Increasing the Ambition of EU Emissions Trading

An Assessment of the Draft Second Allocation Plans and Verified Emission Reports of Germany, the United Kingdom and the Netherlands

A report to Greenpeace International

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0 Executive Summary

The draft Second National Allocation Plans (NAPs) of Germany, the United Kingdom, and the Netherlands have been assessed based on the questions of whether these NAPs ensure meeting the respective national commitments under the Kyoto Protocol in the short term and whether they stimulate the development and the diffusion of low carbon intensive technologies to meet larger emission cuts in the longer term.

In short, these draft NAPs place a disproportionate burden for emissions reductions on the non-ETS sectors in terms of meeting the countries respective commitments under EU Burden Sharing agreement to meet the targets in the Kyoto Protocol. This effectively lets the industries covered 'off the hook', and places an extra burden on the transport, commercial, household, and other sectors not covered by the ETS. While each of the countries in question is likely to meet its Kyoto targets, they are not effectively using the system to drive emissions reductions in the sectors covered by the ETS in the short term. Likewise, the three MS are not using the system effectively to guide long-term investments in clean technologies required to meet the rigorous climate targets in the medium term (2020) or longer term (2050). For the EU long-term emission reductions of 80 % are considered necessary to keep global mean temperature rise below 2° C above pre-industrial levels.

The main results of this report may briefly be summarized as follows:

Short term

With respect to the short-term emission targets for 2008-2012, data from the latest National Inventory Reports for 2006 considered alongside the Draft NAPs suggest that:

- In Germany greenhouse gas emissions were reduced significantly between 1990 and 1998 – partly due to the so called 'wall-fall' profits, i.e. the reconstruction and modernization of the energy and industrial systems of the former East Germany. Since then, however, emissions have been increasing in the power sector, and stagnating overall. Germany appears to be on a path to meet its Burden-Sharing target through domestic measures, but additional efforts are now required to close the remaining gap of 3.5 %.
- In the UK, also due to special circumstances in the early 1990s, significant reductions in greenhouse gas emissions have been achieved. The liberalization of the energy markets has led to a "dash for gas" in the power sector. Since then, total emissions in UK have been relatively stable and the UK is clearly on track to meet its Burden-Sharing target on its own.
- For the Netherlands, current CO_2 emission levels higher than in 1990, and the Burden Sharing Target can only be met by significant reductions of non CO_2 emissions and by relying heavily on the use of the Flexible Mechanisms of the Kyoto Protocol: 50 % of the reductions needed to achieve the Burden Sharing Target will need to be paid for by the Dutch state, purchasing credits from JI and CDM-projects. If

prices for ERUs and CERs continue to increase, this budget will have to be adjusted upwards.

Longer term

With respect to the mid-term and long-term emission reduction target of 30% and 80%, our extrapolation analyses imply:

- For emission reductions of -30% by 2020 and -80% by 2050, Germany's hypothetical ETS emissions target would be approx. 400 Mt CO_2e/a by 2020 (or 345 Mt CO_2e/a to meet the national -40 % target) and around 115 Mt CO_2e/a by 2050; the ETS-emission target of the UK would be around 200 Mt CO_2e/a in 2020 and roughly 55 Mt CO_2e/a in 2050, and the Netherlands's hypothetical ETS emissions target for 2020 would be about 55 Mt CO_2e/a by 2020 and some 15 Mt CO_2e/a by 2050. The hypothetical ETS target assumes equi-proportional emission reductions in all sectors.[1]
- If emissions continue to develop as in the recent past, Germany, the UK and the Netherlands will be far from achieving their mid-term or even long-term indicative reduction targets.
- The emission targets implied at the macro level of the NAPs suggest that Germany, the UK and the Netherlands did not use the NAPs to lead their economies on a reduction path towards these mid-term or long-term targets. To get there, they would have to be significantly more ambitious.
- The analyses on the ambition levels of the ET-budget for the Draft NAPs for 2008-2012 show that Germany and The Netherlands decrease the ET-budget for the second phase compared to the first phase, but the implied reduction for Germany is rather small. The UK and The Netherlands decrease the ET-budget compared to projected emissions of the ET-installations; if the projected growth rates turn out to be correct, the implied reduction is about 10 % for the UK and about 16% for The Netherlands. The experience in the case of Germany, which did not provide projections for emissions and ended with a rather large surplus allocation in 2005, highlights the importance of also using emission projections to determine the size of the ET-budget. Thus, Germany should also provide emission projections for NAP 2.

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1 The hypothetical emission targets are based on verified emission data for 2005 for installations included in the first phase of the EU ETS. Since this data does not include emissions from opt-out installations in the first phase and additional installations joining the EU ETS in the second phase, these targets tend to (slightly) underestimate the hypothetical burden sharing target of the ETS sector in 2008-12.

Improving the NAPs

- Regarding ETS-Non ETS split: in all three MS the budgets for the ET-sectors are too high, particularly in Germany. Thus, compared to the optimal split, the current budgets benefit companies with ET-installations at the expense of the other sectors (private households, transport), and overall reduction costs for society are too high. From an economic perspective, the size of the budgets for the ET-sector and the non-ET-sector should be determined such that (before international trading starts) the total abatement costs are minimized, i.e. that the marginal costs of the abatement measures which are realized in the trading sectors and the non-trading sectors are equal. Thus, sectors with cheaper reduction measures should contribute more reductions (relatively) to achieving the emission target. Of the three countries analyzed, the UK appears to be closest to an optimal split, but a final judgement is difficult without verified emissions data for all installations included in the second phase.
- The analyses and arguments developed in this report suggest that – although some “improvement” in the NAPs is noticeable – there are still many allocation rules in the Draft NAPs for Germany, the Netherlands and the UK which reflect attempts made to use the EU ETS for distributional effects and to preserve existing energy structures. These rules often result in negative effects such as increased costs of climate protection, shifting the burden of emissions' reduction to operators of installations not benefiting from special provisions, or to a transfer of wealth and windfall profits.
- With respect to the aims of this project, the analyses carried out and the arguments presented show that there is still ample room to increase the ambition level of the Draft NAPs of Germany, the Netherlands, and to a lesser extent, the UK. This holds true for both the macro level, i.e., the overall budget, as well as for the micro level, that is, the design of the rules governing the allocation of allowances.

General Recommendations

Based on the arguments derived from economic theory and from empirical evidence, the following is being recommended for the future design of NAPs under the EU ETS:

- In the long run all allowances should be auctioned off.
- For the trading period of 2008-2012 Member States should set the share of allowances to be auctioned off at the maximum level allowed by the Emissions Trading Directive, i.e., at 10% of the total budget.
- Auctioning allowances would reduce windfall profits and would be expected to .have the same effects on output prices as free allocation.

- To address early action and provide incentives for replacement of inefficient technologies gratis allocation for existing installations should be based on product-specific benchmarks for sufficiently homogenous product groups.
- Undifferentiated benchmarks for existing installations would provide the highest incentives for the replacement of inefficient technologies.
- Allocating allowances for free to new projects amounts to subsidizing output and increases overall costs to achieve emission reduction targets for society.
- New projects should acquire the necessary allowances at market prices.
- If new projects receive allowances for free, allocation should be based on BAT-benchmarks and standardized load factors.
- Differentiating benchmarks or load factors (e.g. by technologies or fuels) results in distorted incentives for innovation, subsidies for particular technologies or fuels and eventually higher overall reduction costs for society.
- Rather than providing planning security for investments via long-term gratis allocation rules for new projects, governments should signal future scarcity of emission allowances by setting credible long-term emission targets.

1 Introduction and overview

On 1 January 2005, the EU-wide trading system (EU ETS) for CO_2-emissions was launched covering about 11,000 installations from the energy industry and most other carbon-intensive industry sectors. These installations account for about 45 % of total CO_2-emissions, and for about 30 % of all greenhouse gases in the EU (CEC 2005a). As its key climate policy instrument, the EU ETS is expected to help the EU and its Member States (MS) fulfil their obligations under the United Nations Framework Convention on Climate Change, the Kyoto Protocol and the Burden-Sharing Agreement in a cost-efficient way (CEC 2001). In the Kyoto Protocol, the EU has committed itself to reducing emissions of the greenhouse gases CO_2, CH_4, N_2O, SF_6, PFCs and HFCs by 8 % by 2008-2012 compared to base year levels.[2]. In the subsequent Burden-Sharing Agreement, the EU 15-target was broken down into targets for individual Member States. The average reduction target for the new Member States is slightly below 8 %. The first trading period of the EU ETS lasts from 2005 to 2007 and is considered to be a learning phase. The second trading period runs – as do all subsequent periods – for five years and thus coincides with the first commitment period 2008-2012.

Rationale for using emissions trading to address climate change

The prime purpose in using an emissions trading system for climate policy is cost-efficiency, i.e. to achieve a given emission target at minimum cost. The costs to reduce emissions will eventually be reflected in the market price for EU emission allowances (EUAs) and induce demand for innovative, energy/carbon saving processes, products and services. This increased demand should in turn lead to more research and development (R&D), and the invention, adoption and market diffusion of such innovations (dynamic efficiency).[3] In contrast to other environmental instruments, emissions trading systems also assure that a particular environmental target is met. Since the quantity of allowances allocated (emissions cap) corresponds to the emission target for a particular period, the number of greenhouse gases emitted may not be higher than the number of allowances allocated (apart from sanctions). For these reasons, emissions trading systems are often considered to be superior to other regulations[4]. The rate and direction of the technological change induced by the EU ETS crucially depends on the design of the scheme. The design is the EU ETS is governed by the EU Emissions Trading Directive 2003/87/EC (CEC 2003b) as well as by the National Allocation Plans (NAPs) of individual MS.

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2 The base year for CO_2, CH_4 and N_2O is 1990 and for SF_6, HFCs and PFCs 1995.

3 In this sense, emissions trading is also said to represent a demand-oriented regulation – in contrast to supply-oriented regulation like, for example, subsidies for R&D.

4 See, for example a recent literature survey by ZEW (Oberndorfer et al. 2006).

The role of National Allocation Plans in the EU Emissions Trading System

The national allocation plans (NAPs) are the centrepiece of the EU ETS since they state - at the macro level - the total quantity of allowances available in each period (ETS budget), and – at the micro level - how these allowances will be allocated to individual installations. Thus, since the MS differ considerably in terms of their Kyoto / burden sharing emission targets, reduction potentials and their progress so far, the Directive leaves it up to the individual MS how they decide to meet their emission targets. At the macro level, the NAPs determine to which extent the individual MS rely on the EU ETS to achieve their emission targets, that is how to “split the pie”: How many allowances should be allocated to the installations covered by the EU ETS (trading sectors) and what are the expected emissions from installations not covered by the EU ETS (non-trading sectors)? NAPs need to be approved by the European Commission, and the deadline for submission is 30 June 2006 for the second trading period (2008-2012). Prior to the submission of the NAPs by the national governments, the general public should, according to the Directive, be given the opportunity to express their views and comment on draft versions (CEC 2006a). The European Commission has then 3 months for the approval process so that MS will be able to draft their final NAPs at the end of 2006.

Criteria to assess NAPs from the Directive

Among other things, the assessment of the NAPs by the Commission will be based on the following criteria:[5]

- Consistency with the MS’s EU Burden-Sharing Agreement and national climate change programmes; (Criterion 1)
- Consistency with assessments of historical and projected emission trends towards achieving the required emission targets; (Criterion 2)
- Consistency with potential to reduce emissions; (Criterion 3)
- Non discrimination and non favouring certain companies or sectors; (Criterion 5)
- Information on treatment of new entrants; (Criterion 6)
- Information on how clean technologies are taken into account; (Criterion 8)
- Due account to comments made by the public; (Criterion 9)

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5 Criteria (1) to (6) are given in Annex III of the Emissions Trading Directive (CEC 2003b) together with other criteria not mentioned here to save space. The last criteria results from Article 30 of the Directive 2003/87/EC (CEC 2003b) in combination with the so called “Linking Directive” 2004/101/EC. (CEC 2004b)

- Consistency with MS's supplementarity obligations under the Kyoto Protocol for the maximum number of CERs and ERUs which may be used by operators to cover CO_2 emissions in the EU ETS.[6] The use of the EU ETS is in itself regarded as a domestic (intra EU) measure.

The Commission subsequently published non binding guidelines on how it will interpret these criteria in its NAP assessment (CEC 2004a p.5, CEC 2005b). In particular, for the first period (2005–2007), where no international targets exist, the ETS budget is required to correspond to a reduction path which "is intended to be a trend line, not necessarily a straight one, but one that is leading towards or goes beyond" achieving the Burden Sharing target.[7]

Cost efficient size of budget for ET-sector

From an economic perspective, the size of the budgets for the ET-sector and the non-ET-sector should be determined such that (before international trading starts) the total abatement costs are minimized, i.e. that the marginal costs of the abatement measures which are realized in the trading sectors and the non-trading sectors are equal. Thus, sectors with cheaper reduction measures should contribute more reductions (relatively) to achieving the emission target. At least to some extent, criterion (3) – potential to reduce emissions – addresses this issue. According to the NAP Guidance (2004), this "criterion will be deemed as fulfilled if the allocation reflects the relative differences in the potential between the total covered and total non-covered activities", where "potential" also means economic, and not only technical potential.

Medium- and long-term targets for climate policy

Since climate change is a long-term policy challenge, the NAPs should also be consistent with the long-term international and national emission reduction targets. As a mid-term target, the EU Council considers greenhouse gas emission reductions of 15-30 % (compared to 1990 levels) by 2020 to be necessary for industrialized countries in order to limit the mean global temperature increase to 2°degrees Celsius compared to pre-industrialized levels (European Council 2005). Taking into account projected emission growth in developing countries, a recent report by the German Federal Environmental Agency, among others, requires even more stringent long-term targets of 80 % reductions by 2050 for the group of developed countries (Federal Environmental Agency

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6 All Kyoto ratifying countries have committed themselves to fulfil part of the Kyoto target domestically. However, the definition of this so called supplementarity is more qualitative than quantitative. In the Marrakesh Accords, the following wording is used: "…the use of the mechanisms shall be supplemental to domestic action and that domestic action shall thus constitute a significant element of the effort made by each Party included in Annex I…." (UNFCCC 2001).

7 Subsequently, the EC approval process for the first round has led to substantial cuts in the ETS budgets for several MS, including a 3% cut (from 99.3 to 95.3 Mt) for the Netherlands.

Germany 2006). This coincides with the upper range of the long-term recommendations of the March 2005 Environment Council (European Council 2005), which considers reductions by developed countries of 60-80% to be consistent with the EU 2 degree target.

Box: EU Emissions trading and incentives for innovation

Under the EU emissions trading scheme, operators of installations are allocated a certain absolute number of CO_2-emission allowances (EUAs) by their national governments per year.[8] The allocation decision is taken for the entire trading period; allowances are issued each year. Operators have to surrender the number of allowances equivalent to the amount of CO_2-emissions caused by their installations during the previous year. Otherwise, sanctions have to be paid and missing allowances have to be surrendered in the following year.[9] This is crucial for the integrity and functioning of the scheme. Operators of installations whose emissions are lower than their allocated allowances – for example because they invested in energy-efficient equipment – may sell their surplus allowances to those operators requiring additional allowances to cover surplus emissions who only have high-cost abatement measures available. Ideally, a "cap and trade" approach ensures that emissions are reduced where it is cheapest to do so, and that the market price for EUAs reflects the scarcity of allowances in the system. Eventually, the market mechanism ensures that all participants face the same marginal abatement costs so that overall reduction costs are minimized (*static efficiency*). A result from standard economic theory is that under ideal conditions (absence of market power, perfect information), the price for EUAs is independent of the initial distribution of allowances among participants. Similarly, the price for EUAs is independent of whether allowances are allocated for free or auctioned off.[10]

The market price should not only reflect the marginal abatement costs, but also set monetary incentives to adopt new, more energy-efficient technologies with lower emissions (*dynamic efficiency*). These investments either free up emission allowances which may be sold at the market price, or they avoid having to purchase allowances at that price. Because of these additional revenues/cost savings, emissions trading should lead to *direct innovation effects* in the form of the accelerated diffusion of new energy-efficient technologies (Tietenberg 1985, p. 33). At the same time, there are additional incentives for R&D in such technologies.[11] Clearly, the relevance of emissions trading for innovation crucially hinges on the market price for allowances. The higher

8 One allowance (EUA) gives the right to emit one tonne of CO_2.

9 For the first trading period (2005-2007), these sanctions are 40 € per missing EUA; in the second trading period (2008-2012), they are 100 €.

10 In an auction the bids of the participants lead to the outcome that marginal abatement costs are equal across all participants.

11 Of course, the costs for emissions are only one of many determinants of innovation.

the price for allowances, the higher are the incentives for R&D, invention, adoption and diffusion in energy-efficient technologies.

If the additional costs of covering CO_2-emissions are passed on and included in the product (e.g. electricity) prices, emissions trading may also induce *indirect innovation effects* on the demand side where those products are used as inputs (e.g. energy-intensive industries like the aluminium industry, but also private households). The relevance of these indirect effects depends on the extent to which the additional costs for CO_2-emissions can be passed on, as well as on the cost-share of those inputs. Thus, the innovation effects of emissions trading are not limited to the companies directly covered by the scheme.[12]

Purpose of this Report

Greenpeace International asked the Fraunhofer Institute Systems and Innovation Research (Fraunhofer ISI) Karlsruhe, Germany, in cooperation with the Centre for Energy and Environmental Markets (CEEM) at the University of New South Wales, Sydney, Australia and Jos Cozijnsen, consulting attorney emissions trading, Utrecht, the Netherlands, to assess the early draft Second National Allocation Plans as a scientific input to their campaign to strengthen the ambition level of EU emissions trading.[13] The short timeframe and the limited time available allowed the assessment of Draft NAPs for three Member States: Germany, the United Kingdom, and the Netherlands. The analysis focuses on the following key questions:

- Do the NAPs ensure that the national commitments under the Kyoto Protocol will be met?
- Do the NAPs stimulate the development and the diffusion of low carbon intensive technologies?

The report will identify where these Draft NAPs could be more ambitious in terms of meeting the long-term climate targets and in designing allocation rules that would allow the EU ETS to achieve those emission targets at low costs to society.

Methodology and Outline

Summaries of the actual Draft NAPs for Germany, the UK and the Netherlands for 2008-2012 are presented in a structured way together with the NAPs for 2005-2007 in Annex A.

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12 For an assessment of the innovation and efficiency aspects of the NAPs for the EU MS in the first trading period, see Schleich and Betz (2005). For a more general treatment of innovation effects in the EU ETS, see Gagelmann and Frondel (2005).

13 The authors of this report are thankful to valuable assistance by Johanna Cludius, Alejandra Sáez de la Fuente, Frieder Frasch and Michael Ruf.

Section 2 presents the macro plans and the associated budgets for the installations covered by the Directive (ET-budget). To evaluate the MS' progress towards meeting their Burden Sharing targets, Distance-to-Target (DTT) analysis is conducted. The NAPs are also evaluated in relation to medium-term and long-term climate policy targets. To assess the ambition levels of the ET-budgets for the second NAP they are compared with verified emissions in 2005, with projected emissions for 2010 and with the size of the ET-budget for the first phase. In addition, the split of the required reductions between sectors is evaluated from a cost-effectiveness perspective. The outcomes of the verified emissions data (VET) for the installations covered by the EU ETS for the year 2005 together with results on sector-specific analyses of surplus and shortages are presented in Annex B.

Section 3 presents crucial allocation rules at the micro level of the NAPs and explores their implications for innovation relying primarily on insights from basic economic theory. The rules considered are methods of allocation for existing installations and new projects, closure rules and the treatment of clean technologies.

The concluding Section 4 then draws on the analyses presented in the previous sections and identifies areas where the NAPs for Germany, the UK and the Netherlands could be more ambitious in terms of meeting climate targets and in implementing more efficient allocation rules.

2 Quantitative analysis of Draft NAPs for 2008-12 at the macro level

The EU emissions trading scheme is the climate policy instrument at the centre of the European Union's fight against climate change. In EU ETS first phase 2005-07[14], almost 2.2 billion EUAs are allocated each year to the participants of the scheme. The EU ETS therefore covers about 45% of the EU's CO_2 emissions or around 30% of its overall greenhouse gas emissions (CEC 2005a). But the scheme will only contribute to the EU's effort in reaching its Kyoto reduction target of -8% compared to greenhouse gas emissions in the 1990/95 base period if Member States set stringent caps that are in line with their individual Burden Sharing Target. In order to judge whether this is the case, the ETS budget needs to be compared to the Burden Sharing Target and Member States' distance to achieving this target.

We start our quantitative NAP assessment by looking at Member States' burden sharing commitments and progress in achieving them so far. For our quantitative analysis, we use, whenever possible, greenhouse gas data from the UNFCCC national inventory reports of 2006 (UNFCCC 2006), with the most recent year being 2004. We are always considering GHG emissions excluding LULUCF. Figure 1 shows for Germany, the UK and the Netherlands their Burden Sharing Target (green bars: -21%, -12.5% and -6%, respectively) and their distance to achieving this 2008-2012 target (yellow bars). In 2004, Germany and the Netherlands still had to further reduce their GHG emissions by -3.5% and -8.3%, respectively, while the UK had already fulfilled its target: its 2004 GHG emissions were 1.3% below its base year emissions. When adding the intended governmental use of Kyoto mechanisms (KM), such as CDM and JI credits, this distance-to-target (DTT) figure improves for the Netherlands. While Germany and the UK intend to achieve their Burden Sharing Target by domestic action only, the Netherlands plan to buy KM credits offsetting approx. 20 Mt CO_2e/a of its yearly GHG emissions in the Kyoto period (Draft NAPs of Member States, 2006). This figure is equivalent to 9.5% of the Dutch Burden Sharing Target and the Dutch target therefore increases from 200.2 Mt CO_2e/a to about 220 Mt CO_2e/a in 2008-12. Taking this number into consideration when calculating the distance-to-target in 2004, the Netherlands would have already reached its Burden Sharing Target (+1.2%), as can be seen in the red bar in Figure 1. These figures need to be kept in mind when assessing the ambition level of the proposed caps for the second phase of the EU ETS.

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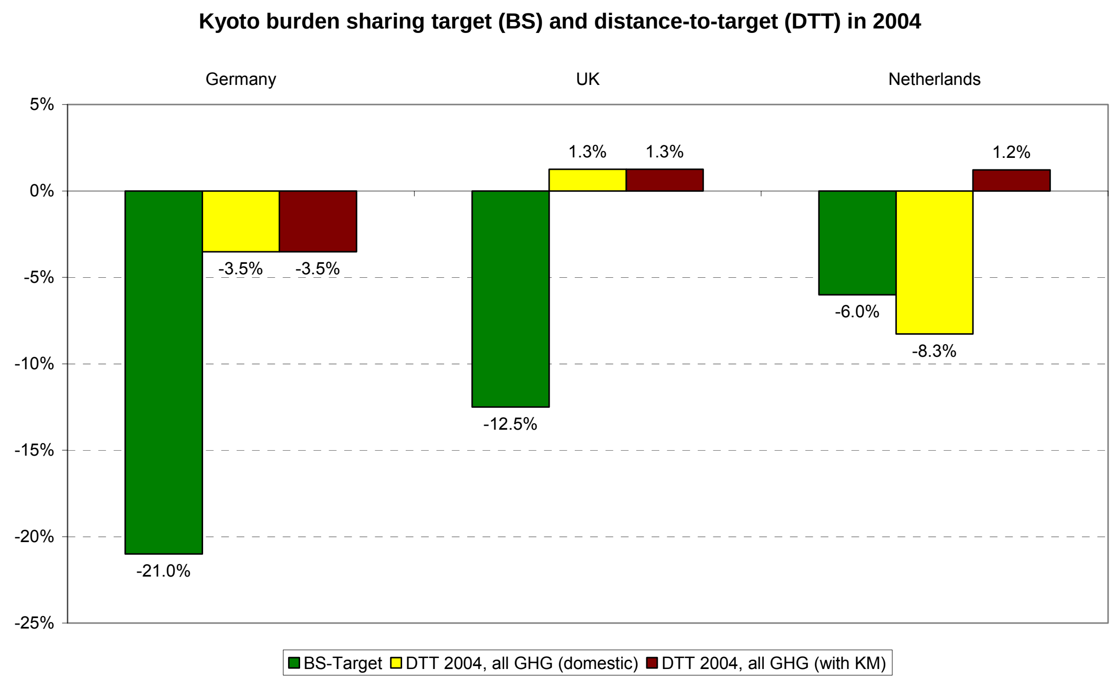
14 The words “phase” or “trading period” are used interchangeably in the report when referring to the periods 2005-2007 and 2008-2012 for which National Allocation Plans have to be developed.

Figure 1: Comparative analysis of Kyoto burden sharing and distance-to-target in 2004 of the Netherlands, United Kingdom and Germany



Source: Fraunhofer ISI, based on UNFCCC national inventory reports 2006 (NIR/CRF) of the UK, NL and GER

The release of the emissions data (verified emissions tables – VET) of the EU ETS installations in 2005 on May 15, 2006 (VET 2005) showed that the majority of Member States had set a generous cap (CEC 2006c) (see also Annex B of this report). The UK was one of the few countries for which total 2005 emissions by ET-installations were lower than the total allocated quantities of EUAs. Figure 2 shows that the amount of allowances allocated in 2005[15] was 15.8% below the actual emissions of the UK installations covered by the EU ETS in 2005, or about -33 Mt CO_2e/a, indicating a stringent cap. On the other side, 2005 emissions of German and Dutch installations were below the amount allocated to them in 2005 (4.3% and 7%, respectively). This figure could still change for Germany as it is intending ex-post corrections of its allocations to a number of installations, e.g. for those who applied for allocation according to the option rule where allocation is based on specific emission values (benchmarks) and projected output. However, this potential cut – amounting to about half of the excess allocation – will only be undertaken if Germany wins a court case against the EU Commission, who had forbidden any kind of ex-post adjustments to allocations.

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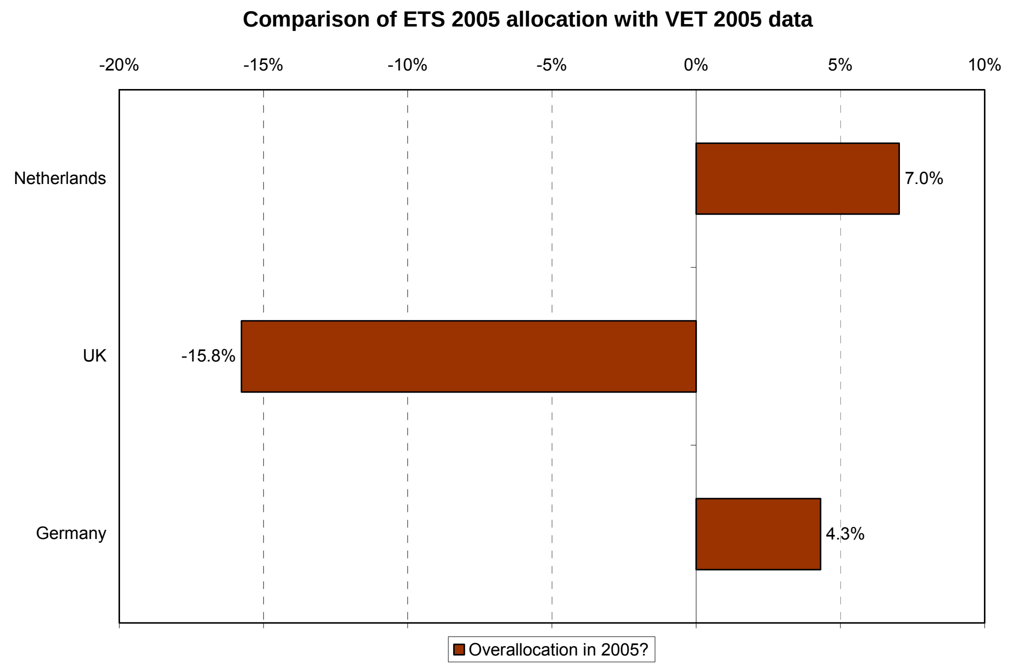
15 This figure does not include the new entrants' reserve, or amounts set aside for opted-out installations.

Figure 2: Comparison of EU ETS allocation for 2005 to actual emissions of EU ETS installations in 2005



Source: Fraunhofer ISI, based on Draft NAPs II and NAPs I of GER, the UK and NL as well as VET of 2005 (CEC 2006c)

2.1 Ambition level of ETS caps for the NAP 2008-12

An assessment of the stringency of the caps Member States proposed for the second phase of the EU ETS is not as straight forward as the comparison of actual allocation and emissions data for 2005. This is the case because data are still subject to change, and not always complete yet. However, there are a number of criteria that help to evaluate the stringency of the ETS budget for 2008-2012. The numbers calculated based on these criteria are just indicative, and need to be interpreted with caution, but some general conclusions can still be drawn from such an early assessment.

1. *ETS emissions in 2005*

First, the ETS cap can be compared to historic emissions of the trading sector. Two options of historic data can be chosen for such a comparison: either the CO_2 emissions of the ETS sector in the country-specific base period (numbers taken from NAP), or the actual emissions of installations covered by the EU ETS. We decided to use the 2005 VET data of the EU ETS installations, as these numbers can be better compared and are all verified and likely to be of better quality than some of the data for the base year emissions Member States had to base their Draft NAPs on. For example, Germany is still in the process of compiling 2003 and 2004 emissions data for its base period of

2000-2005 and therefore figures in the Draft NAP only cover data for the old base period of 2000-2002. Also, VET data for 2005 is available for all three countries, is most up-to-date, and allows for the most objective comparison since it does not rely on Member State specific base periods (which may differ, e.g. 2000-2003 for the UK, 2000-2005 for Germany and the Netherlands, where the UK and the Netherlands allow companies to pick three years out of these periods). However, there is one major caveat in comparing the VET of 2005 data with the cap for the EU ETS for 2008-12: the VET 2005 data does not incorporate the extension of the scope of the EU ETS. Most Member States will include additional installations in the second trading period in an effort to harmonize the applied definition of combustion installation.[16] Also, the UK and the Netherlands have applied opt-out rules in the first phase, so that their VET 2005 data does not reflect the emissions of these installations that are temporarily excluded from the scheme, but will need to be included in phase 2, since the EU ETS directive does not foresee the option of opt-outs beyond 2007. In order to still obtain reliable results, we therefore adjusted the VET 2005 data in two ways: First, we added the reported 2005 emissions of potential additional installations (see figures in NAP tables), even though they are still just estimates subject to change. Of course, we only did so if the caps for phase 2 as stated in the Draft NAPs did already incorporate the amount of allowances to be allocated to additional installations (e.g., in the UK the cap 2 is 252 $MtCO_2e/a$ which includes opt-out installations but excludes additional installations, with which the cap could increase up to 261 $MtCO_2e/a$). Secondly, we corrected the VET 2005 figures by adding emissions of opt-out installations, as they are incorporated in the NAPs of the UK and the Netherlands. We were doing this by comparing the foreseen 2005 yearly allocation (stated in NAP) with the actual 2005 allocation (stated in CEC 2006c), taking out the new entrants' reserve). Of course, it is not sure whether actual emissions of opt-out installations are smaller, bigger or about the same than the 2005 allocation originally foreseen to them. Therefore, this method gives us only a proxy of their 2005 emissions. Finally, since there might not have been many new entrants in 2005 and our second step excluded the unused NER of 2005, we also excluded the new entrants' reserve from the ETS-cap for phase 2. When interpreting the results the aforementioned data limitations need to be kept in mind.

2. ETS budget of previous phase 2005-2007

A second criterion for assessing the size of the ETS budget is by comparing the proposed cap for the second phase with the cap of the first phase, which is somehow similar to a comparison of the phase 2 cap with 2005 emissions. Still, it is another helpful method in order to assess whether the ambition level of the ETS is increasing. We are

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16 The NAP guidance for the second phase requires that "In order to remove inconsistencies in the second trading period, all Member States should therefore in any case include also combustion processes involving crackers, carbon black, flaring, furnaces and integrated steelworks, typically carried out in larger installations causing considerable emissions" (CEC 2005b, p.9).

doing this by taking the cap for phase 1 and 2 (each including the reserve for new entrants). Both caps should equally incorporate the foreseen allocation level for both 2005-07 opt-in and opt-out installations (the latter is only relevant for the UK and the Netherlands, the former only for the Netherlands), but should either exclude 2008-12 new opt-ins or adjust the cap for phase 1 by these additional emissions (only relevant for the Netherlands). Also, if the cap for phase 2 already includes the allocation to additional installations, then we adjusted the cap 1 figure by the specified 2005 emissions level for these installations, thereby making both figures match (in our case, only necessary for Germany and the Netherlands, as the UK cap does not yet incorporate the allocation to additional installations). Additional installations will be included in all three Member States due to the harmonization effort regarding the definition of combustion installations, but also with respect to 2008-2012 additional opt-ins (e.g. N_2O in the Netherland whose allocation, though, is not yet incorporated in the cap for the second trading period; additional installations' allocation in the UK is also not yet incorporated in its phase 2 cap). It needs to be noted that this is just a rough estimate of the adjusted cap for phase 1 because we do not correct the estimated 2005 emissions of these additional installations by the compliance factor used in phase 1. Therefore, the numbers need to be interpreted with caution, but can be seen as indicative figures.

3. *ETS emissions projection 2010*

A third way to assess the ETS cap for 2008-12 is by comparing it with emissions projections for the ETS sector for the second trading period. This criterion is also in line with the allocation method of most Member States being based on projections for the ETS sector. However, data on projections is not always included in the NAP. In order to still make a comparison based on this criterion, we estimated the ETS sector projection for the Netherlands based on its 2010 projection for all GHG, multiplying this by the share of the ETS sector's CO_2 emissions (VET 2005 data) relative to the total GHG emissions for the Netherlands, using the most recent data for 2004 (*National Inventory Reports to the UNFCCC 2006*, UNFCCC 2006). We further assumed that this ratio will remain constant. This is a typical assumption, also used by many Member States in their NAPs. However, it needs to be kept in mind that with the inclusion of additional installations, activities and gases (such as N_2O in the Netherlands), the share of the trading sector's GHG emissions relative to total GHG emissions is likely to increase in the future and thereby also both the ratio of ETS emissions to total GHG emissions and the projection for future ETS emissions. While the determination of the ETS ratio is a crude estimate, it is still useful to look at these figures, taking them as the closest possible proxy. Unfortunately, for Germany there is no recent projection, and therefore criteria three is only applied to the UK and the Netherlands. Their projections are compared to the proposed cap for the second trading phase.

4. *Hypothetical burden sharing budget of ETS 2010*

While the first three criteria are only giving an answer to the direction of the cap compared to past emissions and policy as well as future emissions, the fourth criteria is the only one that is providing insights into the ETS sector's contribution to a Member State's Kyoto Burden Sharing Target. This can be done by comparing the cap with the hypothetical emissions target for the ETS sector for the Kyoto period 2008-12. We obtain this *hypothetical ETS Burden Sharing Target* for a Member State as follows. The annual average Burden Sharing Target for 2008-2012 (all GHG, but excluding LULUCF, UNFCCC 2006 data of NIRs for 2004) is multiplied with the ETS sector's share of total GHG emissions. This ratio is determined by using most up-to-date data for 2004/2005: the ETS sector's CO_2 emissions in 2005 (CEC 2006c) are divided by the total GHG emissions of a country, using most recent data for 2004. The same caveats as stated above apply when using this ratio: it is assumed to be constant over time and 2004/2005 data are assumed to be sufficiently comparable.[17] The same procedure can be applied to calculate a proportional sectoral distribution of the Burden Sharing Target among different sectors. In our analysis, we are distinguishing criterion four into a scenario with domestic action only, and one including a Member State's intended use of Kyoto mechanisms in fulfilling its target:

a. *Without governmental use of Kyoto mechanisms*

   In the domestic action scenario we calculate the hypothetical ETS BS target without the intended governmental use of Kyoto mechanisms.

b. *With governmental use of Kyoto mechanisms*

   In a second scenario, we incorporate Member States' planned purchases of CERs, ERUs and/or AAUs to meet their Kyoto Burden Sharing Targets. As a consequence, the hypothetical ETS BS target increases as well. This option is only relevant for the Netherlands, as both Germany and the UK intend to reach their Burden Sharing Target through internal measures only.

All four criteria can only be interpreted as first impression of the ambition level of the ETS caps for the second trading period. The calculations will need to be updated once allocation data is confirmed and data uncertainties of opt-out and opt-in as well as additional installations can be eliminated. Also, once the GHG emissions of the ETS sector with its expanded scope become available for 2005, the ratio of the ETS sector's emissions compared to total GHG emissions ought to be updated. The same is true once

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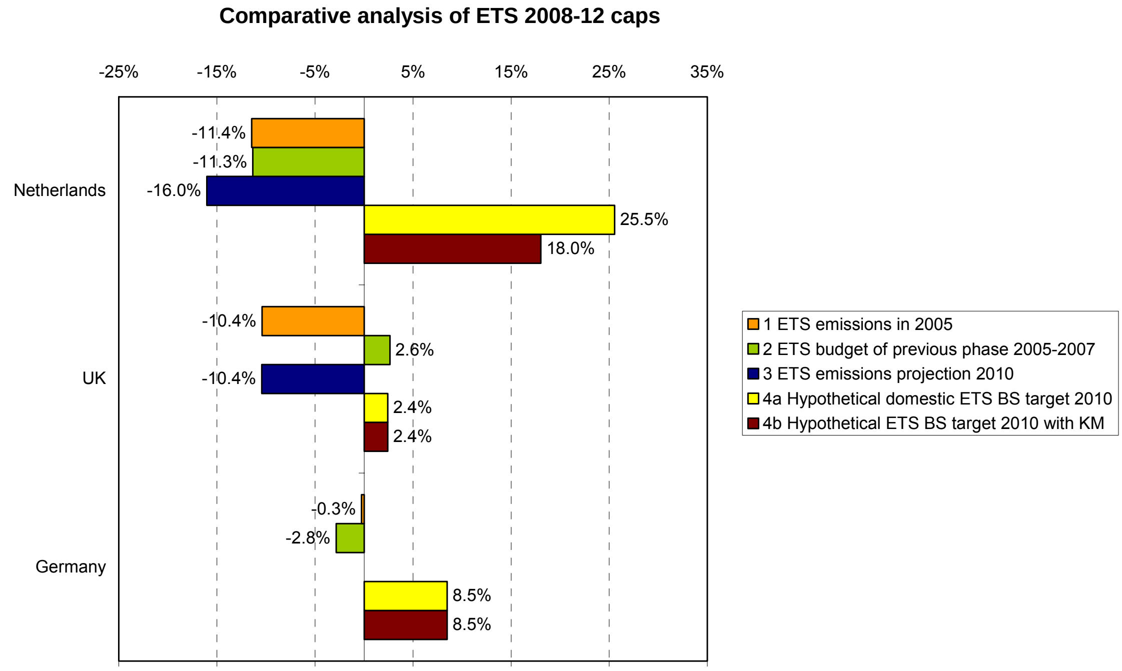
17 In particular, a more accurate hypothetical BS target for the ETS installations would have to also account for emissions by installations which will be added to the set of installations covered by the EU ETS in the second phase. However, no verified data on recent emissions by these installations is available. The same rationale applies for previously opted out installations whose emissions are not included in VET 2005 data. Therefore, the ratio of ETS to all GHG will increase and therefore also the hypothetical burden sharing target for the ETS sector. The general statements, though, still hold.

the total GHG emissions data for 2005 becomes available. With these limitations in mind, Figure 3 gives some indicative insights into the proposed ETS budgets for the NAP II of Germany, the United Kingdom and the Netherlands. It shows the results of the application of the four assessment criteria.

Figure 3: Preliminary comparative analysis of caps of the EU ETS phase 2



Source: Fraunhofer ISI, based on Draft NAPs II and NAP I of the UK, NL and GER, VET of 2005 ETS emissions data (CEC 2006c)

1. *ETS emissions in 2005* (orange bar): As can be seen, all three Member States decreased their ETS cap compared to the actual ETS CO_2 emissions in 2005, though the cut is rather small for Germany (Germany -3.5%, the UK -10.4% and the Netherlands -11.4%).

2. *ETS budget of previous phase 2005-2007* (green bar)*:* The analysis shows that Germany and the Netherlands are also allocating less allowances to the ETS sector in phase 2 compared to the allocation in the first period 2005-07 (Germany -2.8%, the Netherlands -11.4%). On the other hand, the UK is increasing its phase 2 cap by 2.6% which might be reflecting the fact that actual emissions for 2005 showed a significant shortage for the ETS installations of the UK (-33 Mio EUAs, or almost 16%) as well as the comfortable position the UK is in with regard to its current overachievement of its Burden Sharing Target by 1%. However, in the light of its ambitious CO_2 emission reduction target the UK needs to further stimulate emissions cuts and investments in clean technology in the ETS sector which covers about 43% of its CO_2 emissions.

3. *ETS emissions projection 2010* (blue bar): In terms of the projection, data was available for the UK and the Netherlands only, showing that both country's ETS cap is well below their projection of CO_2 emissions of the ETS sector in 2010 (Kyoto period, the UK -10.4% and the Netherlands -16%). Of course, this figure depends on the reliability of the projection.

4. *Hypothetical Burden Sharing Target of ETS 2010:* All three countries decided to give the ETS sector a higher than proportional share of the assigned amount (see also Figure 4 for Germany, Figure 5 for the UK, and Figure 6 for the Netherlands). Looking at the yellow bars, you can see that the Netherlands provides its ETS sector with an allocation that exceeds the equi-proportionally distributed share of ETS to all GHG emissions by approx. 25% (*without the use of Kyoto mechanisms*), a figure that goes down to 18% when including the governments intention to use Kyoto credits in fulfilling their target (w*ith the use of Kyoto mechanisms*, red bar). Germany is also quite generous in setting its ETS cap for phase 2, giving the ETS sector an advantage over other sectors of 8.5%.[18] Only the UK's proposed allocation is close to a situation where the ETS sector's cap corresponds to its hypothetical Burden Sharing Target (only 2.4% above the hypothetical ETS BS target).[19] Providing the ETS sector with a higher than proportional share of a country's Kyoto budget is questionable for several reasons: First, as several studies suggest, the marginal abatement costs of the ETS sector are lower than abatement costs of other sectors of the economy, such as transport and private households[20]. Thus, while the ETS enables the trading sector to cost-efficiently achieve its cap, the economy as a whole pays a premium for providing a more generous share of the Kyoto budget to the ETS sector rather than to those sectors where it is more costly to achieve emissions reductions*.* Such an approach, secondly, also appears unnecessary as long as companies have the option to comply with their ETS obligations by partly using CERs and ERUs, thereby providing even lower cost mitigation options (which are not available to private households, for example). This result is likely to hold true even when the ratio of ETS GHG emissions to total GHG emis-

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18 For Germany the CO_2-emission reductions required by the Draft NAP for 2010 compared to the base period 2000/2002 is actually significantly lower than the reductions promised in the voluntary agreement between the German Industry and the Government from October 2000. These reductions would be more in line with an "efficient" emissions budget.

19 If rough estimates for the emissions of additional installations to be included for the second phase are used, the relative difference between the caps and the hypothetical ETS budgets are for Germany + 6.3 %, for the UK – 0.7 % and for the Netherlands +10.7% (or +1.7 % when including the governmental use of Kyoto mechanisms). Thus, accounting for these additional effects, the distance between the actual and the optimal split becomes smaller, in particular for the UK. However, a final judgement is difficult without verified emissions data for all installations included in the second phase.

20 See for example, Böhringer et al. (2005), Criqui and Kitous (2003).or Klepper and Peterson (2005)

sions will increase due to the inclusion of additional installations. Therefore, especially the caps of the Netherlands and Germany should be reviewed in the light of minimizing society's costs of fighting climate change. It is therefore worth to take a closer look a proportional distribution of Member States emissions reduction targets.

Table 1 shows the deviation of the proposed ETS cap for phase 2 from the hypothetical ETS Burden Sharing Target, assuming that the reduction burden to reach the Kyoto budget is distributed proportionally across sectors. From the table it can be seen that there is still room to increase the ambition level of the ETS phase 2 caps, especially for the Netherlands where a reduction of around 25% (or 25 Mt CO_2e/a) would be needed until the ETS cap would correspond with the hypothetical Burden Sharing Target. In Germany, our analysis suggests that the cap would need to be cut by approx. 8% (or 40 Mt CO_2e/a) until the cap would equal the hypothetical ETS BS target. The cap of the UK is closest to the hypothetical ETS BS target, but also would need to be reduced by some 2% (or 6 Mt CO_2e/a) until it would correspond with the hypothetical ETS BS target.[21] Since emissions reductions in the ETS sector commonly considered to be cheaper than elsewhere in the economy, these numbers are rather conservative estimates, even though the above mentioned reasons for a cautious analysis still apply. However, it is rather save to conclude that further cuts of the phase 2 ETS budgets will most likely lead to a decrease of the overall mitigation costs of the whole economy.

Table 1: ETS phase 2 caps of Draft NAPs, hypothetical Burden Sharing targets of trading sector and corresponding deviation of proposed 2008-12 ETS cap

		Germany	**UK**	**Netherlands**
ETS Cap II (incl. NER)	Mt CO2e/a	495.50	252.00	99.20
BS Target ETS	Mt CO2e/a	453.51	245.92	73.85
Excess allocation compared to	Mt CO2e/a	41.99	6.08	25.35
equal BS contribution by sectors	%	8.5%	2.4%	25.5%

Source: Fraunhofer ISI, based on Draft NAPs II and UNFCCC national inventory reports 2006 (NIR/CRF) of the UK, NL and GER

2.2 Evaluation of ETS caps compared to emission trends from 1990-2004 and targets from 2010-2050

In the following Section, we take a closer look at the GHG emissions situation of Germany, the United Kingdom and the Netherlands, especially focusing on emission trends, the Kyoto target as well as potential longer term reduction targets and the corresponding targets for the EU ETS trading sector. Again, we used greenhouse gas

21 Due to data limitations, these numbers need to be interpreted with caution, see explanation in footnote above.

data from the UNFCCC national inventory reports of 2006, where the most recent year is 2004. We have split up the total GHG emissions into five groups:

- *Energy and industry* (E&I, pink striped bar): This category includes CO_2 emissions from energy combustion activities (without emissions from our two categories transport and private households, commerce and others) and industrial process emissions.
- *Transport* (green bar): This category includes all CO_2 emissions from transport activities, but excludes emissions from bunker fuels (e.g. aviation).
- *Private households, commerce / services and other energy-related emissions* (Households, commerce and others, purple bar): This category includes CO_2 emissions that are commercial / institutional, residential, and of agriculture / forestry / fisheries, military as well as fugitive emissions from fuels.
- *Others* (blue bar): CO_2 emissions in this category are those from solvents and other product use, waste and others.[22]
- *Non-CO_2 greenhouse gas emissions* (Non CO_2, yellow bar): This category sums up CH_4, N_2O, HFCs, PFCs and SF_6 emissions from all sectors, i.e. all non-CO_2 Kyoto gases.

The data for these four categories is shown for 1990 (not necessarily the base year, since for some gases 1995 emissions can be chosen as base year emission levels), 2000 and 2004. Also, the graph includes the country's Kyoto budget for 2010 and the proportional distribution of this target (as of 2004) among these three categories.

In addition, we depicted the proposed ETS cap for phase 2 for 2010 (orange bar). Also, we included a line indicating the size of the hypothetical Burden Sharing Target for the ETS sector in 2010 (Kyoto period)[23]. Finally, for the Netherlands, the red doted line shows the hypothetical Burden Sharing Target for the ETS sector in 2010 when including the governmental use of Kyoto mechanisms.[24] The graphs clearly show – once more – that the German and Dutch ETS caps for 2008-2012 are very generous compared to the hypothetical ETS emissions target. This is especially the case for the

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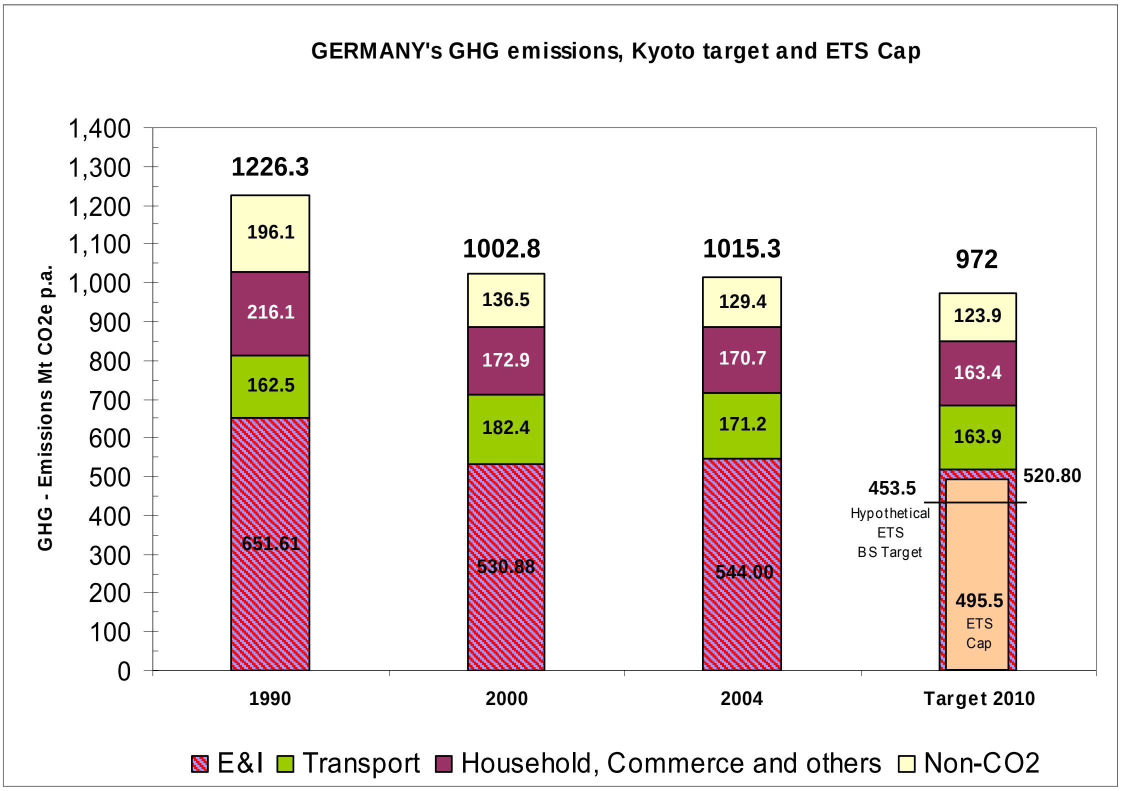
22 There are no emissions reported in this category for Germany.

23 This figure is just an estimate as it neither includes emissions from installations that opted-out of the EU ETS in phase 1 nor additional ETS installations to be included in the scheme starting 2008. We excluded these data, as emissions are not yet verified for these additional sources. Therefore, our figures are likely to slightly underestimate the hypothetical ETS targets.

24 Note that this doted line cannot be compared to the overall Kyoto target and the corresponding distribution among sectors as shown in the graph because the use of Kyoto mechanisms does not only increase the hypothetical Burden Sharing Target of the ETS but also the overall target as well as the share of all the other sectors.

Netherlands, as their proposed allocation for 2008-12 is even exceeding the E&I sectors hypothetical BS target.

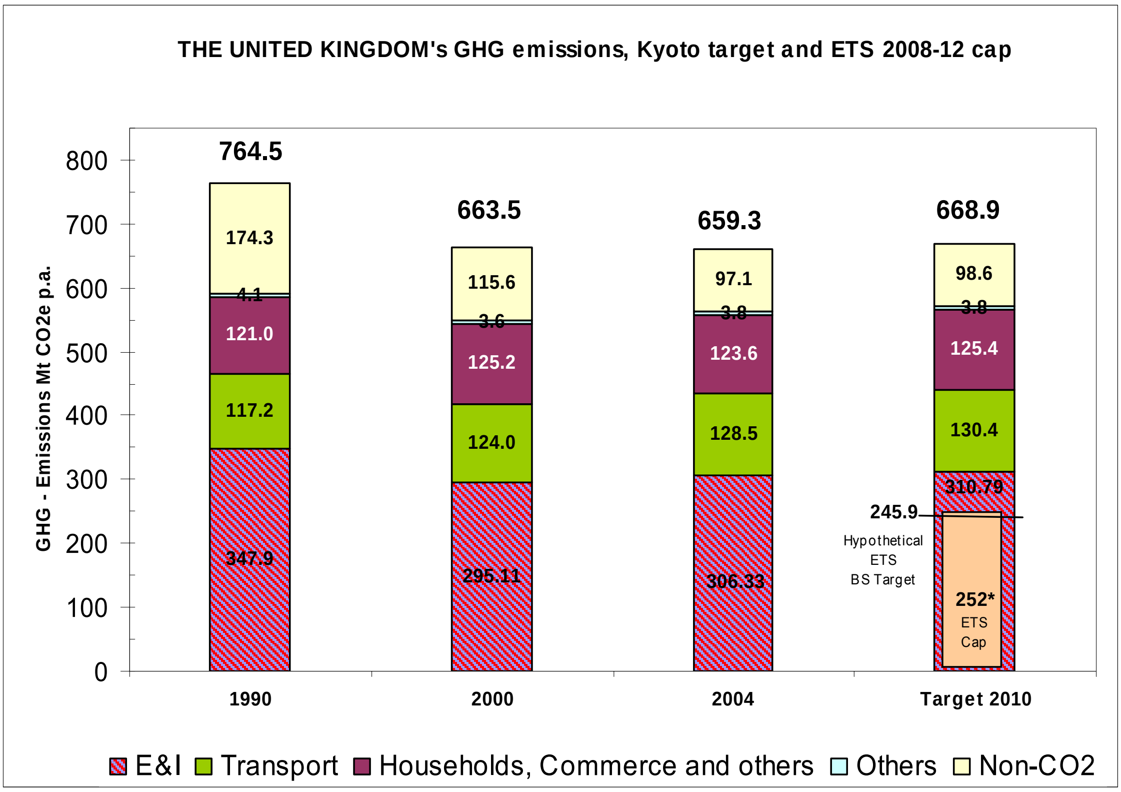
Figure 4: Germany's GHG emissions, Kyoto target, EU ETS cap of Draft NAP 2008-12 and hypothetical ETS Burden sharing target (no state use of Kyoto mechanisms)[25]



Source: Fraunhofer ISI, based on NIR / CRF 2006 for Germany; UNFCCC 2006; German NAP 2008-12; VET 2005 for ETS in Germany (CEC 2006c)

25 Note that the Draft NAP II of Germany states on p. 43 et seq. a different hypothetical ETS BS target than the one we calculate based on UNFCCC 2006 data rather than using the German Energy Balances, as was done for the German NAP. If we had included the estimated amount of CO_2 emissions of additional installations, the hypothetical ETS burden sharing target 2010 would have gone up to about 564 Mt CO_2e/a.

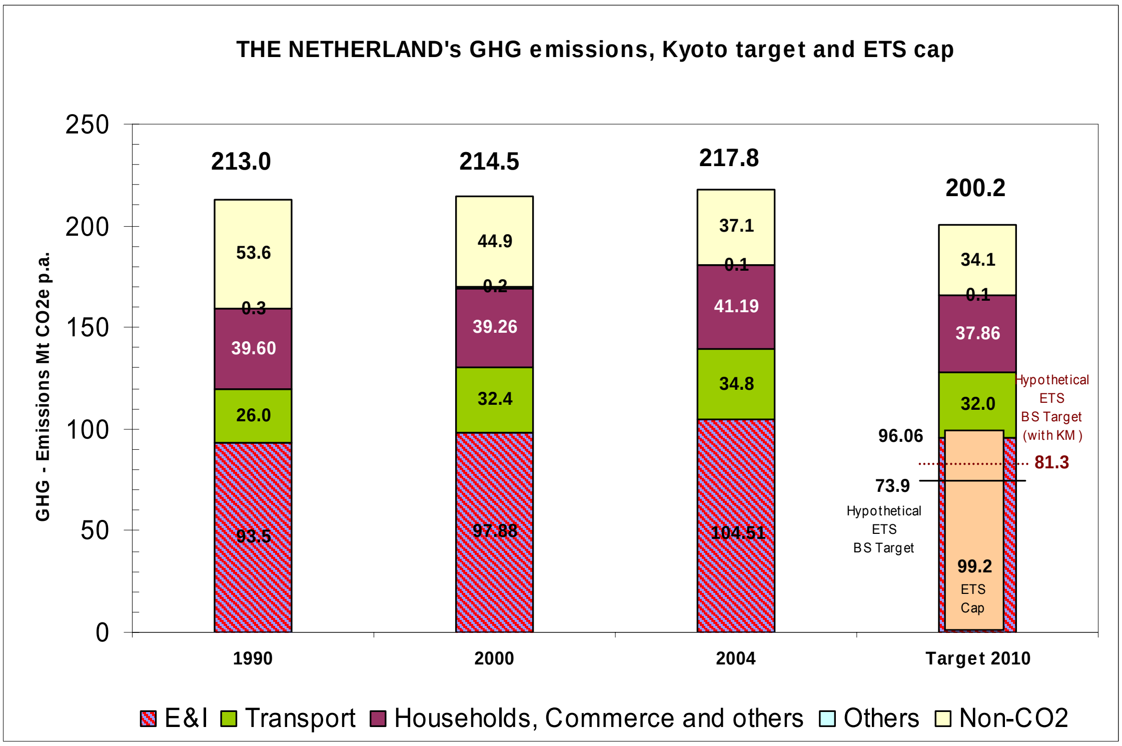
Figure 5: The United Kingdom's GHG emissions, Kyoto target, EU ETS cap of Draft NAP 2008-12 and hypothetical ETS Burden sharing target (no state use of Kyoto mechanisms)[26]



Source: Fraunhofer ISI, based on NIR / CRF 2006 for the UK; UNFCCC 2006; the UK NAP 2008-12; VET 2005 for ETS of the UK (CEC 2006c)

26 The UK ETS cap for phase 2 does not yet include additional installations but already covers previously opted-out installations. If the draft NAP estimate for emissions of additional installations were used, the hypothetical ETS burden sharing target would increase to ca. 254 Mt CO_2e/a, while the UK ETS cap is considered to be extended up to 261 Mt CO_2e/a.

Figure 6: The Netherlands' GHG emissions, Kyoto target, EU ETS cap of Draft NAP 2008-12 and hypothetical ETS Burden sharing target (with and without use of Kyoto mechanisms (KM))[27]



Source: Fraunhofer ISI, based on NIR / CRF 2006 data for the Netherlands; UNFCCC 2006; Dutch NAP 2008-12; VET 2005 for ETS in the Netherlands (CEC 2006c)

The data shown in the graphs is also depicted in Table 2 for Germany, Table 3 for the UK and Table 4 for the Netherlands. In these tables, we added hypothetical GHG emission reduction targets for 2020 and 2050 (compared to the Kyoto base period). For 2020, we assumed a target of -30% (in line with recommendations of the European Council of -15% to -30%) and for 2050 a target of -80% (in line with aspirations of the Environmental Council of -60% to -80%), both relative to the Kyoto base period 1990/95. These targets are formulated as being necessary in order to achieve the 2 degree target. We chose these years and reduction targets – rather than country-specific national goals, such as -40% by 2020 for Germany[28] – to render the numbers

27 The Netherlands hypothetical ETS burden sharing target increases to approx. 89 Mt CO_2e/a (or 97 Mt CO_2e/a, with KM) when calculated with preliminary data for additional installations.

28 For comparison, the "hypothetical" budget in 2020 for the German ETS sector under the 40% reduction scenario would be about 345 M t CO_2e/a.

comparable across countries.[29] We distributed these hypothetical targets proportionally across sectors, which corresponds to assuming a constant share of GHG emissions with respect to 2004/05. The numbers, especially those for the EU ETS in its current scope, impressively show that these long term targets can only be achieved through fundamental reductions of GHG emissions: Germany's hypothetical ETS emissions target for 2010 would have to be further reduced to approx. 400 Mt CO_2e/a by 2020 and to around 115 Mt CO_2e/a by 2050. The United Kingdom's hypothetical ETS emissions target for 2010 would have to be reduced to around 200 Mt CO_2e/a by 2020 and to around 56 Mt/a by 2050. The Netherlands' hypothetical ETS emissions target for 2010 would have to be lowered to ca. 55 Mt CO_2e/a by 2020 and some 15 Mt/a by 2050. This highlights the importance of setting incentives originating from the EU ETS in a way that the ETS sector will be on track and prepared meeting these long term targets. Today's caps and allocation rules, especially those for new entrants need to be viewed from the prospect of meeting such deep cuts as those reflected in the numbers presented here. However, current NAPs do not support such a development, as can be seen in the analysis of the micro-plans of the phase 2 NAPs of Germany, the UK, and the Netherlands. This is particularly troublesome as in phase 2 a significant share of capital in the power sector will need to be replaced, opening up a window of opportunity for a change towards low-carbon technologies. Current draft NAPs jeopardize these opportunities.

Table 2: GHG emissions path and implications of potential long-term targets for Germany

	1990	2000	2004	Target 2010	Potential Target 2020	Potential Target 2050
					-30%	-80%
E&I	651.61	530.88	544.00	520.80	461.47	131.85
Transport	162.5	182.4	171.2	163.9	145.21	41.49
Household, Commerce and others	216.1	172.9	170.7	163.4	144.77	41.36
Others	0.0	0.0	0.0	0.0	0.00	0.00
Non-CO2	196.1	136.5	129.4	123.9	109.78	31.37
Total	1,226.3	1,022.8	1,015.3	972.0	861.24	246.07
ETS Cap				495.5		
Hypothetical ETS Target				453.5	401.84	114.81
Hypothetical ETS Target (with KM)				453.5		

Source: Fraunhofer ISI, based on NIR / CRF 2006 for Germany; UNFCCC 2006; German NAP 2008-12; VET 2005 for ETS in Germany (CEC 2006c)

29 Clearly, these analyses are hypothetical scenarios only and are not based on any kind of burden-sharing across EU MS to achieve a given emission reduction target at the EU level.

Table 3: GHG emissions path and implications of potential long-term targets for the UK

	1990	2000	2004	Target 2010	Potential Target 2020	Potential Target 2050
					-30%	-80%
E&I	347.9	295.11	306.33	310.79	248.63	71.04
Transport	117.2	124.0	128.5	130.4	104.29	29.80
Households, Commerce a	121.0	125.2	123.6	125.4	100.34	28.67
Others	4.1	3.6	3.8	3.8	3.05	0.87
Non-CO2	174.3	115.6	97.1	98.6	78.84	22.53
Total	764.5	663.5	659.3	668.9	535.15	152.90
ETS Cap				252.0		
Hypothetical ETS Target				245.9	196.74	56.21
Hypothetical ETS Target (with KM)				245.9		

Source: Fraunhofer ISI, based on NIR / CRF 2006 for the UK; UNFCCC 2006; the UK NAP 2008-12; VET 2005 for ETS of the UK (CEC 2006c)

Table 4: GHG emissions path and implications of potential long-term targets for the Netherlands

	1990	2000	2004	Target 2010	Potential Target 2020	Potential Target 2050
					-30%	-80%
E&I	93.5	97.88	104.51	96.06	71.54	20.44
Transport	26.0	32.4	34.8	32.0	23.84	6.81
Households, Commerce and others	39.60	39.26	41.19	37.86	28.20	8.06
Others	0.3	0.2	0.1	0.1	0.10	0.03
Non-CO2	53.6	44.9	37.1	34.1	25.41	7.26
Total all 6 GHG	213.0	214.5	217.8	200.2	149.07	42.59
ETS Cap				99.2		
Hypothetical ETS Target				73.9	55.00	15.71
Hypothetical ETS Target (with KM)				81.3		

Source: Fraunhofer ISI, based on NIR / CRF 2006 data for the Netherlands; UNFCCC 2006; Dutch NAP 2008-12; VET 2005 for ETS in the Netherlands (CEC 2006c)

The figures and analyses presented imply that if future emissions develop like past emissions emission reduction targets of 30% and 80% cannot be met in the future.

3 Analysis of allocation rules at the micro level

This Section analyses the allocation rules at the micro level of the NAPs which are important for innovation effects. Based primarily on arguments from economic theory, allocation rules are identified which help the EU ETS put MS on route to reducing greenhouse gas emissions at the lowest possible costs to society.

3.1 Free allocation versus auctioning

In principal, allowances may be allocated for free or auctioned off to participants.[30] For the second trading period (2008-2012), the Emissions Trading Directive (CEC 2003b) requires that the share of allowances that can be allocated through an auction is at most 10 %; for the first trading period, this share was up to 5 %. While the method of allocation does not – at least under ideal conditions assuming the absence of market power – affect the market price for EUAs, participating companies are better off if allowances are allocated for free, since their wealth increases by the total value of these allowances. Auctioning off all allowances could avoid most, if not all, problems and distributional aspects such as early action, windfall profits or rules for new projects and closures. Distributional aspects in particular dominated the processes that led to the first NAPs in most EU MS and are the source of several counterproductive rules in the EU ETS.[31] Thus, if all allowances were auctioned off, the NAPs would be much simpler more transparent and more effective. In addition, the outcome of an auction may be perceived as "fair" because – in contrast to a free allocation of allowances- the "polluter-pays principle" holds.

Auctioning off allowances would also address "windfall profits". Since companies try to pass on any additional marginal costs (opportunity costs) associated with emissions (i.e. price of allowances) to customers, extra profits (windfall profits) accrue if allowances are allocated for free. Note that opportunity cost pricing is not only sensible from an economic perspective, it is also essential for an ETS to send the correct price signals in order to provide adequate incentives to save emissions and to minimize total reduction costs.[32] In principle, whether allowances are auctioned off or allocated for free does not alter the opportunity costs (of additional emissions), but leads to very different outcomes in terms of the distribution of the scarcity rents associated with the allowances. The power sector managed to pass on a large part of the opportunity costs

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30 Allowances may also be sold at a fixed price. In this case, however, participation would have to be rationed according to some rule as long as this fixed price remains below the (expected) market price.

31 These problems include, among others, early action, rules for new entrants, or ex-post adjustments (like in Germany in NAP 1).

32 From this perspective any attempts to directly regulate the price for EUAs, for example by setting a cap, would be counterproductive.

to its customers, in particular since demand for electricity is fairly inelastic (at least in the short run).[33] As a consequence, the power sector was able to secure high windfall profits. Estimates of the pass-through rates are generally high. These rates vary between 60 and 80 %, depending on the country, market structure, demand elasticity and CO_2 price considered (Sijm et al. 2006). Windfall profits would disappear if allowances were auctioned off. The auction revenues could then be used for other purposes. Thus, in the long run, the EU ETS should strive for an auction share of 100 %. To phase in a fully auctioned system, the auction share for the second trading period could be set to the maximum allowed by the Emissions Trading Directive (CEC 2003b), that is to 10 % of the emissions trading budget. Auctioning off a small part of the budget right at the beginning of the trading period may also generate robust early price signals for the actual scarcity in the market, since participants base their bidding behaviour on their marginal abatement costs. Hence, the auction would generate an early price indicator, which may help participants develop their investment and trading strategies and may improve the efficiency of the system (see also Ehrhart et al. 2005).

Concluding summary of main points:

- In the long run all allowances should be auctioned off.
- For the trading period of 2008-2012 Member States should set share of allowances to be auctioned off at the maximum level allowed by the Directive, that is at 10% of the total budget.
- Auctioning allowances would reduce windfall profits.
- Auctioning and free allocation are expected to have identical effects on output prices.

3.2 Benchmarks versus grandfathering for existing installations

As long as full auctioning is not feasible, other allocation rules have to be used. The most common approach is to allocate allowances (EUAs) to existing installations according to their historical emissions in a fairly recent reference period ("conventional grandfathering").[34] However, conventional grandfathering may lead to undesirable distributional effects, since companies investing in abatement measures prior to this pe-

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33 From a theoretical perspective, market power may result in higher or lower increases in the product price in response to the introduction of the EU ETS compared to perfect competition. The outcome depends, among other things, on the shape of the demand curve.

34 For the first trading period (2005-2007) most EU Member States (MS) used grandfathering (for overviews see, for example, Betz et al. (2004), Ecofys (2004), Matthes et al. (2005) or DEHSt (2005)).

riod (early action) receive fewer allowances than those who did not invest in such measures. The latter companies are then able to reduce emissions at lower costs and sell the surplus allowances on the market. This problem will arise in future trading periods if base periods will be updated to calculate allocation at the installation-level.

Alternatively, allocation could also be made based on benchmarks, i.e. on specific emission values per unit of production (e.g. kg CO_2/MWh electricity or t CO_2/t cement clinker) for a particular group of products or installations. For distributional reasons, benchmarks based on average specific emission values per unit of production (average benchmarks) may be politically more feasible for existing installations.[35] The actual number of allowances can be derived from the specific benchmark value per unit of activity multiplied by the past or predicted activity rates of the individual installations. In general, a benchmarking allocation favours carbon-efficient installations compared to less carbon-efficient installations, since operators of the latter need to purchase missing allowances on the market or have fewer excess allowances. To limit the distributional effects, the benchmarks used for existing installations could be differentiated according to fuel use, technologies, installation size or application (e.g. load). While such differentiated benchmarks are generally likely to result in efficiency losses and higher overall mitigation costs, these losses would be smaller for existing installations (compared with new installations).

In the EU ETS, benchmarking could also provide additional incentives for modernization (compared with conventional grandfathering).[36] For installations receiving fewer free allowances under benchmarking than under conventional grandfathering, benchmarking provides a higher incentive for substitution of inefficient installations if closures of installations lead to a termination of allocation (see also Cremer and Schleich 2006). This incentive would be higher, the tighter the benchmark was. Finally, benchmarking would facilitate comparison across EU MS and may be seen as a first step towards harmonized allocation rules throughout the EU (Kruger and Pizer 2004). In fact, EU-wide benchmarks – possibly developed in coordination with business associations – could also be used to determine the allowance budget at the level of sectors. Such a procedure would contribute to levelling the playing field for allocation.

The potential drawbacks of benchmarking include more stringent data requirements and the need to build benchmark groups (see for example Radov et al. 2005). Distributional effects, which may be high even if differentiated benchmarks are used, may also render benchmarks politically infeasible.[37] In the Guidelines for the second trading pe-

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35 Benchmarks based on the specific CO_2 emissions of the best available technology (BAT-benchmarks) would be more appropriate for new entrants.

36 Incentives to reduce emissions are the same under a benchmarking allocation and conventional grandfathering.

37 See Cremer and Schleich (2006) for an empirical analysis of the distributional effects of different benchmarking rules for the German power sector.

riod, the Commission stated that "EU-wide benchmarking is not a sufficiently matured allocation method to be used for the second phase. Member states may however find appropriate use for benchmarking at national level for the installation level allocation in certain sectors and for new entrants, e.g. in the electricity sector." (CEC 2005b, p. 8). The power sector, which is responsible for the vast majority of emissions in the EU ETS, seems particularly well suited to benchmarking, since its output is fairly homogenous and it is easy to assign installations to benchmarking groups.

Concluding summary of main points:

- To address early action and provide incentives for replacement of inefficient technologies gratis allocation for existing installations should be based on product-specific benchmarks for sufficiently homogenous product groups.
- Undifferentiated benchmarks would provide the highest incentives for the replacement of inefficient technologies.

3.3 Allocation rules for new projects

Neither the Emissions Trading Directive nor the NAP-Guidelines make any recommendations on how new projects (i.e. new installations and capacity extensions of existing installations) should be treated.[38] In principle three methods are acceptable under the Directive: auctioning, a purchase of EUAs on the market, or free allocation (from reserve for new entrants). However, the logic of emissions trading requires that all allowances for new projects be purchased at market prices. In this case, investment decisions are based on the full social costs (i.e. private costs plus environmental cost). Allocating free allowances to new projects amounts to subsidizing investments (and output)[39], increasing – ceteris paribus – the costs of achieving climate targets.

If newcomers have to buy allowances on the market or if they have to buy them trough an auction, there are strong monetary incentives to implement energy-efficient technologies since these technologies require the purchase of fewer allowances. In contrast, if new projects receive free allowances, the incentives to use the most cost-efficient technologies are weaker and depend on the actual allocation rules.[40] As a second-best solution, the allocation for new projects could be based on uniform BAT-

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38 Even though the Commission would have preferred newcomers to buy allowances on the market, e.g. European Commission DG Environment (CEC 2003a).

39 See, for example, Graichen and Requate (2005), Spulber (1985) or the Council of Environmental Advisors to the German Government (SRU 2006).

40 In the first trading period (2008-12), all MS established a New Entrant Reserve (NER) to allocate allowances to new projects for free, often on a first-come-first-served basis. Exceptions are non-CHP plants in the Swedish power sector, who have to buy all their allowances on the market.

benchmarks and uniform standardized projections of production or utilization rates for homogenous products. In this case, there are strong innovation incentives to invest in the most efficient technology within a given product group, independent of the level of the benchmark. Investments in technologies which generate fewer specific emissions than the benchmark generate extra allowances which may be sold on the market. By contrast, technologies which are less efficient than the benchmark cause additional costs for the purchase of allowances. Any additional differentiation (e.g. by fuels, processes, or by utilization rates) implies additional subsidization of particular installations and further reduces the cost-saving potential of the EU ETS.[41] In particular, the more sub-benchmarks there are within a product group or within a technology group, the smaller the innovation effects, since innovation incentives are limited to the sub-groups.

Concluding summary of main points:

- Allocating allowances for free to new projects amounts to subsidizing output and increases overall costs to achieve emission target for society.
- New projects should acquire allowances needed at market prices.
- If new projects receive allowances for free, allocation should be based on BAT-benchmarks and standardized load factors.
- Differentiating benchmarks or load factors (e.g. by technologies or fuels) results in distorted incentives for innovation, subsidies for particular technologies or fuels and eventually higher overall reduction costs for society.
- Undifferentiated benchmarks would provide the highest incentives for the replacement of inefficient technologies.

3.4 Allocation rules for closures

The Emissions Trading Directive requires that allowances can only be allocated to installations which operate under a permit to emit greenhouse gases (Article 11 in combination with Article 4, CEC 2004b). Thus, if closed installations cease to adhere to the permit or do not further have a permit at all, the issue of allowances will have to stop. However, taking away allowances for closures results in (economic) inefficiencies and disincentives for new investments. If closure leads to a cessation of an installation's allocation, old plants may continue to be operated too long and new investments postponed since the opportunity costs of a closure are not accounted for properly. In fact economic theory suggest that, stopping allocation for closures subsidizes output, since

41 For the first trading period in most MS, allocation for new projects is typically based on BAT-values or BAT-benchmarks for homogenous products (or technologies). Benchmarks for product groups are used, in particular, in the energy sector, but usually differentiated by technologies and/or fuels (see Schleich and Betz 2005, or DEHSt 2005 for an overview).

there will be too many companies in the market (Graichen and Requate 2005, Spulber 1985).[42] In the first trading period, most MS decided that once an installation has been closed there should be no further issuance of allowances for the remainder of the period. To provide additional incentives for new investments, some MS, like the UK, the Netherlands or Germany, permit allocated allowances to be transferred from closed installations to new ones.

Concluding summary of main points:

- From the perspective of economic efficiency, installation closures should not result in termination of allocation.
- Transfer rules may provide additional incentives for new investments.

3.5 Treatment of clean technologies

Since the EU ETS focuses on combustion installations, renewable energy technologies like wind power, hydro or photovoltaic installations are not directly covered by the EU ETS. Therefore, no direct innovation effects can be expected for these technologies. At best, renewable energy technologies may benefit indirectly, if the EU ETS results in a sufficient increase in the costs of conventional power (and heat generation), making renewable energies (RES) more competitive. However, the increase in electricity prices needs to be substantial in order to drive incentives for renewable energy technologies (Wuppertal Institut für Klima, Umwelt und Energie 2006). The only renewable technologies which may be directly supported by the NAPs are biomass- or waste-based combustion installations if their rated thermal input exceeds 20 MW. However, some countries like Germany have excluded such installations from the EU-ETS. If these installations were included and received allowances (e.g. via benchmarking) they may benefit twice: from the EU ETS and from specific support systems like feed-in-tariffs. Otherwise, they would also have to bear transaction costs to comply with the provisions set by the Emissions Trading Directive and subsequent regulations at EU or national levels. Other countries like the UK have included such installations and set incentives for the use of clean fuels e.g. due to the use of a uniform benchmark for new entrants based on gas. Thus, investors in biomass or waste material will be able to sell their surplus allocation. In sum, the EU-ETS is not expected to particularly enhance the diffusion of RES-technologies and therefore other more direct national support mecha-

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42 For example, the US EPA Acid Rain program for SO_2 and NO_x from power plants is governed by more efficient allocation rules for closures, and also for new entrants: closure of a plant will not terminate allocation and new projects need to purchase allowances on the market or via auctions. Linking allocation to operators as is practised in this program would have facilitated more efficient rules for closures and new entrants in the EU ETS.

nisms such as feed-in tariffs, (tradable) quota systems or direct R&D subsidies need to remain in place.

The EU ETS does not directly favour a particular technology such as combined heat and power. Instead, the price and cost incentives favour variety of energy/carbon-saving technologies in general. However, allocation rules for newcomers could be used to support particular technologies. In fact, based on allocation criterion (9), some countries decided to include special provisions for clean technologies, such as new combined heat and power (CHP). Since fuel is used more efficiently, CHP plants exhibit lower emissions compared to the situation where both heat and electricity are generated in separate installations.

Concluding summary of main points:

- Benchmarking allocation would directly favour renewable energy technologies which are covered by the Directive (i.e. biomass- and waste-based installations). Conventional grandfathering would leave those installations with transaction costs only, but nor direct benefits.
- Renewable energy installations benefit indirectly from the EU ETS because generation costs of fossil-fuel based technologies increase.
- To accelerate the diffusion of renewable technologies or CHP, other more direct support mechanisms might be necessary

4 Conclusions

This Section presents conclusions for the Draft NAPs of Germany, the Netherlands and the UK based on the analyses at the macro and micro levels of the NAPs as well as on the results of verified emissions data for installations from 2005. It identifies areas where these NAPs could be more ambitious in terms of meeting the long-term climate targets and in designing allocation rules that would allow the EU ETS to achieve those emission targets at low costs to society.

4.1 Macro level

Short term

With respect to the short-term emission targets until 2008-2012, data from the latest National Inventory Reports for 2006 together with the Draft NAPs suggest that:

- In Germany greenhouse gas emissions were significantly reduced between 1990 and 1998 – partially thanks to the so called wall-fall profits, i.e. the reconstruction and modernization of the energy and industry system in former East Germany[43]. Since then, however, emissions have been increasing in the power sector, and stagnating overall. Germany appears to be on a path to meet its Burden-Sharing target on its own, but additional efforts are now required to close the remaining gap of 3.5 %.
- In the UK, also thanks to special circumstances in the early 1990s, significant reductions in greenhouse gas emissions were realized. The liberalization of the energy markets has led to a "dash for gas" in the power sector. Since then, total emissions in the UK have been relatively stable. The UK is clearly on track to meet its Burden-Sharing target on its own.
- For the Netherlands, current CO_2 emission levels are even higher than in 1990, and the Burden-Sharing Target can only be met by significant reductions of non CO_2 emissions and by relying heavily on the use of the Flexible Mechanisms of the Kyoto Protocol: 50 % of the reductions needed to achieve the Burden Sharing Target have to be financed by the federal budget for purchasing credits from

43 See Schleich et al. (2001) for a quantitative analysis of the wallfall profits.

JI and CDM-projects. If prices for these CERs and ERUs continue to increase, this budget will have to be adjusted upward[44].

Mid and long term

With respect to the mid-term and long-term emission reduction targets of 30% and 80%, respectively, our extrapolation analyses imply:

- For emission reductions of -30% by 2020 and -80% by 2050, Germany's hypothetical ETS emissions target would be approx. 400 Mt CO_2e/a by 2020 (or 345 Mt CO_2e/a to meet the national -40 % target) and around 115 Mt CO_2e/a by 2050; the ETS-emission target of the UK would be around 200 Mt CO_2e/a in 2020 and about 55 Mt/a in 2050, and the Netherlands's hypothetical ETS emissions target for 2020 would be approx. 55 Mt CO_2e/a by 2020 and some 15 Mt CO_2e/a by 2050.[45]
- If emissions continue to develop as they have over the last five years, Germany, the UK and the Netherlands will be a long way from achieving the mid-term or even long-term indicative reduction targets.
- The emission targets implied at the macro level suggest that Germany, the UK and the Netherlands did not use the NAPs to direct their economies along a reduction path towards these mid-term or long-term targets. To get there, they would have to be significantly more ambitious.
- More stringent allocation plans for the second phase would result in higher future prices for EUAs, which would mean additional financial incentives to invest in carbon-efficient technologies early on. If reduction efforts are postponed for too long, the total (i.e. inter-temporal) reduction costs for society may be much higher if abrupt emission reductions suddenly became unavoidable for ecological reasons. The reason for this is that sudden changes to the economy and its

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44 In the National Budget 2006 it is stated that for the period 1998 to 2011 € 340 mio is reserved for JI credits, and € 402 mio for CDM credits. So, in order to purchase the necessary credits for around 100 Mton CO2, this budget implies a specific average price of € 7/ton CO2.

(see: http://rijksbegroting.minfin.nl/default.asp?CMS_ITEM=6B621CAE8AFA4F3F93AD1A074A965065X727X50991X61). The Dutch government announced in April 2006 that due to market price increases and delay in project delivery € tens of mio's more will be reserved to ensure the purchases.

45 These figures are based on the current scope of the EU ETS, but as it is going to be extended (including both additional installations as well as currently opted out installations), the numbers – once verified data becomes available – will need to be adjusted, thereby slightly increasing the hypothetical targets for the ET-sector.

technological infrastructure are associated with higher costs compared to a smoother transition process.

- Policy makers can accelerate the structural change in energy and industry technologies and in infrastructures necessary to meet long-term climate targets by reducing investment uncertainty. They should set credible long-term emission targets and implement policies which make it possible to achieve these targets.

Ambition level of Draft NAPs

The analyses of the ambition levels of the ET-budget for Draft NAPs for 2008-2012 show that:

- Germany and the Netherlands decrease the ET-budget for the second phase compared to the first phase, but the implied reduction for Germany is rather small.
- The UK and the Netherlands decrease the ET-budget compared to projected emissions of the ET-installations; if the projected growth rates turn out to be accurate, the implied reduction is about 10 % for the UK and about 16% for the Netherlands.
- The Netherlands intends to apply a compliance factor of 0.86, implying that the second NAP is more stringent than the first NAP which used 0.97 as the compliance factor. The flexibility to choose the best out of 5 reference years (2001-2005) may have led to inflated reference emission levels according to the authorities[46].
- The experience in the case of Germany, which did not provide projections for emissions and ended up with a rather large surplus allocation in 2005, highlights the importance of also using emission projections to determine the size of the ET-budget. Thus, Germany should also provide emission projections for NAP 2.

ETS versus non ETS sectors

Our analyses of the size of the emission budgets for the ET-sectors and the non-ET-sectors suggest that:

- In all three MS, the budgets for the ET-sectors are too high, especially in the Netherlands and Germany (Germany +8.5% (or +42 Mt CO_2e/a), the UK 2.4% (6 Mt CO_2e/a) and the Netherlands 25.5% (or 18% with the intended governmental use of Kyoto mechanisms, i.e. 25 or 18 Mt CO_2e/a, respectively)). Thus,

46 See CO2 Emissiehandel Nieuwsbrief, June 19th, 2006

compared to the optimal split, the current budgets benefit companies with ET-installations at the expense of the other sectors (private households, transport), and overall reduction costs for society are too high.

- If preliminary and crude first estimates for the emissions of additional installations to be included for the second phase are used, the relative difference between the caps and the hypothetical ETS bud-gets are for Germany + 6.3 %, for the UK – 0.7 % and for the Netherlands +10.7% (or +1.7 % when including the governmental use of Kyoto mechanisms). Thus, accounting for these additional effects, the distance between the actual and the optimal split becomes smaller, in particular for the UK. However, a final judgment is difficult without verified emissions data for all installations included in the second phase.
- To lower costs to society for the second phase, the relative sizes of the budgets should shift towards a smaller share for the ET-sector compared to the first phase.

Verified Emissions in 2005

The verified emissions data for 2005 proved to be a first check of the ambitiousness of the NAPs for the first trading period and also of the potential scope for a more ambitious allocation in the second phase. General results and additional analyses for the three MS lead to the following findings:

- The surplus of 44 million EUAs in 2005 suggest that, on average, allocation was fairly generous in the MS. Unless there is major economic growth, it seems quite likely that a surplus of allowances will also occur in 2006 and 2007. In this case, the price for EUAs would be expected to drop still further, since banking into the next phase is not permitted.[47] The EU ETS would then barely provide any incentives for energy efficiency or innovation and lose its purpose.
- Of the countries analyzed in this report, the VET data imply that only the UK has a stringent allocation, while the surplus is largest in Germany in absolute terms (21 million EUAs) and in the Netherlands in relative terms (about 7 % compared to verified emissions). The results for Germany and the Netherlands suggest that a larger reduction than required by the ETS budget for the first trading period would have been feasible.[48] This was actually known in advance for the Netherlands, but was granted anyway in order to give credit for early action under the benchmark and energy efficiency covenants.

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47 See Schleich et al. (2006) for an assessment of the banking provisions in the EU ETS.

48 In the light of the slight upward trend in recent years in the energy and industry sector in Germany, this sharp decline in emissions in the ETS-installations comes as somewhat of a surprise.

- In the UK and the Netherlands, operators of energy-installations were generally short (relying more on coal than anticipated because of high gas prices in 2005), but not in Germany where identical compliance factors are in place for energy and non-energy installations. Operators of installations from all other sectors were long in all three countries. Since Germany also plans to apply a stricter compliance factor for energy-installations in the second phase, energy-installations may then be short in all three MS. Empirical evidence suggests that gas-fired CHP seems to be switched on less in the Netherlands. Likewise, one large refinery experienced a major temporary shut-down.
- For the Netherlands, there is some indication that the growth projected in certain sectors (in particular in the iron and steel sector but also in manufacturing) was high compared to the actual economic development, which resulted in a high surplus of EUAs. For the next phase, growth projections may have to be checked more carefully; the application of a national growth figure of 1.7% may be useful, but not necessarily conservative enough. In any case, the ambitiousness of the budget will be determined by the compliance factor.
- For the Netherlands, the allocation in the first phase had regressive effects: smaller installations received a lower surplus/higher deficit than larger installations in relative terms. After additional analyses of the underlying reasons, this may have to be addressed in the second phase.
- For Germany, about half the surplus came from installations in which allocation is based on the options rule (emission value multiplied by expected output). From this perspective, it is vital that a similar allocation rule should not be introduced in the second NAP at the last minute, as was the case for the first NAP.

4.2 Micro level

The trading of emissions does not reduce emissions on its own. But, if designed properly, the EU ETS can contribute to achieving emission reduction targets at low costs. Based on the arguments derived from economic theory and from empirical evidence, we conclude the following:

Auctioning

- The auction share should be set at the maximum possible level of 10 % in all Member States. While Germany does not intend to introduce an auction, the UK and the Netherlands plan to do so in the second phase. For the UK, the auction share should then be set at the maximum level of the given range of 2% - 10% For the Netherlands, a share of 4 % is planned to be auctioned which corresponds to 10 % of the allocation to the power sector[49]. The auction share for the power sector (or sectors which manage to pass on a large share of the additional costs) could be raised to 10 % of the overall allocation.

- Since the power sector proved particularly able to pass on the additional costs of the EU ETS, the auction share should primarily be taken from the “intended” budget of the power producers in order to address windfall profits. This will specifically be the case in the Netherlands.

Windfall profits and competitiveness

- In the political debate, the question of how to best address windfall profits got mixed up with the issue of competitiveness. While windfall profits may be the consequence of the free allocation of allowances, higher output prices (e.g. electricity prices) are the consequence of putting a price tag on carbon dioxide through the EU ETS. The former is an issue that should be dealt with in the NAPs, e.g. through tighter allocation for those companies benefiting from free allocation. The latter is an intended effect of the EU ETS and should be independent of the allocation method. The EU ETS changes the relative prices of factors of production, and thus necessarily affects competitiveness: carbon-intensive production should become relatively more expensive. This effect on output prices, however, should be the same whether allowances are allocated for free or auctioned off. Since the source of windfall profits rests in the method of allocation, the issue of windfall profits should be addressed in the NAPs. By contrast, the issue of competitiveness is not affected by the method used to allocate allowances[50,51].
- Competition may be distorted if electricity-intensive industries like the aluminum industry compete internationally with companies from countries where there is no climate policy in place. Production may then shift to those countries and total emissions may actually increase if production processes abroad are more carbon-intensive (leakage effects). Most existing studies, however, indicate that the distortionary effects of emissions trading are lower than for other instruments[52].
- To reduce windfall profits in the power sector, Germany changed its allocation philosophy compared to the NAP for 2005-2007 and now requires a higher re-

49 Thus, the overall cut of 4 % represents 2/3 of the 15 % budget cut for the power sector as a measure to address windfall profits.

50 Of course the impact on competitiveness depends on the price of the EUAs which in turn is a function of the total emission budgets in all EU MS.

51 For example, the SRU (2006) argues that competitiveness arguments have been erroneously used in the political debate when in fact the issue at stake is distribution.

52 For a recent overview, see for example, Oberndorfer et al. (2006).

duction from energy installations of 0.85 compared to 0.9875 for other installations. But even with a cut of 15 %, windfall profits are likely to be quite substantial and could be honed still further, via auctioning for example.

- Since windfall profits are also subject to corporate (and other) taxes, not all additional revenues translate into an equal increase in net profits for companies. Thus, at least to some extent, taxation may effectively reduce windfall profits. The relative effectiveness of both taxation and auctions also depends on national tax laws.

Using benchmarks for existing installations

- If auctioning is not feasible, benchmarks should be used for allocation to existing installations for sufficiently homogenous products (like electricity). In particular, benchmarks account for early action and may provide higher incentives for modernization. These incentives would be higher for uniform benchmarks than for differentiated benchmarks (e.g. by fuels or technologies). They would also be higher for BAT benchmarks than for average benchmarks.[53]

- As will be the case in the UK and the Netherlands, allocation in the German power sector should also be based on benchmarks in phase 2.

- Differentiated benchmarks distort incentives for innovation. However, because of sunk costs, applying differentiated benchmarks to existing installations would be less harmful than for new installations. Differentiated benchmarks limit distributional effects but may attract greater political support than uniform benchmarks.

Allocation to new projects

- Allocation rules for new installations and modernizations are crucial from a long-term perspective since they (together with several other factors) determine investment decisions and thus affect the technology-structure and CO_2-intensity of the capital stock for many years in advance.

- Allocating allowances for free to new projects - as stated in the Draft National Allocation Plans for Germany, the UK and the Netherlands - amounts to subsidizing investments and output and increases the costs of achieving climate targets. Thus, new projects should buy the allowances required at market prices.

- Since allocation to new entrants is perceived by the national governments as a means to attract new investments, the optimal allocation rule for new entrants is unlikely to emerge without coordination among EU MS.

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53 Unless a fixed budget exists for a benchmark-group of installations.

- If new projects receive allowances for free from a new entrants' reserve, reserve replenishment mechanisms are foreseen in the German and in the Dutch Draft NAPs. If future reduction costs are lower than current costs, such a mechanism would actually reduce total emissions over time. However, the opposite may also be true. The main criticism however is that these mechanisms shift the burden of reducing emissions into the future, which would be at odds with concerns for intergenerational equity.
- As a second-best solution, the allocation to new entrants should be based on uniform BAT-benchmarks. Differentiated benchmarks (e.g. by fuels) distorts the dynamic innovation incentives and also results in higher reduction costs to society in the long run. Differentiated benchmarks are, in essence, technology- or fuel-specific subsidies and counter the spirit of emissions trading systems. In the EU ETS, market prices for EUAs and flexibility should guide investment decisions rather than subsidies for particular types of installations.
- Instead of having two benchmarks for new energy technologies - one for gas and one for other installations – the final German NAP should rely on only one benchmark. For distributional reasons (and to save the new entrants' reserve and future budgets), this benchmark should be based on BAT for gas-fired CCGTs as is the case in the UK.
- Similar to the use of weak benchmarks, the use of high standardized operating hours / load factors to calculate the number of free allowances for new projects corresponds to high subsidies, and possibly high windfall profits for new projects. Standardized load factors should also be low to prevent depletion of the NER. The reserve would also benefit from low load factors because they render the (optional) use of the transfer rule more attractive.
- The standardized load factors proposed in the German draft, which tend to be in the range of actual historical load factors, should be adjusted downward. In particular for power plants, which are expected to be responsible for the bulk of allowances for new projects from the NER, it is crucial that the standardized annual operating hours be kept at a much lower level than, say 7000 hours p.a.[54]
- To avoid unjustified, technology-specific subsidies, standardized load factors should – as is the case in the UK – be equal for all fuels or technologies (within a homogenous group of products).
- Allocation rules for new projects in Germany, but not in the UK or the Netherlands apply for several periods (now 14 years). This long period increases in-

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54 Unlike other installations, there is no proposal for standardized operating hours for power plants included in the German Draft NAP.

vestment security, but is also likely to secure windfall profits for an equally long period. Allocation rules which extend far into the future also limit the flexibility of future NAPs and their corresponding budgets.

- Transfer rules may speed up the diffusion of new installations since they should generate additional financial incentives for an earlier replacement of older installations. In the Draft NAP for phase 2, the Netherlands decided to introduce such a transfer rule similar to the one already in place in Germany in phase 1. It is also proposed to retain the transfer rule of phase 1 in the UK NAP in phase 2. However, it is more restricted compared to the German transfer rule since the installation being shutdown and the recipient installation must have the same permit holder and be in the same EU ETS sector.

Treatment of clean technologies

- To support investments in new CHP installations, Germany, the UK, and the Netherlands use allocation rules to subsidize new CHP. In the UK, there is a special proportion of the New Entrant Reserve (10%) ring-fenced for good quality (GQ) CHP in order to ensure that the projected growth in CHP is accurately and transparently recognised.[55] In addition, it is proposed that GQ CHP will receive 100 % allocation based on the calculations for new entrants compared to other electricity supply industry which will receive a maximum 90 % of the calculated allocation. In Germany and the Netherlands, new CHP-plants benefit from an allocation based on a “double benchmark” for heat and electricity. From an economic perspective, these special treatments correspond to an investment subsidy for particular CHP plants, but should not affect the competitiveness of these plants per se. Instead, if additional support for CHP is considered necessary under current economic conditions, other types of support mechanisms, like feed-in tariffs, or quotas should be used.
- Because of transaction costs and to avoid double regulation, renewable energy technologies should be excluded from the EU ETS. Renewable energy technologies benefit indirectly since the EU ETS increases the generation costs for fossil-fuelled technologies.

Concluding remarks

- The analyses and arguments developed in this report suggest that – although some “improvement” in the NAPs is noticeable - there are still many allocation rules in the Draft NAPs for Germany, the Netherlands and the UK which reflect

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55 Good quality CHP means that the power efficiency is greater than or equal to 20 % and the Quality Index (which combines power and heat efficiencies adjusted by factors that take size, technology and fuel of the individual scheme into account) is greater or equal to 100.

attempts made to use the EU ETS for distributional effects and to preserve existing energy structures. These rules often result in negative effects such as increased costs of climate protection, shifting the burden of emissions' reduction to operators of installations not benefiting from special provisions, or to a transfer of wealth and windfall profits.[56]

- With respect to the aims of this project, the analyses carried out and the arguments presented show that there is still ample scope to raise the ambition level of the Draft NAPs of Germany, the Netherlands, and to a lesser extent, the UK. This holds true for both the macro level, i.e., the overall budget, as well as for the micro level, that is, the design of the rules governing the allocation of allowances.

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56 See also the assessment of allocation rules for the first trading period by the Council of Environmental Advisors to the German Government (SRU 2006).

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Annex A: Summary of National Allocation Plans for Germany, the United Kingdom and the Netherlands

GERMANY NAP 2005-2007	
Micro-level plan (allocation rules)	
Installations covered (share of CO_2 emissions)	1849 (59%), no opt-in, no opt-out, (no pooling); allocation share of energy sector in terms of installations (emissions): 66.7 % (78.8 %);
Allocation method for existing installations	100 % cost-free allocation, with the following options: based on annual average emissions in base period 2000-2002; uniform compliance factor of 0.9702 and uniform adjustment factor of 0.9538, use of new entrant rule and uniform adjustment factor (option rule); Note: allocation method does not discriminate between sectors.
Allocation method for new entrants	100 % cost-free allocation based on best-available technology benchmarks and projected output[57]; for electricity and heat generation upper and lower bounds exist (e.g. 365g CO_2/kwh and 750g CO_2/kwh for electricity); investors may apply for higher specific values than the given lower bound if they can prove that the new technology is BAT; fixed product- or technology-specific benchmarks for the production of homogenous products: cement clinker, glass, and bricks; BAT standards for inhomogeneous products on the basis of a submission-of-proof procedure; no compliance factor will be applied to these allocation rules for 14 years; *Transfer rule*: allowances from closed installations may be transferred to replacement installation for four years (afterwards no compliance factor will be imposed for 14 years);
Special provisions for energy-efficient installations	for existing *combined heat and power* (CHP) installations additional allowances of 27 t per kWh CHP electricity generation[58]; double benchmark (heat/electricity) for new CHP plants
Treatment of renewable	Installations covered by Renewable Energy Act (benefit from feed in

57 Subject to ex-post adjustment, decision by European Court of Justice is pending.

58 Subject to ex-post adjustment, decision by European Court of Justice is pending.

energy sources (RES)	tariffs for RES) are excluded from EU ETS.
Special features	*early action rules*: installations which exceed threshold levels for specific emission reductions receive allocation with compliance factor of 1.0 for 12 years after modernization (going back to 1994); if specific reduction exceeds 40 %, compliance factor will be 1.0 for first two trading period; for *process-related emissions*, compliance factor of 1.0 is applied if share of process-related emissions on total emissions exceeds 10% (adjustment factor is not applied); *capacity utilisation adjustment rule*: if in one year a drop in production leads to emission levels which are below 60% of emission levels in the base period, allocation will be adjusted in proportion (ex-post adjustment); hardship clause (s): special provisions may apply, if emissions in base period are at least 25 % below "regular" levels; additional allowances as compensation for *phase-out of nuclear power*; *reserve replenishment rule*: size of reserve is 3 Mt p.a. (i.e. 0.6% of budget); if needed, additional allowances will be purchased by the German reconstruction Bank (KfW) and distributed free of charge; the purchased quantity of allowances will be subtracted from the budget in 2008-2012 and sold on the market (refinancing of KfW); Allocation rules, in particular new entrant rules, are in part defined over long periods ; complex system, 58 combination of rules were used

Note: New data from revised NIR for Germany (2006) resulted in adjustment of base year emissions and target emission levels; application of ex post adjustments are subject to final outcome of lawsuit on EU Commission decisions regarding German NAP at EU Court of Justice.

GERMANY

NAP 2008-2012 (Draft Version of 13 April 2006)

Macro-level Plan (Emission targets and budgets)

Burden sharing target (BS) & ETS	$GHG_{1990/1995}$ (Mt CO_2e/a)	$CO_{2,1990}$(Mt CO_2e/a)		BS target (Mt CO_2e/a)	BS (%)	(Hypothetical) CO_2 BS target excluding Kyoto mechanisms (Mt CO_2e/a)	
		ETS[59]	Non-ETS			ETS[60]	Non-ETS
	1230.3	**378.1**	**651.1**	**972.9**[61]	**-21**	**453.5**[62]	**394.6**
		1029.1				**848.1**	

Emissions, distance to target (DTT), use of Kyoto mechanisms (KM) by government	GHG_{2004} [63] (Mt CO_2e/a)	$CO_{2,2004}$(Mt CO_2e/a)		KM 2008-12 (Mt CO_2e/a)	DTT_{2004} Mt CO_2e/a	
		ETS	Non-ETS		without KM	with KM
	1008	**540**	**341.1**	**0**	**43.3**	**43.3**
		882.0[64]				

ETS cap (both NAP I and II) & new entrant reserve (R)	**2005-07**			**2008-12**		
	$ETS_{2005-07}$ cap including $R_{2005-07}$ (Mt CO_2e/a)	$R_{2005-07}$		$ETS_{2008-12}$ cap including $R_{2008-12}$ (Mt CO_2e/a)	$R_{2008-12}$	
		Mt CO_2e/a	%		Mt CO_2e/a	%
	499[65]	**3**	**0.6**	**495.5**	**12 (10)**[66]	**2,4**

						(2)
Verified emissions (VET) of ETS-installations (2005)	VET_{2005} Mt CO_2 (% of installations covered)		Difference to allocation for 2005		Emissions of additional installations (Mt CO_2)	
			Mt CO_2	%		
	473.7 (99.8%)		**21.3** (wrt 495.1)	**4.3**	**11**	
Base period (BP), projection (P), growth rates (GR)	BP (years)	BP (Mt CO_2e/a)	$P_{2008\text{-}12}$ (Mt CO_2e/a)	$\Delta_{BP\text{-}P}$ (Mt CO_2e/a)	$GDP_{2003\text{-}10}$ (%)	$GR_{2008\text{-}12}$ NAP II (%)
	2000-2005	**509**[67]	**NA**	**NA**	**1.5**[68]	**-**
Rationale for Cap	Not result of optimization approach; relies on cap and logic developed for NAP 2005-2007, where cap for sectors Energy and Industry (from German energy balances) was outcome of political negotiations.					
Information on future ETS caps	**Yes:** Cites European council's target of at least minus 15-30% until 2020 for industrialized countries, further states Environment Council's recommendations of minus 60-80% until 2050 for industrialized countries, German government aiming at EU Post Kyoto target of -30% by 2020 (compared to 1990), if the EU commits to such a target, Germany will even further reduce its emissions. For this case, The Climate Protection Programme 2005 sets a national medium-term target of -40 %. As for all other sectors, the ETS					

59 In Germany: Sectors Energy and Industry from Energy Balances, therefore numbers in NAP II vary from our calculations: Hypothetical CO_2 BS target 849, distribution between ETS and Non-ETS is 515 and 334.

60 In Germany: Sectors Energy and Industry from Energy Balances

61 The emission levels and targets changed compared to the data underlying NAP I because of adjustments in the national inventory NIR (see German Draft NAP 2008-12): NAP states 967 Mt CO_2e/a for Kyoto period.

62 Using a first rough estimate for the emissions by installations which will be additionally included in phase 2 (a figure of 11 Mt CO_2 is given in the German Draft NAP), the hypothetical target would amount to about 464 Mio. EUAs.

63 Draft NAP Germany (Data for 2004). UNFCCC 2006 data for Germany states 1015 Mt CO_2e for 2004. The more recent, higher, figure is used to calculate the hypothetical budget.

64 UNFCCC 2006 data submitted by Germany states CO_2 emissions for 2004 with 885.9 Mt CO_2e/a.

65 The actual allocation was slightly below that: 495.1 Mt CO_2e/a in 2005; this figure was used for the comparison with VET 2005 data.

66 10 Mio t for new entrants, 2 Mio t to be sold to cover administrative costs of JI/CDM and KfW-mechanism

67 Average for 2000-2002, including 11 Mio t for additional installations.

68 IEA/OECD (2005): Energy policies of IEA countries, 2005 Review.

<table>
<tr><td></td><td colspan="8">budget for 2013-2017 will reflect these future reduction targets, too.</td></tr>
<tr><td colspan="9">Micro-level plan (allocation rules)</td></tr>
<tr><td rowspan="3">Installations covered (excluding opt-out and including opt-in)</td><td rowspan="2"># 2005-07</td><td rowspan="2"># 2008-12</td><td rowspan="2" colspan="3">Inclusion of additional installations</td><td colspan="3">Opt-in / opt-out (Yes/No)</td></tr>
<tr><td>2005-07</td><td colspan="2">2008-12</td></tr>
<tr><td>1849</td><td>tbd</td><td colspan="3">Yes: crackers in chemical industry, etc. according to NAP II guidance (2005)</td><td>No / No</td><td colspan="2">No / No</td></tr>
<tr><td rowspan="5">Allocation method for existing installations</td><td colspan="7">Cost-free Allocation</td><td rowspan="2">Auctioning</td></tr>
<tr><td>%</td><td colspan="4">Compliance Factor</td><td colspan="2">Growth Factor</td></tr>
<tr><td rowspan="2">100</td><td>Energy</td><td>Industry</td><td>CHP</td><td>Others</td><td>Energy</td><td>Industry</td><td rowspan="2">No (but share of reserve is being sold)</td></tr>
<tr><td>0.85</td><td>0.9875</td><td>1</td><td>-</td><td>None</td><td>None</td></tr>
<tr><td colspan="7">Based on annual average emissions in extended new base period of 2000-2005 (in NAP I: 2000-2002).</td><td>KfW-mechanism and JI/CDM fees</td></tr>
<tr><td>Allocation method for new entrants</td><td colspan="8">100 % cost-free allocation based on BAT-benchmarks and standardized utilisation rates[69] for electricity and heat generation only two benchmarks are applied, one for gas-fired installations (365g CO_2/kwh for electricity) and one for others (750g CO_2/kwh for electricity) no compliance factor will be applied to these allocation rules for 14 years

standardized load factors fixed product- or technology-specific benchmarks for the production of homogenous products: cement clinker (three different technologies), glass (two types of products), and bricks (four types of products) BAT standards for inhomogeneous products on the basis of a submission-of-proof procedure no compliance factor will be applied to these allocation rules for 14 years

Transfer rule: allowances from closed installations may be transferred to replacement installation for four years (afterwards no compliance factor will be imposed for 10 years)

Note: somewhat shorter and not identical binding allocation rules</td></tr>
<tr><td>Reserve</td><td colspan="8">12 Mt CO_2/a, of which 2 MtCO_2 are being sold on the market to finance KfW-mechanism and to cover administration costs for JI/CDM. If reserve is depleted, it will be replenished through the market (see special features below)</td></tr>
<tr><td>Closure rules</td><td colspan="8">No further allocation of allowances after closure exception: transfer rule for replacement installations) operator has to declare closure; intention to include suitable measures in final NAP II</td></tr>
<tr><td>Special provi-</td><td colspan="8">Combined heat and power (CHP) face less stringent compliance factor of 0.9875</td></tr>
</table>

69 Because ex-post adjustment is ruled out in NAP guidance, standardized utilization rates were used rather than projected output as in the NAP for 2005-2007.

sions for energy-efficient installations	
Treatment of renewable energy sources	Installations covered by Renewable Energy Act (benefit from feed in tariffs for RES) are excluded from ETS.
Use of ERUs/CERs by companies	Max. 12% of allocation to each installation can be used at once or spread over trading period.
Special features	no specific *new early action rule* no special treatment of existing *combined heat and power* (CHP) installations or *process-related emissions*; both are considered to be recognized via a compliance factor of 0.9875 special treatment of *small installations*: installation with average annual emissions of less than 25,000 t CO_2 in the base period receive compliance factor of 1.0 *no capacity utilisation adjustment rule*; no *ex-post* adjustments no special *hardship clause* (s) foreseen no additional allowances as compensation for further *phase-out of nuclear power* *reserve replenishment rule* (as before): if needed additional allowances will be purchased by the German reconstruction Bank (KfW) and distributed free of charge; the purchased quantity of allowances will be subtracted from the budget in the subsequent trading period and sold on the market (refinancing of KfW); in addition 2 Mt will be sold to cover administrative costs for CDM and JI projects and to finance the reserve replenishment rule of NAP 2005-2007; *malus rule*: old inefficient coal and lignite power plants receive cuts of 15%; *closure rule*: not yet specified
Information on future allocation rules	No statement in Draft NAP of April 13, but in earlier versions benchmarking was mentioned as future allocation rule for existing installations.
Comparison with first NAP	No choice between allocation based on new entrant rule (options rule) and Grandfathering; special provisions for CHP are easier; no ex-post adjustments; nor special rules for process-related emissions, early action, phase out of nuclear, or hardship planned; only two benchmarks for new energy installations; system is less complex and more transparent, discrimination of compliance factor between energy installations and other installations; special compliance factor for small installations;

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UNITED KINGDOM NAP 2005-2007	
Micro-level plan (allocation rules)	
Installations covered (share of CO_2 emissions)	674 (46%), no opt-in, opt-out up to 2007 for installations covered by the UK emissions trading scheme (63 installations) and pt-out up to 2008 for 330 installations covered by the climate change agreements[70]
Allocation method for existing installations	100 % cost-free allocation All sectors / subsectors (except for the energy sector) receive an allocation at the level of projected emissions (allocation according to estimated need). The energy sector receives the remaining allowances once other sectors allocations have been taken off the total cap. 2-level allocation method **Sector budget:** Around 50 different sectors. Projected sector-specific emissions in 2005-2007 were determined on the basis of historic emissions multiplied by growth rates. Allocation needed for new entrants have been subtracted. **Allocation at installation level**: Ratio of the installation's historic emissions to the sum of the sector's historic emissions * sector budget Base period: 1998-2003, excluding the year with the lowest emissions; if the installation commenced operation in the base period, the reference period is correspondingly shorter.
Allocation method for new entrants **Reserve**	New installations are installations, capacity extensions or closed installations that re-commence operation, which commence operation on/after 1 January 2004. Allocation to be made cost-free from new entrants' reserve, whilst there are still allowances remaining in the reserve. Capacity utilization in 2005-2007 is derived from uniform and subsector average figures determined ex ante. Allocation to be made on the basis of BAT benchmarks. Reserve for new entrants: 15.6 Mt CO_2 p.a. (equivalent to 6% of the ETS budget) Will be distributed on a first come – first served basis and any allowances remaining at the end of the phase may be auctioned. Additional special allocation: CHP and late applicants. Transfers are possible in cases in which capacity utilization or production is transferred between one operator's installations (in the same sector) during the phase. Precondition: the installations must produce comparable products (same 3-digit SIC code), the permit holder must be the same for both installations, the transferring installation must cease operations and at least 50% of the transferring installation's production must be transferred. This rule does not apply to the power stations sector.

70 EU Commission 2006: Commission decision of 23/XII/2005 concerning the temporary exclusion of certain installations bet he United Kingdom, C(2005)5714final.

Treatment of Renewable Energy Sources (RES)	No special treatment.
Special Features	- Good quality CHP special ring-fenced new entrant reserve to ensure allocation for new entrants. - No early action other than through the base period

UNITED KINGDOM

NAP 2008-2012
(Draft Version March 2006)

Macro-level plan (emission targets and budgets)

Burden sharing target (BS) & ETS	$GHG_{1990/1995}$ (Mt CO_2e/a)	$CO_{2,1990}$(Mt CO_2e/a)		BS target (Mt CO_2e/a)	BS (%)	(Hypothetical) CO_2 BS target without Kyoto mechanisms (Mt CO_2e/a)	
		ETS	Non-ETS			ETS	Non-ETS
	764.5	**NA**	**NA**	**668.9**	**-12.5**	**245.9**	**324.5**
		590.2				**570.4**	
Emissions, distance to target (DTT), use of Kyoto mechanisms (KM) by government	GHG_{2004} (Mt CO_2e/a)	$CO_{2,2004}$(Mt CO_2e/a)		$KM_{2008-12}$ (Mt CO_2e/a)		DTT_{2004} Mt CO_2e/a	
		ETS	Non-ETS			without KM	with KM
	659.3	**242.4**	**319.8**	**0**		**9.6**	**9.6**
		562.2					

ETS cap (both NAP I and II) & new entrant reserve (R)	**2005-07**			**2008-12**		
	$ETS_{2005-07}$ cap including $R_{2005-07}$ (Mt CO_2e/a)	$R_{2005-07}$		$ETS_{2008-12}$ cap including $R_{2008-12}$ (Mt CO_2e/a)	$R_{2008-12}$	
		Mt CO_2e/a	%		Mt CO_2e/a	%
	245.3[71]	**18.9**	**7.7**	**252**[72]	**17**	**6.7**

Verified emis-	VET_{2005} Mt CO_2	Difference to allocation for	Emissions of addi-

71 However, the number of allowances actually allocated was only 209.4 (mostly due to opt-out installations). We used this actual allocation figure to determine the gap to VET data.

72 Only for the installations covered in phase 1 (but includes the opted-out installations since they have been covered from January 2007 onwards). For additional installations cap still needs to be determined. The maximum cap will be around 261 Mt CO_2 (6.5% of maximum cap=> 85 $MtCO_2$ for reserve for 5 year period).

sions (VET) of ETS-installations (2005)	(% of installations covered)	2005		tional installations (Mt CO_2)
		Mt CO_2	%	
	242.4 (99.9%)	**-33.1** (wrt 209.4)	**-15.8**	**max. 7.8** (DEFRA 2006b)

Base period (BP), projection (P), growth rates (GR)	BP (years)	BP (Mt CO_2e/a)	$P_{2008-12}$ (Mt CO_2e/a)	Δ_{BP-P} (MtCO_2 e/a)	Δ $GDP_{2003-10}$ (%)	$GR_{2008-12}$ NAP II (%)
	2000-2003[73]	**242.4**[74]	**270.5**	**-28.1**	**3**[75]	**Varying.**

Rationale for cap	The cap was set in line with new UK Climate Change Programme 2006 which is among others based on the following principles: - the need to take a balanced approach with all sectors and all parts of the UK playing their part; - the need to safeguard, and where possible enhance, the UK's competitiveness, encourage technological innovation, promote social inclusion and reduce harm to health.
Information on future ETS caps	**No:** ***but targets for 2050 (-60% CO_2 reduction) with real progress by 2020***
Comments	ETS CO_2 share: 50% all 6 GHG (projected for 2008-2012)

Micro-level plan (allocation rules)

Installations covered (excluding opt-out and including opt-in)	# 2005-07	# 2008-12	Inclusion of additional installations	Opt-in / Opt-out (Yes/No)	
				2005-07	2008-12
	1057	tbd	Glass; mineral wool; gypsum; flaring from offshore oil and gas production; petrochemicals (crackers); carbon black; integrated steelworks etc. (DEFRA 2006b)	- Opt-in: No - Opt-out: Yes 59 install. in the UK ETS, 329 install. under climate change agreements	No

Allocation	Cost-free Allocation	Auctioning

73 Average of three years with highest emission level. In NAP I the base period was 1998-1999. However this early data is considered to be of poorest quality and incomplete that is why none of the year was included. Data from 2004 was not included since there would have been considerable costs involved in collecting the data or might have lead to perverse incentives.

74 No data yet for the base period, therefore, as a proxy we use VET 2005 data for NAP I installations only.

75 Source: IEA/OECD (2005): Energy policies of IEA countries, 2005 Review.

<table>
<tr><td rowspan="4">method for existing installa-tions</td><td>%</td><td colspan="4">Compliance Factor</td><td colspan="2">Growth Factor</td><td></td></tr>
<tr><td rowspan="2">90-98</td><td>Energy</td><td>Indus-try</td><td>CHP</td><td>Others</td><td>Energy</td><td>Industry</td><td rowspan="2">2-10% (sub-tracted from energy-cap)</td></tr>
<tr><td>bears reduction</td><td>1</td><td>1</td><td>1</td><td>Yes</td><td>Yes, varying for 17 sectors</td></tr>
<tr><td colspan="8"><u>2-level allocation method</u>:

Sector budget:
- 17 different sectoral budgets (projected emissions) are set based on sectoral growth factors and reduction potential. A proportion is deducted for the new entrant reserve.
- Total reduction (incl. auctioning) will be borne by electricity supply industry (ESI). All other sectors will receive allocation based on projected BAU emissions.

Allocation at installation level::
- Allocation for electricity supply industry will be based on a benchmark (and maybe also for the brewing sector): individual plant's Transmission entry Capacity (as given in national Grid's Seven Year Statement 2005 sub-sector)* standard load factor * sub-sector standard emission factor (efficiency factor * fuel emissions factor). Five different technologies are distinguished.[76]
- All other sectors are allocated based on a share of relevant emissions of an installa-tion in base period (2000-2003) multiplied by total available allowances of the sector (see step1). Good quality CHP (GQ CHP) will be based on 2001-2003 emissions.</td></tr>
<tr><td>Allocation method for new entrants</td><td colspan="8">- New entrants are installations that open during 2008-2012 or that start operating in later phase 1 (after 30 June 2006). Allocation will be based on BAT benchmarks, some of which have been revised from those under phase 1. The majority of new en-trant benchmarks assume use of gas and electricity supply industry benchmark is CCGT.
- It is proposed that non- ESI and non-GQ CHP new entrants will receive 95% of the allowances allocated based on spreadsheets. ESI new entrants will receive 90% or same cut in allocation as ESI incumbents whichever is greater. GQ CHP will receive 100% of allocation based on calculation by the spreadsheet.</td></tr>
<tr><td>Reserve</td><td colspan="8">The New entrant reserve is made out of contributions from each of the 17 sectors. An indicative figure given in NAP II is 85 Mt CO2e which is 6.7% of allocation. However, the final size is not decided yet. 11 MtCO2e may be used for late phase 1 new entrants (start after 30th of June 2006).</td></tr>
<tr><td>Treatment of closures</td><td colspan="8">An installation is considered to have ceased production when:

1) the installation ceased operating

2) capacity of installation dropped below thresholds of Annex I in Directive.

Permanently closing installation will retain allowances for the year in which the closure occurs but will not be issued allowances for the years after closure.</td></tr>
</table>

76 Gas-fired generators; coal-fired generators that have opted in to the Large Combustion Plants Directive by 3 February 2006; Coal-fired generators that opted out of the Large Combustion Plants Directive by 30 June 2004 and have not opted back in by 3 February 2006; Non Good Quality CHP (GQ CHP) capacity at CHP plants and others.

	Same transfer rule (called rationalization rule) as in phase 1 is proposed. This rule states that if one installation has closed and operations are moved to another installation or installations the operator may apply to continue to receive a percentage of the allowances from the closed installation.
Treatment of Renewable energy Sources	Combustion of biomass and waste material are mentioned as reduction options and its use should be enhanced due to benchmarking based on gas.
Use of ERUs/CERs by companies	Not quantified yet but the proposal is to base it on the level of effort (allocation compared to BAU). The limited will most likely be set annually with banking between years. It has not been decided yet if the limit will be based on national, installation or sector level.
Special features	- *Good Quality Combined Heat and Power* (GQ CHP): to give a strong incentive to invest in this kind of clean technology. Growth rates and a ring-fenced reserve are set in order to ensure favorable treatment of GQ CHP. In addition GH CHP will receive 100% of the amount of allowances calculated by the spreadsheets. The allocation will be based on 2001-2003 emission data after dropping the lower year of emissions. - *Contingency reserve* of most likely less than 1% in order to provide flexibility (e.g. if administrative error in allocation, too late issuance of permit). Rest will be transferred in new entrant reserve.
Information on future allocation rules	No statement in Draft NAP of March 2006.
Comparison with first NAP	Approach relatively similar to NAP I but now includes benchmarking element for electricity supply sector and auctioning.

References:

DEFRA 2006a: Consultation on the phase II UK Draft National Allocation Plan.

DEFRA 2006b: EU Emissions Trading Scheme phase II (2008-2012) Expansion – Explanatory Note

NETHERLANDS NAP 2005-2007	
Micro-level plan (allocation rules)	
Installations covered (share of CO_2 emissions)	There were 152 opt-outs (9 „combustion sites“ and sites <25kt; an additional 149 small emitters still await opt-out approval from EC.
Allocation method for existing installations	100 % cost-free allocation - Historic emissions*growth factor (per sub sector)* efficiency factor (benchmark)* compliance factor (0.97) - Compliance factor of 0.97 is without reserve because allocation formula contains a growth figure - Base period is 2000-2001 unless company can prove that these years were not representative
Allocation method for new entrants	Cost free allocation according to BAT benchmark as applied worldwide - Known new entrants receive allocation from sector budgets, are included in NAP I - Unknown new entrants receive allocation from reserve (4 Mt)
Special provisions for energy-efficient installations	- Via benchmark: EE factor is maximum 1.1 - Double benchmark for existing CHP installations
Treatment of renewable energy sources (RES)	Due to Coals Covenant amount of CO_2 avoided is subtracted from allocation via co-fired biomass
Special features	- Compliance factor is applied to *process related emissions* - *De minimis rule* regarding sites with <25kt (opt out) - Allowances for energetically usable blast furnace gas (Hoogovengas) are allocated to final user - Closure rule: not clear; commitment to address this in next NAP and legislation - EC Decision July 7 accepts NAP, provided cut of 3 Mt, to 95,3 Mt

NETHERLANDS

NAP 2008-2012
(Draft Version of May 23th 2006; Comments dead line on July 4th[77])

Macro-level plan (emission targets and budgets)

Burden sharing target (BS) & ETS	$GHG_{1990/1995}$ (Mt CO_2e/a)	$CO_{2,1990}$(Mt CO_2/a)		BS target (Mt CO_2e/a)	BS (%)	(Hypothetical) CO_2 BS target without Kyoto mechanisms (Mt CO_2e/a)	
		ETS	Non-ETS			ETS	Non-ETS
	212.9	**NA**	**NA**	**200.2**	**-6**	**73.9** [78]	**92.2**
		159.4[79]				**166.1**	

Emissions, distance to target (DTT), use of Kyoto mechanisms (KM) by government	GHG_{2004} (Mt CO_2e/a)	$CO_{2,2004}$(Mt CO_2e/a)		KM $_{2008\text{-}12}$ (Mt CO_2e/a)	DTT_{2004} Mt CO_2e/a	
		ETS	Non-ETS		without KM	with KM
	217.8	**80.4**	**100.3**	**20 (JI: 34; CDM: 67)**	**-17.6**	**2.6**
		180.7				

ETS cap (both NAP I and II) & new entrant reserve (R)	**2005-07**			**2008-12**		
	$ETS_{2005\text{-}07}$ cap including $R_{2005\text{-}07}$ (Mt CO_2e/a)	$R_{2005\text{-}07}$		$ETS_{2008\text{-}12}$ cap including $R_{2008\text{-}12}$ (Mt CO_2e/a)	$R_{2008\text{-}12}$	
		Mt CO_2e/a	%		Mt CO_2e/a	%
	95.9[80]	**2.5**	**2.6**	**99.2**[81]	**6**[82]	**6**

Verified emissions (VET) of ETS-installations (2005)	VET_{2005} Mt CO_2 (% of installations covered)	Difference to allocation for 2005		Emissions of additional installations (Mt CO_2)
		Mt CO_2	%	

77 See NAP II

78 That is, the ratio of most recent ETS CO_2-emissions (80.4Mt/a) to total GHG emissions in 2004 (217.8) multiplied by the burden sharing target (200,2MtCO_2e/a) for 2008-12. Accounting for additional installations to be included - a first rough estimate is 12-16Mt/a – would bring the hypothetical BS for the ETS to about 89 Mt CO_2e/a (see also Footnote 84).

79 See UNFCCC 2006

80 NAP II: cap including ETS/Non-ETS was 112 Mt. In fact, due to opt-outs only 86.5 Mt was allocated.

81 That is including additional sits, opt-outs.

82 There is an additional ‘legal claims’ depot of 0.5 Mt/a.

	80.351[83] (100%)		**6.1** (wrt 86.5)		**7**	**12-14**[84]
Base period (BP), projection (P), growth rates (GR)	BP (years)	BP (Mt CO_2e/a)	$P_{2008-12}$ (Mt CO_2e/a)	Δ_{PP-P} (Mt CO2e/a)	Δ $BIP_{2003-10}$ (%)	$GR_{2008-12}$ NAP II (%)
	Average of 3 out of: 2000-2005	**92.8**[85]	**99.1**[86]	**-6.3**	**2.9**[87]	**1.7**[88]
Rationale for Cap	Benchmarking covenant is main driver for cap (15% EE in 2010), assuming that emission trends are de-linked from economic growth. There is a small shift to non-ETS. A Large use of KM is needed to meet Kyoto.					
Information on future ETS caps	No: only 2°C target.					
Comments	Government is preparing extra measures to meet Kyoto: 6 Mt in non-ETS sector (energy saving in building; increase use of biofuels for cars to 5.57%; fiscal clean car purchase incentive) and 1. 4 Mt in ETS sectors[89].					

Micro-level plan (allocation rules)

Installations covered (excluding opt-out, including opt-in)	# 2005-07	# 2008-12	Inclusion of additional installations	Opt-in / opt-out(Yes/No)	
				2005-07	2008-12
	210	**500**[90]	- Crackers etc (9-12) - 2 Carbon Black (0.3)	**Opt-out:**	- **Opt-in**: sites with linked 20

			- Off gas process emission from desulpher. installations from coal fired power - 2 plus 1 new entry adipic acid producers, 50% of N_2O (1.6) - 80-100 horticulture greenhouses with >20MW_{th} (2Mt) - Hospitals, universities with CHP (0.25)[91] - In NAP-1 'Forgotten' sites	Yes: 152 (9 combust. and <25kt sites, 149 small emitters still await opt-out approval) **Opt-in:** No. (though some denied opt-out provision)	MWth (instead of single installations) may opt-in - **Opt-in**: N2O for saltpetre production for 50% of its CO2e (Art 24 Directive): 1.6 Mt/a allocation

Allocation method for existing installations	Cost-free Allocation							Auctioning
	%	Compliance Factor				Growth Factor		
	96	Energy	Industry	CHP	Others	Energy	Industry	4%

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83 See VET NL 2005

84 The initial first NAP for phase 1 from April 2004 stated a total allocation budget for the ETS installations of 99.2 Mio. EUAs per year. Subsequently it was decided to opt-out numerous small installations and some crackers from the EU ETS for the first phase. According to the VET for 2005, the total allocation was then only 86 Mio. EUAs. The difference in total allocation yields an estimate for the emissions of those installations in the range of 12-14 Mio. EUAs.

85 ETS participants average inventory report for 2001 and 2002 (92.6 resp. 93Mt, excluding process emissions: 78.6 resp. 79.3), from ECN 2006a

86 Own calculation, based on share of ETS-CO_2 emissions (VET 2005) relative to national GHG emissions (2004) and projection of national GHG emissions of 224 Mt CO_2e for 2010 (95% certainty (MNP)); that is 2 Mt above target, with policy. Without policy it would be 246 Mt in 2010.

87 Source: IEA/OECD (2005): Energy policies of IEA countries, 2005 Review.

88 1.7% CO_2 growth, for all sectors on average, ECN 2006b

89 MNP 2006

90 That amounts to 90% of energy/industry emissions. NL small companies' provision: NAP2 will include sites with single 20MW_{th}; in NAP-1 it could also be linked 10MW_{th}. When companies want to participate they can use an opt-in provision. It will be to the EC to accept the narrower 20MWth approach and the opt-in. This will mean that 100 horticulture sites that are thought to participate in ETS (Agreement May12) are not included.

91 ECN 2006 a

		0,86[92]	**0,86**[93]	**0,86**	**1** small install-ations	**1.7**	**1.7**	(or sold (3.9 Mt); this is 10% of the power sector cap and 2/3 of the 15% windfall allowance correction of the power sector
	- Allocation=HE*GF*EE*C*sb: historic emissions (average of 3 out of 2001-2005) * growth(2005-2010) * relative energy efficiency * correction factor * sector specific special circumstances. - Requirements: environment permit or notification; concrete building plans; official Board investment approval within 6 months after EUA request. - Growth: for 2005-2010: is CO_2 related growth, based on May 2006 ECN projections[94]. ECN has taken into account closures and new entrants in a sector to come with average growth of 1.76%. - *Benchmark* is determined by 1) EE=distance to world top by Benchmarking Covenant; assessment is confidentially done by VBE[95]. Energy efficiency is maximised at 15%, so EE can be max 1.15; 2) Energy Efficiency Agreement[96], EE=1; companies that do not participate in 1) or 2) get EE=0.85: 15% energy efficiency is assumed in 2008-20012 regarding 2001-2005. 4) For CHP, default EEs are used (gas/oil: 52% (E), 90% (heat); coal 39%/90%; Hoogoven gas 40%/90%. 5) for process emissions EE=1 (plus correction factor is applied for 50%). Specific sector circumstances can be: 50% correction application for process emissions and power companies that implement the Coal Covenant, meaning co -firing biomass, means that the allocation will be reduced with the co-firing part due to the existing coal covenant (to implement RE Directive).							
Allocation method for new entrants	- Coverage: Sites active after Dec. 2006, not sites that received opt-out under NAP I (these will be treated as existing sites). Physical growth means of new units within site. Threshold @ 50kt/a or 10% of capacity. - Allocation on basis of best practice and expected emissions, but max. 90% of official design (name plate) capacity. No correction factor; no growth factor. New power companies will not be affected by cat to address windfall profits. - *Transfer provision:* when the production of site A moves to site B within NL within the same company (as in Art. 24b Civil Code), the company can keep the EUAs, provided the production of site B increases with 10% growth or 50kt CO_2.							
Reserve	- 30 Mt, 6 Mt/a at first-come-first-served - NL will look for ways to replenish the depot when emptied. It will be filled with unused reserve for legal claims and not used allowances after closures.							

92 NAP II proposes that the calculated allocation will be shortened with 15% over the net electricity delivered to the grid minus purchased electricity. This threshold is the first 350 GWh, so most CHP installations are excluded of 15% cut. But it appears that a handful of the largest (joint venture) CHP plants will be included. The destination and compensation will be as follows: 2/3 of the 15% will benefit small users / households (to be later decided how) through the sale of est. 4% of the overall allocation; 1/3 of the 15% (2%) will be allocated to 'the other ETS participants', based on electricity used (data for that are asked).

93 50% of the process emissions will be excluded.

94 ECN 2006b

95 www.benchmarking-energie.nl

96 www.senternovem.nl/mja

	- Legal claims depot is 0.5 Mt/a
Closure rules	Closure means not meeting criteria of Art 16.5, 1 Environment Act (no monitoring of emission etc.); NEA can withdraw CO_2 permit, then no more allowances will be issued. Not issued allowances will be added to new entrant depot.
Special provi-sions for energy-efficient installa-tions	- Dealt with in general allocation method - New entrants should apply BAT - Saltpetre industry should apply below BAT
Treatment of renewable en-ergy sources	No provision. Power companies are treated on energy efficiency/capacity, not on CO_2/kWh. Newcomers on BAT.
Use of ERUs/CERs by companies	8% of quota; not explicitly mentioned whether this is for application per annum or that companies are free to use it, e.g. in one year at once. When other MS will apply other percentage, percentage will be reconsidered. NL no JI host country.
Special features	- 15% cut of power companies quota (not for new entrants;see above) - Allocation for N2O installations will be based on benchmark in gg N2O/ton of 100% saltpetre *U GWP * growth; benchmark cap will be lower than BAT cap; NL will add N2O monitoring protocol. When benchmark is not ready, entry into force may be later than Jan. 2008. Allocation = P (average production 3 of 2001-2005 * 100% saltpetre) * Benchmark (1.7 kg/t 100% Salp.) * GWP (310) * Growth 1.7 (though NAP says no growth rate for N_2O allocation. The N_2O new entrant depot is 1.3 Mt, legal claims de-pot is 0.032: total available: 7.75 Mt EUA/a .
Information on future allocation rules	Not in NAP. But Minister of Economic Affairs Brinkhorst wrote in a letter from May 24 to European Commission (Green Paper EE) that he prefers for future allocation: - a continuation of the ETS after 2012 - Needed changes in the system: harmonization of allocation for new and existing sites, limit free allocation to the power sector to tackle 'windfall profits' and to take into account the value of CO_2 storage and nuclear energy - Favours extension of EU ETS to aviation, marine transport and non CO_2 gases.
Comparison with first NAP	Difficult to compare. Looks more stringent. More companies are included. Some addi-tions take own CO_2 space (N_2O, CO_2 in horticulture; CO_2 from buildings). Reserve of 30Mt is mainly for new coal power plants (no sustainable signal). To limit the inclusion of $20MW_{th}$ to sites with at least a single $20MW_{th}$ might not be accepted by EC.

References

- NAP-2, the Netherlands, May 23rd: http://www.senternovem.nl/mmfiles/Ontwerp%20Allocatieplan%20NAP-II_tcm24-188483.pdf
- UNFCCC 2006: Netherlands' Report to the UNFCCC on Demonstrable Progress under Art. 3.2. Kyoto Protocol Feb'06
- VET NL: Verified Emissions Report, see: http://ec.europa.eu/environment/climat/emission/pdf/citl_netherlands.pdf
- ECN 2006a: Allocation for CAP, May 2006: www.ecn.nl/docs/library/report/2006/c06030.pdf

- ECN 2006b: ECN, Groeicijfers voor CAP, May 2006: http://www.ecn.nl/docs/library/report/2006/c06031.pdf
- MNP2006: Milieubalans 2006., May 2006
- NIR / CRF 2006 for the Netherlands, UNFCCC (all data not further specified is taken from UNFCCC 2006

Annex B: Analysis of verified emission data for 2005

On 15 May the European Commission released the 2005 CO_2 emissions data and compliance status of more than 9,400 installations covered by the EU ETS from 21 Member States.[97] The published data shows a surplus of about 44 m EUAs (compared to total emissions by these installations of about 1,785.3 m EUAs for 2005. Thus, the surplus of allowances for these installations amounts to about 2.5 %. With the announcement of Luxembourg's surplus of 0,6 Mt CO_2e the EU surplus comes to 44,6 m, 2,4% of its total allocated EUAs (CEC 2006b).

The situation for the countries covered in this report is as follows: with a surplus of about 21 m EUAs Germany exhibits the largest surplus of all MS in terms of quantity. In relative terms, the surplus accounts for 4.3 % of the German ET-budget (without NER), and is well above average. In relative terms, the surplus of 6.2 m EUAs in the Netherlands is even larger (7 % of ET-budget without NER). By contrast, with a shortage of 33.1 m EUAs (or 15.8 % of ET-budget without NER) installations in the UK exhibit the largest shortage in absolute values.

B.1 Analysis for Germany

Figure B-1 indicates that on average all activities in Germany enjoyed a surplus of allowances. The highest relative surplus can be found in the production of cellulose (only four installations). The surplus of energy installations (combustion installations in the energy and in the industry sectors), which are responsible for the vast majority of emissions (about 80 %) and of installations (about 2/3), amounts to 9.5 M EUAs, or 2.5 % of total EUAs allocated to these installations. By comparison Installations in all activities in the industry sector (i.e. excluding energy installations) account for about 33 % of installations and 20 % of allocated EUAs. The surplus of these installations is about 11.1 m EUAs which corresponds to 10.6 % of total allocation to these installations (DEHSt 2006). A more detailed analysis on the underlying sources for the surplus by the German Emissions Trading Authority (DEHSt) reveals that the installations which received their allocation based on the options rule are responsible for more than half the surplus in Germany (DEHSt 2006, p. 16).

Overall, for the first year of the EU ETS about 2/3 of all installations in Germany received more allowances than they surrendered, while about 1/3 of all installations were short.

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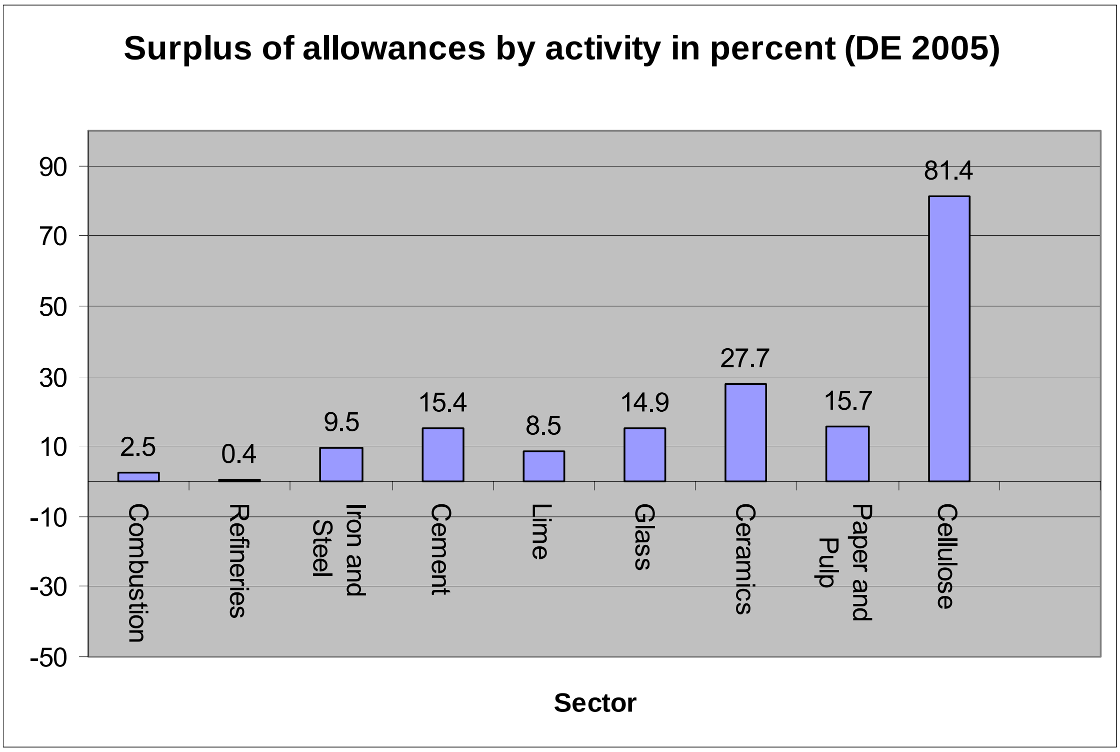
97 Since the registries of Cyprus, Luxembourg, Malta and Poland were not operational, installations from theses MS were not included in this report.

Figure B-1: Surplus of allowances by activity in percent of allocated quantities of EUAs in Germany



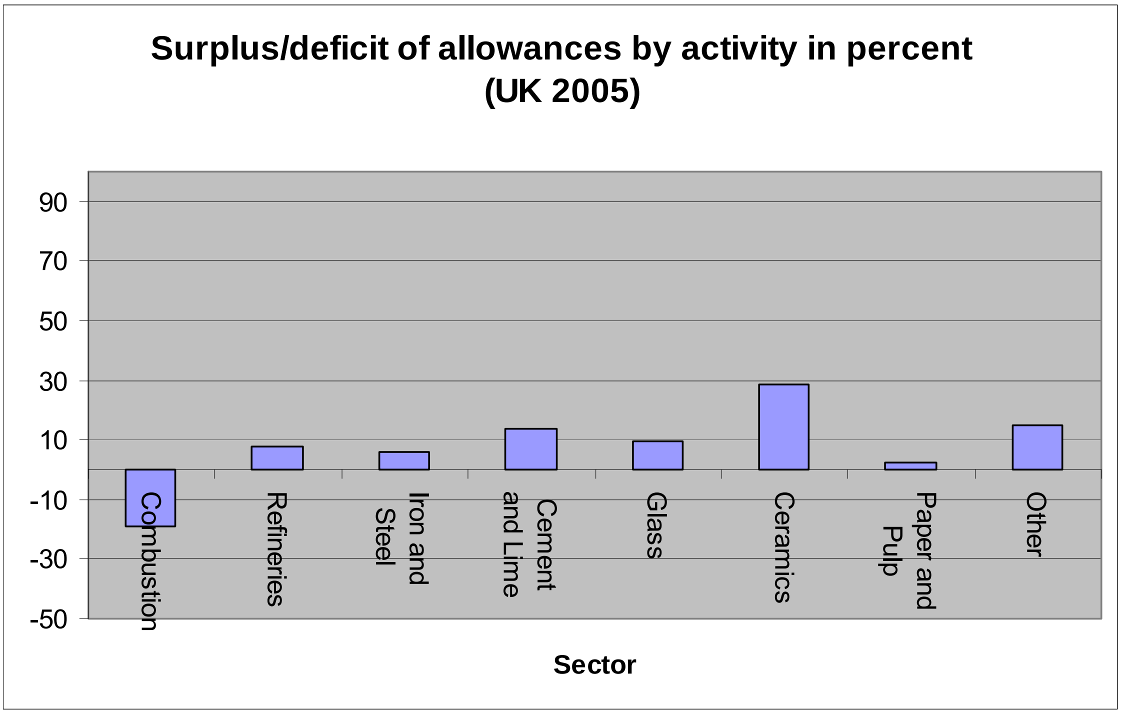
Source: Fraunhofer ISI based on DEHSt (2006)

B.2 Analysis for the UK

Figure reflects that in the UK allocation for the first trading period is by design more stringent on the energy sector[98] than on the industry sectors. Energy installations face an average deficit of almost 20 % corresponding to a total of about 35.5 M EUAs, while the non-energy installations enjoy an average surplus of about 9 % corresponding to a total of around 4.7 M EUAs. Overall, for the first year of the EU ETS slightly more than half the installations in the UK received more allowances than they had emitted. A sectoral analysis shows that about half the energy installations face a deficit. In the iron and steel sector this share is 90 % and in the other industry sectors (besides “Other”) it is around 70 % (see Figure B-3).

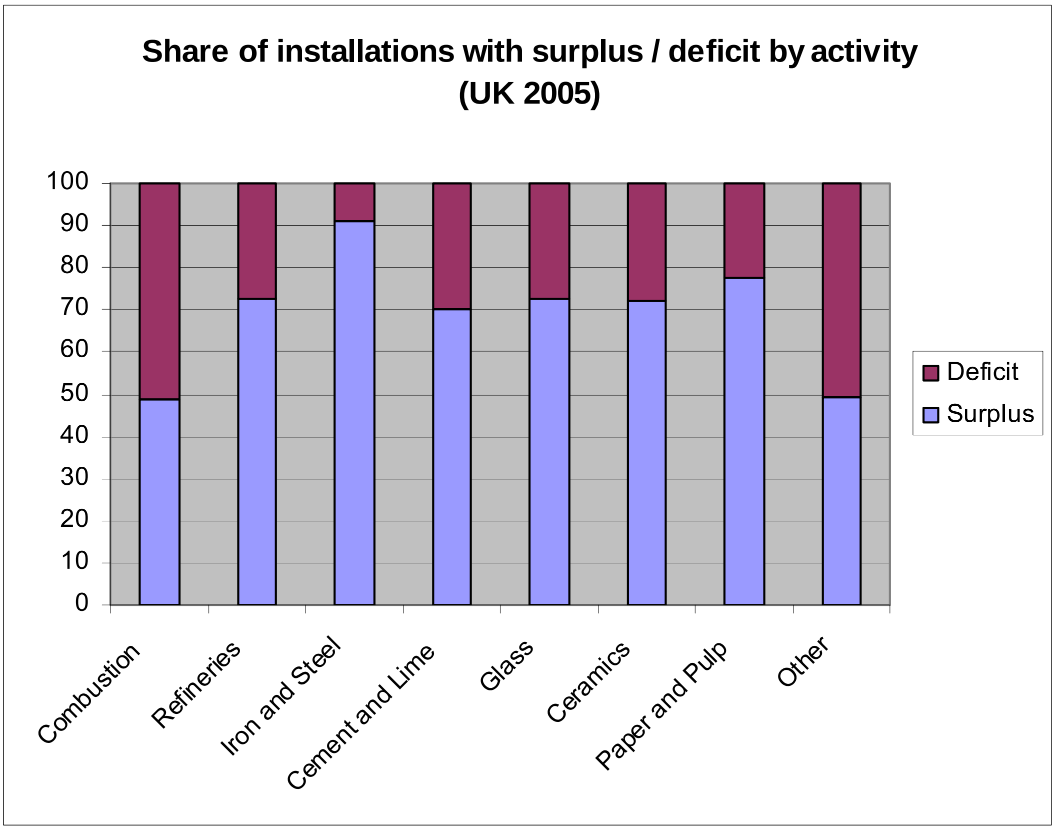
98 The terms energy and industry sector as used in this report do not exactly correspond to the underlying concepts in the Directive. For example, the energy sector would also include energy installations in industry such as CHP plants.

Figure B-2: Surplus/deficit of allowances by activity in percent of allocated quantities of EUAs in the UK



Source: Fraunhofer ISI based on Community Independent Transaction Log (CITL) (CEC 2006c)

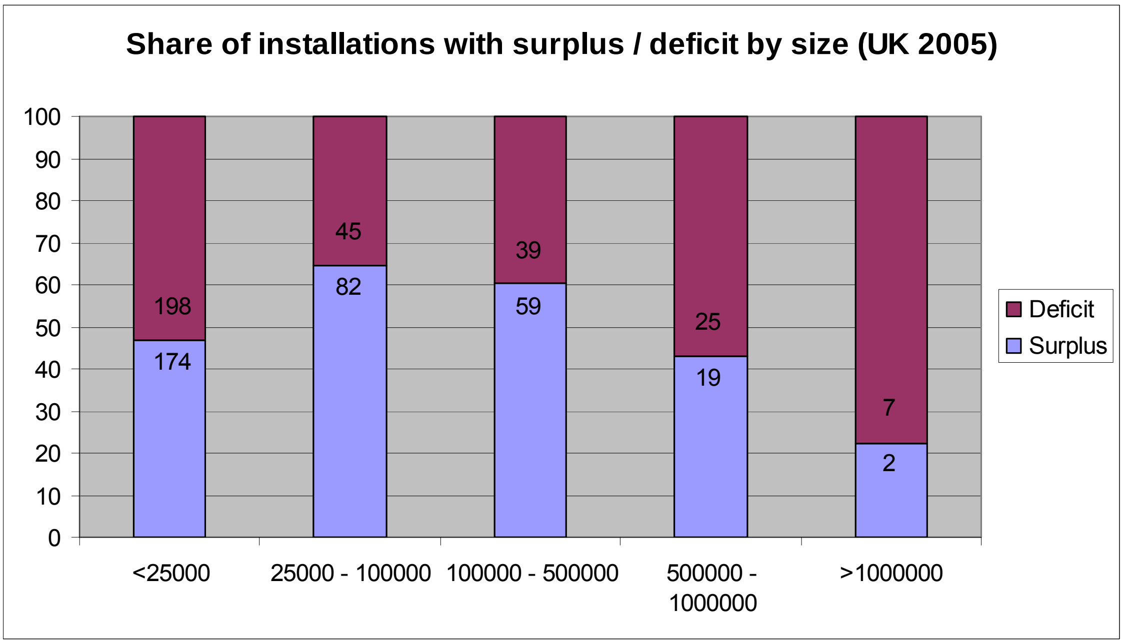
Figure B-3: Share of installations with a surplus or a deficit of EUAs by activity in the UK for 2005



Source: Fraunhofer ISI based on Community Independent Transaction Log (CITL) (CEC 2006c)

Relating the size of installations (as measured by the allocated quantities of EUAs) with the surplus or deficits in the UK (see Figure B-4) implies that smallest and – in particular – the largest installations exhibit the highest shares of installations with deficits. The distribution as measured in terms of share of installations with a surplus resembles the shape of an inverse U.

Figure B-4: Share of installations with a surplus or a deficit of EUAs by size in the UK for 2005



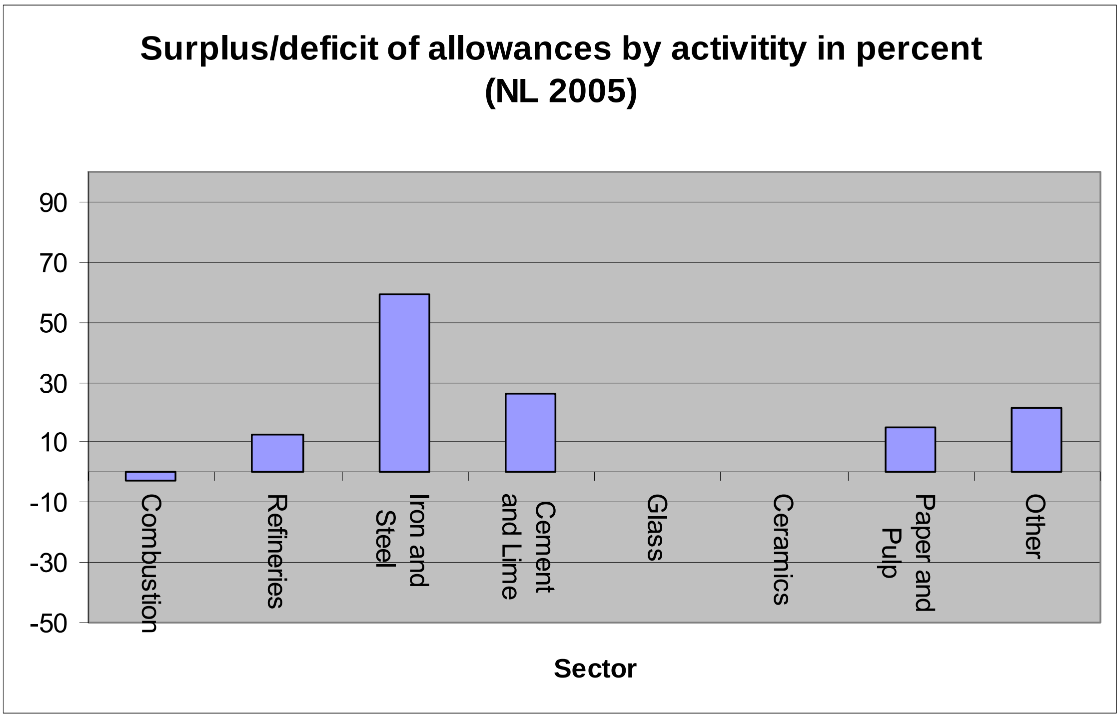
Source: Fraunhofer ISI based on Community Independent Transaction Log (CITL) (CEC 2006c)

B.3 Analysis for the Netherlands

Figure reflects that in the Netherlands allocation for the first trading period is somewhat more stringent on the energy sector than on the industry sectors. In terms of stringency for the energy sector, the allocation ranges between the rather generous allocation in Germany and the rather tight allocation in the UK. In the Netherlands energy installations face an average deficit of a bit over 2.5 %, which corresponds to a total deficit of around 1.4 M EUAs. By comparison, non-energy installations enjoy an average surplus of almost 26 % owing, in particular to the huge surplus for the installations in the emissions-intensive iron and steel industry. The total surplus for non-energy installations is about 7.5 M EUAs.

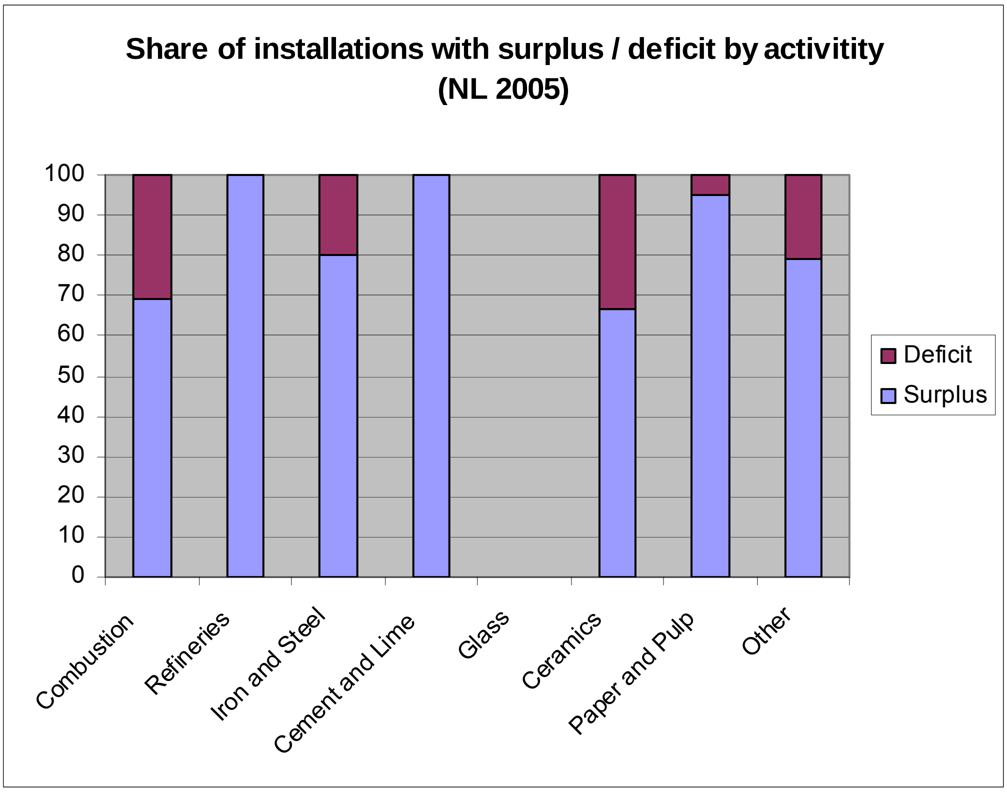
Overall, for the first year of the EU ETS almost three quarters of the installations in the Netherlands received more allowances than they had emitted. Figure B-6 shows that the sectors with the highest shares of installations with a deficit are combustion installations in the energy and industry sectors and the installations in the ceramics sector. All installations in the iron and steel industry and in the cement industry enjoyed a surplus, due to a smaller than anticipated growth in 2005.

Figure B-5: Surplus/deficit of allowances by activity in percent of allocated quantities of EUAs in the Netherlands



Source: Fraunhofer ISI based on Community Independent Transaction Log (CITL) (CEC 2006c)

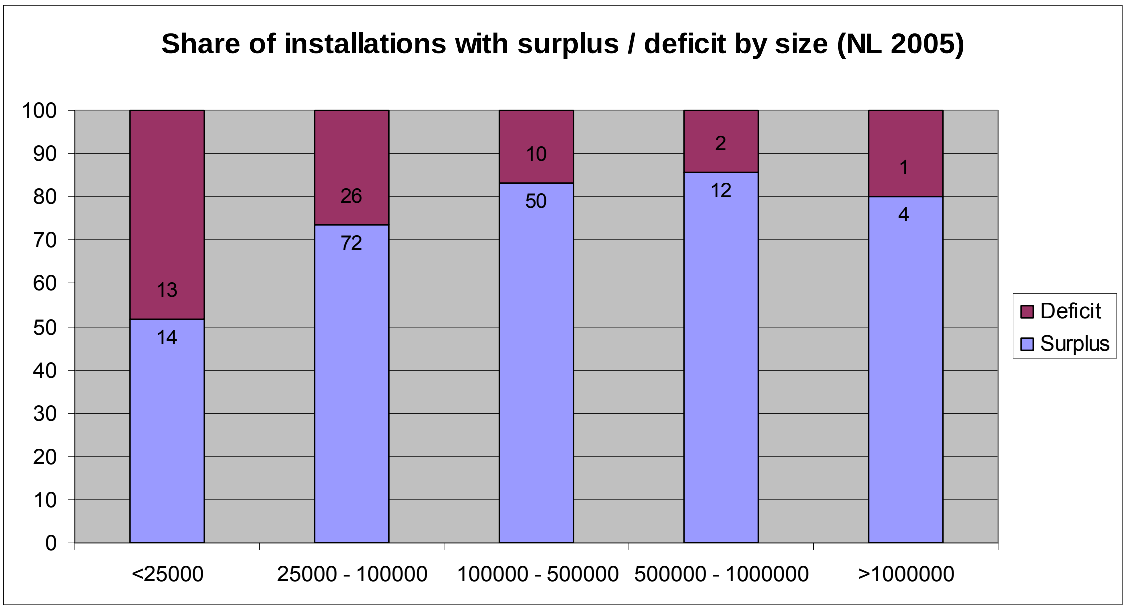
Figure B-6: Share of installations with a surplus or a deficit of EUAs by activity in the Netherlands for 2005



Source: Fraunhofer ISI based on Community Independent Transaction Log (CITL) (CEC 2006c)

Relating as before in the case of the UK, the size of installations with the surplus or deficits in (see Figure B-7 in Annex B) shows that the allocation in the Netherlands appears to have regressive effects: the larger the installation, the larger the surplus.

Figure B-7: Share of installations with a surplus or a deficit of EUAs by size in the Netherlands for 2005



Source: Fraunhofer ISI based on Community Independent Transaction Log (CITL) (CEC 2006c)

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