Maison de la culture du Japon à Paris
Juin 2, 2010

Le Japon après le sommet de Copenhague (COP15)

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Ultimate Objective of the UNFCCC

The ultimate objective of this Convention --- is to achieve --- stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.

Such a level should be achieved within a time-frame sufficient to

- allow ecosystems to adapt naturally to climate change,
- to ensure that food production is not threatened and
- to enable economic development to proceed in a sustainable manner.

Sustainable Development is the objective of climate policies

My basic position

- Substantial reduction is necessary in a long run to avoid catastrophe losses
- Decision under uncertainty
- Take cost into account (feasibility)
- Balanced approach toward global issues such as MDGs (efficient use of global limited resources)
- Technology is the key

Evaluation of COP 15

- End of the EU-led Target Settings

FT Dec. 19/20, 2009

- Collapse of the Kyoto-style International Framework
- Difficulty of UN-led negotiation
- Funding Mechanism: details to be clarified later

End of the EU-led Target Settings

- 2 ℃ since industrialization
- →450 ppmCO2e
- →Halving global emissions at least 50% (and 80% for developed countries) by 2050
- →25-45% aggregate reduction for developed countries by 2020

- Took note of “Copenhagen Accord”

  No agreement on 2℃ target “since industrialization”

Current situation of the Article 2 of UNFCCC

No Consensus on Dangerous Level:

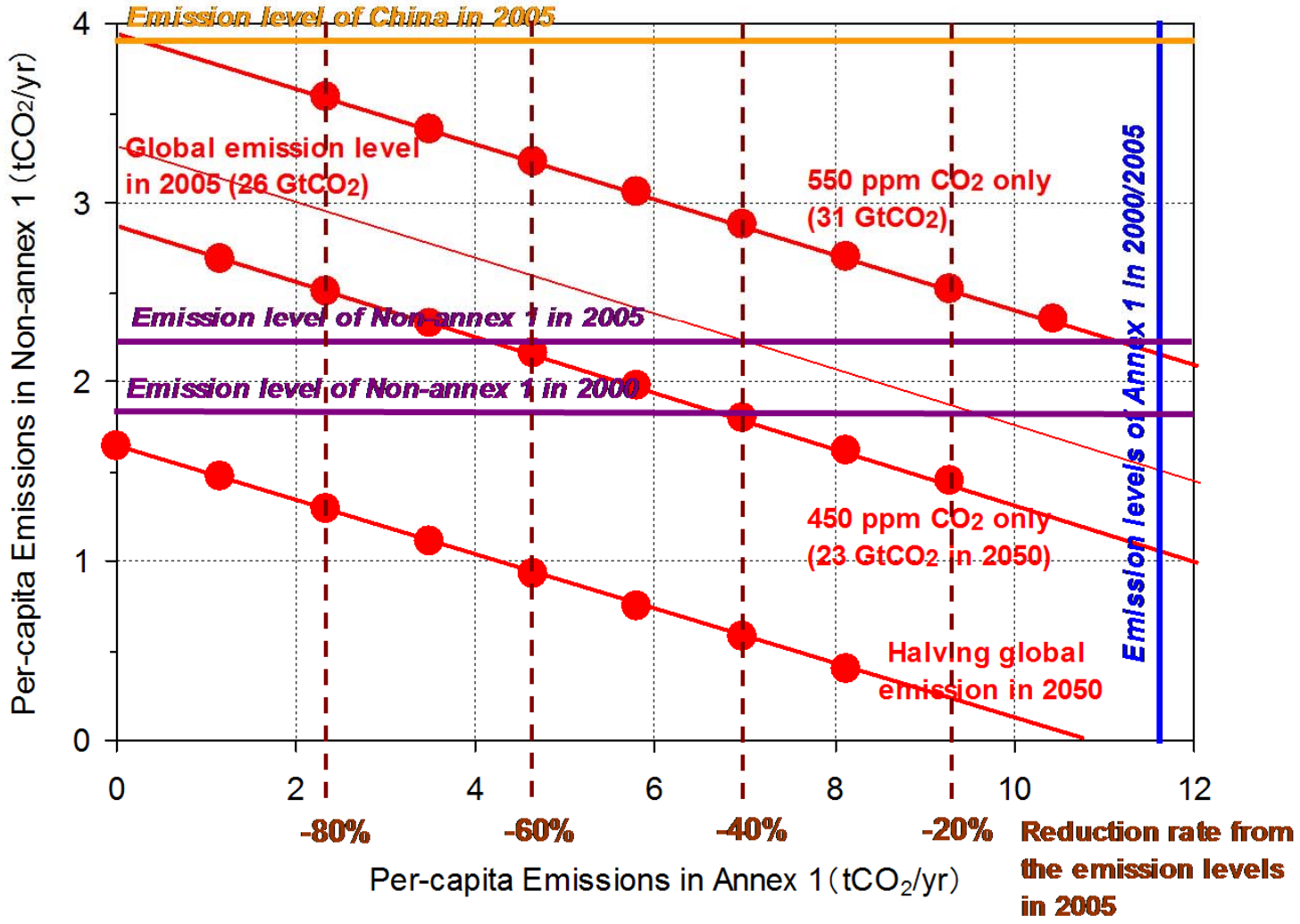
The choice of a stabilization level implies the balancing of the risks of climate change ……against the risk of response measures that may threaten economic sustainability.

There is little consensus as to what constitutes anthropogenic interference with the climate system and, thereby, on how to operationalize Article 2 (*high agreement, much evidence*). IPCC/AR4/WG3/Ch.1 p.97

What does 50% global reduction mean?

Per-capita Emissions for Global Targets

Source: RITE



China 3.9t→1.3t (80% reduction for Annex 1), 1.6t (zero emission for Annex 1)

Can cap reduce emissions drastically?
(2050/2000) (Kaya Identity)

- $\text{CO2 emissions} = \frac{\text{CO2 emissions}}{\text{GDP}} \times \text{GDP}$
- $\Delta \text{CO2}/\text{CO2}$

$$= \frac{\Delta(\text{CO2 emissions}/\text{GDP})}{\text{CO2 emissions}/\text{GDP}} + \frac{\Delta \text{GDP}}{\text{GDP}}$$

$$= \text{Technology improvement ratio} + \text{GDP growth ratio}$$

Global BAU GDP in 2050 will be $122 Trillion. 80% reduction corresponds to $24.4 trillion, that is 23% less that that in 2000. Source: WB, UN and IPCC B2 scenario

To achieve 50% reduction	
GDP loss(%)	Tech. imp. ratio(%)
0	3.856
10	3.681
20	3.485
30	3.262
40	3.005
50	2.701
80	1.174

Tech. imp. ratio of 1.227%	
CO2 reduction(%)	GDP loss (%)
0	58.710
10	62.839
20	66.968
30	71.097
40	75.226
50	79.355

Average annual technology improvement ratio since 1970 is1.227%.

BAU GDP growth ratio up to 2050 is 2.76%/yr (RITE estimate based on World Bank and IPCC SRES B2 Marker scenario).

Collapse of the Kyoto-style International Framework

- What is the Kyoto-style?

  Purchase allowances from other countries by tax payers' money
- U.S. Situation (Waxman-Markey Bill)

  Economy-wide reduction target of 20% is an aspirational.
- Pledge and Review (Copenhagen Accord)
- No single global carbon market

Difficulty of UN-led negotiation

Who drafted Copenhagen Accord?

Japanese Strategy

DPJ's Landslide Victory Aug. 30, 2009 and Drastic Change of Climate Policy

- Declaration of exorbitantly ambitious mid-term target without implementation plan
- Carbon price will be 10 times higher than both the EU and the USA

Basic law on climate change
likely to pass the Diet

- Mid-term target: 25% reduction from 1990 by 2020 (or 30% from 2005)

  -- a fair and effective international framework in which all major economies participate,

  -- is premised on agreement on ambitious targets by all the major economies
- Become effective when premises are met
- Long-term target: 80% reduction by 2050
- Renewable Energy: 10%

Came from IPCC 4th Assessment Report

CO_2 concentration[c] (ppm)	CO_2-eq concentration[c] (ppm)	Global mean temperature increase above pre-industrial at equilibrium, using "best estimate" climate sensitivity[b], [c] (°C)	Peaking year for CO_2 emissions[d]	Change in global CO_2 emissions in 2050 (% of 2000 emissions)[d]
350-400	445-490	2.0-2.4	2000-2015	-85 to -50
400-440	490-535	2.4-2.8	2000-2020	-60 to -30
440-485	535-590	2.8-3.2	2010-2030	-30 to +5
485-570	590-710	3.2-4.0	2020-2060	+10 to +60
570-660	710-855	4.0-4.9	2050-2080	+25 to +85
660-790	855-1130	4.9-6.1	2060-2090	+90 to +140

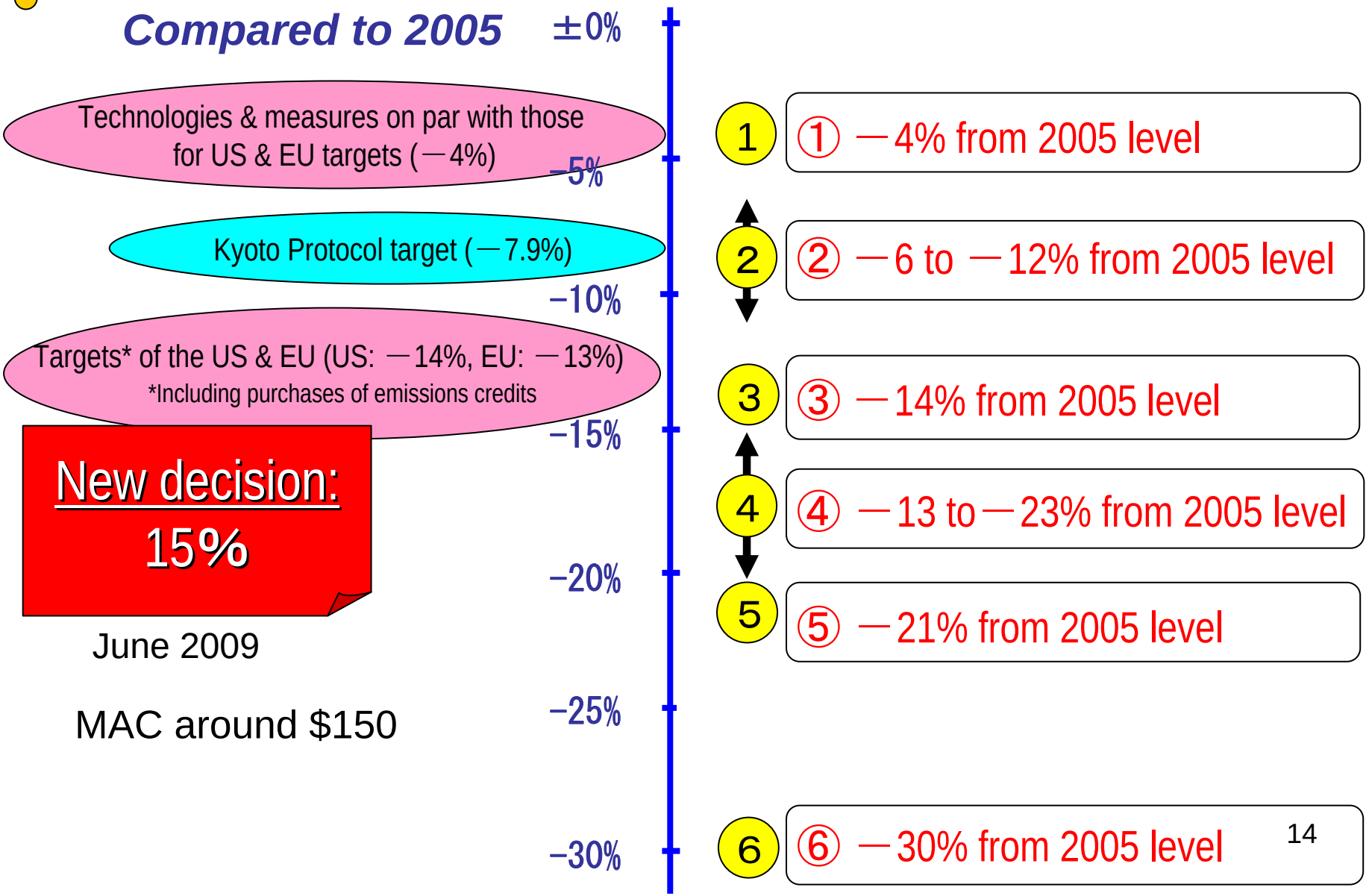
Box 13.7 The range of the difference between emissions in 1990 and emission allowances in 2020/2050 for various GHG concentration levels for Annex I and non-Annex I countries as a group[a]

Scenario category	Region	2020	2050
A-450 ppm CO_2-eq[b]	Annex I	–25% to –40%	–80% to –95%
	Non-Annex I	Substantial deviation from baseline in Latin America, Middle East, East Asia and Centrally-Planned Asia	Substantial deviation from baseline in all regions
B-550 ppm CO_2-eq	Annex I	-10% to -30%	-40% to -90%
	Non-Annex I	Deviation from baseline in Latin America and Middle East, East Asia	Deviation from baseline in most regions, especially in Latin America and Middle East
C-650 ppm CO_2-eq	Annex I	0% to -25%	-30% to -80%
	Non-Annex I	Baseline	Deviation from baseline in Latin America and MIddle East, East Asia

Annex 1 countries as a group, cost and feasibility not considered

Mid-term Target under LDP

(Domestic emission reductions)



Economic Impacts of Mid-Term Targets in 2020

		Keio Univ.	Japan Center for Economic R.		NIES
		KEO	CGE	マクロ	AIM/CGE
Option①	Against Option ①（which is almost equivalent to US and EU targets）				
Option③	Real GDP	▲0.5%	▲0.6%	▲0.9%	▲0.5%
	Unemployment R.	+0.3%	—	+0.2%	—
	Private Investment	+3.4%	+0.1%	+2.2%	▲0.8%
	Disposable Income（per household）	▲3.1% ▲¥150,000	▲0.8% ▲¥40,000	▲0.7%	▲1.1% ▲¥50,000
	Lighting & heating（per household）	+19.7% ¥30,000	+17.6% ¥30,000	—	+13.2% ¥20,000
	Gasoline price（same as MAC）	+¥40/l	+¥30/l	+¥40/l	+¥20/l
Option⑥	Real GDP	▲5.6%	▲3.2%	▲6.6%	▲6.0%
	Unemployment R.	+1.9%	—	+1.3%	—
	Private Investment	+6.6%	▲0.4%	+12.5%	▲11.9%
	Disposable Income（per household）	▲15.9% ▲¥770,000	▲4.5% ▲¥220,000	▲5.6% ▲¥270,000	▲9.1% ▲¥440,000
	Lighting & heating（per household）	+76.6% +130,000	+81.0% +140,000	—	+65.7% +¥120,000
	Real GDP loss of 0.1% corresponds to loss of compensation for 100,000 employees. (Associate Prof. K. Nomura, Keio University)				

Compiled by the presentater based on the documents distributed at the 6th Mid-term study committee in March 27, 2009

Comparison of Four CGE Models (25% Domestic Reduction)

	Real GDP	Real disposable income (per household)	Unemployment	Electricity price increase	Marginal abatement cost
Keio University					
Mid-term Committee	-5.6%	-15.9% (¥770,000)	1.9%	97.3%	¥87,667
Task Force					
NIES					
Mid-term Committee	-6.0%	-9.1% (¥440,000)	—	100.6%	¥61,029
Task Force	-3.2%	-3.4% (¥170,000)	—	113.6%	¥54,438
JCER					
Mid-term Committee	-3.2%	-4.5% (¥220,000)	—	124.7%	¥81,555
Task Force	-3.1%	-4.5% (¥220,000)	—	117.0%	¥63,180
Osaka University					
Business-as-usual innovation	-0.43%	-0.4% (¥19,000)	0.13%	10.2%	¥55,635
Accelerated innovation	0.40%	-0.05% (¥2,000)	-0.41%	10.7%	¥52,459

Can the premises be met?

Ambitious Targets (25-40% reduction)

	Base Year	Lower side	Higher side
Australia	2000	-5%	-25%
Canada	2005	-17%	-17%
EU	1990	-20%	-30%
Japan	1990	(-25%)	-25%
Russia	1990	-15%	-25%
USA	2005	-17%	-17%
Total Annex 1*	1990	(-11%)	(-18%)
(Total Annex 1 reduction ratio is the one calculated in last December)			
China	2005	-40%*	-45%*

*CO_2 emissions per unit of GDP

Can the premises be met?

Fairness (Cost/GDP based)

Mid-term target and equity (based on Cost/GDP) Base Year 199(

Japan's Target	Think Tank	Cost/GDP in Japan	Reduction ratio*	
			USA	EU
Domestic 10%, Credit 15%	RITE	0.43%	▲7%	▲30%
same as above	NIES	0.44%	▲5%	▲27%
Domestic 25%, no credit	RITE	1.13%	▲30%	▲39%
(D: 20%, C: 5%)	NIES	1.40%	▲24%	▲33%

* Reduction ratio that will make Cost/GDP equal to that in Japan.
NIES did not have domestic 25% reduction figures
Source: Task Force Interim Report Dec. 11, 2009

Can the premises be met?

Fairness (MAC based)

Mid-term target and equity (based on MAC) Base Year 1990

Japan's Target	Think Tank	MAC in Japan	Reduction ratio*	
			USA	EU
Domestic 10%, Credit 15%	RITE	$167	▲26%	▲28%
same as above	NIES	$205	▲30%	▲29%
Domestic 25%, no credit	RITE	$476	▲44%	▲39%
(D: 20%, C: 5%)	NIES	$546	▲32%	▲22%

* Reduction ratio that will make MAC equal to that in Japan.
NIES does not have domestic 25% reduction figures
Source: Task Force Interim Report Dec. 11, 2009

Source: Task Force Interim Report

Japan, US and EU: MAC and Cost/GDP to achieve targets

	Japan	USA	EU
MAC	$476	$60	$48-135
Cost/GDP	1.13%	0.29%	0.08-0.26%

Assuming 100 % domestic reductions except EU (4% credit purchase) Source RITE

Comparison with Waxman-Markey Bill (MAC)

	Waxman-Markey Bill（Cap & Trade sectors only）		
Reduction Ratio	17% reduction for 2020, 83% reduction for 2050 (base year 2005)		
	CBO	EPA	DOE/EIA
Permit price (MAC) (2020)	$26 (2019)	$16: (Core Scenario) $16～$30 w.i.o w.o.i.o *	$32 (base case) $20～$93 (other cases)
International Offset (2020)	340 Mt	1,000Mt	966Mt (base case) 0～1305Mt (other cases)
GDP Loss (2020)	-	-0.57% (IGEM) +0.13% (ADAGE) (コアシナリオ)	-0.3% (base case) -0.1%～-0.7% (other cases)
Unemployment (2020)	-	- (full employment is assumed))	-
Consumption loss (per household, annual) 2020	$175 （2010年 Price） （Disposable Income）	$84(IGEM), $105(ADAGE) Before discounting (Core Scenario)	$134 (2007 price) (base case) $30～$362 (2007 price) (other cases)
Models	several	IGEM and ADAGE (CGE Model)	National Energy Modeling System (NEMS)

Sources: documents by CBO, EPA and EIA

Assumptions of the most optimistic model the Government target relies on

- AEEI (Autonomous EE Improvement): 2.5%
- De-carbonization: 2~4%
- Cost reduction of renewables:

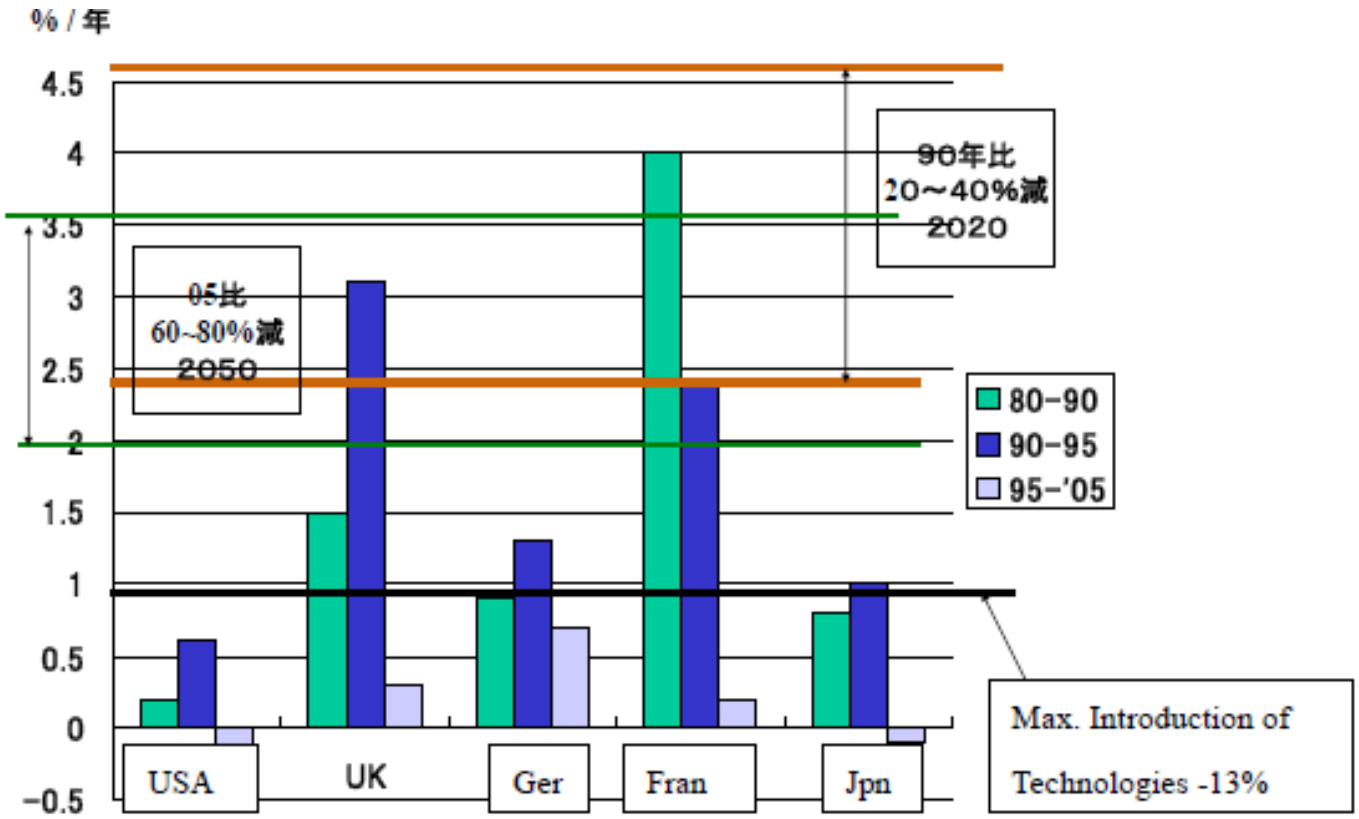
  4% until 2010 then increase to 5~8%
- Expansion of areas for renewables:

  15% until 2010 then increase to 20~32.5%

(above ratios are all annual)

Are those feasible? If not, what will happen?

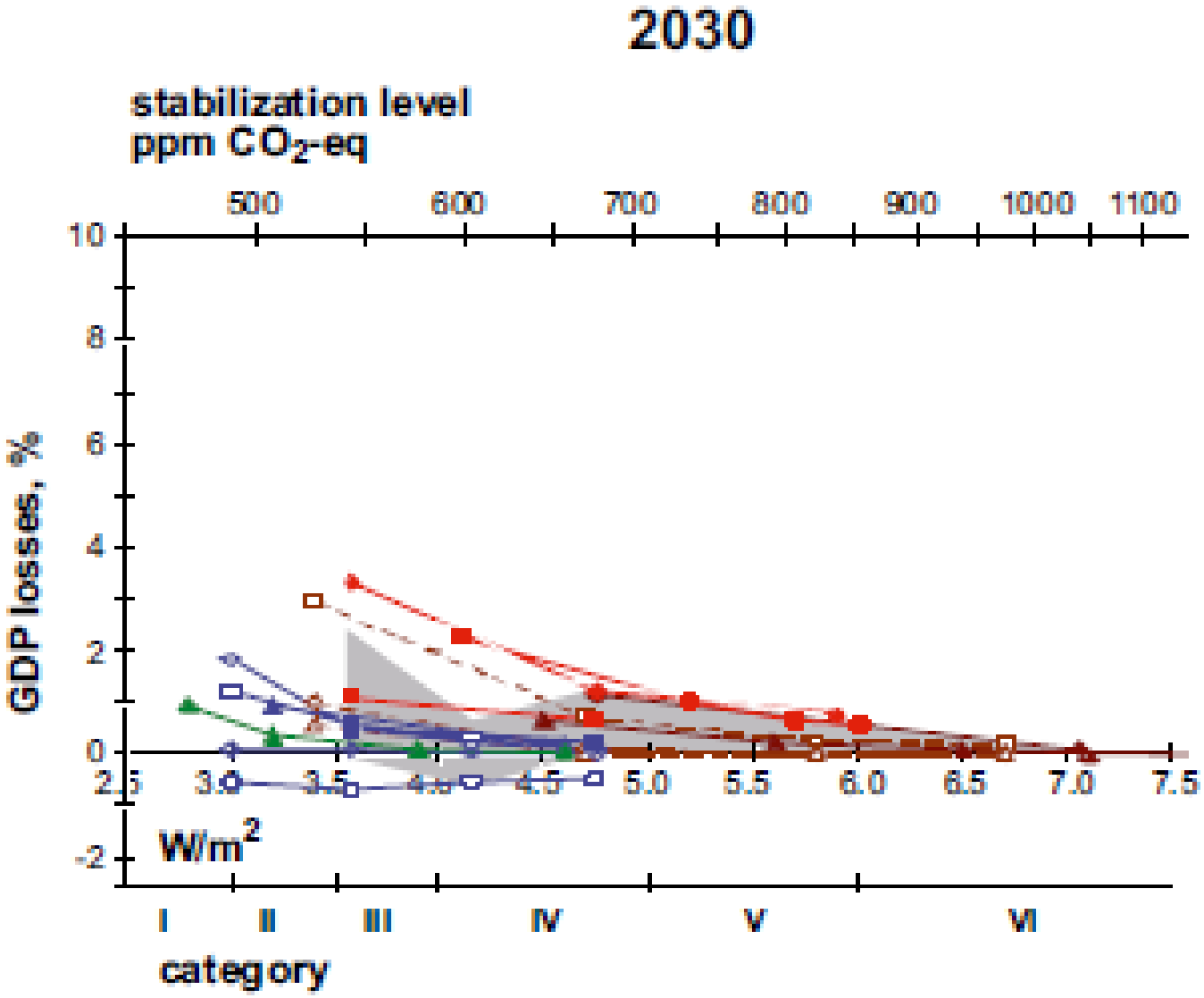
Historic de-carbonization ratios



Historical De-carbonization Ratio of Developed Countries and Necessary De-Carbonation Ratio to achieve several Japanese Targets

Chart by Dr. Y. Kaya

Mitigation and GDP loss



Source: IPCC AR4 WG3 TS p.40

What would the Government do when the premises are not met?

- Draft Proposal of Minister of Environment based on optimistic model (25% domestic reduction)
- Portion of domestic reduction is unknown

  at this moment (20% + 5%, 15% + 10% etc)
- Utilization of all available policies, including tax, emissions trading and feed in tariff.
- Can Japanese economy and people tolerate (under current economic situation and huge deficit)?

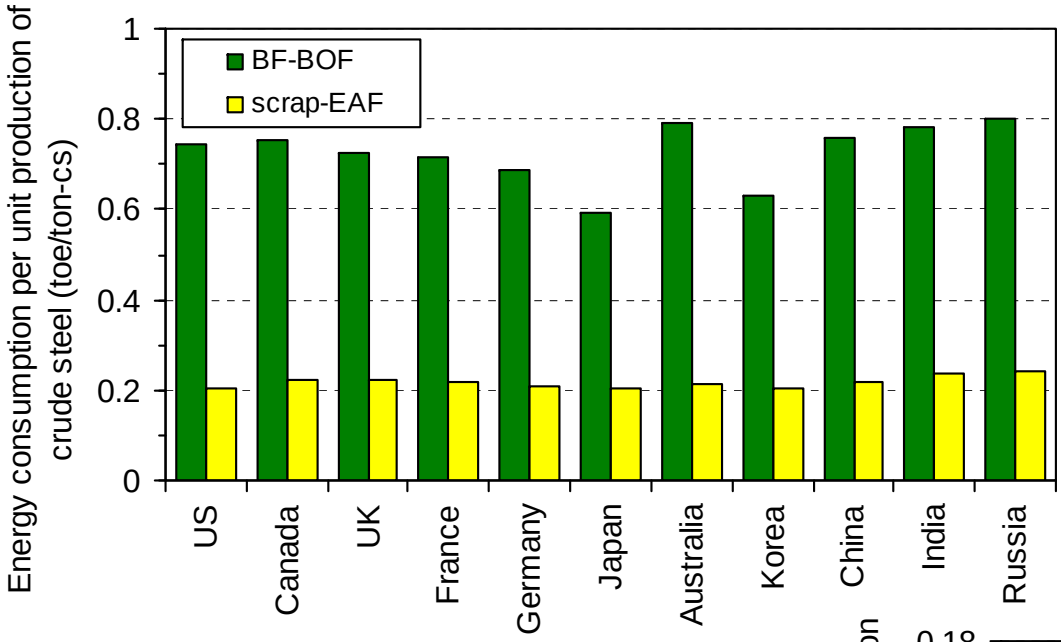
Japan's Strategy: Re-open global discussions on the ultimate objective

- Stabilization at the level not dangerous
- Sustainable development is the goal
- Mutual supportiveness of climate policy and sustainable economic growth

- Projected anthropogenic climate change appears likely to adversely affect sustainable development
- Conversely, costly mitigation measures could have adverse effects on economic development. This dilemma facing policymakers results in (a varying degree of) tension that is manifested in the debate over the scale of the interventions and the balance to be adopted between climate policy (mitigation and adaptation) and economic development. (IPCC AR4 WG3 Ch. 1, p.99)

- Contribute substantial global emissions reduction through technology innovation and diffusion

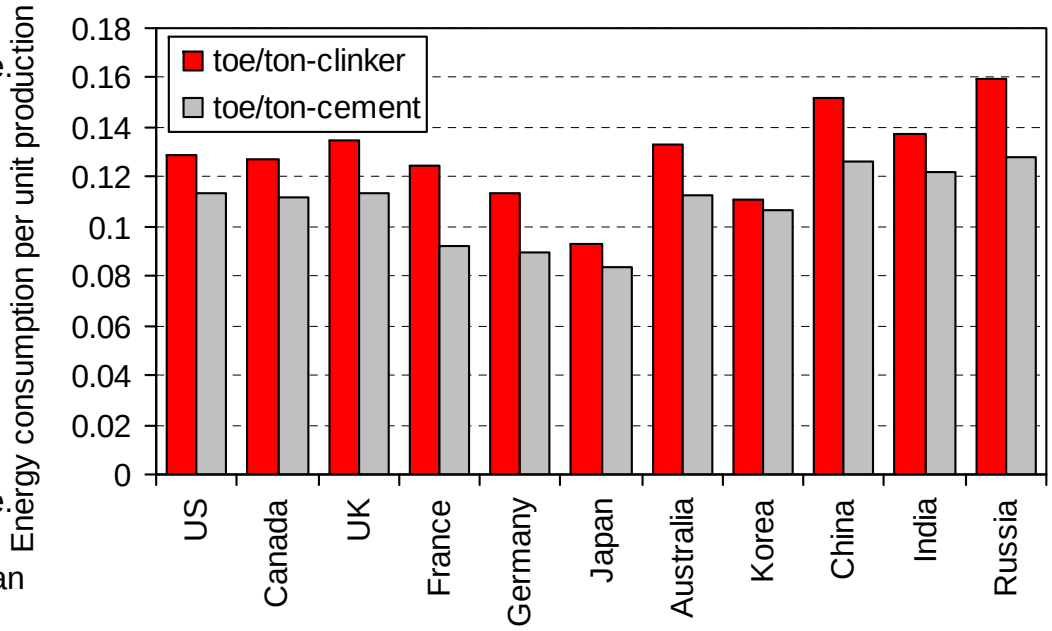
Comparisons of Energy Efficiency (1/2)



Iron & steel (2000)

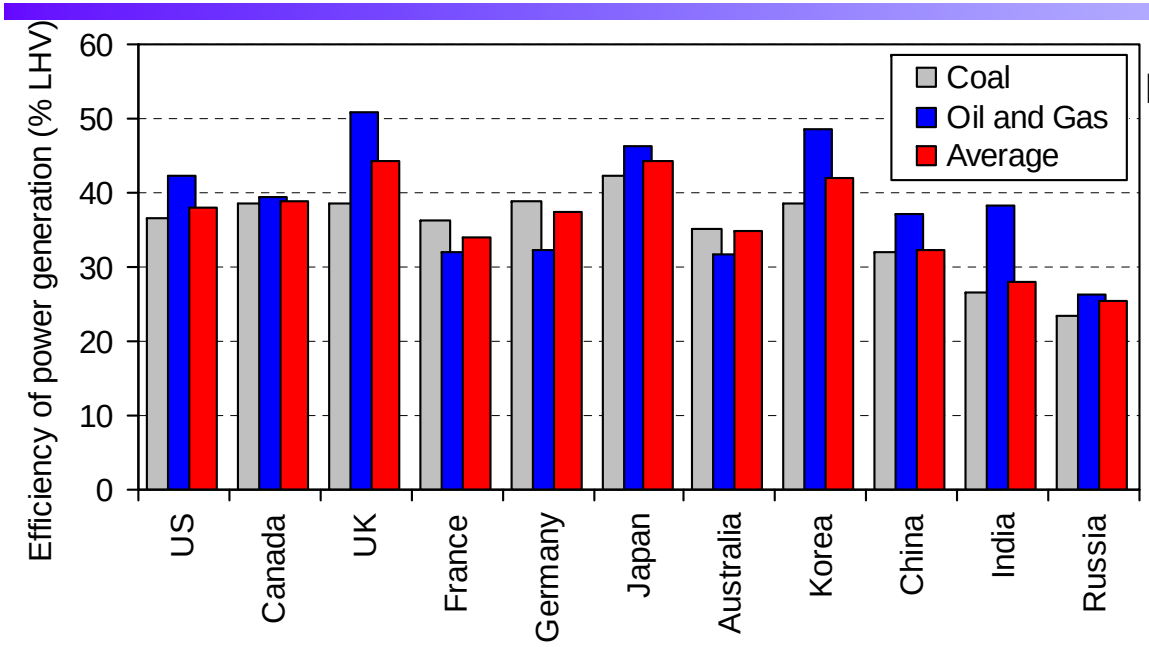
Note: Electricity is converted by using 1MWh=0.086/0.33toe.
Source: Estimates by RITE from IEA (2006), IISI (2005) etc.

Cement (2000)



Note: Electricity is converted by using 1MWh=0.086/0.33toe.
Waste biomass use is excluded in the energy efficiency.
Source: Estimates by RITE from Humphreys and Mahasenan (2002), IEA (2006) etc.

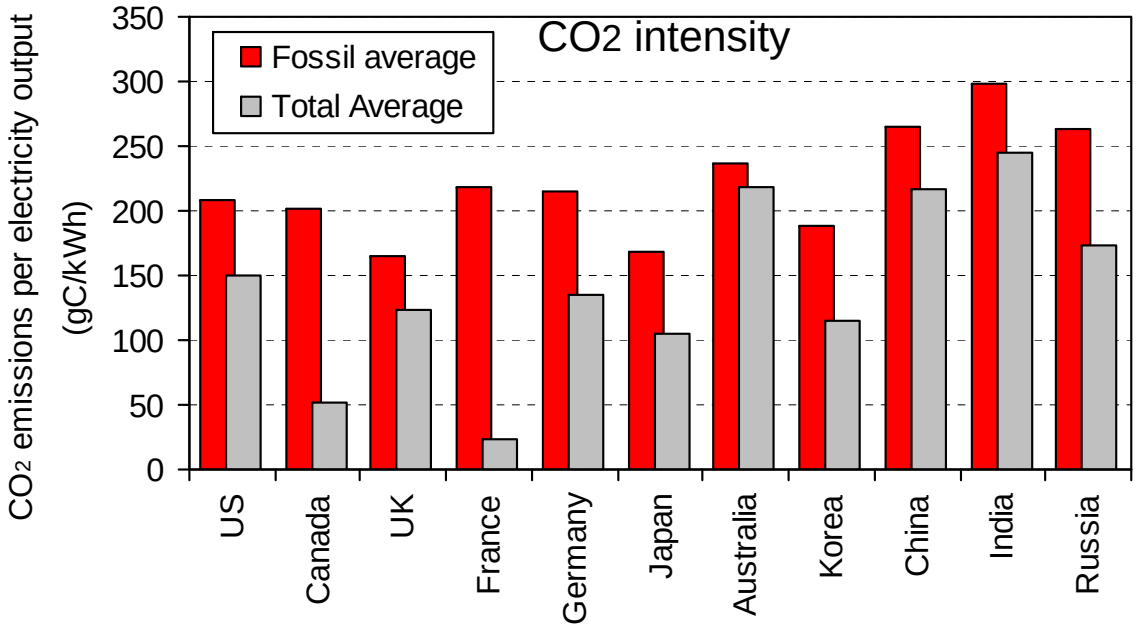
Comparisons of Energy Efficiency (2/2)



Efficiency

Power sectors (2005)
Including CHP

Source: IEA, 2007



Criteria for discussions

- Avoid catastrophe losses
- Contribute for long-term substantial reduction
- Balanced approach toward both global issues such as MDGs and domestic issues such as pension, health care under budget constraint (efficient use of limited resources)

My suggestions (global)

- Sustainable development is the key
- Reach political agreement on the Article 2
- Promotion of sectoral approach

  Good example is that of steel sector
- Mobilization of all measures

  Mechanism for technology transfer

  Adaptation including utilization of insurance

  Funding
- Initiative for SISs (reality and ethics)

What should be Japan's target

Japanese Experience with the Kyoto Protocol

- Initial Allocation (unfair)
- Meaning of Commitment in Japan

  Earthquake in 2007 and voluntary action plan (purchase 30Mt of credit additionally)
- CDM and industry experience

  Industries hate the scheme
- Technology innovation and diffusion are essential for long-term substantial reduction

My suggestions (domestic)

- -15% unilaterally (MAC $150), -30% if premises are met (base year 2005)
- Domestic reduction and offsets as a last resort (for -15% target)
- Internationally non-binding
- Industry: commitment of highest energy efficiencies
- Transportation: same as above
- Others: carbon tax

Thank you for your attention

Copenhagen Accord and the Target

1) -- we shall, recognizing the scientific view that the increase in global temperature should be below 2 degrees Celsius, -- enhance our long-term cooperative action to combat climate change.

2) We agree that deep cuts in global emissions are required according to science, and as documented by the IPCC Fourth Assessment Report with a view to reduce global emissions so as to hold the increase in global temperature below 2 degrees Celsius, and take action to meet this objective

Original Wordings

2. The Parties -- commit to a vigorous response through – national action and strengthened international cooperation with a view to limit global average temperature rise to a maximum of 2 degrees above pre-industrial levels.

3. The Parties support the goal of a reduction of global annual emissions in 2050 by at least 50% versus 1990 annual emissions --

Decision: The Parties take note of the Copenhagen Accord

What we should avoid regardless of cost
Examples of Catastrophe AR4 TS p. 80

THC (MOC)

- **While no models run for this assessment suggest an abrupt MOC shutdown during the 21st century, some models of reduced complexity suggest MOC shutdown as a possible long-term response to sufficiently strong warming. However, the likelihood of this occurring cannot be evaluated with confidence.** The few available simulations with models of different complexity rather suggest a centennial-scale slowdown.
- it is --- *but very unlikely (*< 10% probability) *that* the MOC will undergo a large abrupt transition during the course of the 21st century. Longer-term changes in the MOC cannot be assessed with confidence (p.72).

Antarctic Ice Sheet

- **Current global model studies project that the Antarctic Ice Sheet will remain too cold for widespread surface melting and will gain in mass due to increased snowfall. However, net loss of ice mass could occur if dynamical ice discharge dominates the ice sheet mass balance.**

Greenland Ice Sheet

- **Dynamical processes not included in current models but suggested by recent observations could increase the vulnerability of the ice sheets to warming, increasing future sea level rise. Understanding of these** processes is limited and there is no consensus on their likely magnitude.
- **If a global average warming of 1.9℃ to 4.6℃ relative to pre-industrial temperatures were maintained for millennia, the Greenland Ice Sheet would largely be eliminated** except for remnant glaciers in the mountains.

Both

- Models do not yet exist that address key processes that could contribute to large rapid dynamical changes in the Antarctic and Greenland Ice Sheets that could increase the discharge of ice into the ocean. P. 90