

NIES JAPAN

# **Greenhouse Gas Emissions Technical Mitigation Potentials and Costs in 2020 (second edition)**

**Tatsuya Hanaoka**

**National Institute for Environmental Studies**

**Workshop on issues relating to scale of emission reductions to be achieved  
by Annex I Parties**

**Maritim, Bonn, Germany**

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# Key Questions

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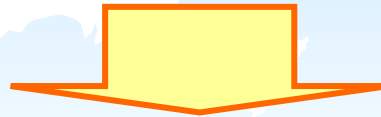
- **How to estimate mitigation potentials?**
- **How much is mitigation potential by region and by sector in 2020?**
- **What are important points when comparing results of mitigation potentials estimated by different models?**
  - **Data assumptions**  
(Population, GDP and service demands, energy price, discount rate, baseline scenario etc.)
  - **Marginal Abatement Cost curve**

# Overview of AIM/Enduse[Global] model

- ◆ **Target Regions : 23 geographical world regions**
- ◆ **Time Horizon : 2000 – 2020**
- ◆ **Target Gas : CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs, SF<sub>6</sub>**
- ◆ **Target Sectors : multiple sectors**  
Power generation / Industry / Transport /  
Residential and Commercial / Fugitive/  
Agriculture / Waste / F-gas emissions sector

**Technology database**

**Energy Database**

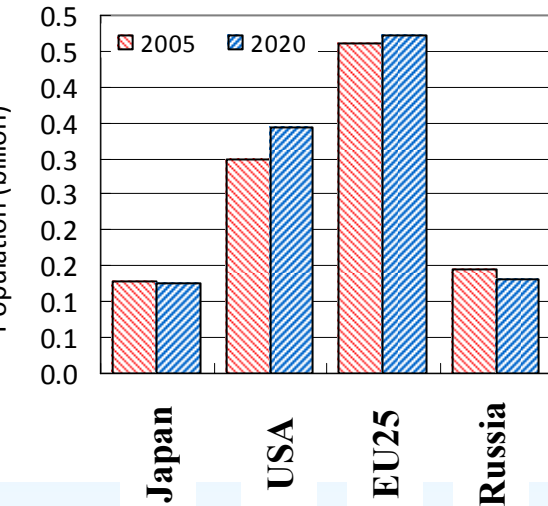


Mitigation potentials in 2020 are estimated by using MAC tool with detailed mitigation options database

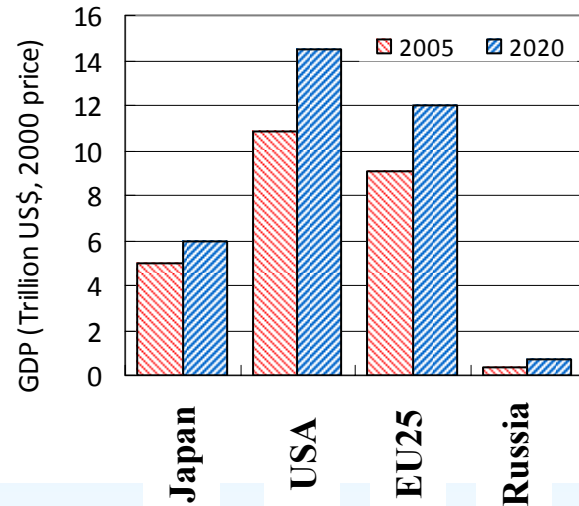
# Socio-economic settings

- Population (POP): The prospects at medium variant by UN World Population Prospects 2007
- GDP: GDP by region are estimated by the Socio-economic Macro Frame model.
- Service demands : several models are developed to estimate service demands in each service and sector based on various kinds of international and national statistics

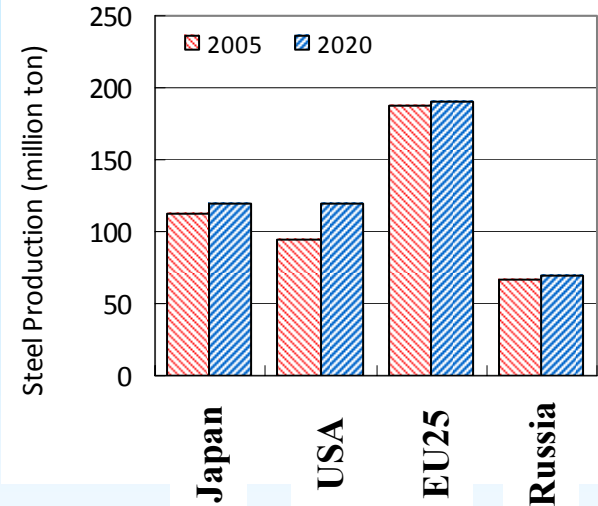
## Population



## GDP



## Steel



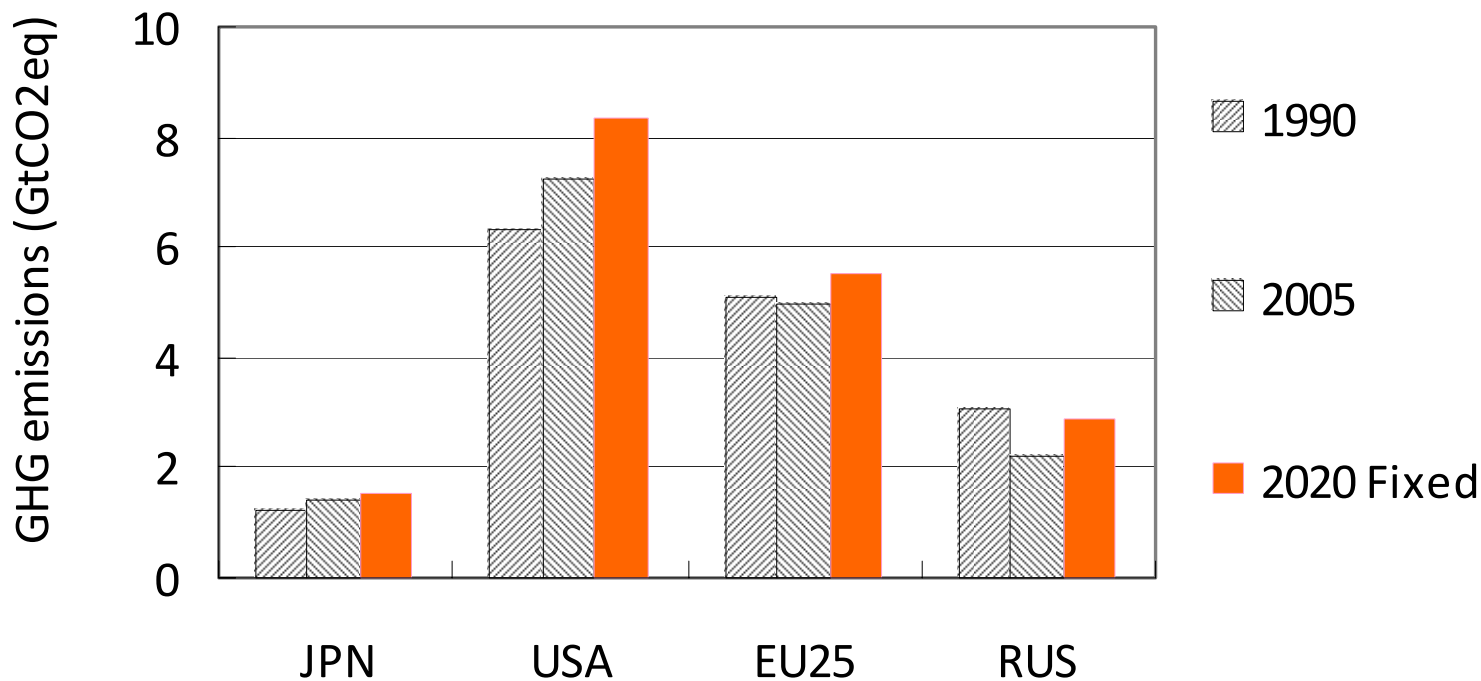
➤ Annual growth rate from 2005 to 2020 (%/year)

	Japan	USA	EU25	Russia	Developed	Global
POP	-0.2%	0.9%	0.1%	-0.6%	0.3%	1.1%
GDP	1.3%	1.9%	1.9%	5.0%	1.9%	3.0%

# Baseline GHG emissions

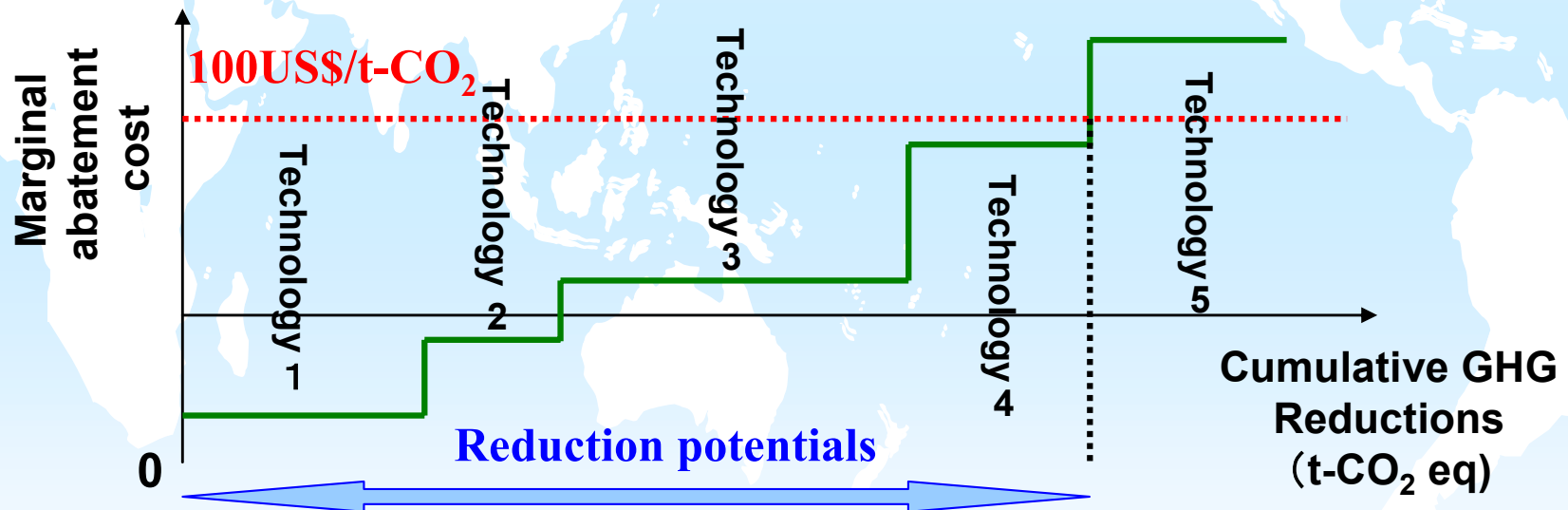
## Baseline assumption

**Baseline is set as a technology frozen case, i.e. when the future share and energy efficiency of standard technologies are fixed at the same level as in the base year.**

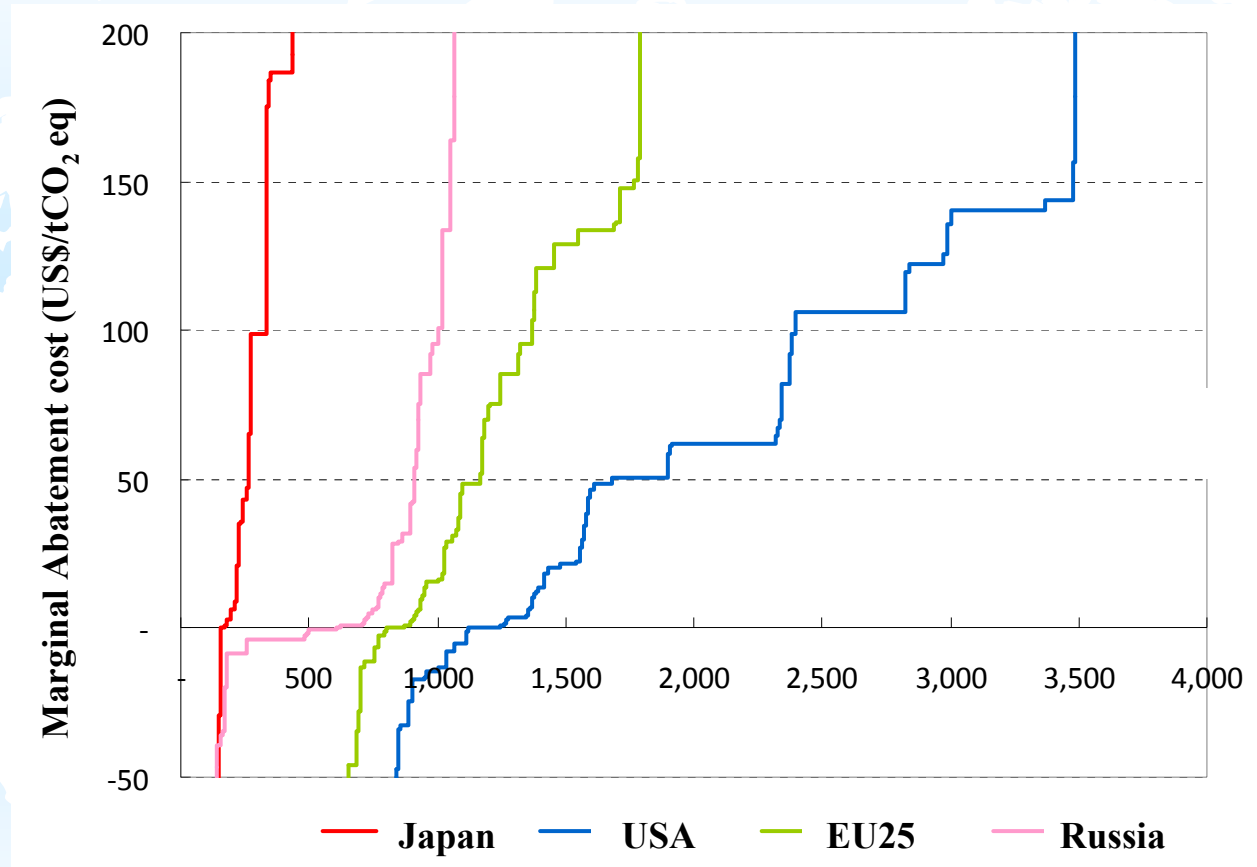


# Methodology of reduction potential estimates in this study

Around 300 mitigation options based on realistic and currently existing technologies



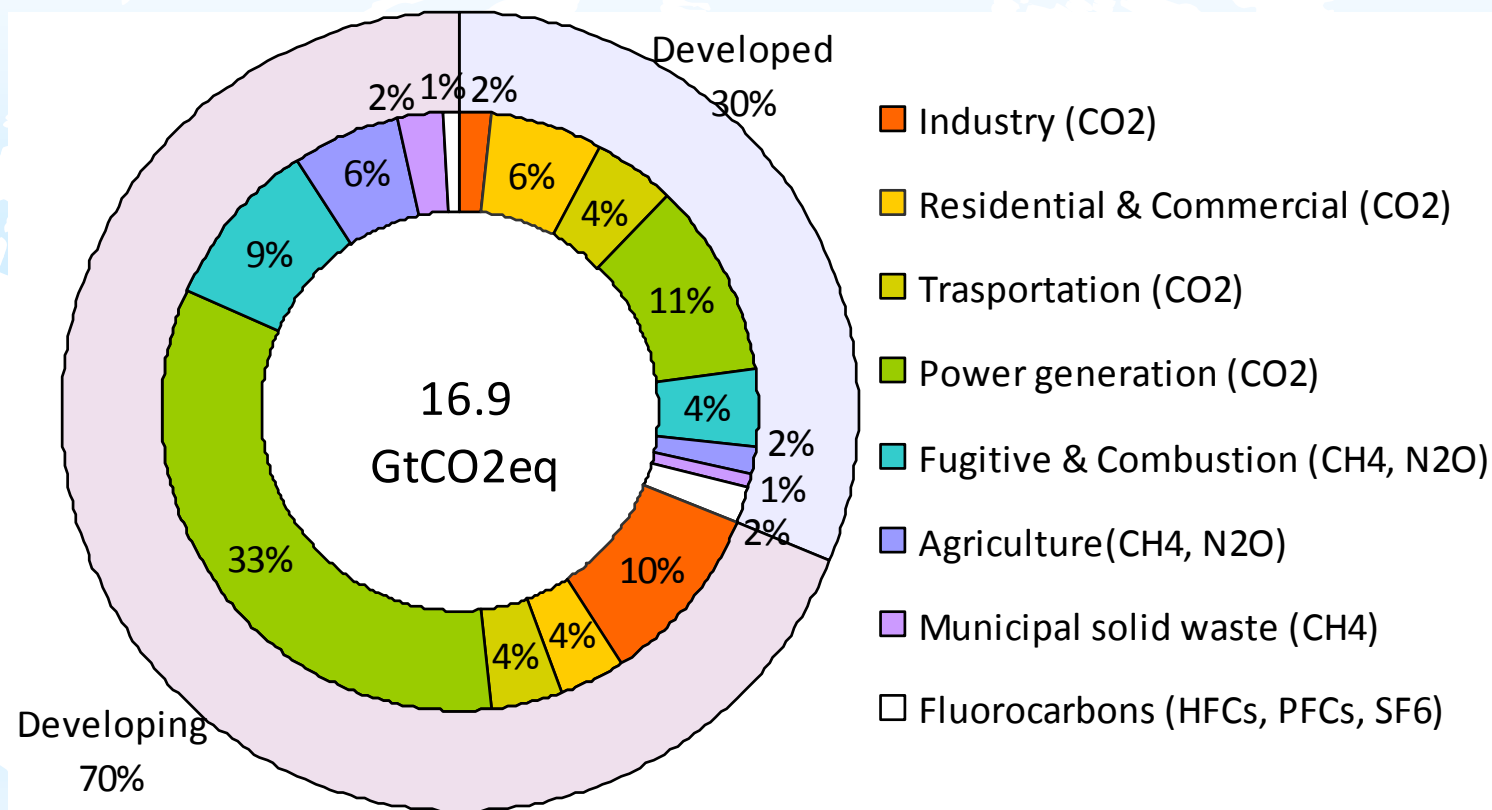
# Marginal abatement cost curves in 2020 in major developed countries



**Marginal abatement cost curve is one of effective tools to compare mitigation potentials across different countries.**

**Mitigation potentials and marginal abatement costs will vary depending on different socio-economic data settings and assumptions.**

# Ratio of sector-wise mitigation potentials in Developed and Developing in 2020

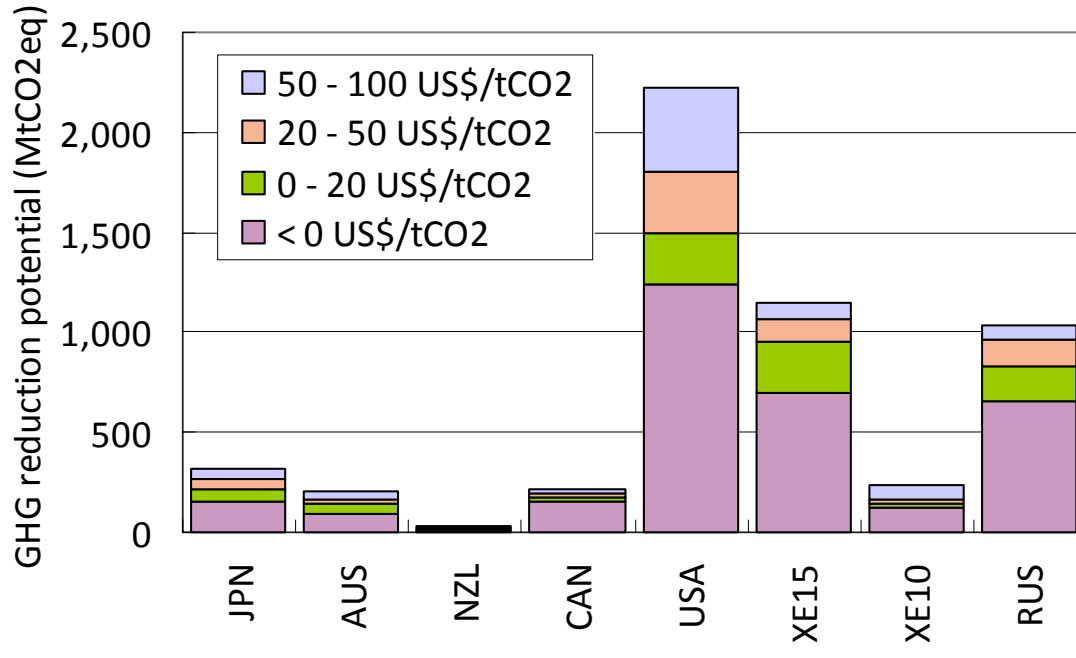


- Mitigation potentials are 30 % in developed and 70 % in developing countries
- Large mitigation potentials are identified in the power generation and industry sectors account for about 55% of the total potential.



# Region-wise mitigation potentials in 2020 for different cost categories

Mitigation potentials from 0 to 100 US\$/tCO<sub>2</sub>



**JPN** Japan  
**AUS** Australia  
**NZL** New Zealand  
**CAN** Canada  
**USA** USA  
**XE15** Western Europe(15)  
**XE10** Eastern Europe(10)  
**RUS** Russia

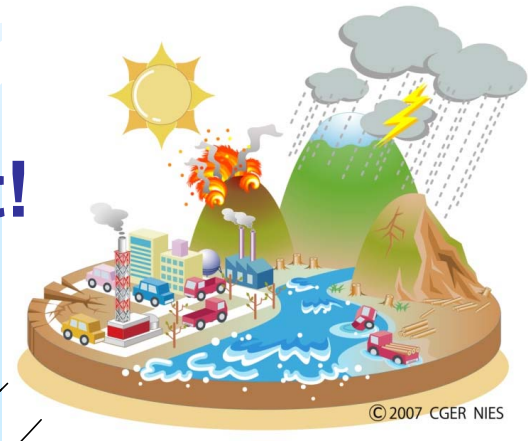
- **US, EU25 and Russia are three major regions with large reduction potentials, accounting for approximately 30% of the total reduction potential in the world.**
- **It is important to think carefully about the meaning of the no-regret (i.e. 0US\$/tCO<sub>2</sub> eq.) case . Even if it is no-regret, such options cannot be introduced without imposing initial investments.**

# Next Step

- The difference of mitigation potentials among models largely come from
  - different data assumptions for estimating baseline emissions
  - a feature of marginal abatement cost curves
- NIES has initiated a model comparison project with IIASA, RITE, PBL/Ecofys, PNNL, IEA etc.
- NIES plans to report the outcome of the comparison project before the next AWG session in June.

**In order to promote drastic GHG reductions, it is important to think of not only efficiency improvement of current technologies but also the future innovations and changes of social structure towards the Low Carbon Society.**

**Timing is important!**



**Thank you for your attention!**