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COP15 and Japan's strategy

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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)
- Same as above within domestic issues, such as pensions, health care

Evaluation of COP 15

- End of the EU-led Target Settings
- 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

Copenhagen countdown World leaders locked in climate change talks



Chinese premier Wen Jiabao and US president Barack Obama in the first of two discussions they held yesterday at the United Nations climate change summit in Copenhagen as 120 world leaders attending the talks sought to reach an agreement on cutting greenhouse gas emissions **Page 3; Latest at www.ft.com/copenhagen** AFP/Getty

FINANCIAL TIMES 2009.12.19/20

End of the EU-led Target Settings

- 2 °C since industrialization
- →350-400 ppmCO₂
- →Halving global emissions at least 50% (and 80% for developed countries) by 2050
- →25-40% aggregate reduction for developed countries by 2020

- Took note of “Copenhagen Accord”
No agreement on 2°C target “since industrialization”

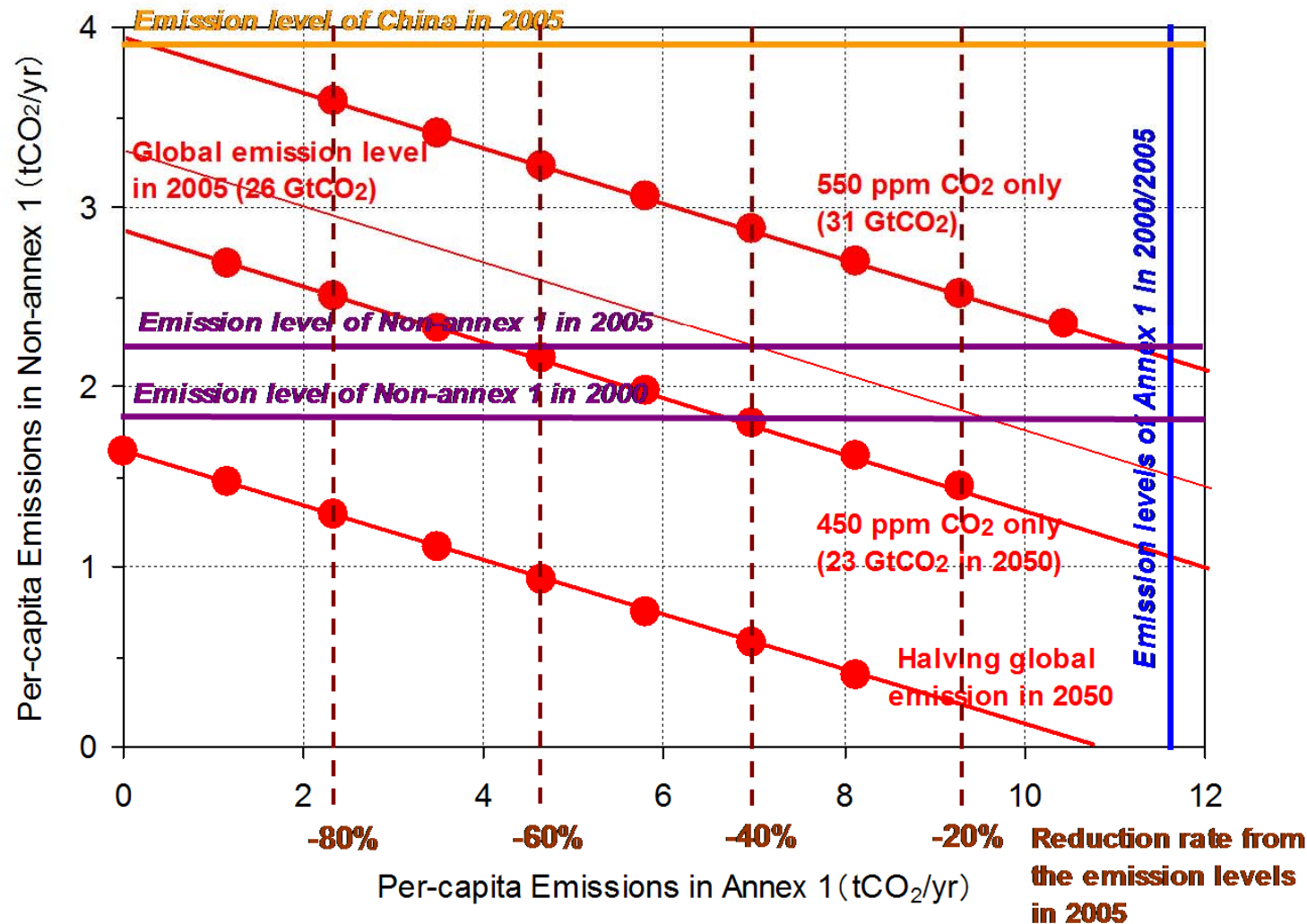
Current situation of the Article 2 of UNFCCC

No agreement on what
constitutes “dangerous
anthropogenic interference”

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)

- $\text{CO}_2 \text{ emissions} = \frac{\text{CO}_2 \text{ emissions}}{\text{GDP}} \times \text{GDP}$

- $\Delta \text{CO}_2 / \text{CO}_2$

$$= \frac{\Delta(\text{CO}_2 \text{ emissions}/\text{GDP})}{\text{CO}_2 \text{ emissions}/\text{GDP}} + \frac{\Delta \text{GDP}}{\text{GDP}}$$

= Technology improvement ratio + GDP growth ratio

Global BAU GDP in 2050 will be \$122 Trillion. 80% reduction corresponds to \$24.4 trillion, that is 23% less than 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 is 1.227%.

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

25-40% reduction for Annex I ?

Scenario category	Region	2020	2050
<i>A-450 ppm CO₂-eq^b</i>	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
<i>B-550 ppm CO₂-eq</i>	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
<i>C-650 ppm CO₂-eq</i>	Annex I	0% to -25%	-30% to -80%
	Non-Annex I	Baseline	Deviation from baseline in Latin America and Middle East, East Asia

IPCCAR4WG3 p.776

	CO2		CO2e		year	percent	°C	metres	
	ppm	ppm	ppm	ppm					
I	350 – 400	445 – 490	445 – 490	445 – 490	2000 – 2015	-85 to -50	2.0 – 2.4	0.4 – 1.4	6
II	400 – 440	490 – 535	490 – 535	490 – 535	2000 – 2020	-60 to -30	2.4 – 2.8	0.5 – 1.7	18
III	440 – 485	535 – 590	535 – 590	535 – 590	2010 – 2030	-30 to +5	2.8 – 3.2	0.6 – 1.9	21
IV	485 – 570	590 – 710	590 – 710	590 – 710	2020 – 2060	+10 to +60	3.2 – 4.0	0.6 – 2.4	118
V	570 – 660	710 – 855	710 – 855	710 – 855	2050 – 2080	+25 to +85	4.0 – 4.9	0.8 – 2.9	9
VI	660 – 790	855 – 1130	855 – 1130	855 – 1130	2060 – 2090	+90 to +140	4.9 – 6.1	1.0 – 3.7	5

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?

Resignation of Yve de Boer

Japanese Strategy

Drastic change from LDP to DPJ
(from -15% since 05 to 25% since 90)
Can DPJ continue its climate policy?

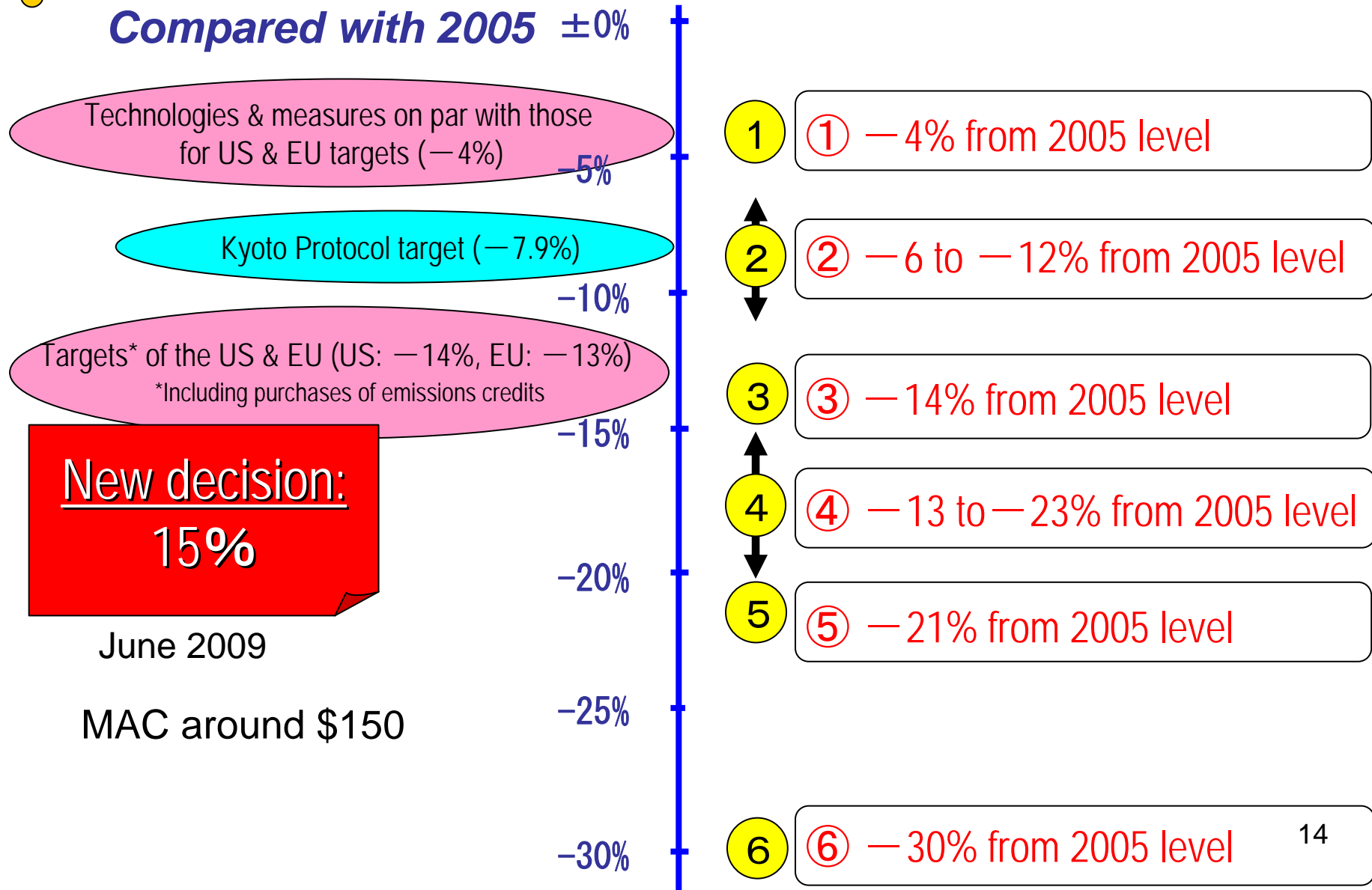
Mid-term target under LDP

- Based on various modeling
CGE Models, Technology Models, Energy Models
- Transparent meetings with almost complete minutes
- Public Hearings
- Open discussion at the Prime Minister's office with Mr. T. Aso's attendance (with real time internet broadcastings)

Deciding Japan's Mid-term Target

(The future reduction level without purchases of emissions credits etc)

Compared with 2005 $\pm 0\%$



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)				

Japan's Mid-term Target: Options and technologies

Comparison of technology options between IEEJ and NIES

	Institute	Renewable Energy				Nuclear	Generation Mix		
		PV	Wind Power	Next Gen. Car	Biomass (heat)		New Ene	Nuclear	Coal
Current Situation 2005		1420MW	1680MW	2% of new cars (0.6% of all cars)	Bio Ethanol (Domestic Production 30kL)	4958kW Capacity Factor 70%	1%	31%	26%
Option 1 -4% from 2005	IEEJ	6000MW 4 times	4000MW 2.4 times	10% (3%)	heat 290万KL (fuel 50万KL)	61500MW CP 81%	3%	40%	22%
	NIES	6000MW 4 times	4900MW 2.9 times	1% (1%)	214万KL (fuel 0)	61500MW CP 81%	4%	41%	21%
Option 3 -14% from 2005	IEEJ	14300MW 10 times	5000MW 3 times	46% (19%)	330万KL (60万KL)	61500MW 81%	4%	44%	20%
	NIES	14000MW	4900MW 2.9 times	38% (17%)	318万KL (60万KL)	61500MW 81%	5%	43%	20%
Option 6 -30% from 2005	IEEJ	56000MW 40 times	10000MW 6 times	100% (39%)	470万KL (200万KL)	61500MW 90%	10%	51%	14%
	NIES	79000MW 55 times	11000MW 6.5 times	74% (32%)	458万KL (200万KL)	61500MW 81%	10%	45%	13%

Max. wind power on land 6400MW (excl. national park)

9 new nuclear power plants

IEEJ: The Institute of Energy Economics, Japan, NIES: National Institute for Environmental Studies

In case of IIEJ, the figures for option 6 are same as option5. Production volume will be shrunk in the former case.

PV for Option 6: IEEJ 10M houses (20% of all houses), NIES 9.1M houses (PV for industry use is almost twice in case of NIES)

Source: Data presented to the Committee on Japan's Mid-Term target (6th and 7th meetings)

DPJ's Landslide Victory August 30, 1990

Drastic Change of Climate Policy

Fraternity is the Key Word

The ideal and the real

Relative Power Shift from business
to Labour Union and NGOs

PM Hatoyama's speech at the UN

September 21, 2009

- Japan will aim to reduce its emissions by 25% by 2020, if compared to the 1990 level, consistent with what the science calls for in order to halt global warming.
- It is imperative to establish a **fair** and effective international framework in which all major economies participate. The commitment of Japan to the world is premised on agreement on **ambitious targets** by all the major economies.

But there was no concrete idea how to achieve it.

Task force was set up by the cabinet on how to achieve the target

Major issues (within one month discussion)

- Domestic reduction portion and costs
- Whether to review macro economic framework or not (CO2 reductions and industrial policy)
- Can promotion of stringent environmental target help economic growth?
- International comparison and competition
- Both cost and benefit should be considered
- Crucial budget deficit and economic models

Can the premise 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%*

*CO₂ emissions per unit of GDP

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

Can the premise be met?

Fairness (Cost/GDP based)

Mid-term target and equity (based on Cost/GDP) Base Year 1990

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 does not have domestic 25% reduction figures

Source: Task Force Interim Report Dec. 11, 2009

Economic Impacts in 2020 recalculated

25% reductions		Keio Univ.	Japan Center for Economic R.	NIES
		KEO	CGE	AIM/CGE
Baseline	Against Baseline (which is almost equivalent to US and EU targets)			
Domestic 10%	Real GDP	▲1.3%	▲0.8%	▲0.9%
	Unemployment R.	+0.5%	—	—
International Offset 15%	Disposable Income (per household)	▲5.9% ▲¥283000	▲1.2%	▲0.6% ▲¥30,000
Domestic 25%	Real GDP	▲5.6%	▲3.1%	▲3.2%
	Unemployment R.	+1.9%	—	—
International offset, 0%	Disposable Income (per household)	▲15.9% ▲¥765,000	▲4.5% ▲¥220,000	▲3.4% ▲¥170,000*

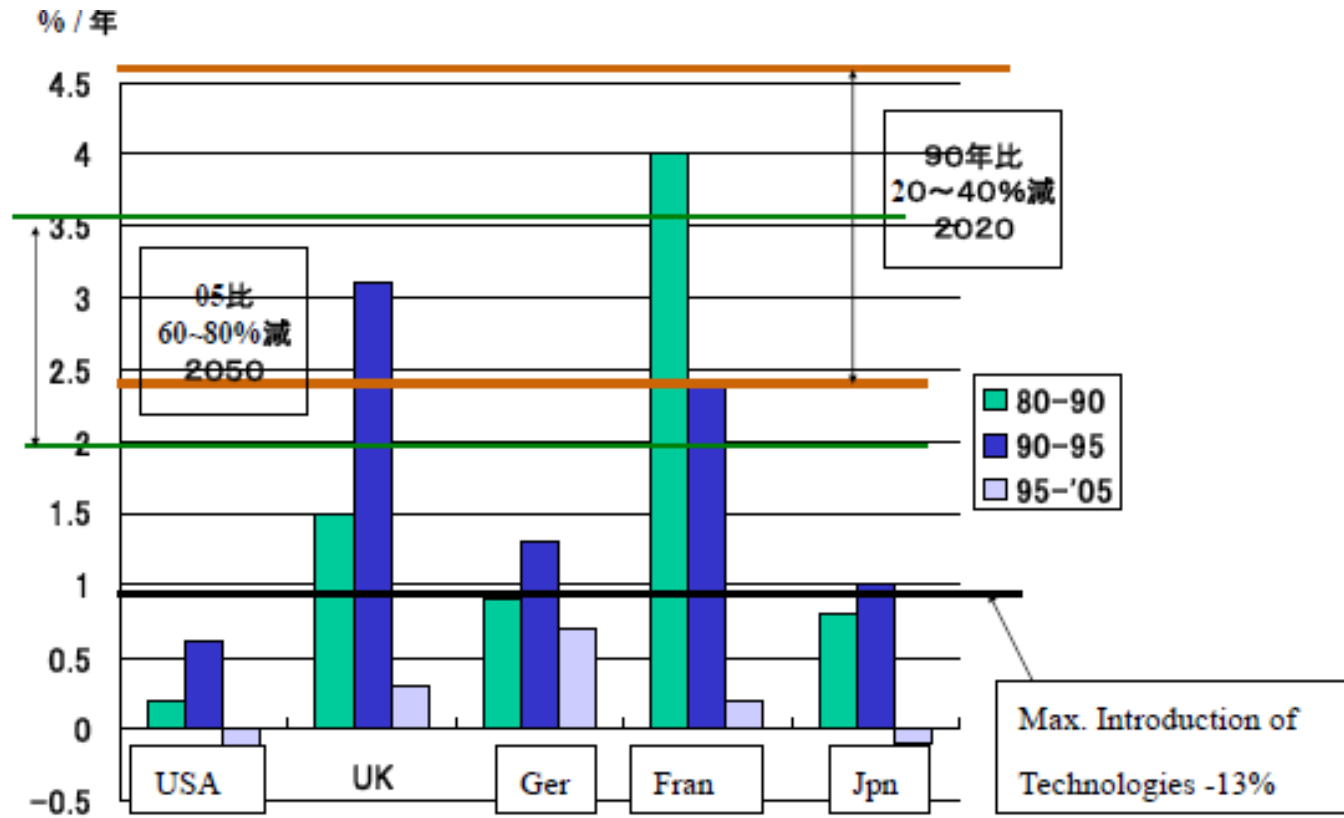
*Reduced from -¥440,000. Also the figure will be ¥-130,000 if tax revenues are used for subsidies on mitigation. Only Keio University model has fiscal and financial sector in it and carbon tax revenue is used for debt payment.

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

Can domestic 25% reduction be feasible?



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

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)
- Search for the effective and feasible goal
 - Strong weak agreement vs. Weak strong agreement

Criteria for discussions

- Avoid catastrophe losses
- Contribute for long-term substantial reduction
- Balanced approach toward global issues such as MDGs (efficient use of global limited resources)
- Same as above within domestic issues, such as pensions, health care

My suggestions (domestic)

- -15% unilaterally (MAC \$150), -30% if premises are met (domestically binding)
- 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

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)

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 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

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°C to 4.6°C 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

Better a strong weak agreement that has a good chance of being honoured than a weak strong agreement that is likely to collapse.

(The Economist November 29, 1997)