2.1 From the viewpoint of Equity

2.1.1 What is equity?

- Equity is a situation in which everyone is treated fairly.

- Why equity matters ?

  Equity conflict with national interests

For developing countries' participation

- If the regime targets for GHGs stabilization at 550 ppm, the practical participations of developing countries are needed from the early stage.

<u>therefore</u>

- The viewpoint of equity is important
- The regime should be acceptable to every country and avoid negative effects on national interests.

2.1.2 five dimensions

1. Responsibility
2. Equal Entitlement
3. Capability
4. Basic Need
5. Comparable Effort

source: Xueman et al (2001)

2.1.3 Proposals that meet equity

Allocation

- Brazilian Proposal
- Contraction & Convergence

Timing

- Simultaneous Participation
- Timing Differentiation

Allocation

	Brazilian proposal	C&C
Responsibility	○	×
Equal entitlement	×	○
Capability	○	○
Basic need	○	○

独自に作成

- Capability **と** basic need**は責任と平等に付属する要素である。**

- Responsibility **と** equal entitlement**の判断は価値基準による。**

Timing

	Simultaneous participation	Timing differentiation
Responsibility	×	○
Equal entitlement	−	−
Capability	×	○
Basic need	×	○

独自に作成

Allocation & Timing

	B.P	T.D	C&C	T.D
Responsibility	○	○	×	○
Equal entitlement	×	−	○	−
Capability	○	○	○	○
Basic need	○	○	○	○

Comparable effort	Emission trading

Brazilian Proposal

- Burden sharing is based on historical responsibility for global warming.

- Annex I countries should reduce CO2 emissions to 30 per cent of 1990 level by 2020.

Contraction & Convergence

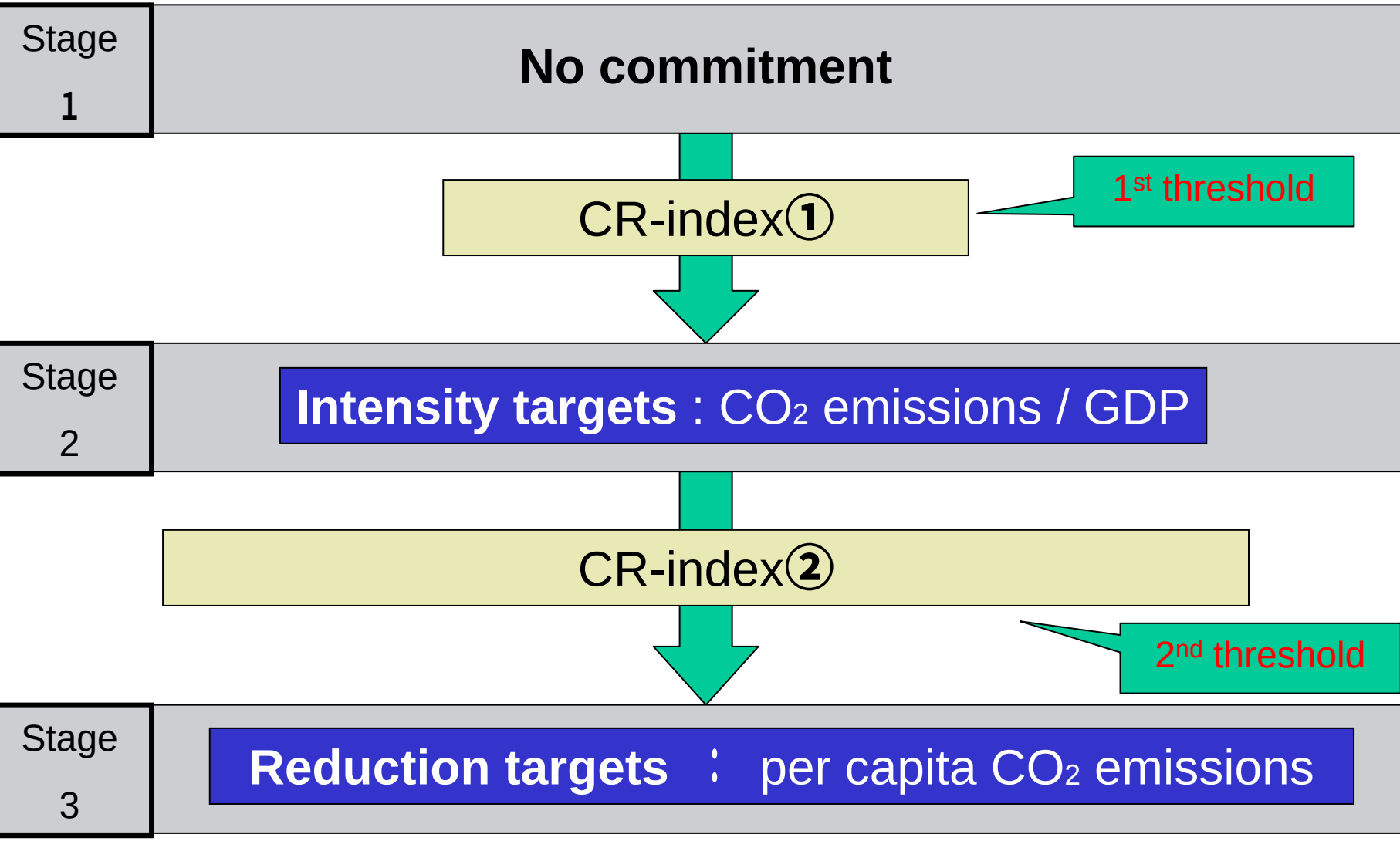
- Simultaneous participation of every country right after the first commitment period of KP (2013)
- Stabilization of the GHG concentration level by 2100.
- Convergence of per capita emissions at a given year, say 2050.

What is MS?

Non-Annex Ⅰ

- Stage1　No commitment
- Stage2　Limitation targets (e.g. intensity targets)
- Stage3　Reduction targets
- Per capita emissions will eventually converge across countries.

What is MS?


Stage 1
No commitment
CR-index①
1st threshold
Stage 2
Intensity targets : CO2 emissions / GDP
CR-index②
2nd threshold
Stage 3
Reduction targets ： per capita CO2 emissions

CR-index

- Article3.1 of UNFCCC

"Common but differentiated responsibilities and respective capabilities"

Per capita GDP：A

Per capita CO_2 emissions：B

•CR＝ A ＋ B

Elzen's model indices

- ***<u>550ppm</u>***

  1st threshold・CR-index①＝5

  2nd threshold・CR-index②＝12

Cf.650ppm

  1st threshold・CR-index①＝12

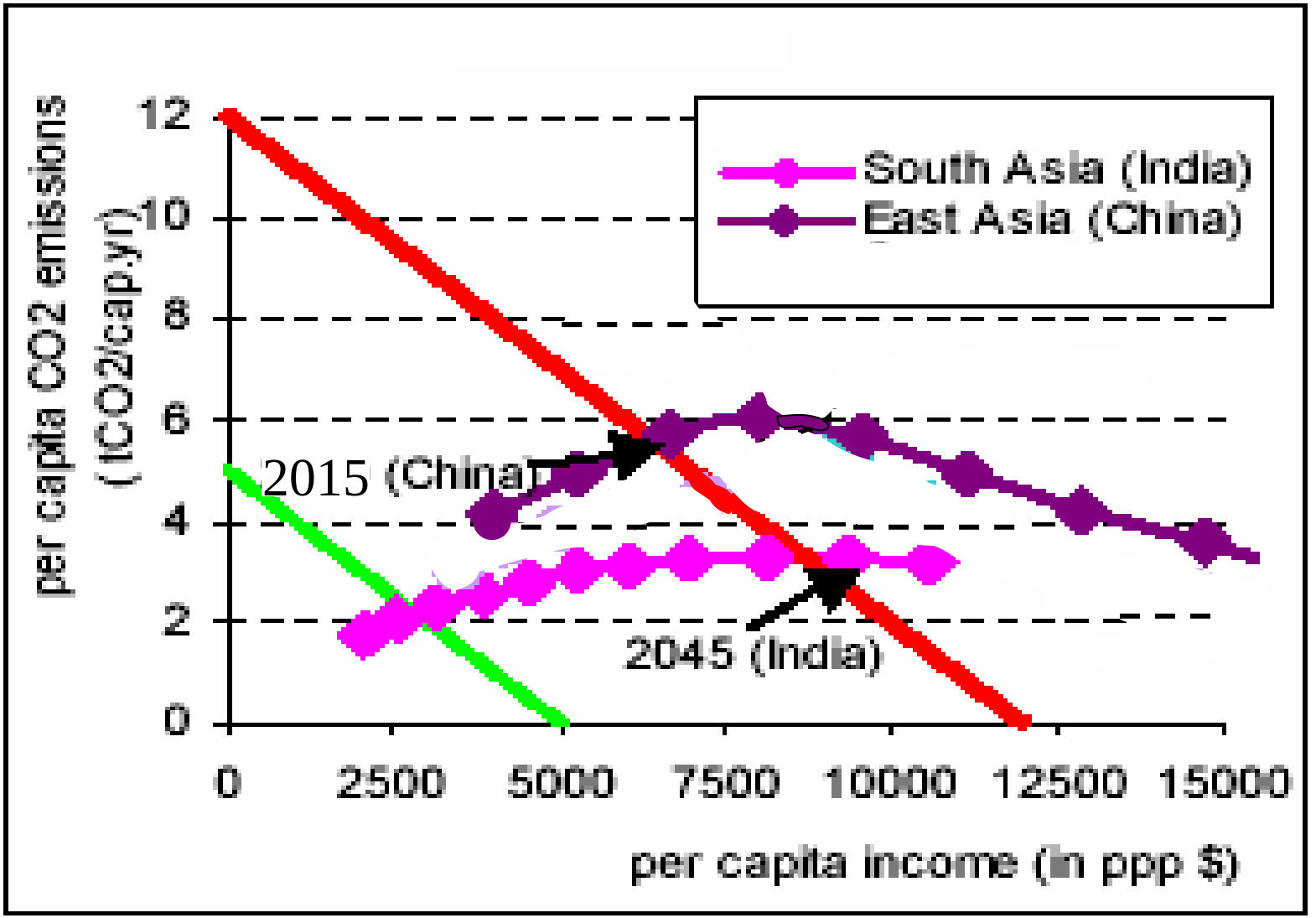
  2nd threshold・CR-index②＝20

CR-index

	1995		
	Per capia GDP	Per capia emissions	CR-index
	1000 PPP$	tCO2-eq	
USA	28	26	54
Canada	24	21	45
Oceania	17	19	36
Japan	24	11	35
OECD Europe	20	11	31
Former USSR	5	12	18
Eastern Europe	7	9	15
Middle East	5	7	12
South America	7	5	12
Central America	5	5	10
Southern Africa	2	4	7
East Asia (China)	3	4	7
Northern Africa	3	3	6
South East Asia	3	3	6
South Asia (India)	2	2	4
Western Africa	1	1	2
Eastern Africa	1	1	2

Source: den Elzen (2004)

CR-index


per capita CO2 emissions
(tCO2/cap.yr)
12
10
8
6
4
2
0
0
2500
5000
7500
10000
12500
15000
per capita income (in ppp $)
South Asia (India)
East Asia (China)
2015 (China)
2045 (India)

Stage 1 ⇒ Stage 2

No Commitment ⇒Limitation Target

- threshold

region	CAM	SAM	NAF	WAF	EAF
	2013	2013	2013	2055	2065
region	SAF	ME	**SAS**	**EAS**	SEAS
	2013	2013	**2015**	**2013**	2013

Source: den Elzen (2004)

Stage 2 ⇒ Stage 3

Limitation Target ⇒ Reduction Target

- threshold

region	CAM	SAM	NAF	WAF	EAF
	2015	2013	2050	2100	2100
region	SAF	ME	**SAS**	**EAS**	SEAS
	2060	2013	**2050**	**2015**	2030

Source: den Elzen (2004)

Formula of allocation in stage 3

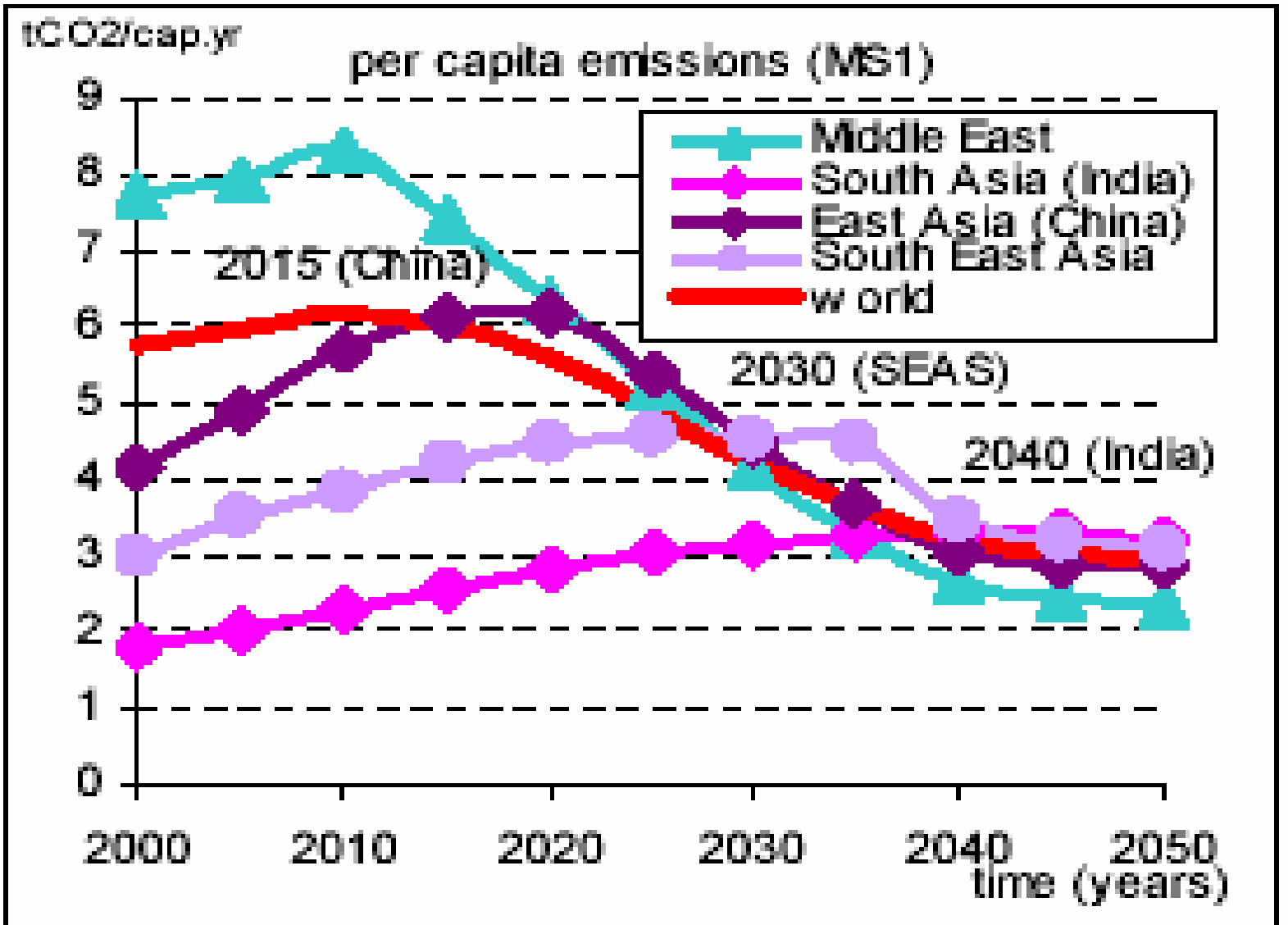
Share of each nation (=S)

=Emission ✕ Emissions per capita

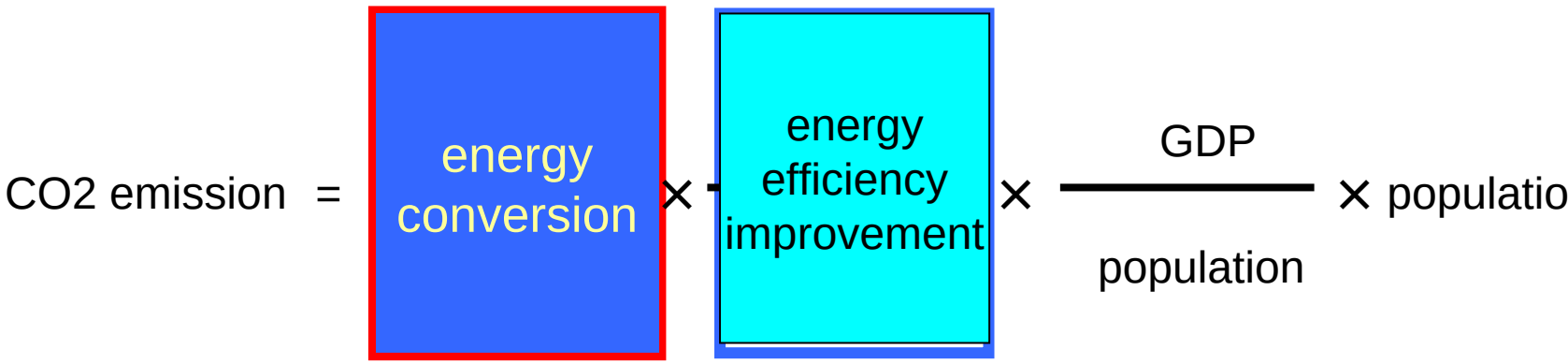
Total emission reduction ✕ S

= Emission budget of each nation

Convergence



3.2 Advanced Technology Development



3.2.1 Definition

We define advanced technology as :

1. De-carbonizing technology which could diffuse in long term, not near term
2. De-carbonizing technology which could emerge in long term and would not exist in near term

3.2.2 Instruction for Advanced Technology Development

1. Inertia and capital stock turnover

➢ Inertia

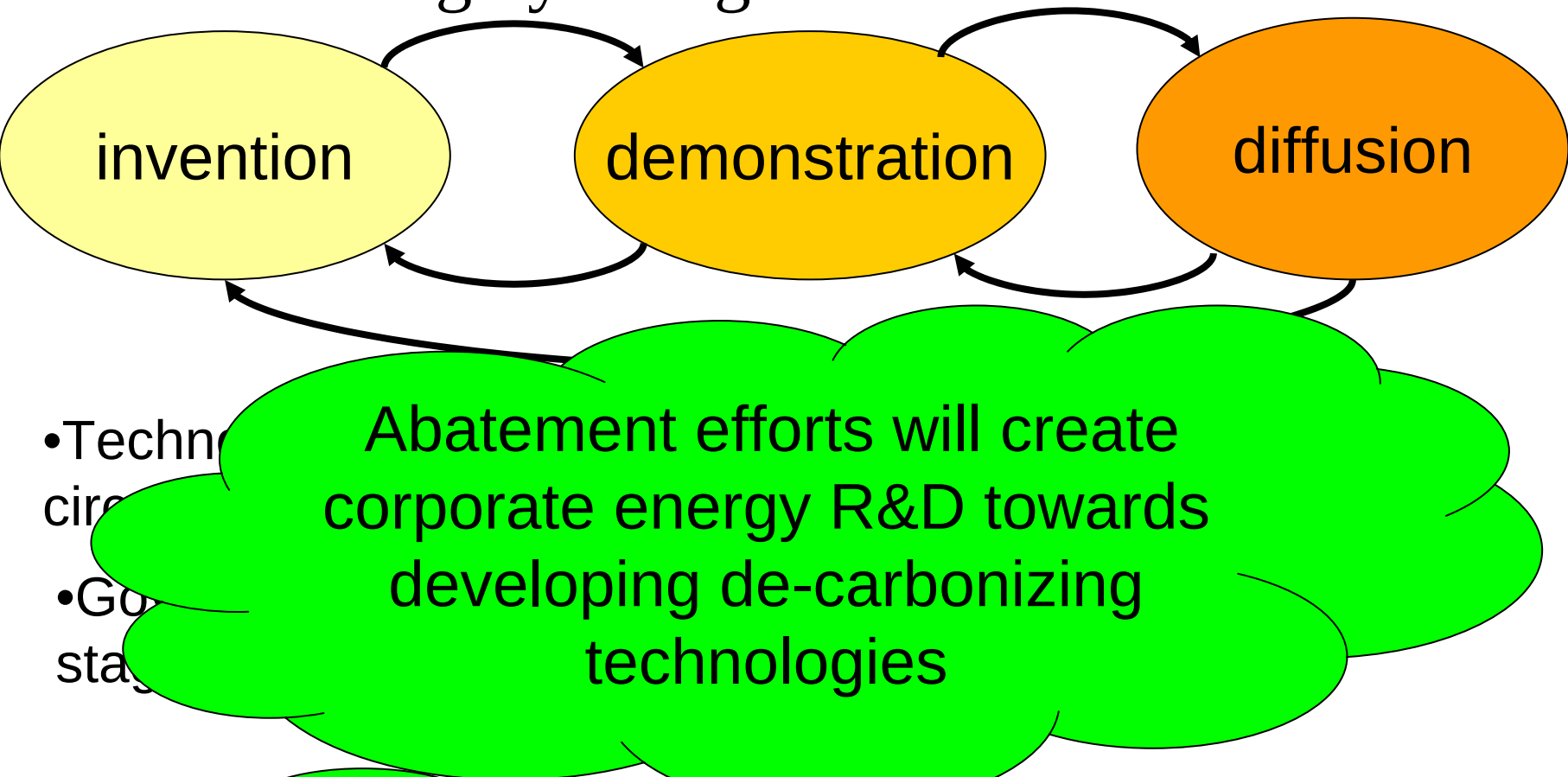
- Energy system has a lifetime of 30 years
- Technology development tends to be strongly biased towards existing modes

⇨ lock-in effect!!

➢ Capital stock turnover

- If adequate alternatives are available, almost complete transition at low cost is possible
- Delay in constraining emissions is not beneficial to industry
- If continued, carbon-intensive investments will have to be prematurely retired at large cost
- So, we need to accelerate transformation of energy system *as soon as possible*!!

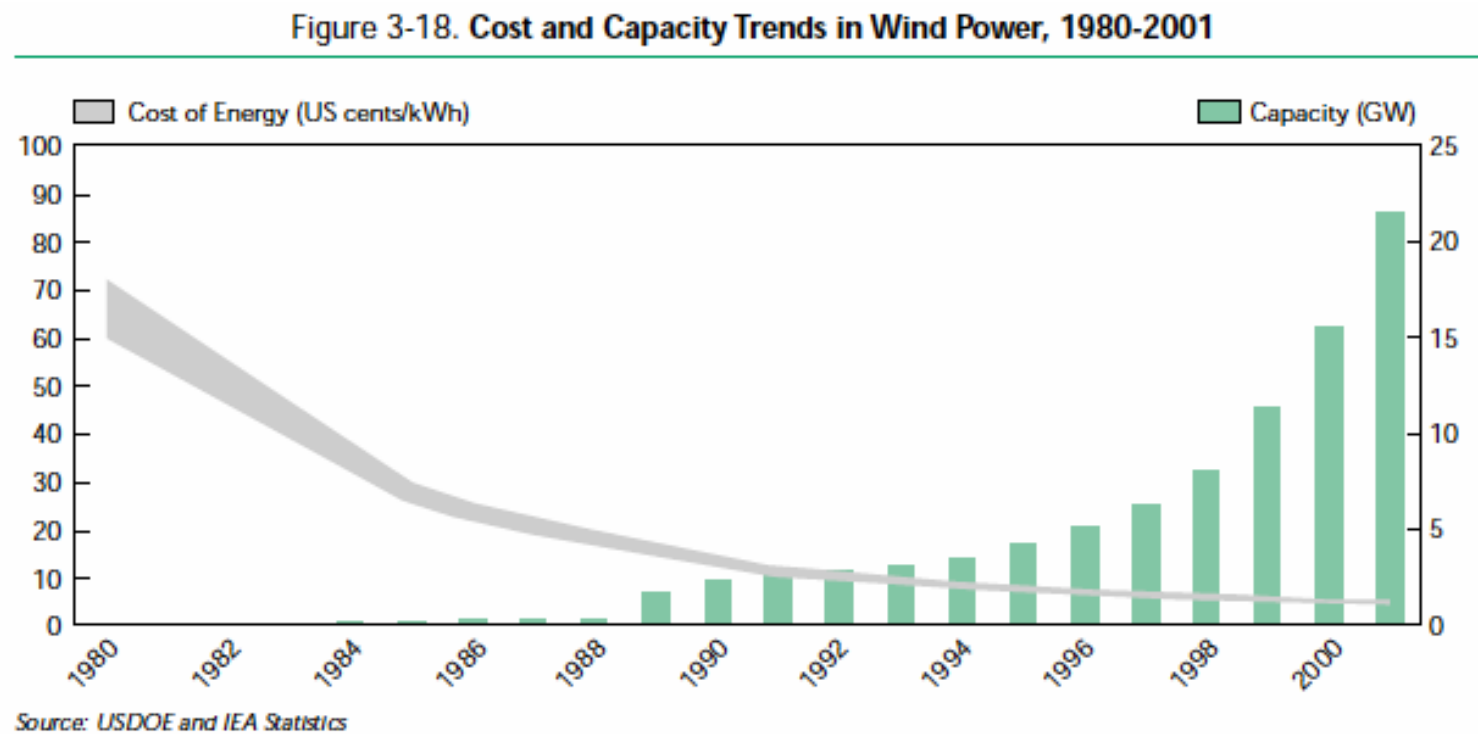
2. Learning by doing



•Techn
cir

•Go
sta

- Example
- Current wind power circumstance



source: IEA(2004x)

3. Appropriate policies in each stage promote advanced technology development

➢Invention stage

•government R&D is necessary

ex) Accumulative investments for PV system amount to JP¥160b

➢Demonstration & diffusion

•Renewable Portfolio Standard (quota system)

•emission trading & tax

4. International technology co-operation

- Implementation of advanced technology development would require large cost

➢ International collaboration

- Carbon sequestration Leadership Forum (Jun. 2003)
- International Partnership for Hydrogen Economy (Nov. 2004)

➢ Kyoto mechanism

- CDM, JI

⇒ These efforts are carried out together, not separately