

DIW Berlin

Deutsches Institut
für Wirtschaftsforschung

www.diw.de

European Emission Trading 2005-2007 – Lessons learned?

Hans-Joachim Ziesing
German Institute for Economic Research
(DIW Berlin)

7. CTI Capacity Building Seminar
Hotel Breitenfelder Hof
21-25 October 2006, Leipzig

The Task of National Allocation plans according to the ET Directive

- For each period, each Member State shall develop a national plan stating the total quantity of allowances that it intends to allocate for that period and how it proposes to allocate them to the installations subject to emissions trading.
- Beside this policies and measures should be implemented **across all sectors**, and **not only within the industry and energy sectors**, in order to generate substantial emissions reductions.

Some binding limitations of the EU Directive

- Limited to **specified activities**, mainly energy and industry sectors – no transport, no residential
- Limited to the **period 2005 to 2007**
- Limited to **Carbon Dioxide (CO₂) only**
- Limitations for **auctioning with a maximum of 5 % in 2005-2007 and 10 % in 2008-2012**

Beside this the Directive comprises a mixture of “shall” and “may” provisions which leaves a wide leeway for Member States.

The basis structure of the German National Allocation Plan

- The **Macroplan** defines the national emissions budget and determines the total quantity of allowances to be allocated and
- The **Microplan** for the intended allocation of allowances to operators of individual installations; the Microplan defines the methods, rules and criteria which determine allocation decisions and the question of what quantity of allowances will be granted to the various installations.

Three steps to define the CO₂ budget by 2005 to 2007 within the macro plan

1. Only the budget of the six greenhouse gases by 2008 to 2012 is clearly defined with the burden sharing commitment of a 21% reduction (i.e. 962 Mt of CO₂ equiv. per year)
2. It was felt that greenhouse gas emissions of 982 Mt per year by 2005 to 2007 would be in line with the 21 % target in 2008 to 2012.
3. Then assumptions had to be made concerning the non CO₂ emissions by 2005 to 2007.
4. The result are 859 Mt CO₂ per year by 2005 to 2007 which had to be allocated between the activities under the trading scheme and the other activities.

Options proposed for allocation within the macro plan

- 1. All sectors have to reduce CO₂ emissions by the same reduction rate**
- 2. The emission's level of the Non-ET Sectors remains on the emissions of 2000 to 2002**
- 3. Like option 2 but with temperature corrected emissions of the Non-ET sector in the base period**
- 4. Emissions level of the ET sectors will be derived from the voluntary agreement of the German industry**
- 5. Setting the reduction target on the basis of the results of optimisation models**

What happened on the political level?

- **First there was a clear decision of the Federal Ministry of Environment to follow the voluntary agreement approach**
- **Controversial debates between the Federal Ministry of Environment and the Ministry of Economics (assisted by the chancellors office)**
- **Controversial debates also between the Federal Ministry of Environment and the German Industry**
- **Roundtables between the secretary of state of the Ministry of Environment and the Ministry of Economics on the one hand and the CEO of the big companies in industry and the energy sector on the other hand.**
- **Then a lot of different bargaining processes between the different actors took place.**

Bargaining process concerning the NAP

(thanks to Paul van Slobbe Project Manager NAP, The Netherlands)



The Allocation 2005-2007 and 2008 - 2012: Results in comparison

million tonnes of CO ₂		Energy and Industry	Other Sectors	Total
Average 2000-2002		505	358	863
2005-2007	<i>Baseline (forecast without additional measures)</i>	495	366	861
	The BMU-Plan = Voluntary Agreement	488	363	851
	The final decision according to the Act on Allocation	503	356	859
2008-2012	<i>Baseline (forecast without additional measures)</i>	488	372	860
	The BMU-Plan = Voluntary Agreement	480	366	846
	The final decision according to the Act on Allocation	495	349	844

Exceptions and special rules within NAP I

- **Compliance factor = 1** (i.e. no reduction) referring to
 - Process emissions **without any time limitation** (§ 13)
 - New entrants for **14 years** (§ 11)
 - Existing installations which made use of the option to be treated like new entrants **14 years** (§ 7 Abs. 12)
 - New installations according to the transfer rule **4 plus 14 years** (§ 10)
 - Installations installed in 2003 und 2004 for **12 years** (§ 8)
 - Early actions from 1994 to 2002 for **12 years** (§ 12)
(high burden for following periods)

Exceptions and special rules within NAP I

- **Additional allowances for CHP plants (§ 14)**
- **Double benchmarks** for heat and electricity for new CHP plants (§ 11 Abs. 2)
- **Compensation** for additional power generation in conventional power plants by **decommissioning of nuclear power plants (§ 15)**

Germany: The National Allocation Plan 2005-2007 (NAP I) in retrospect

1. The design of NAP I contains an **over-complex set of rules** with (too) many special arrangements and exceptions from an actually simple ET system. The German German Emissions Trading Authority (DEHSt) proves **58 (!) different combinations of rules**.
2. **Non-existing calculability** of the relevant compliance factor by companies affected by emission trading
3. Burden of future trading periods due to **non-application of compliance factors** or **long-ranging extension of compliance factors of 1**

The outcome: Different compliance factors (incl. proportional adjustment)

Compliance factor incl. proportional adjustment ... %	Installations	
	number	%
0	378	20,4
0 - 2	112	6,1
2 - 4	150	8,1
4 - 6	387	20,9
6 - 7,4	259	14,0
7,4	563	30,4
Total	1849	100,0
source: DEHSt (2005)		

The outcome: Number of installations and allocations according to activities

	Installations		Allowances allocated 2005 - 2007			Average 2005-2007
	number	%	Mt	Mt/a	%	Mt/install.
Energy	1234	66.7	1170.3	390.1	78.8	0.948
Iron & Steel	39	2.1	101.6	33.9	6.8	2.605
Refinerie	37	2.0	73.3	24.4	4.9	1.981
Cement	48	2.6	71.2	23.7	4.8	1.483
Lime	68	3.7	28.0	9.3	1.9	0.412
Paper	123	6.7	15.0	5.0	1.0	0.122
Glass	89	4.8	14.0	4.7	0.9	0.157
Ceramics	207	11.2	7.5	2.5	0.5	0.036
Pulp	4	0.2	4.3	1.4	0.3	1.075
Total	1849	100.0	1485.2	495.1	100.0	0.803
source: DEHSt (2005)						

The outcome: Allowances allocated – ranking according to individual operators of installations

Operator	Activity	Period 2005 to 2007			
		total	per year	share in %	
		Mt CO ₂		single	cumulativ
RWE Power Aktiengesellschaft	Electricity	332.2	110.7	22.4	22.4
Vattenfall Europe Generation AG & Co. KG ¹⁾	Electricity	233.0	77.7	15.7	38.1
E.ON Kraftwerke GmbH	Electricity	103.9	34.6	7.0	45.0
STEAG AG ²⁾	Electricity	40.2	13.4	2.7	47.8
EnBW Kraftwerke AG	Electricity	30.2	10.1	2.0	49.8
ThyssenKrupp Stahl AG	Steel	26.8	8.9	1.8	51.6
SaarEnergie GmbH ³⁾	Electricity	21.9	7.3	1.5	53.1
Großkraftwerk Mannheim Aktiengesellschaft	Electricity	19.8	6.6	1.3	54.4
swb Synor GmbH & Co. KG, Bremen	Electricity	19.6	6.5	1.3	55.7
SWM Services Energie und Wasser GmbH, München	Electricity	13.2	4.4	0.9	56.6
Salzgitter Flachstahl GmbH	Steel	10.1	3.4	0.7	57.3
sub-total		850.9	283.6	57.3	
Total combustion		1169.9	390.0	78.8	
Total allocation of allowances		1485.2	495.1	100.0	

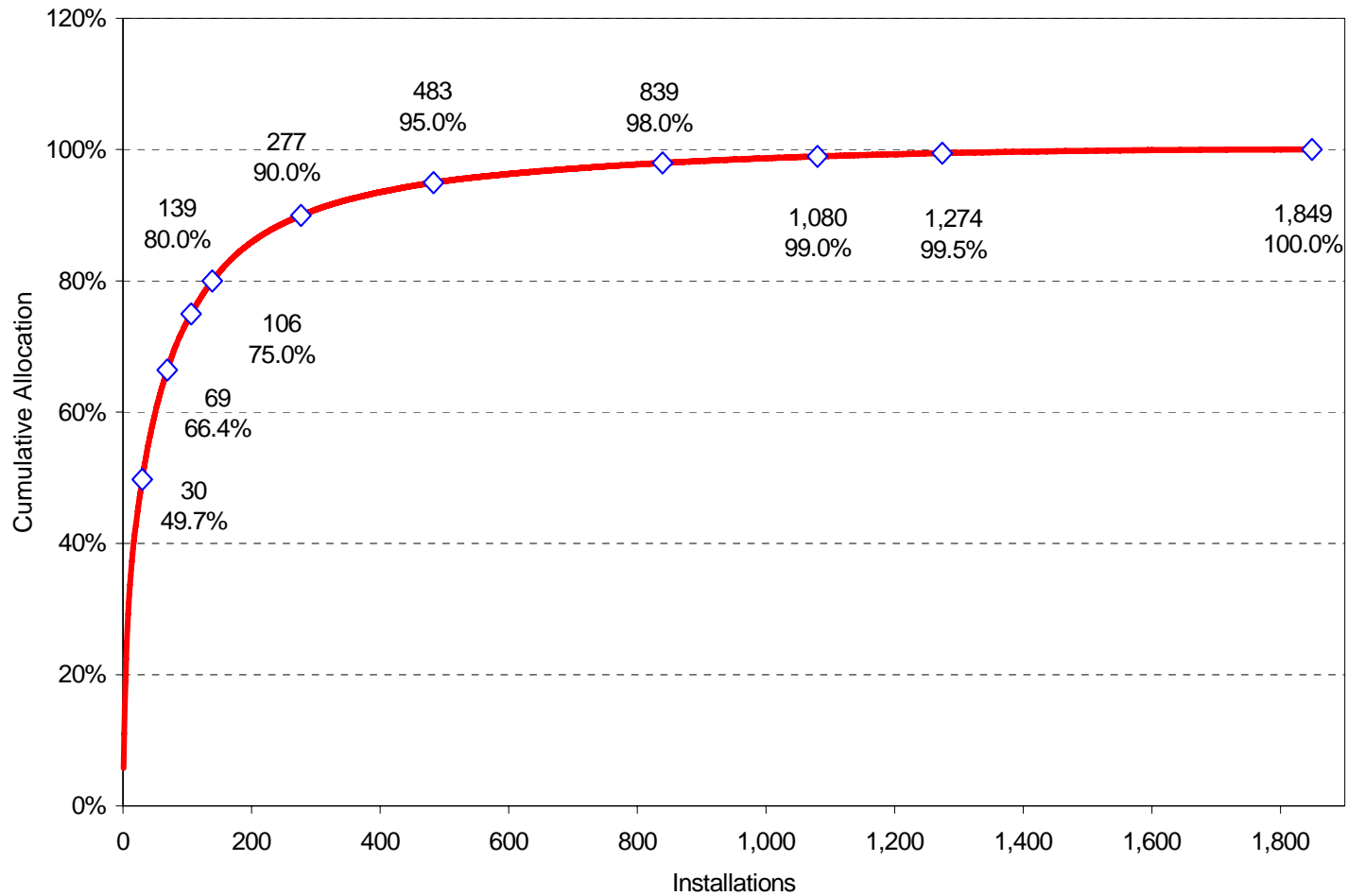
1) incl. Bewag AG & Co. KG and Hamburgische Electricitäts-Werke AG:- 2) incl. STEAG Fernwärme GmbH and STEAG and RWE Power - Gemeinschaftskraftwerk Bergkamen A oHG.- 3) incl. SaarEnergie AG.

source: DEHSt (2005)

The outcome: Installations and allowances allocated related to the size of allowances

Size of allowances allocated	Installations		allowances allocated		average
	numer	%	million tonnes	%	Mt per installation
> 15 million allowances	16	0.9	585.4	39.4	36.588
1.5 - 15 million allow.	147	8.0	643.4	43.3	4.377
150,000 - 1500,000 allow.	407	22.0	196.8	13.3	0.484
30,000 - 150,000 allow.	705	38.1	51.3	3.5	0.073
< 30,000 allowances	574	31.0	8.1	0.5	0.014
Total	1849	100.0	1485.0	100.0	0.803
Source: DEHST (2005)					

Results of the Allocation 2005 - 2007



2005 – the first year of the EU - ETS

Member State	Relation between allocation and emission (- = surplus - + = deficit)	Relation between allocation and emission (- = surplus - + = deficit)
Austria	+ 697.936	+ 2,09 %
Belgium	- 4.499.479	- 8,13 %
Czech. Republic	- 14.454.105	- 17,53 %
Denmark	- 4.948.708	- 18,97 %
Estonia	- 6.141.647	- 48,66 %
Finland	- 11.514.394	- 34,2 %
France	- 19.352,780	- 14,76 %

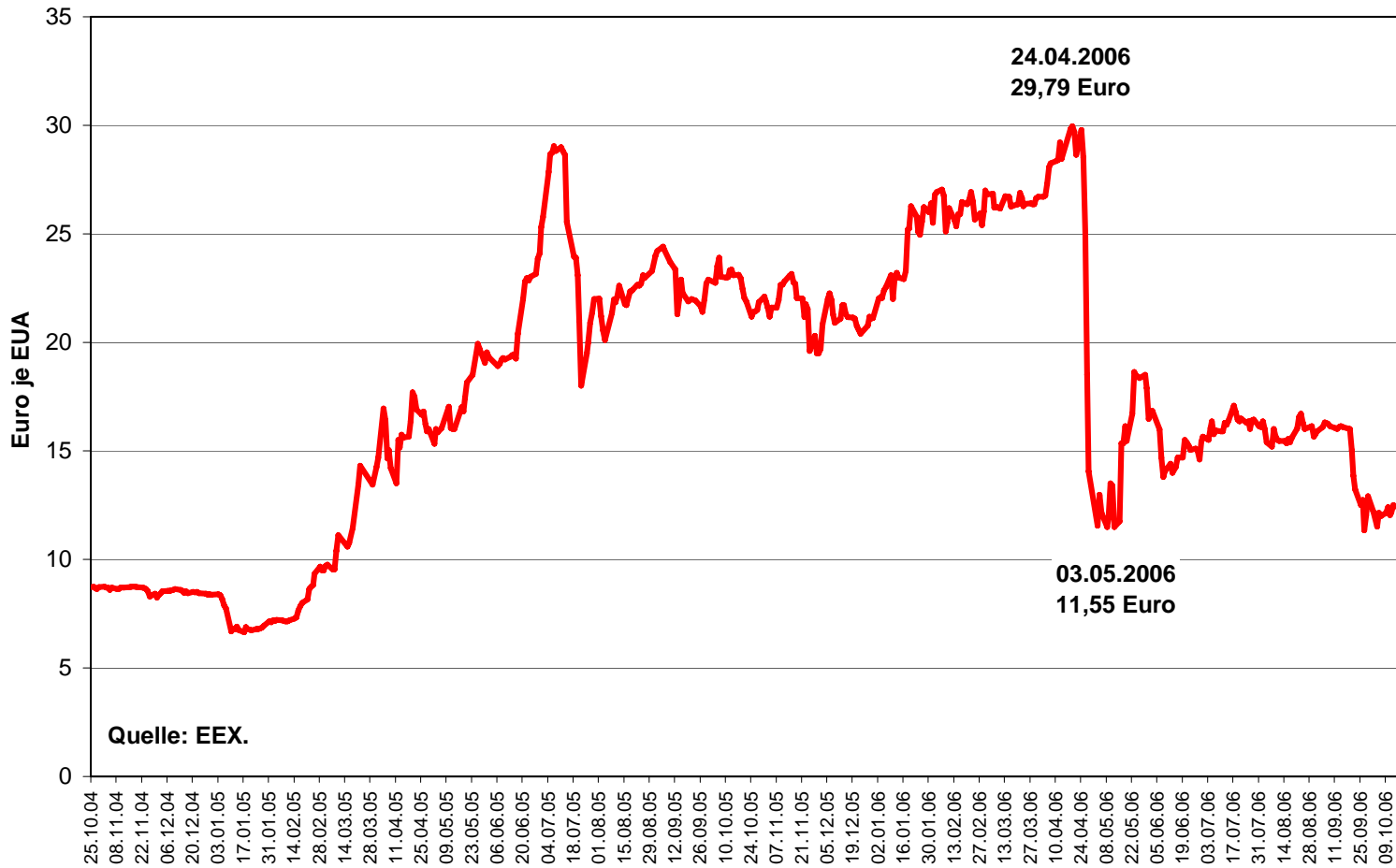
2005 – the first year of the EU - ETS

Member State	Relation between allocation and emission (- = surplus - + = deficit)	Relation between allocation and emission (- = surplus - + = deficit)
Germany	- 21.357.702	- 4,51 %
Greece	- 101.740	- 0,14 %
Hungary	- 4.521.592	- 17,58 %
Ireland	3.159.488	+ 14,11 %
Italy	7.896.781	+ 3,67 %
Latvia	- 1.200.007	- 42,04 %
Lithuania	- 4.864.312	- 73,66 %

2005 – the first year of the EU - ETS

Member State	Relation between allocation and emission (- = surplus - + = deficit)	Relation between allocation and emission (- = surplus - + = deficit)
Netherlands	- 6.087.739	- 7,58 %
Portugal	- 485.512	- 1,33 %
Slovakia	- 5.127.109	- 20,32 %
Slovenia	+ 28.560	+ 0,33 %
Spain	+ 18.951.750	+ 10,47
Sweden	- 3.224.070	- 16,70 %
United Kingdom	+ 33.008.185	+ 13,62 %
total	- 44.138.196	- 2,47 %

EEX CO₂ Index (European Carbon Index)



Some conclusions

- The common tendency of these regulations was to give industry and energy sector almost that amount of emissions certificates they wanted to have. So the overall CO₂ reduction rate in the first period compared with the 2000/2002 level is very low (-0,4%).
- Due to the numerous special rules the **real compliance factor ranges between 0 % and 7.4 %**.
- With the numerous **special rules** the German NAP is very (too?) **complicated**.
- The German NAP is rather the **result of a political bargaining process** than of a perfect trading system with clear caps.

Some considerations from a theoretical point of view concerning the NAP I

It possibly was a mistake

- ... not to stipulate **full auctioning** from the very beginning,
- ... not to include **other GHG** (the problem is, that there is no binding CO₂ target, so there is a loophole, which can be abused),
- ... not to include **all relevant emissions sectors**,
- ... to leave **many criteria not clearly defined**. Differences in the application of criteria and definitions in the NAP could lead to unacceptable **market distortions** (e.g. interpretation of Annex I definitions, unequal treatment of equal installations; different reference periods; different benchmarks; different use of JI/CDM and – vice versa – domestic actions;...)

The ETS for the period 2005 to 2007 is not perfect at all, but keep in mind ...

- The first period is a **learning period**. So the implementation of the **institutional structure** and the **regulatory framework** in Member States might be more important than the volume of emissions trading.
- From the implementing procedure and the experiences with the emissions trading in the pilot period 2005 to 2007 **we could learn** how the emissions trading scheme and the National Allocation Plans could and should be improved.
- Then, hopefully, **we will establish a real efficient emissions trading system** for 2008 to 2012 and the periods beyond.

**The most important lesson
we learned was:**

**Keep the NAP II
as simple as possible**

COM(2005)703 final: Further guidance on allocation plans for the 2008 to 2012 trading period of the EU ETS

Annex 4: Summary of **experience** for the first phase (2005-2007) and **general lessons** for the second phase (2008-2012)

1. **More use of emissions trading is necessary** to meet the Kyoto targets cost-effectively.
2. Allocations have in general been **more restrictive for power generators** than other sectors covered by the scheme.
3. **Member States experiencing considerable excess in actual emissions with respect to their Kyoto targets intend to purchase a substantial amount of Kyoto units.**
4. The **non-acceptance of ex-post adjustments is essential** for the allowance market development.
5. Some allocation plans are **more complex than necessary and not sufficiently transparent.**

COM(2005)703 final: Further guidance on allocation plans for the 2008 to 2012 trading period of the EU ETS

The Commission urges Member States to work towards **simpler plans** for the second trading period. Simple allocation plans boost the understanding of the instrument among stakeholders and also increase transparency and predictability.

Member States should **strive to keep the second national allocation plans as simple as possible**, in particular with respect to allocation methods and rules on new entrants and closures.

Member States should **critically assess the necessity and efficiency of rules** contained in the first round national allocation plans and **keep only those deemed absolutely essential**.

Burden for the NAP II period 2008-2012 caused by NAP I rules

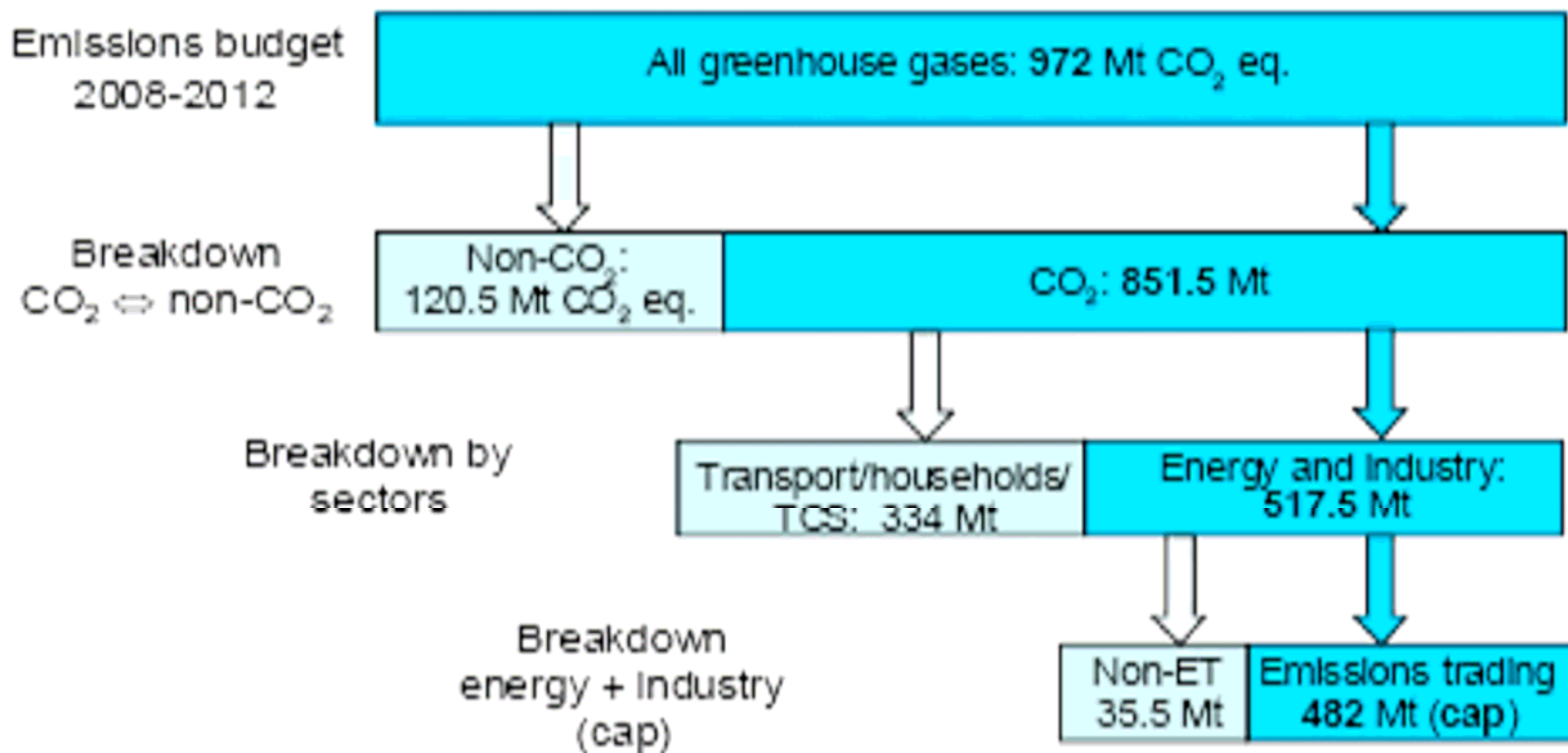
- **Early actions:** **56 Mt CO₂**
- **New entrants in 2003 and 2004:** **19 Mt CO₂**
- **Transfer provision:** **2 Mt CO₂**
- **New entrants:** **20 Mt CO₂**
- **Refunding as per § 6/3 ZuG 2007** **5 Mt CO₂**
- **Total burden** **107 Mt CO₂**

NAP II:

Compliance factor – sectoral differentiation

- **Industry** including the additional installations (NAP guidance on 22 december 2005) and **industrial and public CHP**: 0,9875 of the average emissions amount in the reference period (reasons: strong international competition, limited possibilities to avoid CO₂-emissions because of process related emissions)
- **Energy supply (mainly electricity production)**: 0,85 (low international competition, high windfall profits)
- Compliance Factor 1: **small emitters, new entrants under the new comer rules** (§ 8 ZuG2007 + § 11 ZuG2007), **new entrants under the transfer rule, early action installations**

The steps to define the CO₂ budget by 2008 to 2012 within the macro plan



Germany: GHG emissions 1990 to 2004 by greenhouse gases and NAP-II-targets 2008-2012

	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆	Total non CO ₂	Total
	Mt CO ₂ equivalent per year							
base year	1030.2	99.8	84.8	6.6	1.7	7.2	200.1	1230.3
1990	1030.2	99.8	84.8	4.4	2.7	4.8	196.4	1226.7
2000	886.3	64.9	59.6	6.6	0.8	5.1	137.0	1023.2
2001	899.3	62.1	60.4	8.0	0.7	4.9	136.0	1035.3
2002	886.5	59.2	59.8	8.6	0.8	4.2	132.6	1019.1
2003 (prel.)	892.5	56.2	62.4	8.5	0.9	4.3	132.3	1024.8
2004 (prel.)	885.9	51.4	64.3	8.8	0.8	4.5	129.8	1015.7
Average 2000-2002	890.7	62.1	59.9	7.7	0.8	4.7	135.2	1025.9
Target 2008-2012	851.5	no differentiation					120.5	972.0
sources: BMU; Umweltbundesamt; Öko-Institut; DIW Berlin.								

Germany: CO₂ emissions 1990 to 2004 and NAP-II-targets 2008-2012 by sector

	Emission trading sectors			Other sectors				Total
	Energy (E)	Industry (Ie + Ip)	Total E+I	TCS	Transport	Residential	Total other sectors	
	Mt CO ₂ per year							
1990	436.1	216.2	652.2	90.3	158.2	129.5	378.0	1030.2
2000	364.4	167.4	531.7	59.3	178.4	116.8	354.5	886.3
2001	370.5	160.7	531.2	62.1	174.7	131.2	368.1	899.3
2002	378.8	155.8	534.6	59.2	172.6	120.1	351.9	886.5
2003 (prel.)	386.2	156.8	543.0	60.6	166.5	122.4	349.6	892.5
2004 (prel.)	382.8	162.1	544.9	58.1	167.3	115.6	341.0	885.9
Average 2000-2002	371.2	161.3	532.5	60.2	175.2	122.7	358.2	890.7
Target 2008-2012	no differentiation		517.5	no differentiation			334.0	851.5

sources: BMU; Umweltbundesamt; Öko-Institut; DIW Berlin.

Regulations for replacement installations

Replacement installations („transfer rule“):

- **100% free allocation for new installations that replace an existing installation;**
- **additional incentive for replacement of inefficient installations**
- **transfer of allocation from „old“ to replacement installation for 4 years**
- **after transfer period: 10 years no compliance factor;**

Regulations for new entrants

New entrants:

- **100% free allocation for new entrants based on differentiated BAT-Benchmark (e.g. power production: coal: 750 g CO₂/kWh, gas: 365 g CO₂/kWh);**
- **one standard load factor of 7.500 h/a for new power stations**
- **no compliance factor for 14 years**

Reserve

17 Mio. allowances per year, of which

- 10 Mio. t/a as new entrants reserve**
- 5 Mio. t/a to cover the compensation mechanism as defined in § 6 Abs. 3 ZuG 2007**
- 2 Mio. t/a to cover administrative costs of the system, to be sold;**
- in case of closures: allowances are transferred to reserve**

National Allocation Plan NAP II 2008-2012: Special rules and their impacts

➤ **Compliance Factor = 1 with long-ranging extension**

- o **Additional new entrants: 14 years**
- o **Transfer rule: 4 plus 10 years**
- o **Smallest installations: compliance factor = 1 without any time-limitation**

**= burden for trading periods beyond 2012
(ever larger loads must carry
ever fewer installations)**

National Allocation Plan NAP II 2008-2012: Special rules and their impacts

- **Fuel-related benchmarks for specific emissions instead of fuel neutral benchmarks:**
 - = Lowering the incentives for emissions reduction
- **Closure rules of installations:**
 - = Liability to misuse
- **Hardship Provisions and low new entrants reserve:**
 - = Increased risks regarding the need of a second compliance factor

Basic rules within NAP II – progress compared with NAP I

- ↑ No explicit option rule
- ↑ No early action rule
- ↑ No compensation for decommissioning of nuclear power plants
- ↑ No ex-post adjustments
- ↑ No special treatment of process emissions
- ↑ Different compliance factors between manufacturing industry/CHP plants and energy industries
- ↑ At least some information on policies and measures concerning non emissions trading sectors (transport and residential)
- ↑ Easing for smallest installations

Basic rules within NAP II – no progress compared with NAP I

- ↓ Abandonment of auctioning
- ↓ Fuel specific benchmark instead of benchmarks independent of specific fuels
- ↓ Long-ranging extension for compliance factors for new entrants (burden for the future)
- ↓ New entrants reserve is much too small
- ↓ Too much of the reduction effort has been shifted to the non-trading sectors
- ↓ The contribution of renewable energies (subsidised by the feed-in-tariff) to the reduction of CO₂ emissions especially in the electricity sector has not been explicitly regarded
- ↓ Still some problems with the data base

Project-based mechanisms (JI/CDM)

- for EU ETS installations: use of JI/CDM possible in 2008-2012: 12% of individual allocation can be met through CERs/ERUs
- government will not buy credits from JI/CDM
- but: government will support private companies' involvement in JI/CDM
- administration costs will mainly be financed from reserve

The asymmetry within the NAP between the ET sector and the Non ET sector

- According to the EU directive „Policies and measures should be implemented at Member State and Community level **across all sectors** of the European Union economy, and **not only within the industry and energy sectors**, in order to generate substantial emissions reductions.“
- This is all the more true because the **Non-ET-sectors now have to bear even the higher share of burden.**
- Anyhow, the policies and measures necessarily to be implemented to reduce emissions in the residential and the transport sector mostly still are rather **unspecific.**

Germany: CO₂ emissions 1990 to 2004 and NAP-II-targets 2008-2012 by sector

	Emission trading sectors			Other sectors				Total
	Energy (E)	Industry (Ie + Ip)	Total E+I	TCS	Transport	Residential	Total other sectors	
	Mt CO₂ per year							
1990	436.1	216.2	652.2	90.3	158.2	129.5	378.0	1030.2
2004	382.8	162.1	540.9	58.1	167.3	115.6	341.1	882.0
Average 2000-2002	371.2	161.3	532.5	60.2	175.2	122.7	358.2	890.7
Target 2008/2012			517.5				334.0	851.5
	Changes 1990 - 2004							
%	no differentiation		-17.1	no differentiation			-9.8	-14.4
Mio. t CO₂	no differentiation		-111.3	no differentiation			-36.9	-148.2
	Changes 2008/2012 vs. average 2000-2002							
%	no differentiation		-2.8	no differentiation			-6.7	-4.4
Mio. t CO₂	no differentiation		-15.0	no differentiation			-24.2	-39.2

Some conclusions concerning the desirable changes in German NAP II

- Compared with NAP I there are some simplifications concerning the amount of specific rule and exceptions. So the complexity is lower and the transparency is higher
- Nevertheless still some improvements should be realised, especially
 - shorten the long-ranging extension of compliance factors = 1
 - fuel neutral instead of fuel related specific emissions benchmarks
 - increase the volume of new entrants reserve
 - start with the auctioning
 - change the allocation between ET and Non ET sectors

Some conclusions concerning the desirable changes in the German NAP II

Modifications will only be carried out depending on the
decisions of the EU Commission

or/and

the decisions of the German Parliament within the
legislation process on the Allocation Law 2012 (ZuG 2012)

The great challenge to reach the targets in the commitment period 2008 to 2012 and beyond

- The generous allocation for the first period requires even **more serious and strict emissions reductions** in the second commitment period.
- The challenge seems to be extremely difficult for those countries, which are **still far away from meeting their target**.
- The EU must be the **driving force** to formulate new emissions reduction targets for the time beyond Kyoto and to follow that path strictly.

The great challenge to reach the targets in the commitment period 2008 to 2012 and beyond

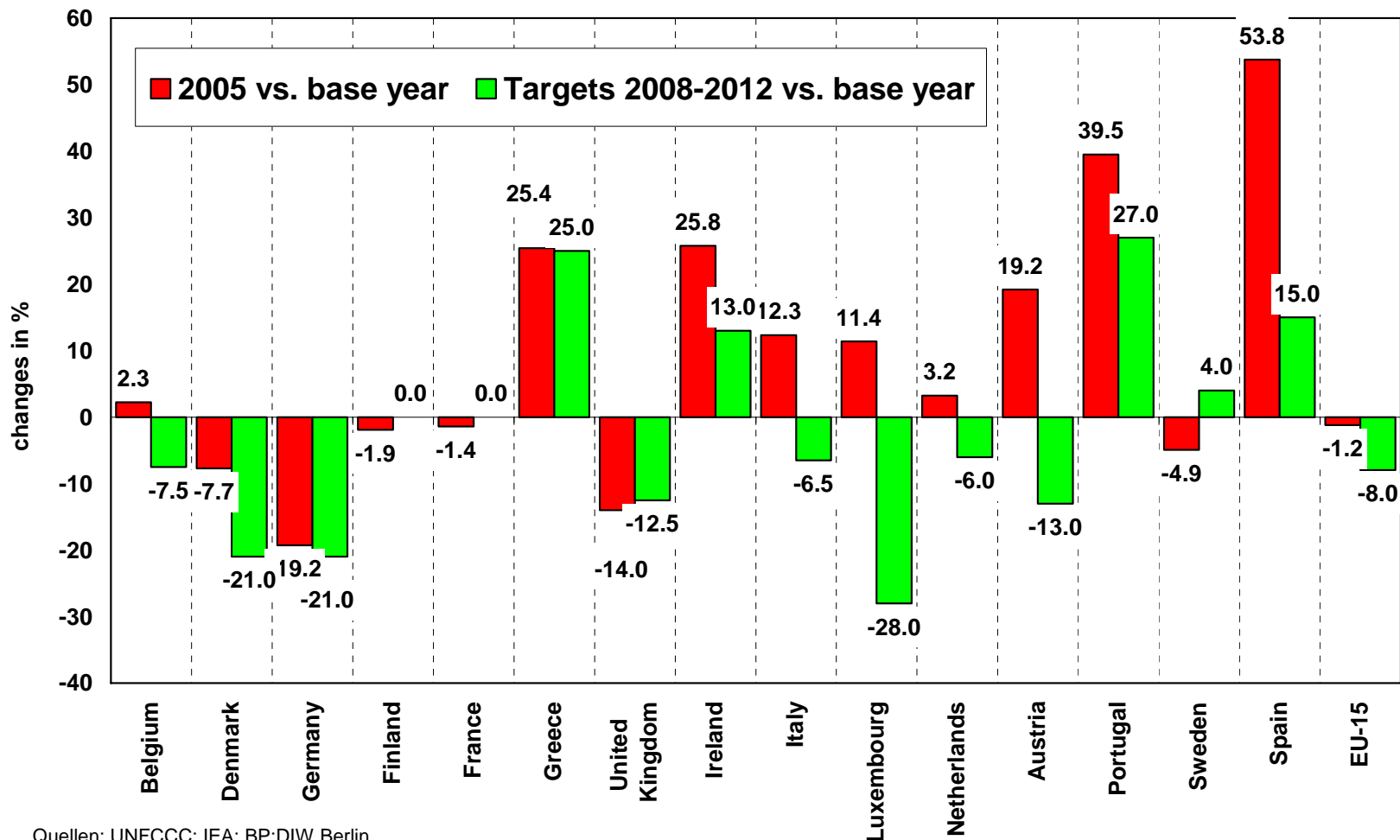
- The **“policies and measures”** concerning the Non ET sectors must be given more attention. Without a significant reduction of greenhouse gas emissions in these sectors the targets never will be reached.
- **JI and CDM** may improve the overall efficiency but should **not replace domestic actions**.

GHG emissions in EU 15: base year to 2005 and Kyoto targets 2008 to 2012

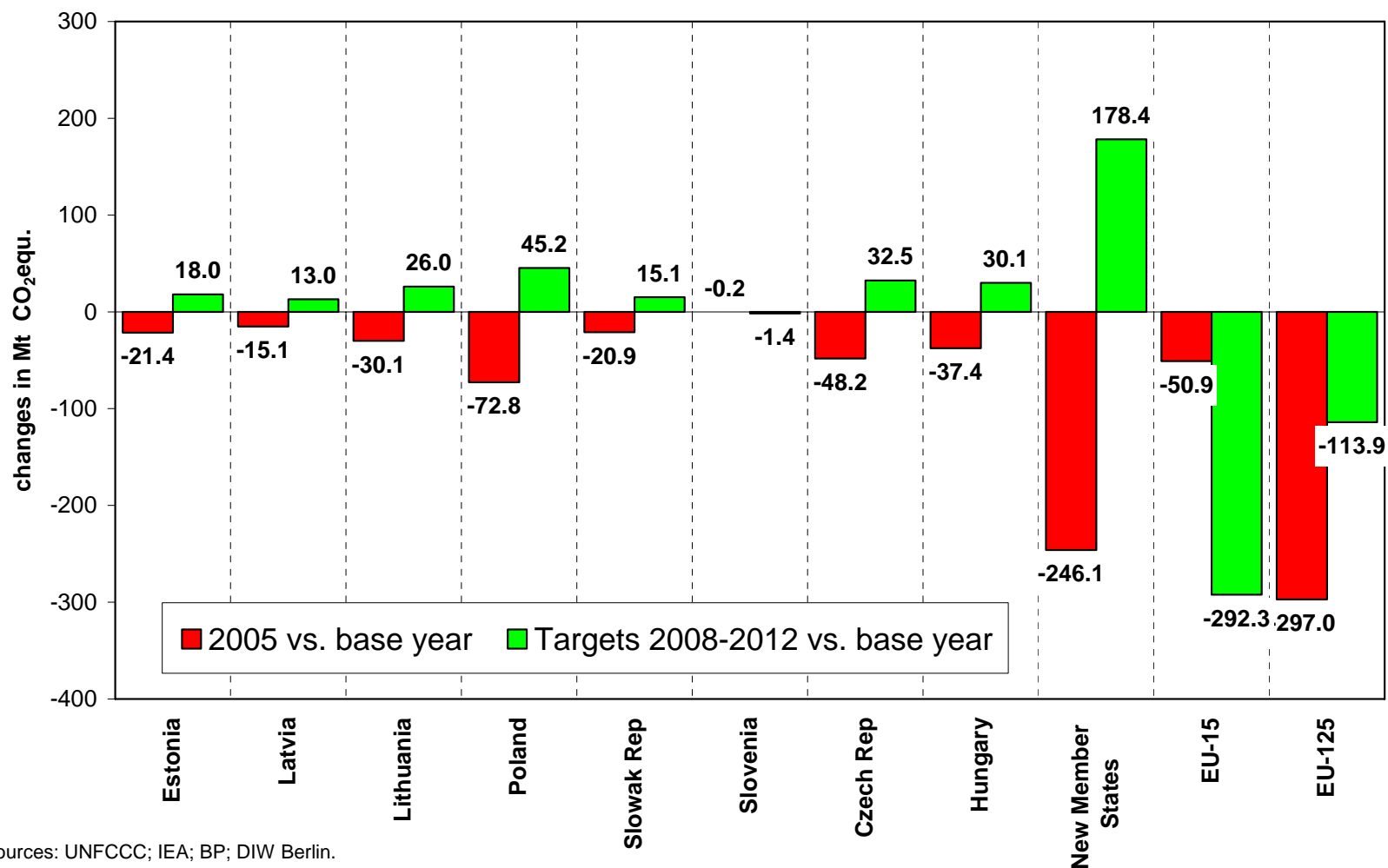
	2005 versus base year	Kyoto target 2008/2012 versus base year	Kyoto target 2008/2012 versus 2005		2005 versus base year
	%	%	%	Mt CO _{2equ}	
Austria	19.2	-13.0	-27.0	-25.4	15.1
Belgium	2.3	-7.5	-9.5	-14.3	3.3
Denmark	-7.7	-21.0	-14.4	-9.2	-5.3
Finland	-1.9	0.0	1.9	1.4	-1.4
France	-1.4	0.0	1.4	8.1	-8.1
Germany	-19.2	-21.0	-2.2	-21.6	-236.8
Greece	25.4	25.0	-0.3	-0.5	27.7
Ireland	25.8	13.0	-10.2	-7.1	14.3
Italy	12.3	-6.5	-16.8	-97.9	64.1
Luxembourg	11.4	-28.0	-35.4	-5.0	1.4
Netherlands	3.2	-6.0	-8.9	-19.6	6.9
Portugal	39.5	27.0	-9.0	-7.5	23.7
Spain	53.8	15.0	-25.2	-111.4	154.4
Sweden	-4.9	4.0	9.4	6.5	-3.6
United Kingdom	-14.0	-12.5	1.7	11.4	-106.9
EU-15	-1.2	-8.1	-6.9	-292.3	-50.9

sources: Nationale Emissions Inventories 2006; DIW Berlin.

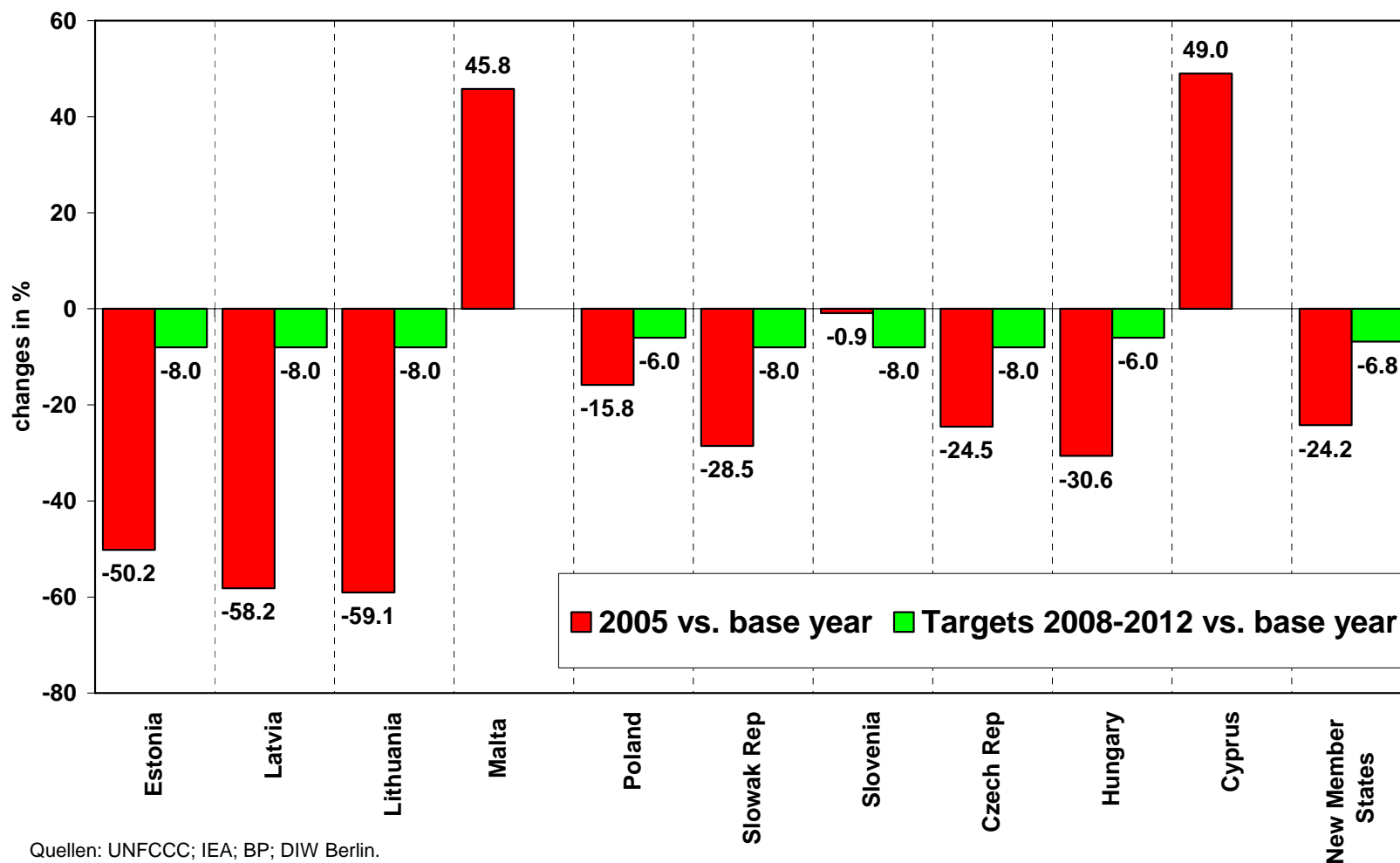
The problem in EU 15: GHG-targets 2008-2012 and changes from base year to 2005 (%)



No problem in new MS? GHG-targets 2008-2012 and changes from base year to 2005 (Mt CO₂equ)



No problem in new MS? GHG-targets 2008-2012 and changes from base year to 2005 (%)



▪
Thanks for your attention

hziesing@t-online.de
hziesing@diw.de