of CE implementation;
- The industrial development policies must meet with the demand of CE law;
- Regular inspection system on CE performance;
- Energy saving and resource saving activities will be fully supported;
- Land saving is a key area;
- Financial support and preferable tax and price policies are provided;
- Illegal use of hazardous materials and energy inefficient facilities, technologies will be fined from 50,000 to 200,000 RMB.
- Illegal sales of second hand home appliances without reuse labels and remanufactured or renovated products without labels will be fined from 5,000 to 50,000 RMB.
- Illegal import of hazardous materials and energy inefficient facilities, technologies will be fined from 100,000 to 1,000,000 RMB.
- R&D activities on CE and public awareness raising activities on CE will be fully supported.

Energy saving and emission reduction

- From 2006 to 2010, the total energy consumption should be reduced by 20%, while the total emission should be reduced by 10%.
- From 2006 to 2010, total CO2 should be reduced from 25.49 million tons to 22.95 million tons, while COD emission should be reduced from 14.14 million tons to 12.73 million tons.

National CE demonstration projects

- The State Council, and National Development and Reform Committee (NDRC) drafted the first circular economy workplan on October 27, 2005 jointly with other relevant ministries, including State Environmental Protection Administration (SEPA), Ministry of Science and Technology, Ministry of Finance, Ministry of Commerce and the National Statistics Bureau (NDRC 2005).

At the enterprise level

- 42 companies across the country have been chosen as national circular economy demonstration enterprises, including those involved in industrial sectors ranging from steel and iron, metal manufacturing, coal excavation and processing, to power generation, chemicals, construction materials and light industries.

At the Industrial Park Level (13 parks totally)

- economic and technological development zones
- chemical industrial parks
- agricultural industrial parks
- high-tech zones
- and metallurgical industrial parks

At the Regional Level

- three provinces (including Liaoning, the largest heavy industry province in China, Shandong and Jiangsu);
- and seven cities (including Beijing, Shanghai, Ningbo, Hebi, Guiyang and Chongqing) .

National EIP projects

- Initiated by SEPA;
- Totally 33 national EIPs;
- Three categories, including sector-integrated EIP, sector-specific EIP and venous EIP.
- Three EIP standards have been released for evaluating their success;
- Including economic, environmental, social and administrative indicators.

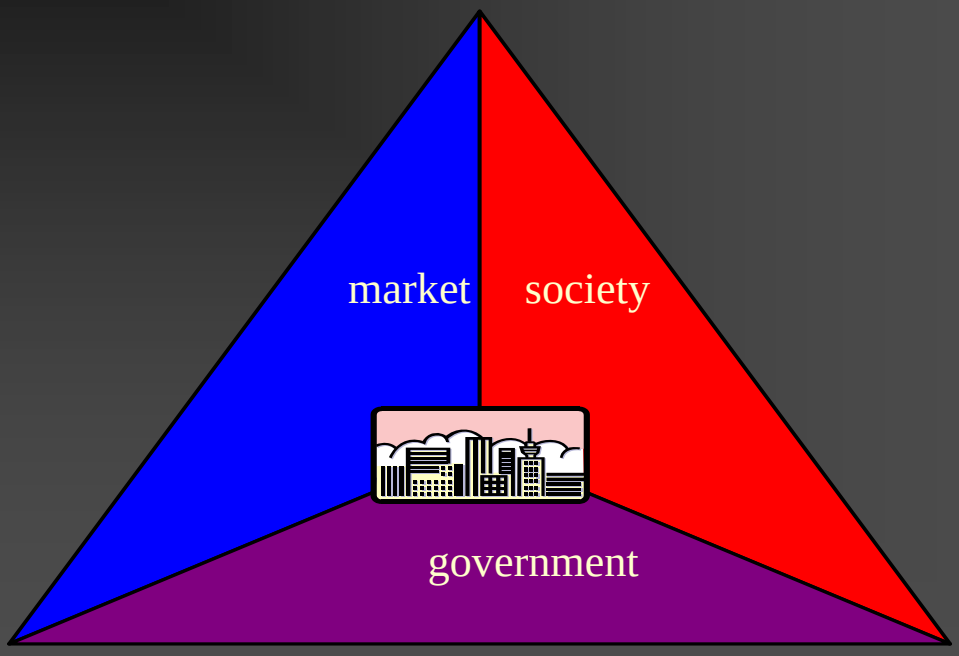
National CP projects

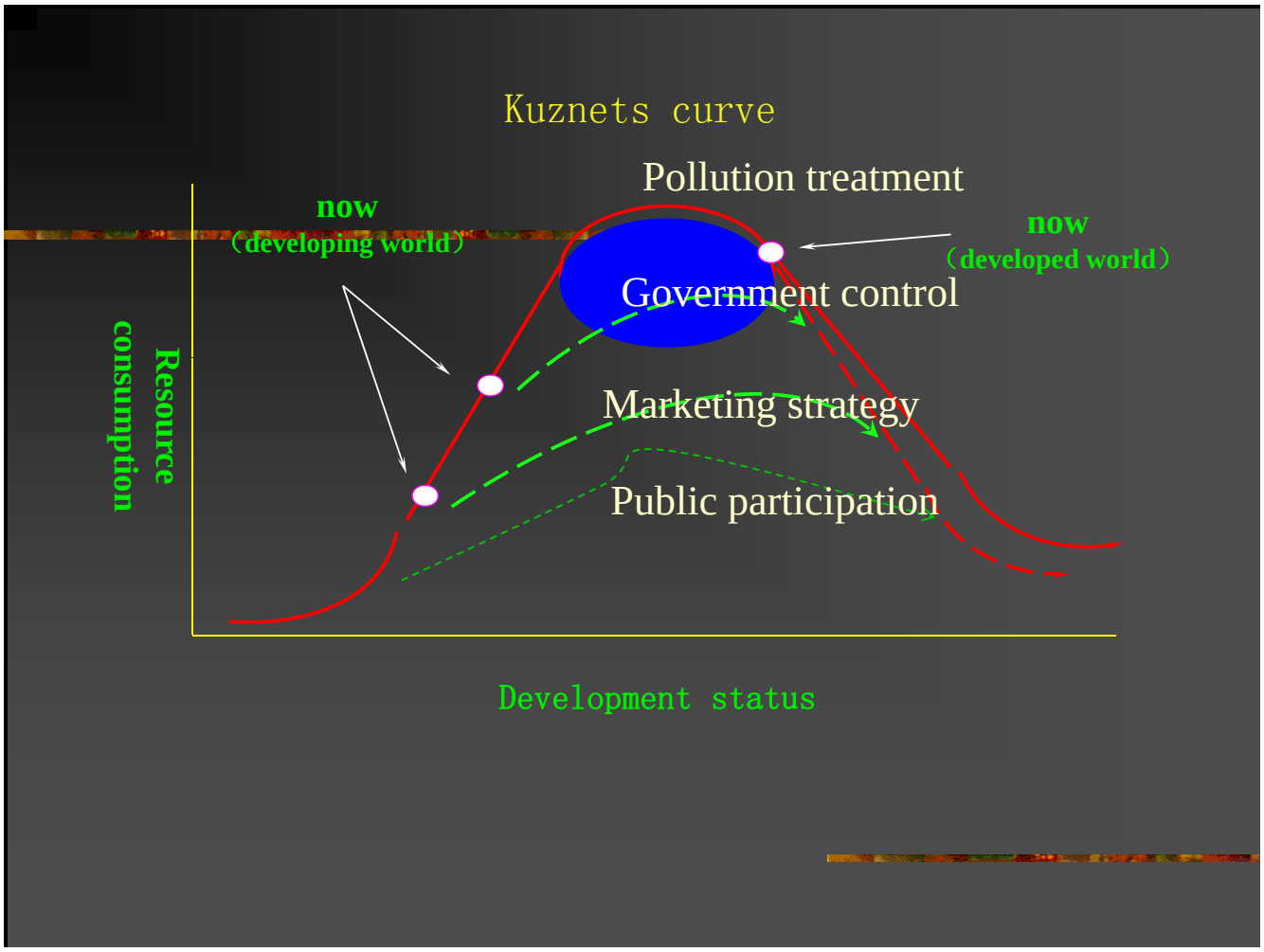
- Enforcement of CP Promotion law;
- CP revolving fund established in key provinces;
- those enterprises that exceed the national or local discharging standards or exceed the total volume control targets for pollutants set by the relevant local people's governments and those enterprises using toxic and hazardous materials in production or discharging toxic and hazardous substances must conduct compulsory cleaner production audit.

Marketing –oriented strategy

- Marketing instruments should play a key role, such as emission trading, environmental tax, energy tax, etc.
- Decentralization of environmental policies;
- Full public participation.

Integration is needed!





Roadmap for implementing CE in China

government	citizens	companies
Green GDP Enforcement of resource and environmental laws Energy saving programs Environmental tax Emission trade	Sustainable living model Green purchasing Green consumption Participation of green programs Green investment	Eco-design Cleaner production Extended producer responsibility Green marketing Service economy Responsible waste treatment

Some misunderstandings on CE in China

- Only recycling, no economic returns;
- Only production, no consumption;
- Only reuse and recycling, no reduction;
- Only EIP, no collaboration with surrounding areas;
- Only planning, no implementation;
- Only governmental duties, no public participation.

Barriers on implementing circular economy

- Hard to change the current industrial structure;
- Poor environmental awareness;
- Lack of public participation;
- Lack of advanced technologies and tools;
- Lack of Fund;
- Fragmented political framework;
- Lack of effective enforcement on key regulations;
- Lack of information support.

Thank you!

Any questions?