Equity aspects of linking the European emissions trading system under a long-term stabilisation scenario

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Research question

A widely accepted indicator to assess equity aspects of a climate regime: per capita emissions

How does a linking of the EU-ETS to

(1) other national trading schemes and

(2) the market for CDM credits

together with a stabilisation target

affect per capita CO_2 emissions in the EU?

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Motivation

Challenges for post-2012 climate policy:

- and related equity aspects regarding the EU-ETS -

1. Make the control of greenhouse gas emissions a global issue; - ***does the EU-ETS give a signal that Europe as a group of industrialised countries is willing to take the lead?*** -
2. Use the flexible instruments in a way that promote a shift to non-fossil energy technologies; - ***does the EU-ETS set incentives to invest in R&D and to broadly introduce new technologies in order to realise stricter long-term climate goals?*** -
3. Agree on reduction targets which allow a long-term target in line with Article 2 of the UNFCCC; - ***does a linking of the EU-ETS increase the acceptability of stringenter targets?*** -

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Three - step analysis

Step 1: Calculate reduction targets for 17 countries and 14 regions for 2020 based on a global emission pathway aiming at CO_2 stabilisation of 450 ppm

Step 2: Calculate costs of reductions resulting from step 1 and abatement shifts of different EU linking scenarios using the partial equilibrium model SIMAC

Step 3: Analyse results of economic model with respect to modification of EU per capita emissions

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Scenarios

1. <u>Stabilisation scenario</u>: Global CO_2 emissions to reach 450 ppm CO_2, ~ 500-550 ppm CO_2 equivalents,
2. <u>Linking scenarios in 2020 (target 450 ppm CO_2)</u> :

   a) ETS EUROPE (EU-27)

   b) ETS KYOTO (EU-27+Canada, Japan, FSU)

   c) ETS ANNEX B (EU-27+ Canada, Japan, FSU+Australia, New Zealand, USA)

3. <u>Reference scenario</u>: IPCC B2 as realised by the IMAGE 2.2 model (RIVM/MNV), moderate growth of global population, economy and CO_2 emissions

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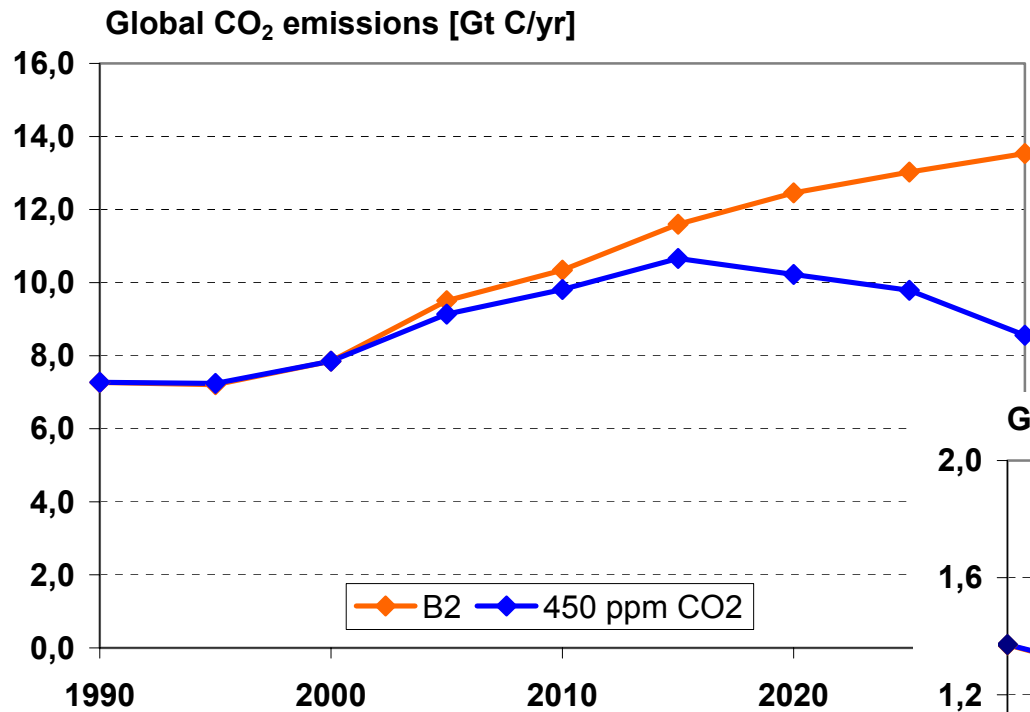
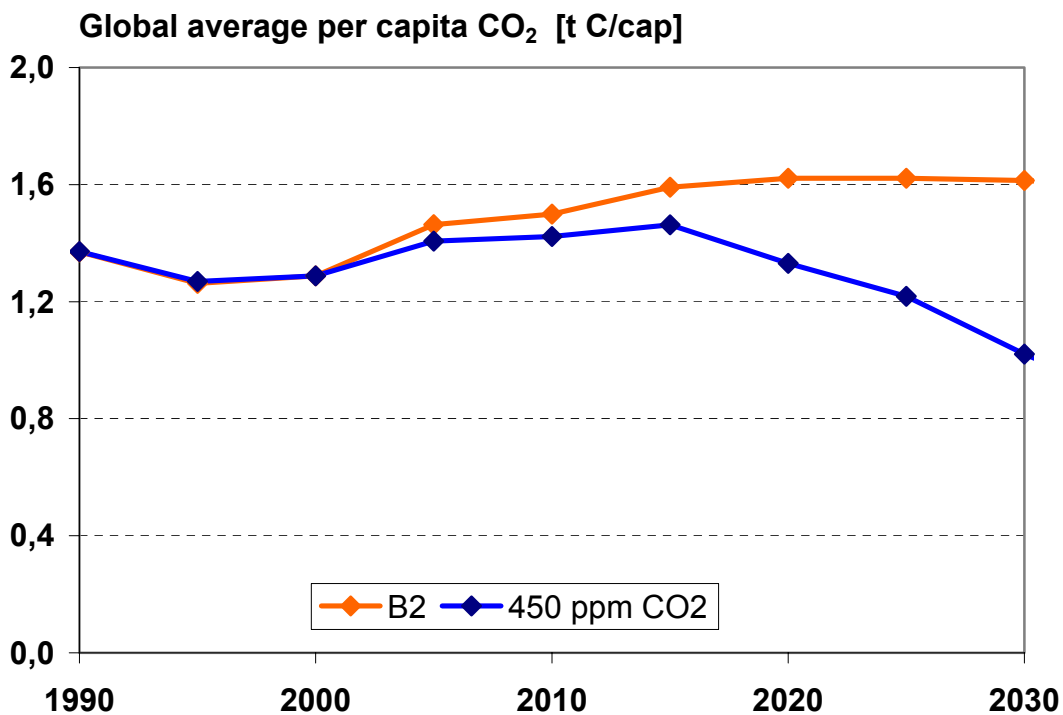
Global emission pathways for CO_2



STAB 450 ppm CO_2



Data: Eickhout et al, 2003, IMAGE-team, 2001

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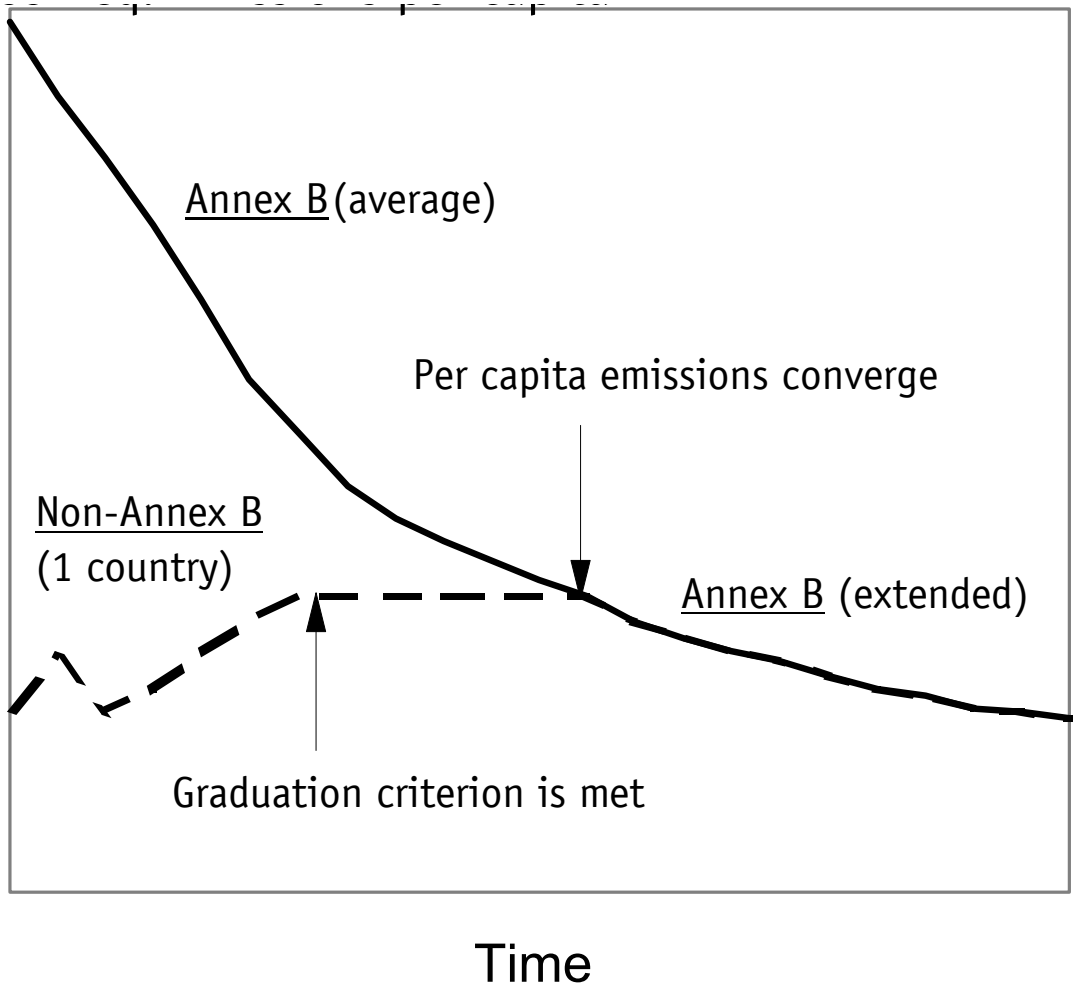
Participation of Non-Annex B countries



Graduation and convergence approach:

***Graduation criterion* for Non-Annex B participation per capita income (GDP-PPP)**

Step 1: per capita emissions follow baseline

Step2: when grad criterion is reached per capita emissions are stabilized

Step 3: when per capita emissions converge with Annex B emissions reduction is necessary

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Results (I): total CO_2 emissions Stab 450

relative to 1990 in %

	World	*Annex B*	*Non-Annex B*
1990	100	100	100
2010	135	98	186
2020	141	76	231
2030	118	39	228

Non-Annex B with commitments from 2015 on:

- **South America,**
- **Central America,**
- **East Asia**

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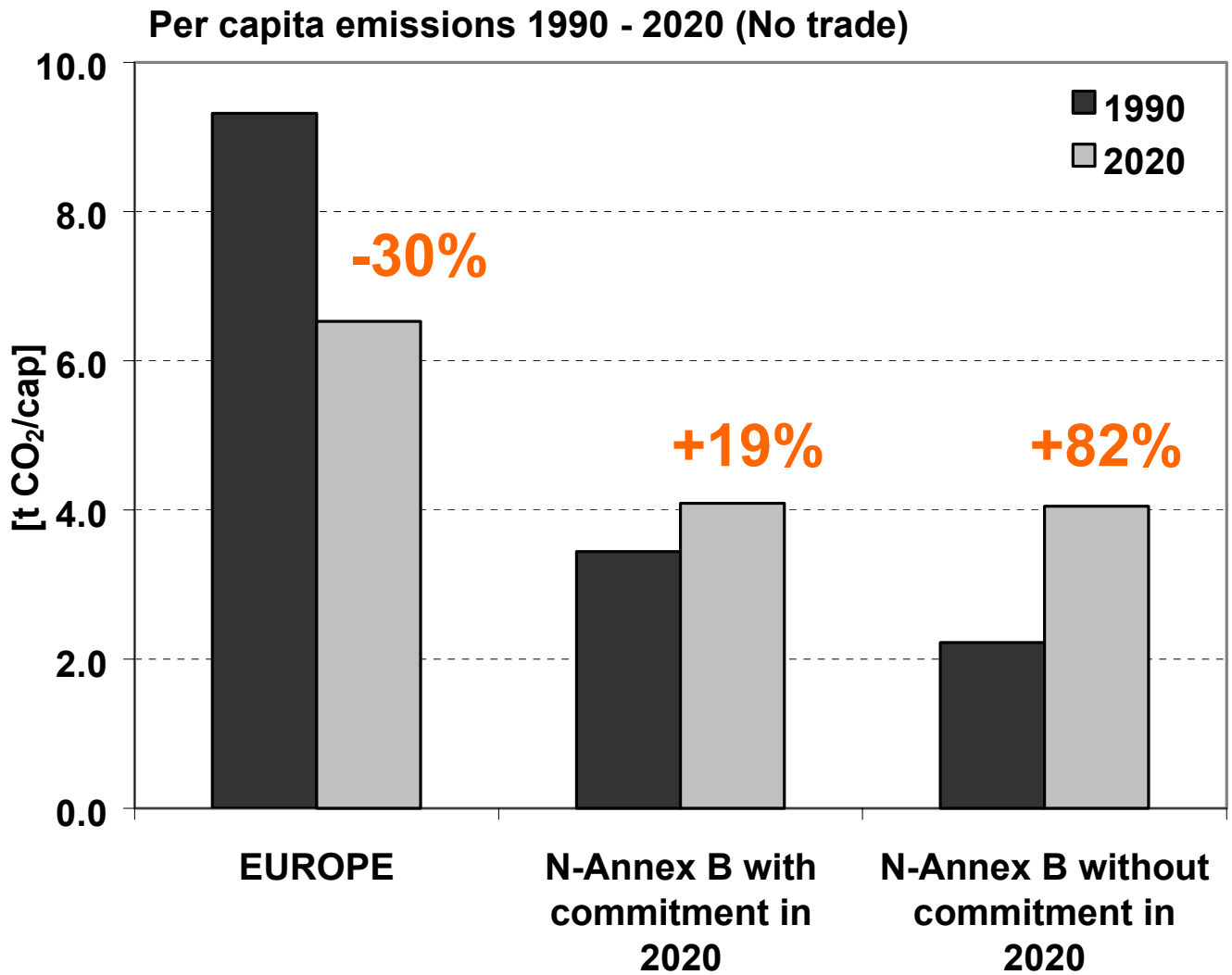
Results (I): per capita emissions Stab 450



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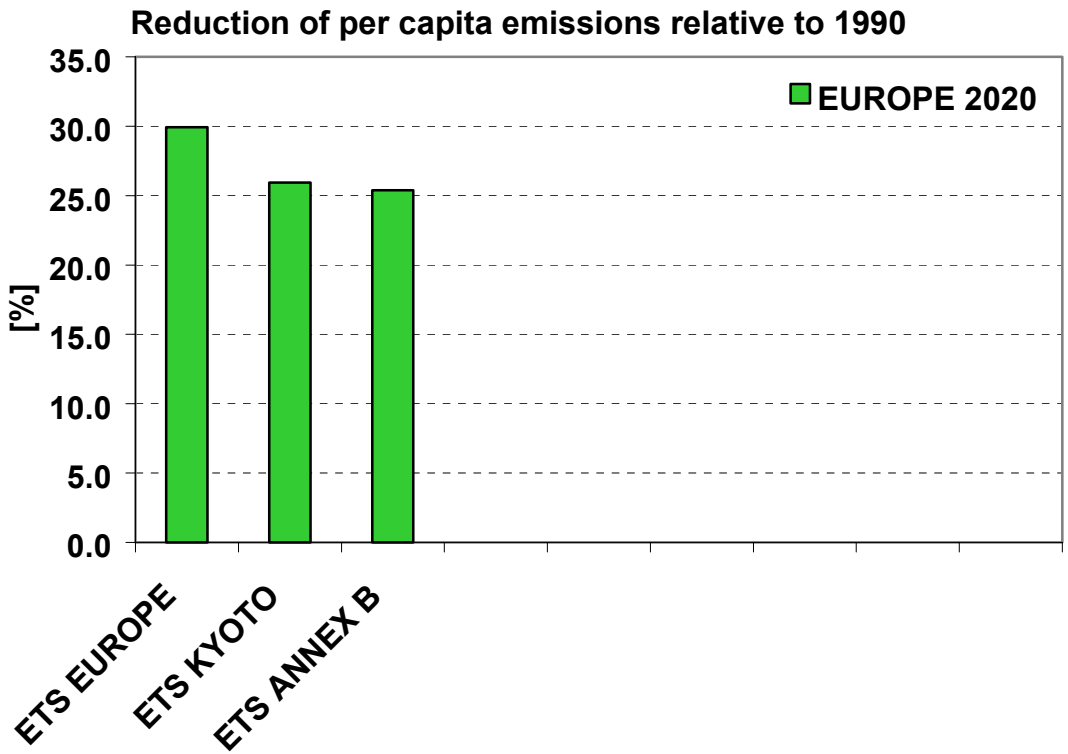
Results (III): EU-ETS + current Annex B countries



Linking the EU-ETS to industrialized countries results in slight shift of EU reductions

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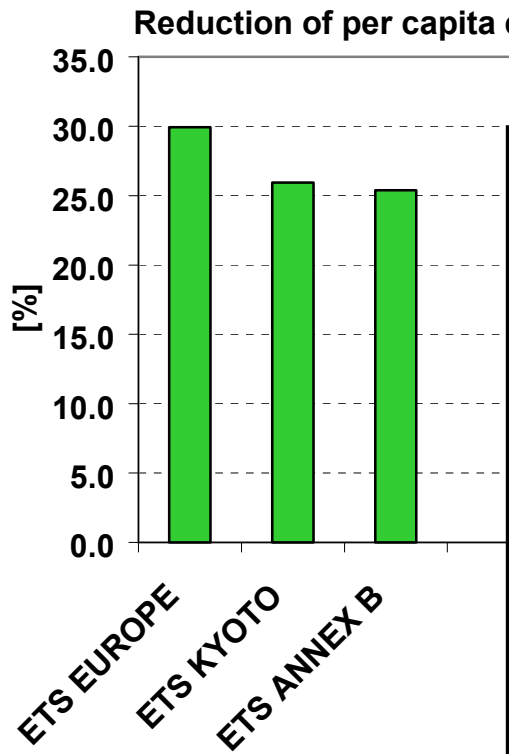

ETS KYOTO (+Can, Jap, FSU):

- all EU countries + linked countries buy allowances from the FSU

- major part of necessary abatement comes from non-trading sectors

Linking the EU-ETS to industrialized countries results in slight shift of EU reductions

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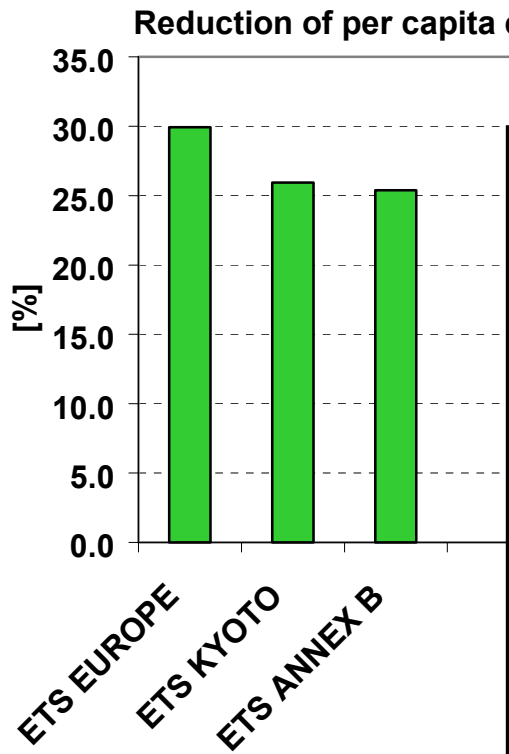
Results (III): EU-ETS + current Annex B countries



ETS ANNEX B (+Can, Jap, FSU +USA, Aust, NZ):

- all EU countries + CAN, Jap buy allowances from the FSU, USA, Aust, NZ

- major part of necessary abatement comes from non-trading sectors

Linking the EU-ETS to industrialized countries results in slight shift of EU reductions

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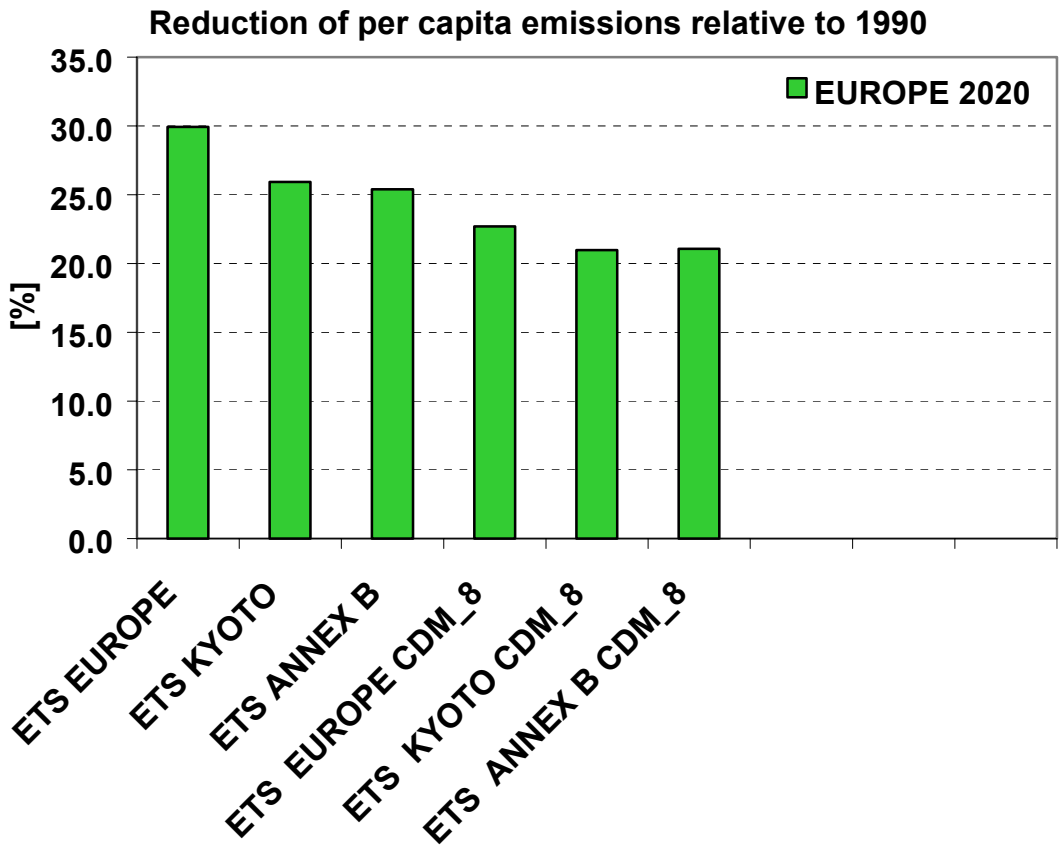
..... + CDM restricted to 8%



Linking to CDM with 8% restriction leads to further abatement shifts

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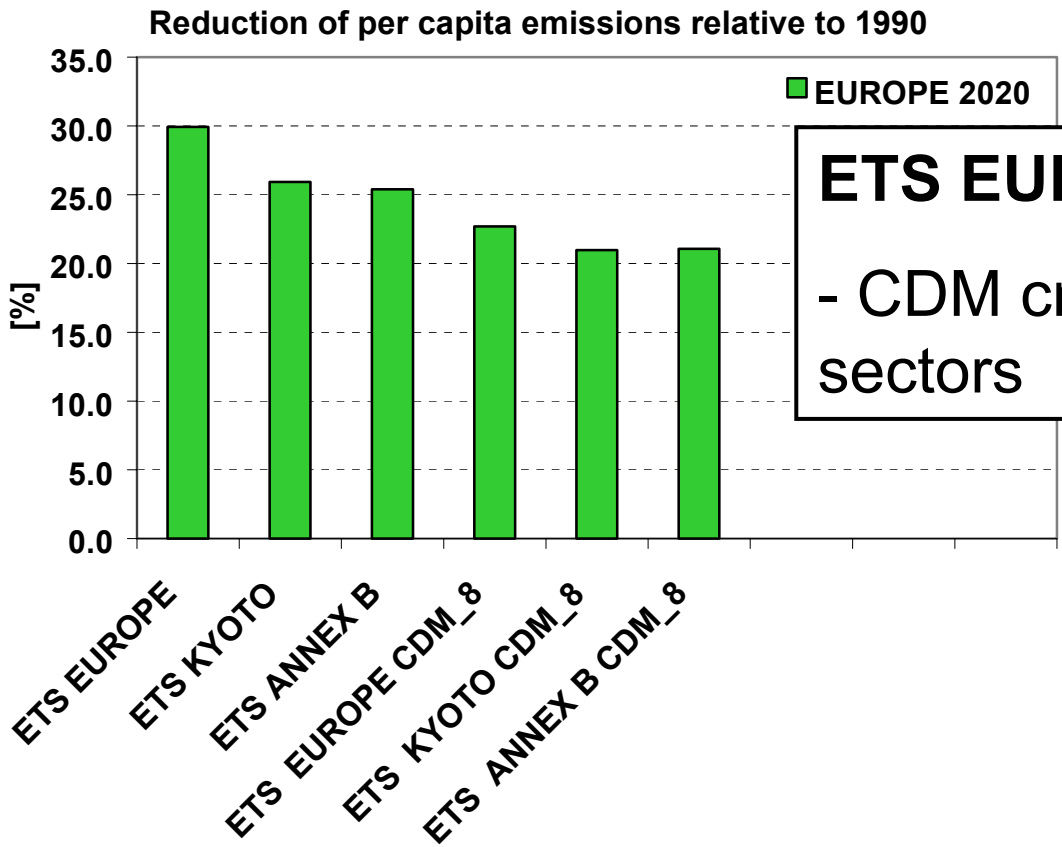

ETS EUROPE CDM8

- CDM credits for all sectors

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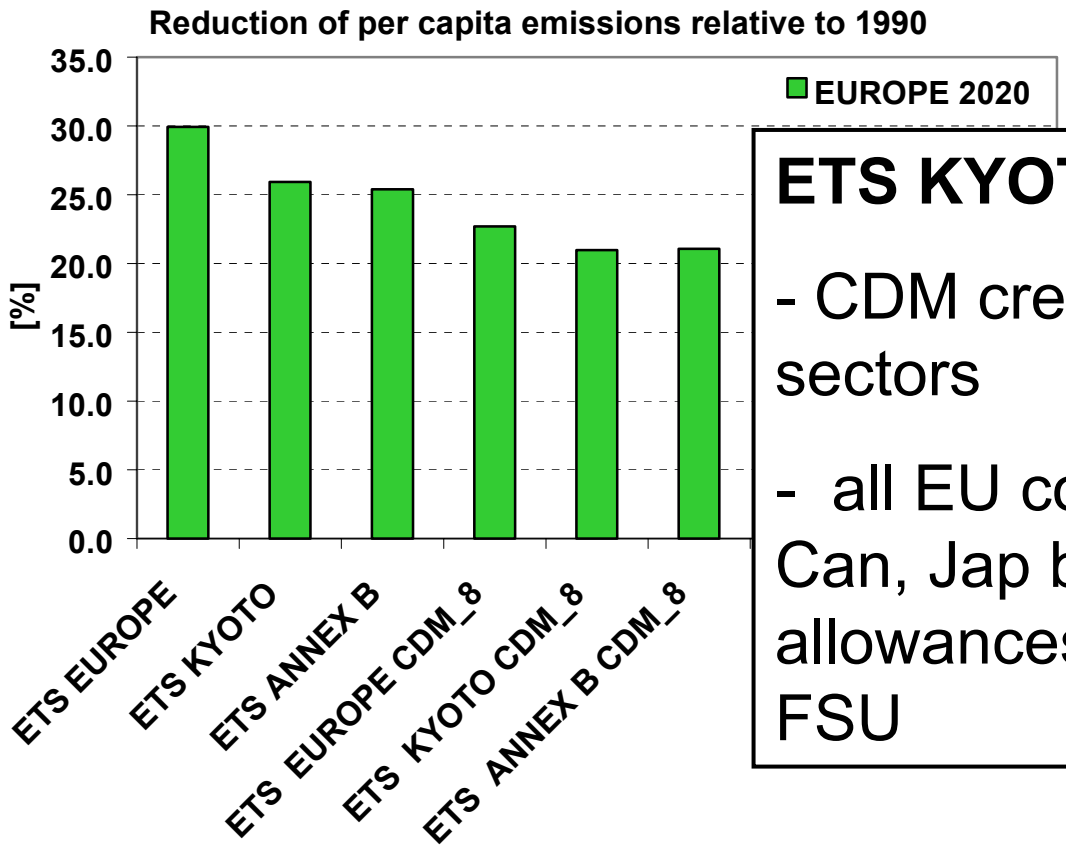

ETS KYOTO CDM8

- CDM credits for all sectors

- all EU countries + Can, Jap buy additional allowances from the FSU

Linking to CDM with 8% restriction leads to further abatement shifts

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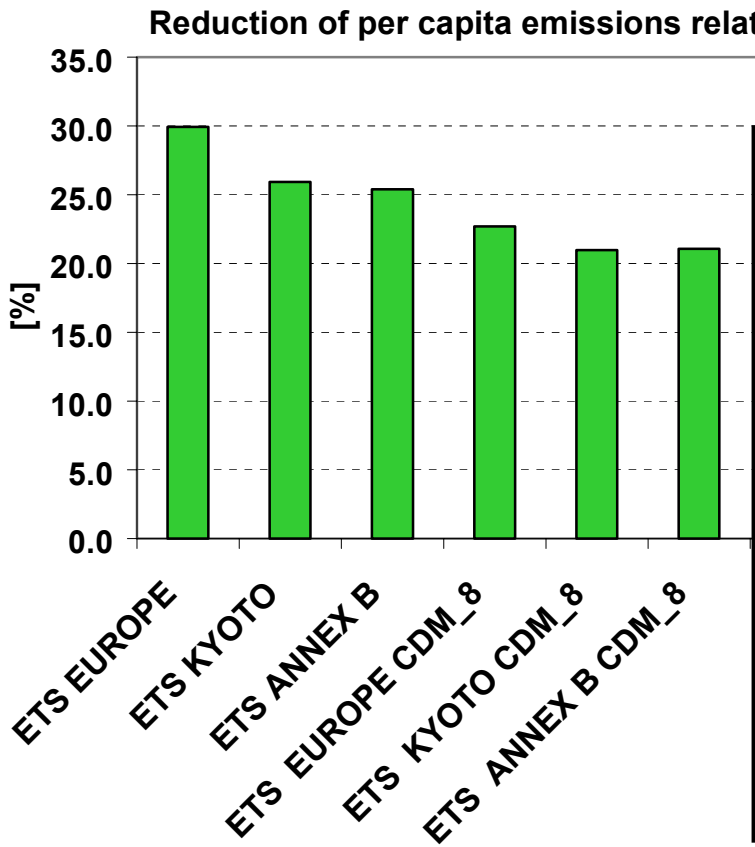

ETS ANNEX B CDM8

- CDM credits for all sectors

- EU countries + linked countries (-FSU) buy CDM credits and allowances from the FSU

Linking to CDM with 8% restriction leads to further abatement shifts

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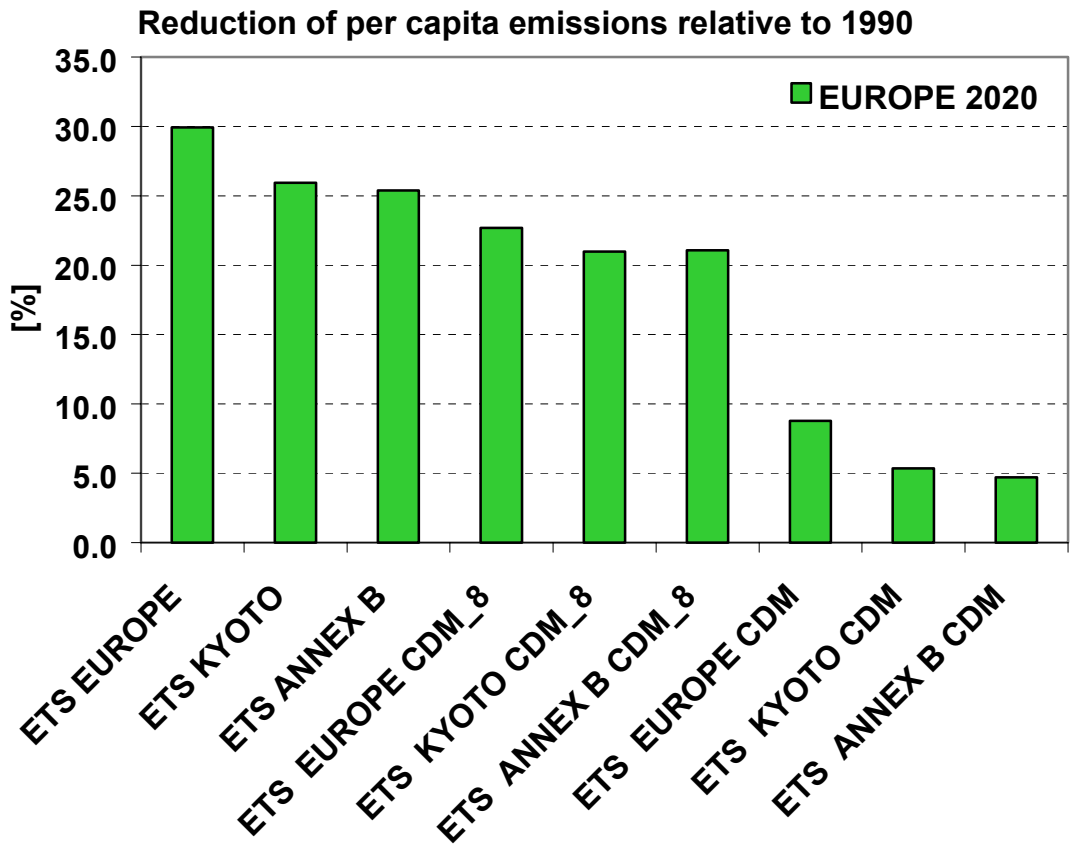
..... + CDM unrestricted



Unrestricted CDM allows EU per capita emissions to almost remain at 1990 level

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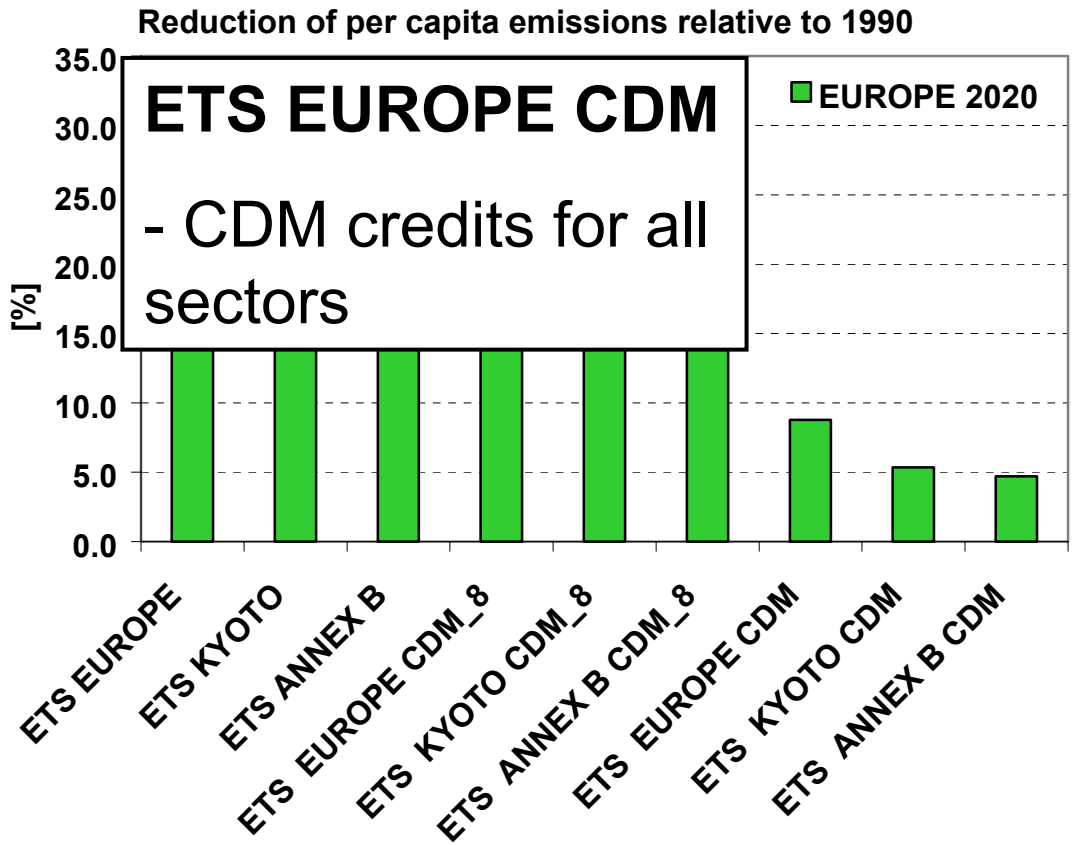

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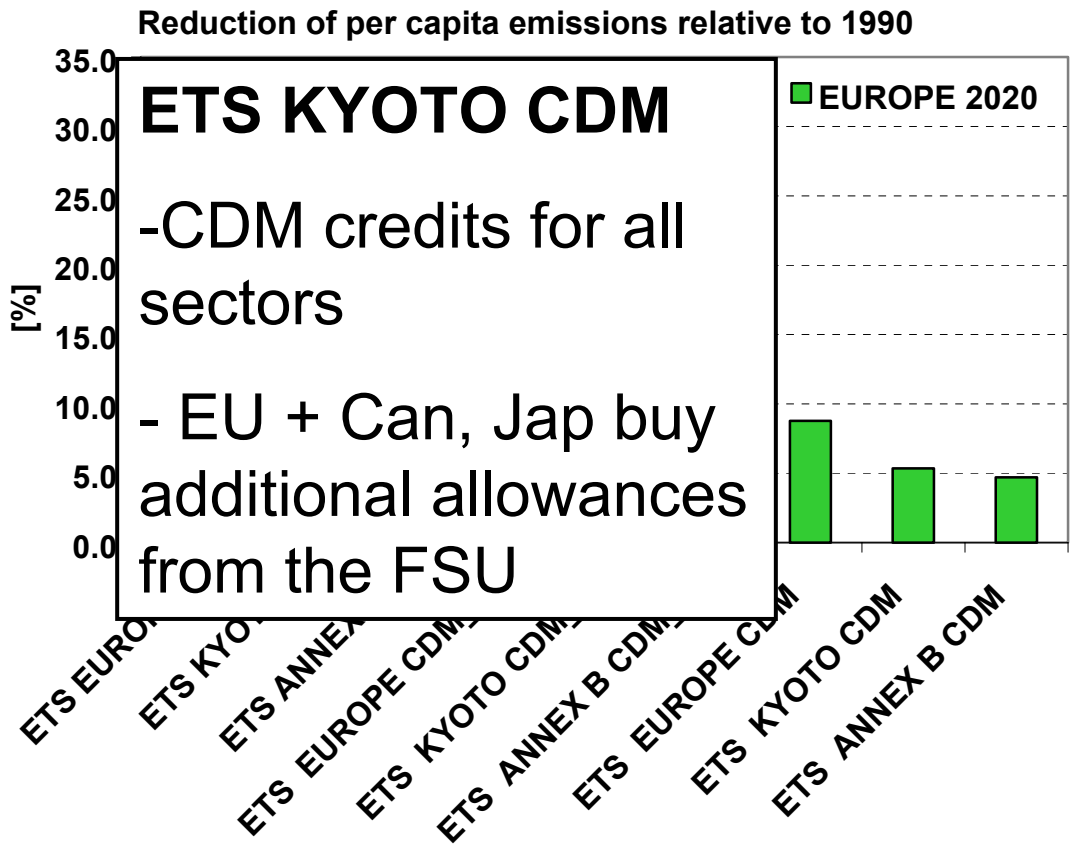

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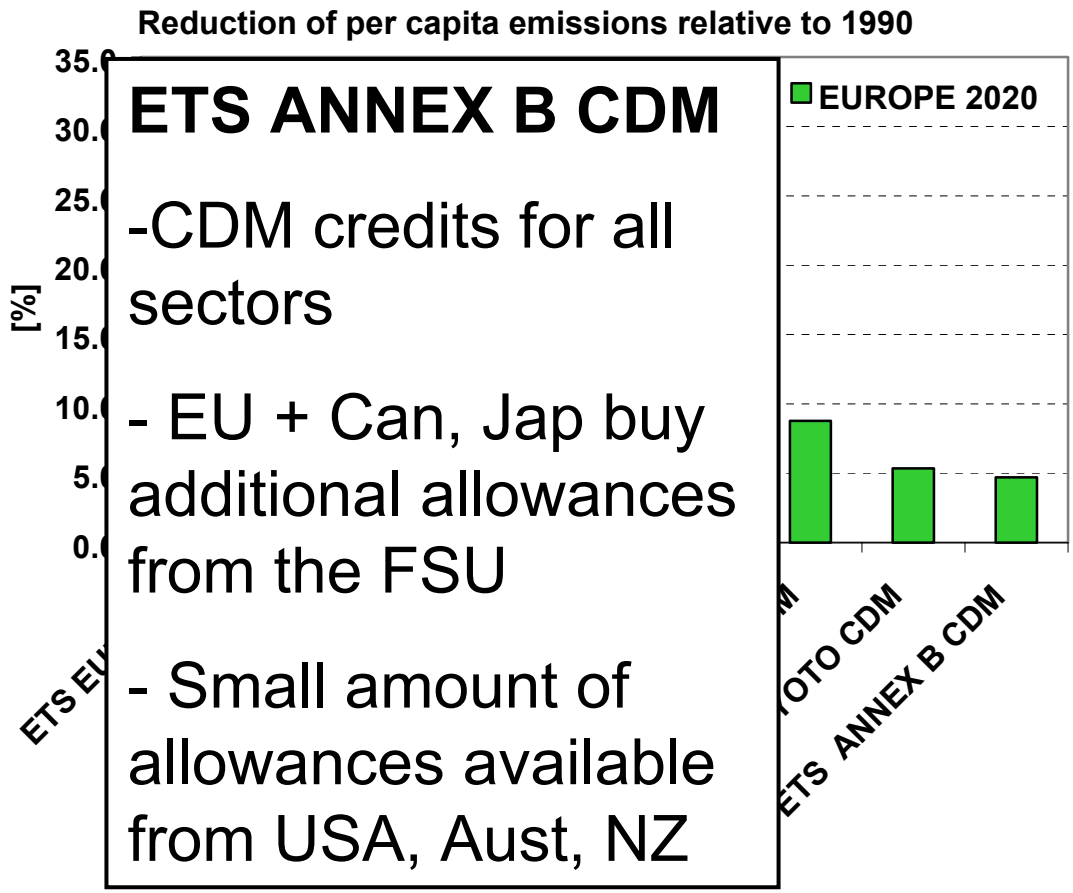

Unrestricted CDM allows EU per capita emissions to almost remain at 1990 level

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Summary with respect to ...

per capita emissions under a 450 ppm scenario (Step 1)

- **Global average per capita emissions must be substantially reduced already by 2030.**
- **Even high emission reductions of Annex B by 2020 allow only a slight increase of Non-Annex B per capita emissions.**

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Summary with respect to ...

modification of EU-per capita emissions under different linking scenarios (Step 3)

•Linking of the EU trading system to other national systems only slightly modifies EU reduction requirements

• Highest effect on reduction requirements when FSU is linked (even without hot air)

• Reduction requirements are substantially reduced when CDM-credits may be used without restrictions

• Non-Annex B countries can sell CDM-credits but relatively have to reduce per capita emissions without having commitments

Conclusion

Be aware of the long term effects of using CDM to realise short term targets

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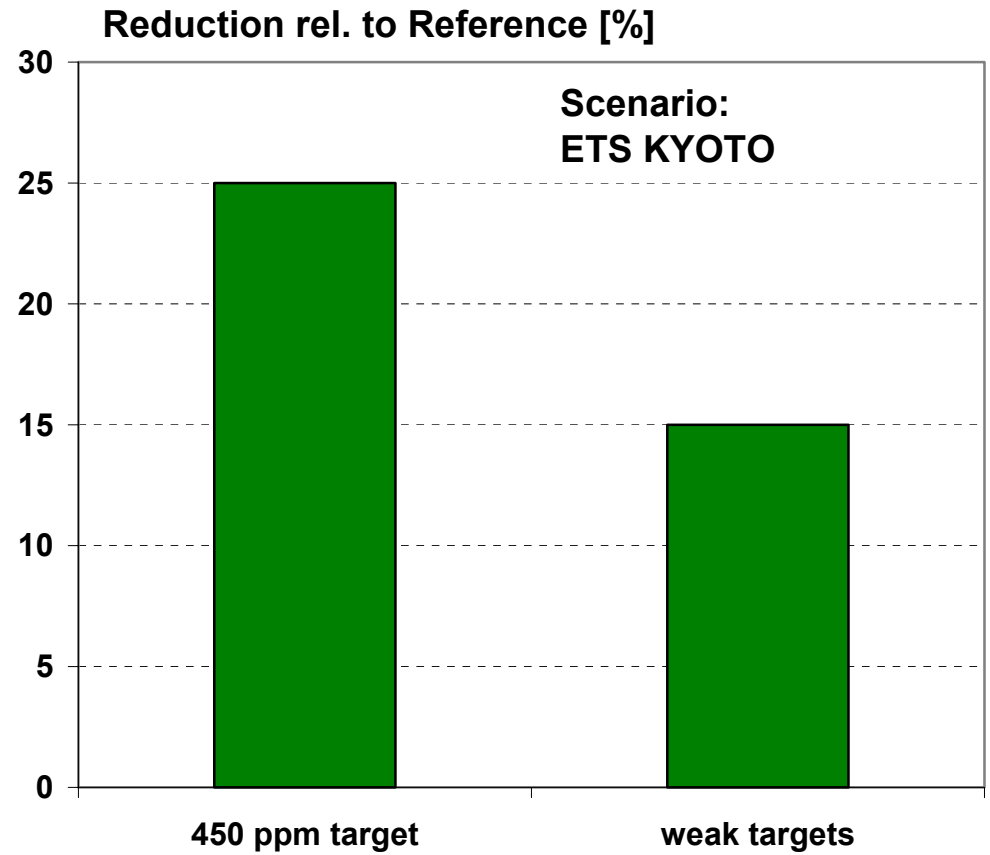
Reduction Kyoto ratifiers in 2020



450 ppm target increases reduction of Kyoto ratifiers by factor ~ 2.8

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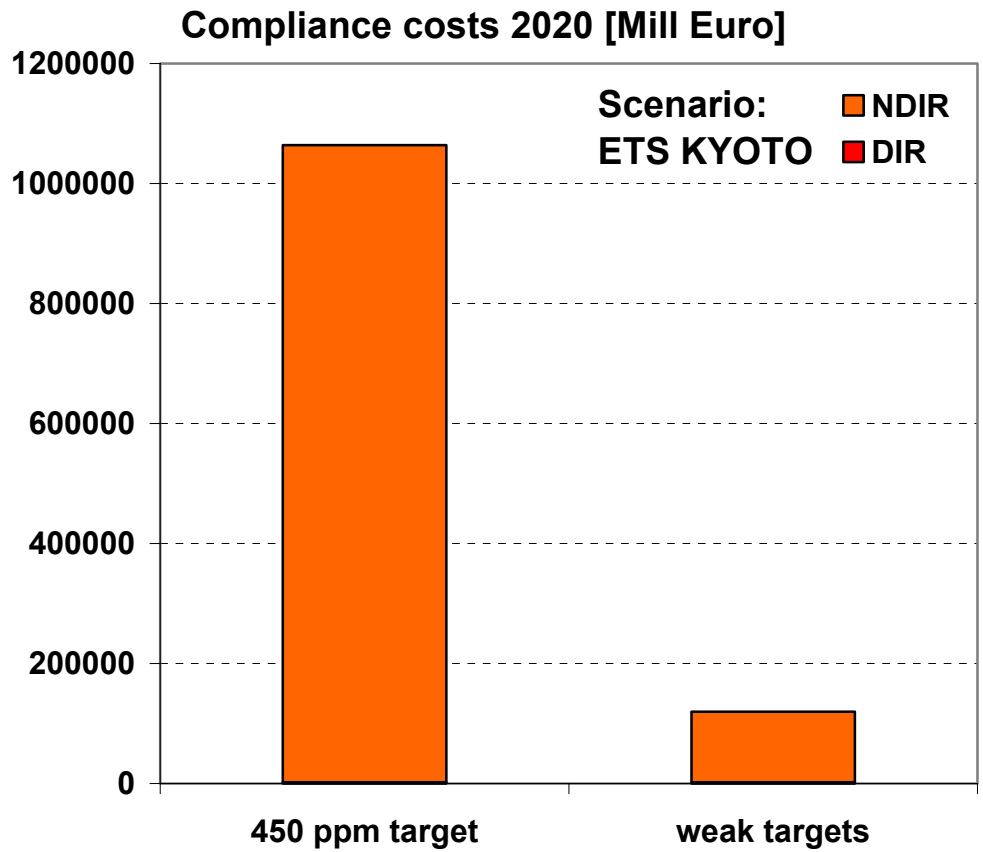
Costs



Under current EU-ETS a 450 ppm target would increase costs for Kyoto ratifiers by factor ~ 9

Results (I)