

Markus Amann

International Institute for Applied Systems Analysis (IIASA)

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# **GHG mitigation potentials and costs in Annex 1 countries**

# IIASA's analysis of GHG mitigation potentials

## Objectives

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- Impartial, coherent and transparent comparison of GHG mitigation potentials and costs in Annex 1 countries
  - Independent assessment, financed through IIASA's core funds (IIASA is funded by scientific organizations of its member countries in Asia, Europe, North America, Africa),
  - based on publicly available data,
  - taking into account co-benefits on air pollution.
- Results, input data and an interactive calculator freely available in the public domain:

<http://gains.iiasa.ac.at/Annex1.html>

# Methodology

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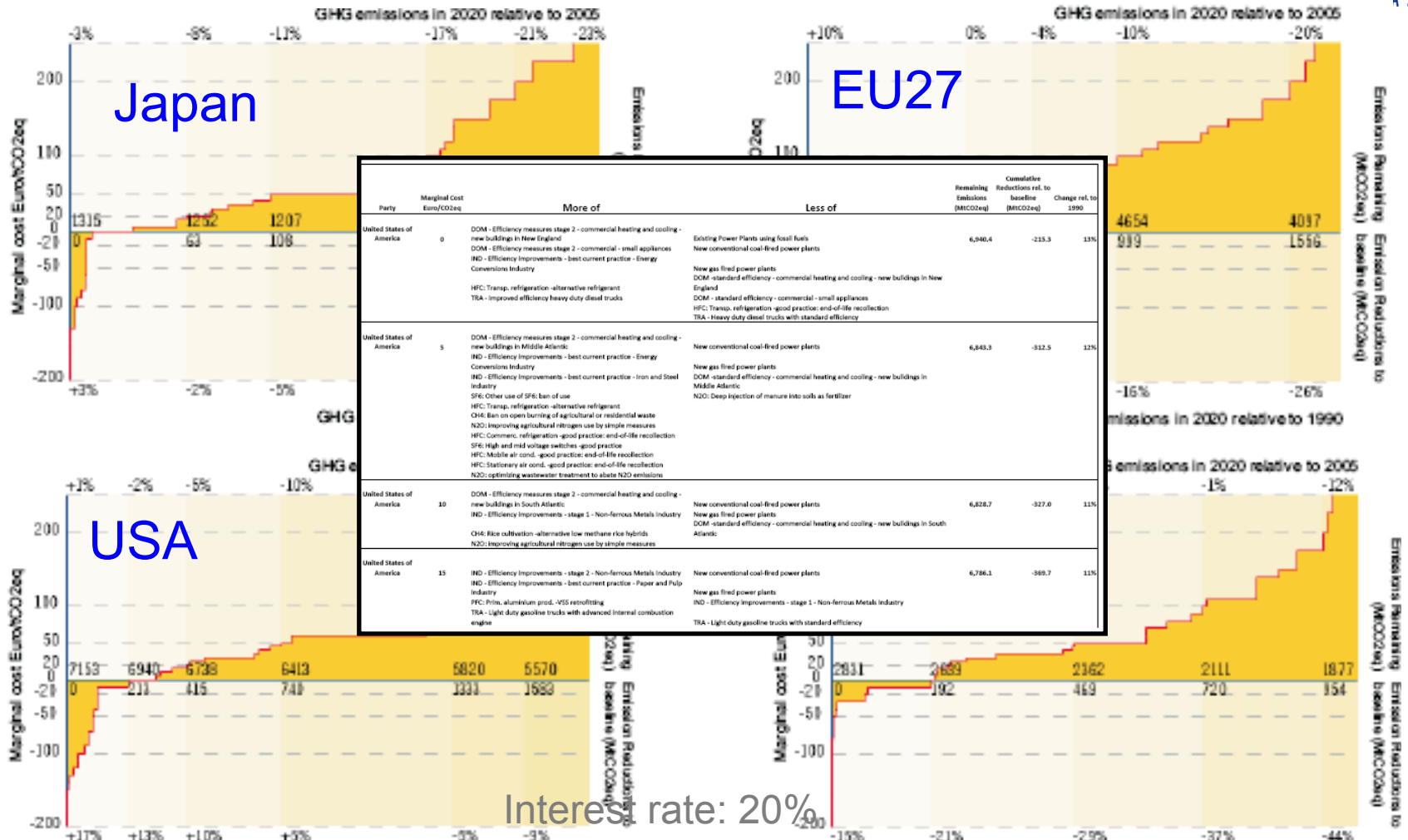


## Bottom-up approach:

- All gases and sectors,
- at detailed technical level (several 100 source categories, 300+ mitigation measures, etc.),
- systems approach (interactions between demand and supply sectors),
- consistent with UNFCCC 2005 inventories,
- employing exogenous activity projections.

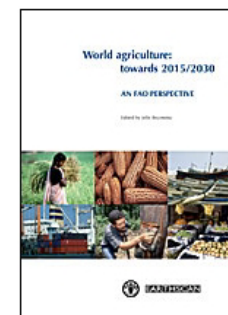
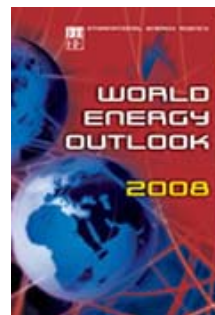
Based on earlier work with IIASA's GAINS (Greenhouse gas – Air pollution Interactions and Synergies) model

# Marginal cost curves for each Annex 1 Party

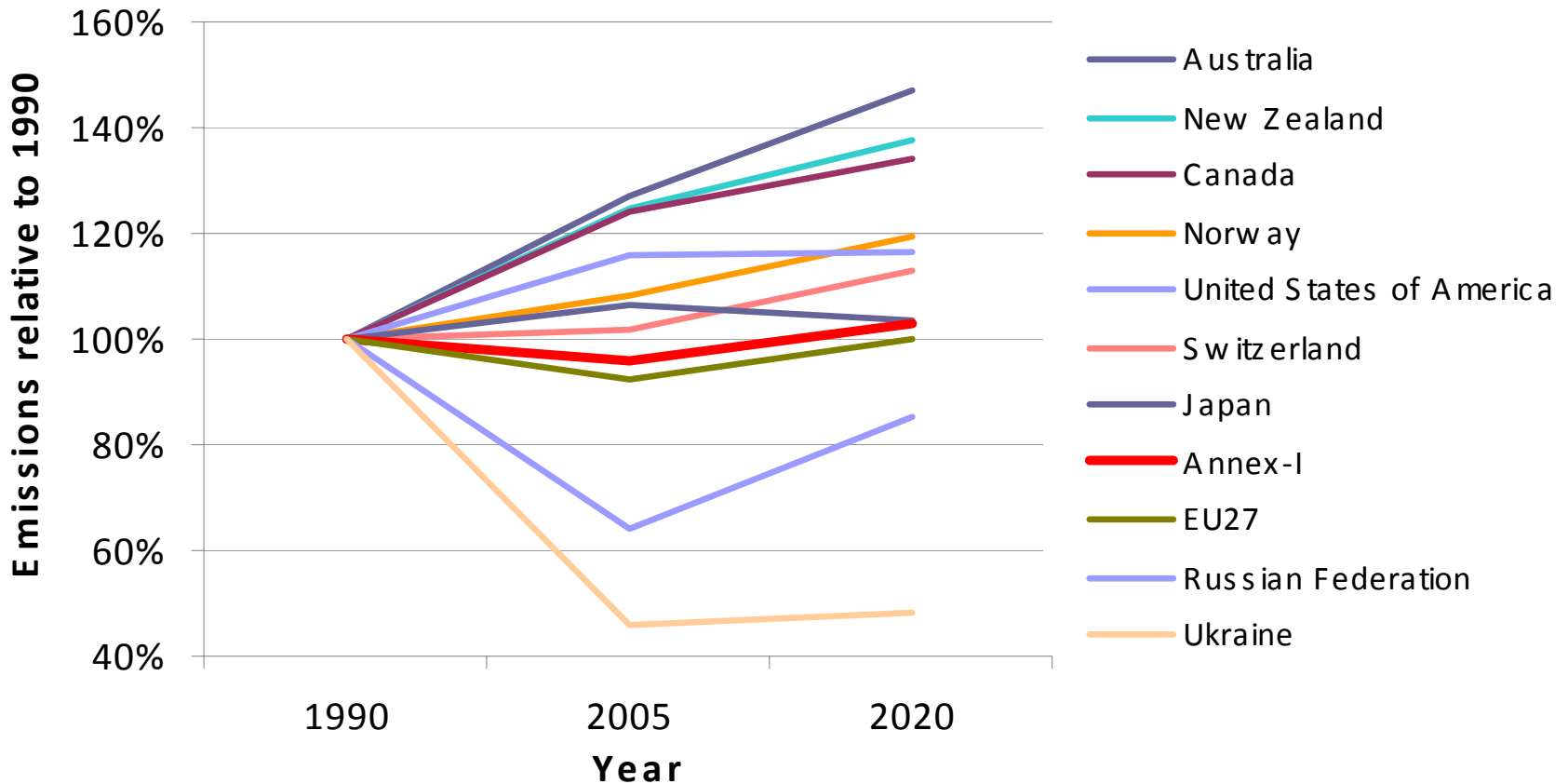


# An initial implementation

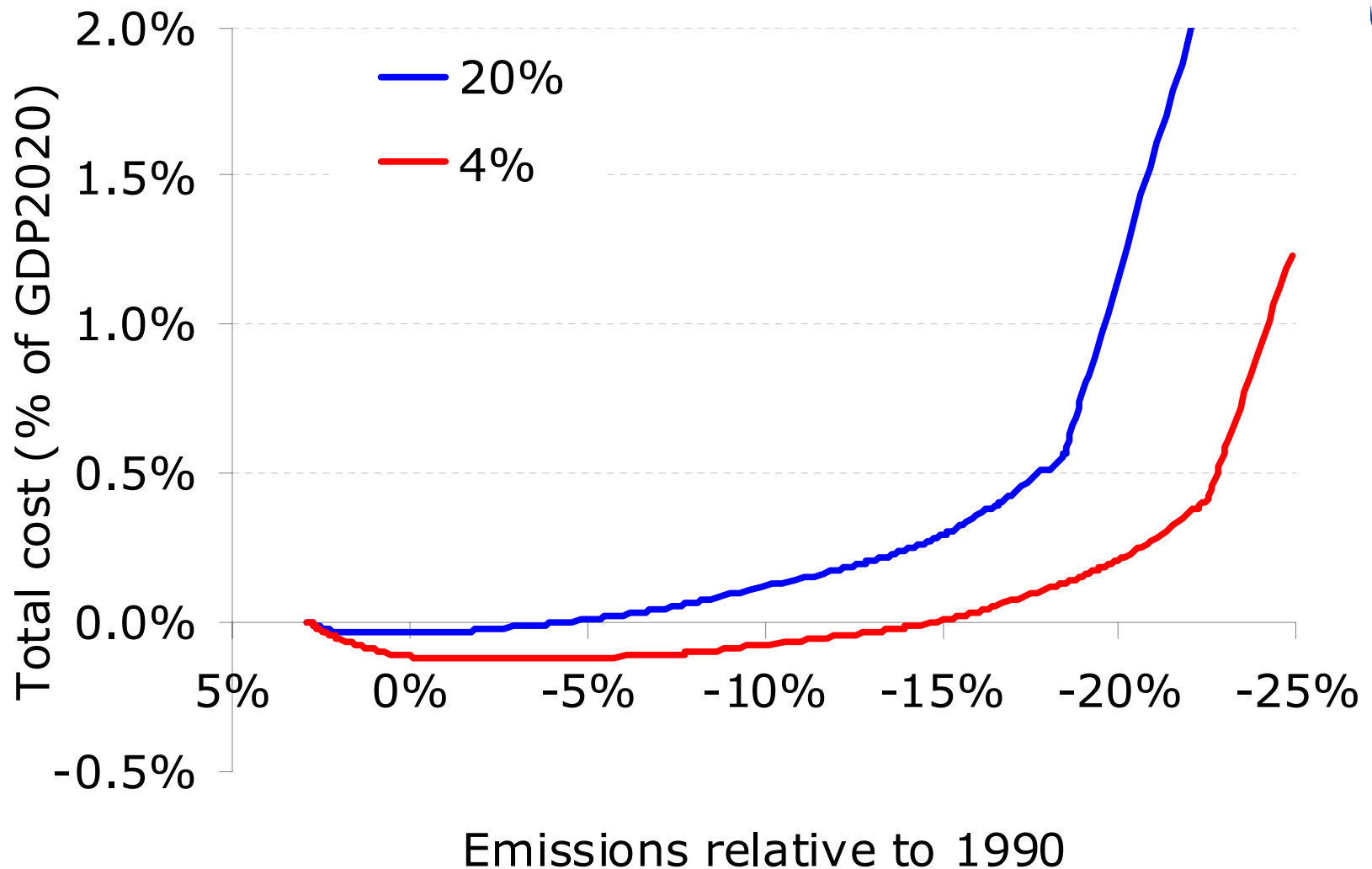
- For almost all Annex 1 countries (98% of 1990 emissions), here EU27 presented in aggregate
- Based on activity projections of IEA World Energy Outlook 2008 and FAO World Agriculture Perspective
- Key assumptions:
  - Only currently available technologies, CCS as in IEA 'blue scenario'
  - Natural turnover of capital stock, no premature scrapping
  - No behavioural changes
  - Domestic measures only
  - LULUCF excluded for now
- Initial analysis compiled from publicly available information, received only limited review by national experts up to now



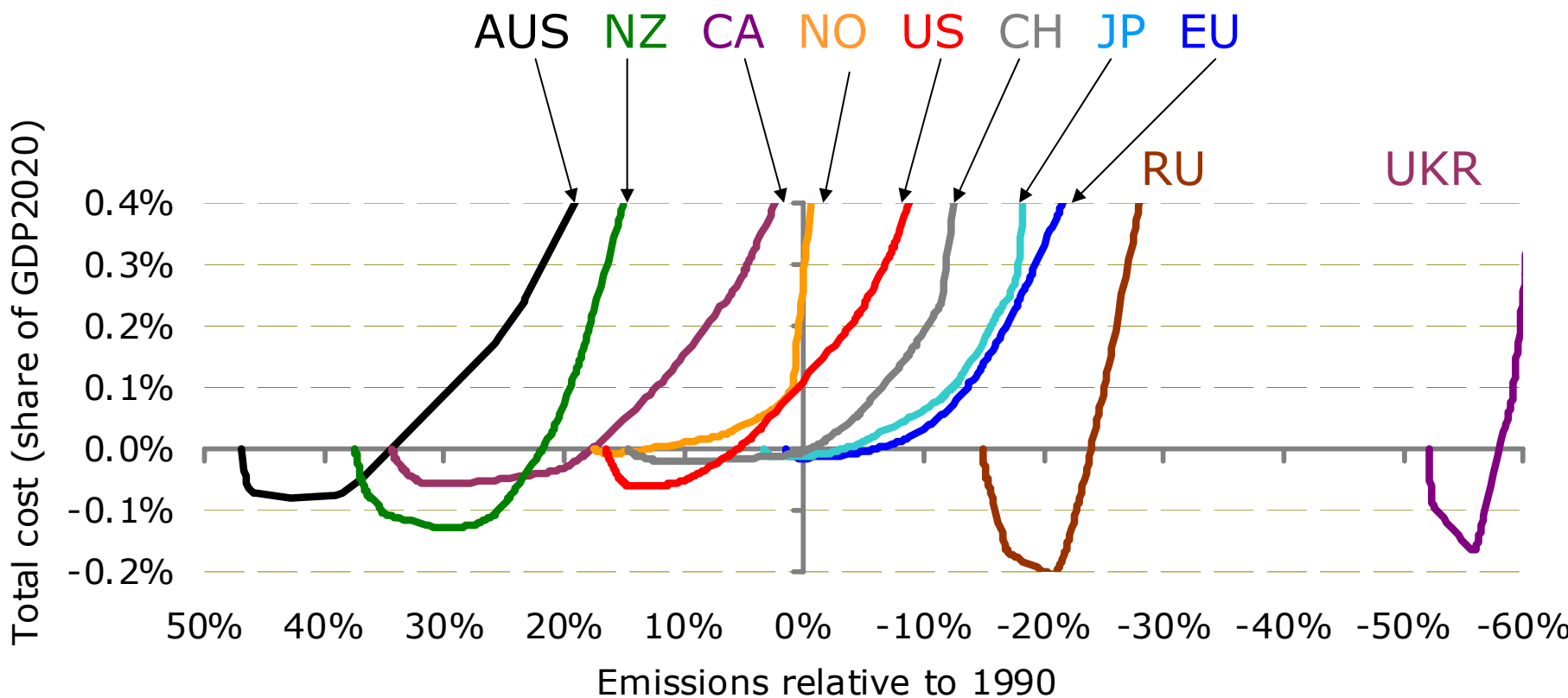
# Baseline GHG emissions projections for IEA WEO 2008 projection (excl. LULUCF)



# Total costs for GHG mitigation, Annex 1, 2020 for different interest rates (excl. LULUCF)



# Total cost curves for 2020 (% of GDP) (10% interest rate, excl. LULUCF)



# On-line calculator on the Internet

<http://gains.iiasa.ac.at/MEC>



GAINS - GHG Mitigation Target Calculator for cc

File Edit View History Bookmarks Tools Help

http://gains.iiasa.

**GAINS • MITIGATION**

Scenario

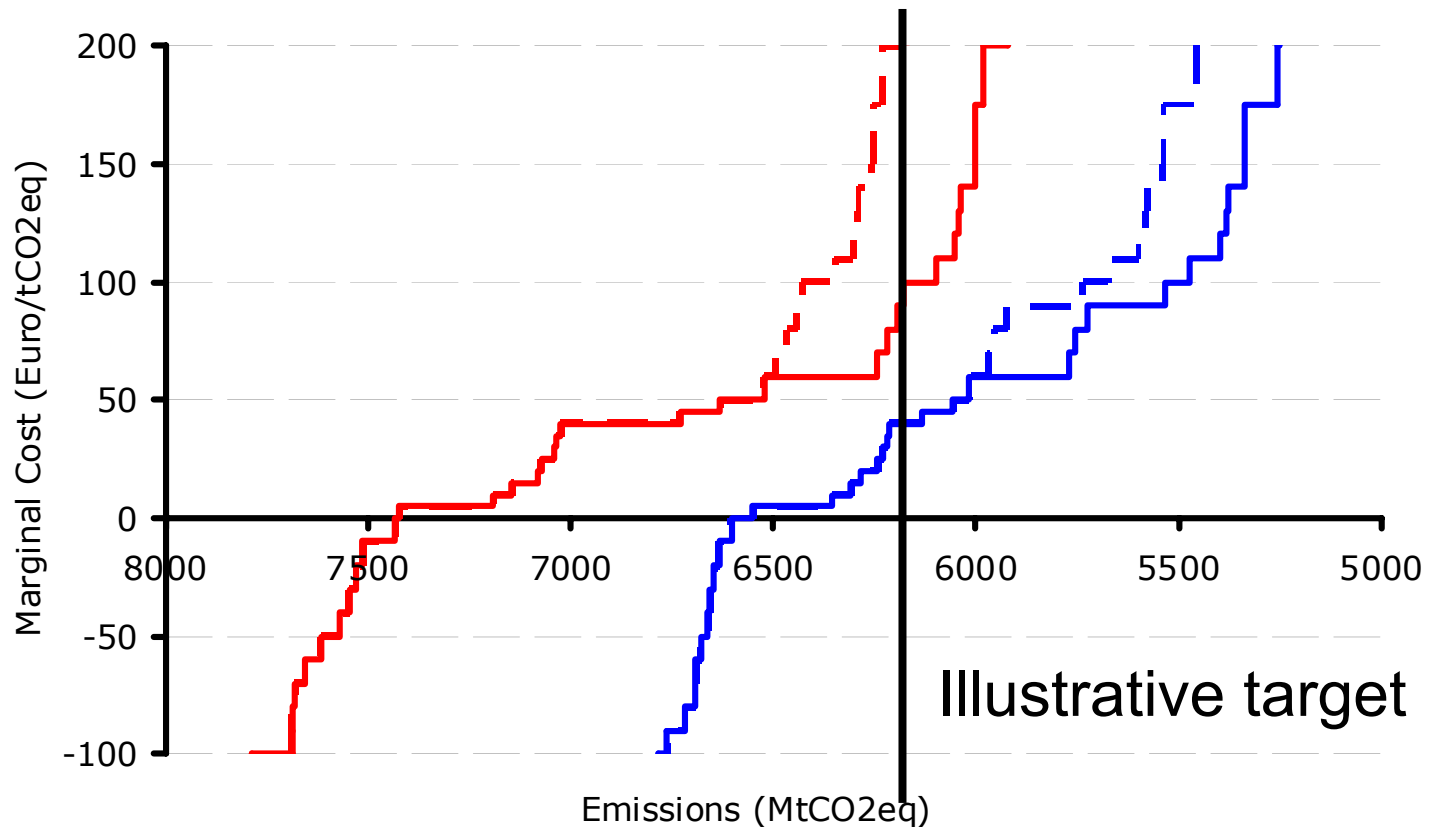
Party	Base year	Mt CO2eq
	1990	
<b>Target for each Party</b>		
Australia		416
Canada		592
EU 27*		5568
Japan		1272
New Zealand		62
Norway		50
Russian Federation		3326
Switzerland		53
Ukraine		922
United States of America		6135
<b>Total for Annex I</b>		<b>18396</b>

Done

Mitigation Cost			
Carbon price	Total costs	% of GDP	Per capita
€/t CO2eq	bln €/yr	%	€/cap/yr
		0.02 %	
25	0.14	0.02 %	6.0
35	0.26	0.02 %	7.1
80	3.14	0.02 %	6.3
50	1.36	0.02 %	10.9
60	0.02	0.02 %	4.3
60	0.08	0.02 %	16.8
45	0.26	0.02 %	1.8

# Sensitivity to alternative assumptions

Marginal cost curves for USA 2020, for IEA WEO 2008 and 2007



— WEO2008 — WEO2007 — WEO2008 - no CCS — WEO2007 - no CCS

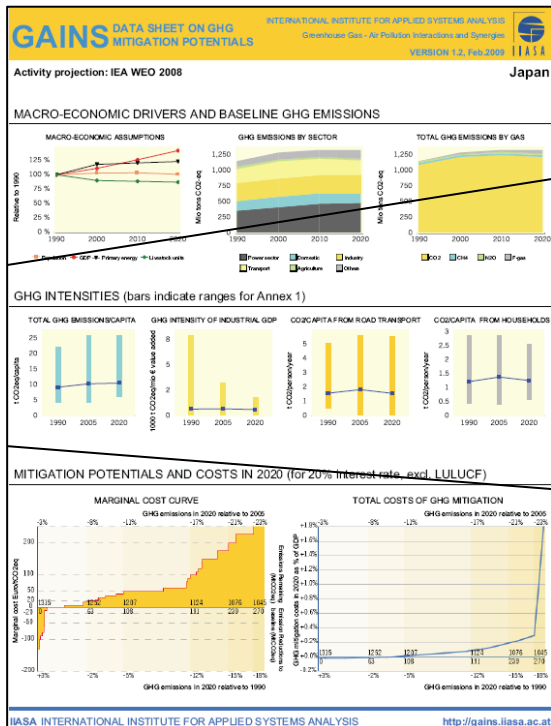
# Access to more information

<http://gains.iiasa.ac.at/Annex1.html>

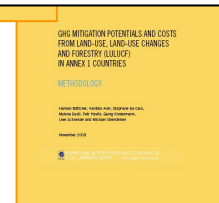
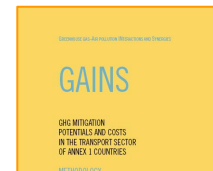
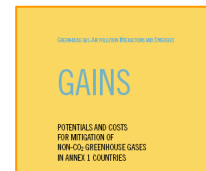
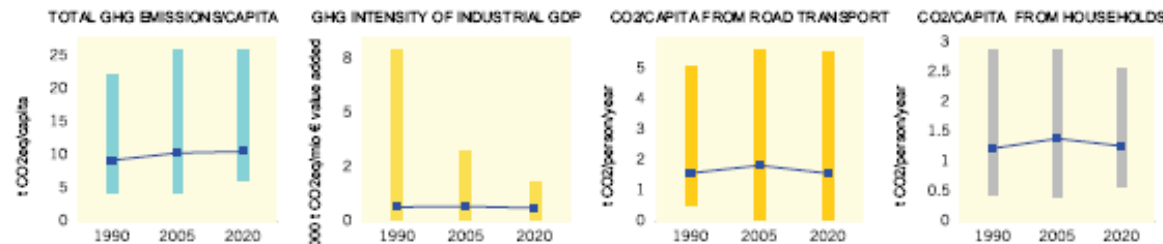


## Data sheets on GHG mitigation potentials for all Annex 1 Parties

## Methodology documentation



### GHG INTENSITIES (bars indicate ranges for Annex 1)



# Conclusions

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- IIASA's GAINS analysis:
  - Coherent and impartial comparison of mitigation efforts, based on publicly available data
  - Open access to results and input data <http://gains.iiasa.ac.at>
  - Review workshop: May 28-29, 2009
- For IEA WEO2008: Annex 1 mitigation potential <100 €/t  
-20% to -25% below 1990
- Estimates for countries are sensitive towards:
  - Economic structures and energy efficiencies
  - Assumptions on future economic development
  - Assumptions on availability of key technologies