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# Implications of announced Phase 2 National Allocation Plans for the EU ETS

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*We quantified the volume of free allowances that different National Allocation Plans proposed to allocate to existing and new installations, with specific reference to the power sector. Most countries continue to allocate based on historic emissions, contrary to hopes for improved allocation methods, with allocations to installations frequently based on 2005 emission data; this may strengthen belief in the private sector that emissions in the coming years will influence their subsequent allowance allocation. Allocations to new installations provide high and frequently fuel differentiated subsidies, risking significant distortions to investment choices.*

*Thus in addition to being numerically weak in aggregate, proposed allocation plans reveal continuing if diverse problems, including perverse incentives. Ensuring the effectiveness of EU ETS in the coming years will require credible evidence to the private sector that free allowance allocation will be drastically reduced post-2012, or these problems otherwise addressed.*

**Key words:** Emission Trading, National Allocation Plans, Comparison, European Member states

**JEL classifications:** D72, L94, Q52, Q54,

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## Introduction

The EU Emissions Trading Scheme is designed to cap emissions of energy intensive industry in Europe. Under the European Directive on Emissions Trading, each Member States is required to state within their proposed National Allocation Plan (NAP), both the allocation volume of emissions allowance to the covered sectors and the allocation methodology.

Sensible decisions on the allocation volume or 'cap' level by Member States is crucial. Stringent caps create scarcity, which holds key to both the environmental efficacy of the scheme and good functioning of the CO2 market. Yet, Neuhoff, Ferrario et al (2006) argue that the volume of allowances allocated under the currently proposed NAPs for Phase2 is too high, by comparing the NAPs with CO2 emissions projection scenarios and the historic trend of emissions extrapolated forward. The analysis by Rogge, Schleich et al (2006) also show that in many Member States, allocation for Phase II is excessive relative to 2005 emissions, historic trends, and country level projections.

The National Allocation Plans also have to specify how the allowances are distributed among existing installations, new installations and auctions. Rogge, Schleich et al (2006) analyze how the different approaches selected by Member States result in increasing complexity and lack of transparency of the overall system. Much of the complexity results from industry interests and aims to address distributional concerns. The complexity subsequently not only complicates participation by industry, but also complicates the roll of NGOs and less informed industrial sectors in controlling the outcome of the political process. Thus the need for harmonization in the methodology used across the Member States has been widely emphasized.

Economic theory and anecdotal evidence also suggest that the methodology chosen for the allowance allocation can directly influence decisions on investment, retrofitting and plant operation(Fischer 2001; Harrison and Radov 2002; Palmer and Burtraw 2003; Böhringer and Lange 2005; Burtraw, Palmer et al. 2005; Entec and NERA 2005; Matthes, Graichen et al. 2005; Åhman, Burtraw et al. 2006; Bartels and Müsgens 2006). We compare the allocation methodologies envisaged in the different National Allocation Plans for the period 2008-2012 as already submitted to the Commission or alternatively which were available in draft format as of the 1st of November 2006.

Taking the power sector as an example, in this study we quantify the large differences in free allowance allocation across countries and generation technologies.

- For new installations investment incentives are distorted towards fossil generation and in various countries even towards $CO_2$ intensive fuel types. This reduces the effectiveness of EU ETS in reducing $CO_2$ emissions and reduces overall costs. Free allocation also represents output subsidies and might thus undermine substitution effects to less $CO_2$ intensive products. The free allocation of allowances to new installation, with all the detrimental implications, is unique to the EU ETS

- For existing installations the inhomogeneous allocation can distort the merit order choice, incentives for efficiency improvements and closure decisions, again detrimental for the cost efficiency of the EU ETS in reducing $CO_2$ emissions. This effect is even stronger if ex-post adjustments shall apply which are under legal dispute between Germany and the European Commission and are still demanded by some players. The large differences across countries again illustrate that significant reductions of free allowance allocation are not only economically but also politically possible.

A reduction of free allowance allocation in the period 2008-2012 could be used both to reduce the overall level of free allocation to the covered sector and to increase the share of auctions to the 10% limit specified in the Directive.

Distortions from the free allocation to existing facilities mainly result because owners and operators could expect that the future free allowance allocation is going to be similar to the current approach. For example, many countries use installation level emission data from 2005 to decide on the allocation for 2008 to 2012. If market participants expect a similar approach will be taken in the future, then they will adjust investment and operation behavior until 2012 in expectation of the allocation post-2012 (updating and early action problem), which leads to a less cost-efficient outcome, i.e. higher costs to society.

Any move to less distorting allocation methods increases confidence in non-distorting future allocation methods. The use of auctions and the initial use of benchmarks in some sectors and countries are a promising start. A strong commitment to rapid facing out of free allowance allocation could avoid most distortions. A thorough assessment of the free allocation under EC law State aid criteria could conclude that the continued allocation post-2012 would offer a disproportionate benefit relative to the cost of the environmental regulation (Johnston 2006). This could provide a credible commitment towards phasing out free allocation and thus address the early action problem.

This paper does not address closure conditions. The expectation of receiving future allowances within the commitment period or in the next commitment period only with the continued availability or operation of a power station creates an incentive to postpone the retirement of power stations or to invest in retrofit of power plants rather than closing the power station(Spulber 1985; Neuhoff, Keats et al. 2006). This distortion is only partially compensated for by transfer provisions (Gagelmann 2006). Åhman and Holmgren (2006) and Rogge, Schleich at al (2006) compare such closure and transfer provisions across Member States.

We summarise the information contained in the currently proposed (October 30th, 2006) National Allocation Plans for the period 2008-2012 and present it for general scrutiny in an Excel database at http://www.econ.cam.ac.uk/research/tsec/euets/.[2] Our first findings regarding the economic effects that might follow from these plans are summarised below. Please note that the analysed National Allocation Plans are currently being assessed by the Commission, and there is some hope that some of the negative aspects of the currently proposed plans will be improved during the approval process.

## 1 Quantity of free allocation to installations – example power sector

To illustrate the distortions of free allocation to new investment we calculate the subsidy which new coal and gas power stations[3] that are assumed to run for 6000h will receive in different EU Member States[4]. Figure 1 illustrates that in all Member States fossil fuel generators receive high subsidies in terms of free new entrant allocation. In many countries, a new entrant allocation does cover the emissions of CCGT gas plants, and in some countries it even covers all the emissions a coal power station is expected to produce. While it is sometimes argued that new power stations should receive the allowances that they require for covering their emissions, this is not in accordance with economic principles. In liberalised electricity markets, power generators pass the opportunity costs of $CO_2$ allowances into the electricity price and thus do not require any free allocation. This is desirable to achieve substitution effects, and only avoided where electricity price regulation only cover real costs and not opportunity costs (Burtraw, Palmer et al 2005).

Any free allocation *does* represent a subsidy – and where only fossil fuel generation is subsidised, this distorts investment choices to favour fossil fuel generation. Where coal receives a higher allocation than gas, the investment choice is in addition distorted towards coal. The level of these subsidies is so high that the construction of coal power stations is more profitable under the ETS with such distorting allocation decisions than in the absence of the ETS (Åhman and Holmgren 2006; Matthes, Graichen et al. 2006; Neuhoff, Ferrario et al. 2006). The long-run consequences of these distortions can be significant since, once built, plants will stay on the system for many decades, significantly increasing the cost of shifting towards a low carbon economy in the future (Bartels and Müsgens 2006; Neuhoff, Keats et al. 2006).

The German National Allocation Plan notified with the commission not only provides the highest allocation for new coal generation in general, but the draft Allocation Law also contains a provision providing an even higher free allocation for new lignite fired installations. In addition, the current NAP guarantees the continuation of free, fuel

[2] The data base covers volume of the allocation, verified and projected emissions, allocation methodologies for power and non power sectors, auctioning, general features, and evaluation of the allocation a standard power plant would receive in each Member State according to the proposed rules.
[3] We assume a 200MW coal power station and Combined Cycle Gas Turbine with efficiencies of 33% (existing coal), 45% (existing CCGT gas), 43% (new coal) and 55% (existing CCGT gas).
[4] BE-W Walloon, CY Cyprus, DE Germany, ES Spain, FI Finland, HU Hungary, IE Ireland, IT Italy, LV Latvia, NL Netherlands, UK, BE –F Flemish, CY Cyprus, EE Estonia, LU Luxembourg, Sl Slovenia, AT Austria, CZ Check Republic, DK Denmark, SE Sweden, BE-B Brussels, FR France, GR Greece, LT Lithuania, MT Malta, PL Poland, PT Portugal, SK Slovakia.

specific allocation for fourteen years.[5] This undermines investments in low carbon technologies. Fixing the free allocation beyond the commitment period 2008-2012 also reduces the flexibility to evolve climate policy in a national, European and global context in the coming decade and might pre-empt negotiations about future burden sharing between sectors or among European member states. Since Germany has announced to put climate change as on the agenda of its Presidencies of the EU and the G8 in 2007, changing/reneging on these long-term provisions would strengthen the German government's credibility for requesting more stringent emission targets from other countries.

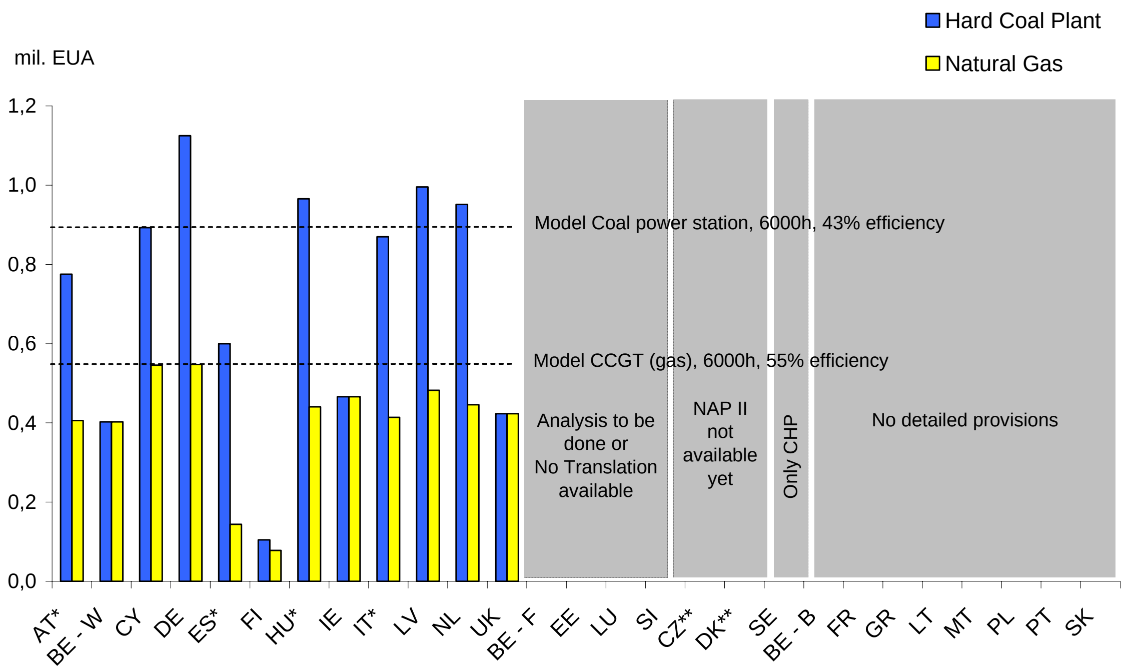


**Figure 1: Comparison of new entrant allocation[6]**

Figure 2 illustrates the allocation per Member State to two standard types of existing power stations of 200 MW, assuming that they operate on average for 6000h/year. Once again, the large discrepancies between different EU Member States are striking. Also striking is how some countries can still justify large free allocation if others manage to negotiate with their industry a significantly lower level of free allowance allocation. In liberalised power markets, electricity generators pass on the opportunity costs of $CO_2$

[5] We note that the draft for the German law which eventually implements the NAP already contains provisions that make this allocation contingent on the rules of allocation in the third period.
6 * Draft NAP, ** NAP not available
The regions of Belgium are identified as F – Flemish, W – Walloon, B – Brussels, in every graph and table. Different load factor used for UK (5812h for both coal and gas), as indicated in NAP II. In DE a standardized load factor of 7500 h is applied to all power plants.

allowances to the wholesale power market (Sijm, Neuhoff et al. 2006) and thus can draw significant benefits from the free allowance allocation (Burtraw, Palmer et al. 2002; Neuhoff and Keats-Martinez 2005).

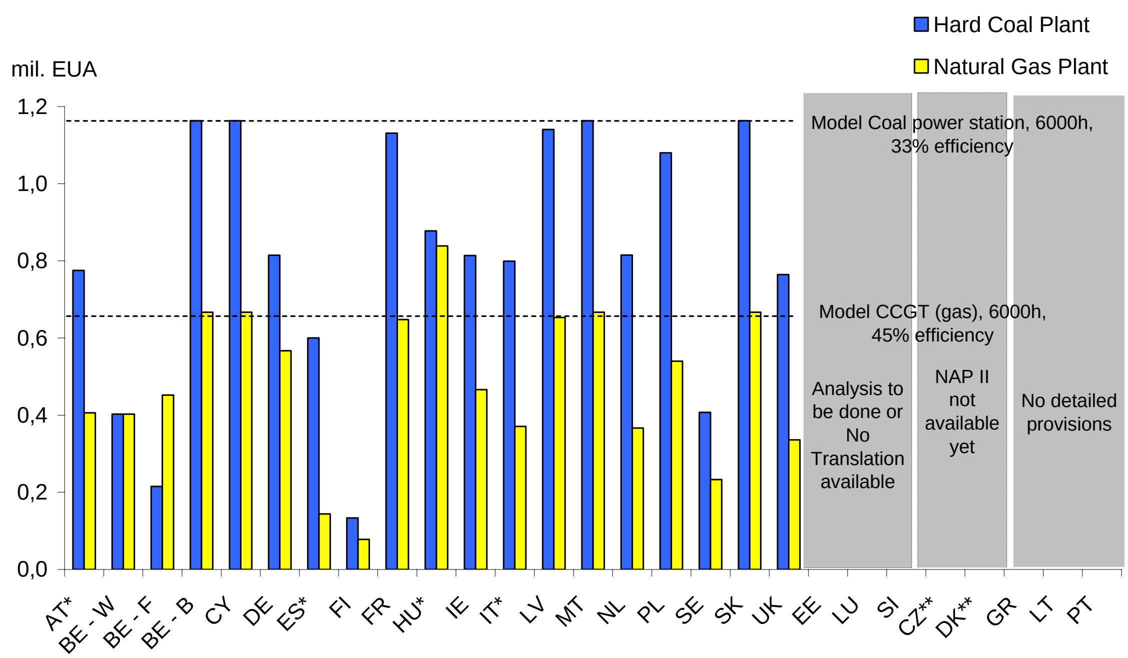


**Figure 2: Comparison of allocations to existing facilities**[7]

This high degree of free allocation to the power sector could easily be reduced without reducing power sector profits below pre-ETS levels (Pál and Bartek-Lesi 2006) and would thus allow for a reduction of the total cap for the covered sector. This is a basic requirement to ensure a viable allowance market that drives investment and addresses concerns that several Member States are not on track to meet their Kyoto targets.

## 2. The use of auctioning

The EU Directive allows Member States to auction up to 10% of the allowances available. Figure 3 illustrates that all Member States can still make more use of this option. This would reduce distortions from the free allowance allocation, and would also allow all countries to become comfortable with allowance auctions. Additionally, a minimum price auction could further ensure a price floor that would facilitate investment in low Carbon technologies (Hepburn, Grubb et al. 2006), and auction revenues could be

[7] Notes to Figure 2:
a) Different load factors used for BE-F (3000h for coal, 6300h for gas), ES (4167h for coal).
b) PL - Low SO2 emitting installations
c) SE – Adjustment factor assumed equal to 0.35.

recycled creatively to support development and initial deployment of suitable technologies. Furthermore, auctioning of significant amounts of allowances could support the transparency of the allowances market especially in the settlement period, and avoid price volatilities resulting from asymmetric risk hedging strategies between sectors which are short and sectors which hold long positions.

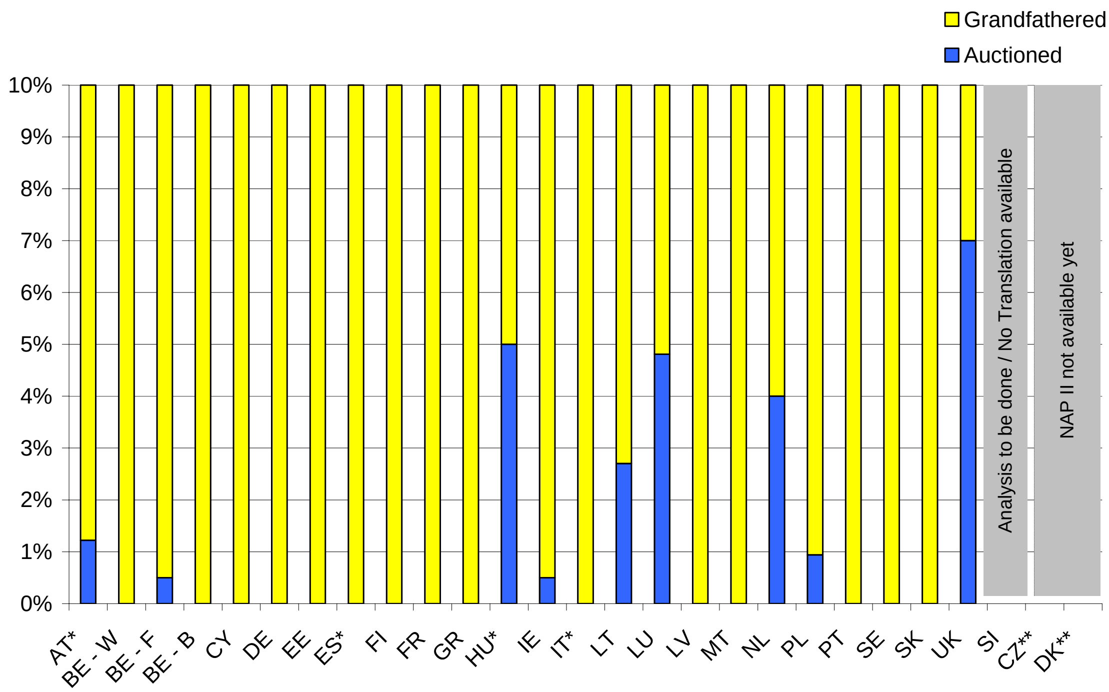


**Figure 3: Comparison of potential to extend use of auctions between countries**

## 3. The use of CDM and JI credits

In the context of the overall Kyoto Protocol implementation framework, the linkage with the international trading scheme is another important dimension. With uncertainty about the future international demand for JI and CDM credits from Canada, Japan and other Annex I countries, some market participants anticipate that the European market could be flooded by these allowances to such an extent that the EU allowance price would plummet. Such uncertainty undermines investment certainty for low carbon options and also poses obstacles to implementing a price floor using auctions.

Article 30(3) of the EU Directive on emission trading requires that the use of JI and CDM credits is supplementary to domestic action. Figure 4 illustrates the provisions of the currently proposed NAPs regarding what fraction of their emissions can be covered by individual installations using JI and CDM credits. As all installations can freely trade allowances, the only binding limit is the resulting overall import volume from JI and CDM credits. Extrapolating from the currently available NAPs for Phase II, up to 15.8% of the emissions of the eligible installations in the EU, or 295.2 $MtCO_2$, may be covered by JI and CDM credits. This will not necessarily happen, but could happen, depending on prices for EUAs and ERUs or CERs, which in turn depend on demand and supply. For example, if Japanese demand, which is estimated to accounts for about half of total Demand for JI and CDM credits ((Grubb and Neuhoff 2006), were to fall.

Article 30(3) requires that the eligible installations across the EU also directly implement measures to reduce emissions by at least the same volume. However, projections (Neuhoff, Ferrario et al. 2006) do not support this hypothesis. Compliance with the Directive would thus require the reduction of the overall budget allocated and/or the volume of JI and CDM credits that can be imported into the EU ETS.

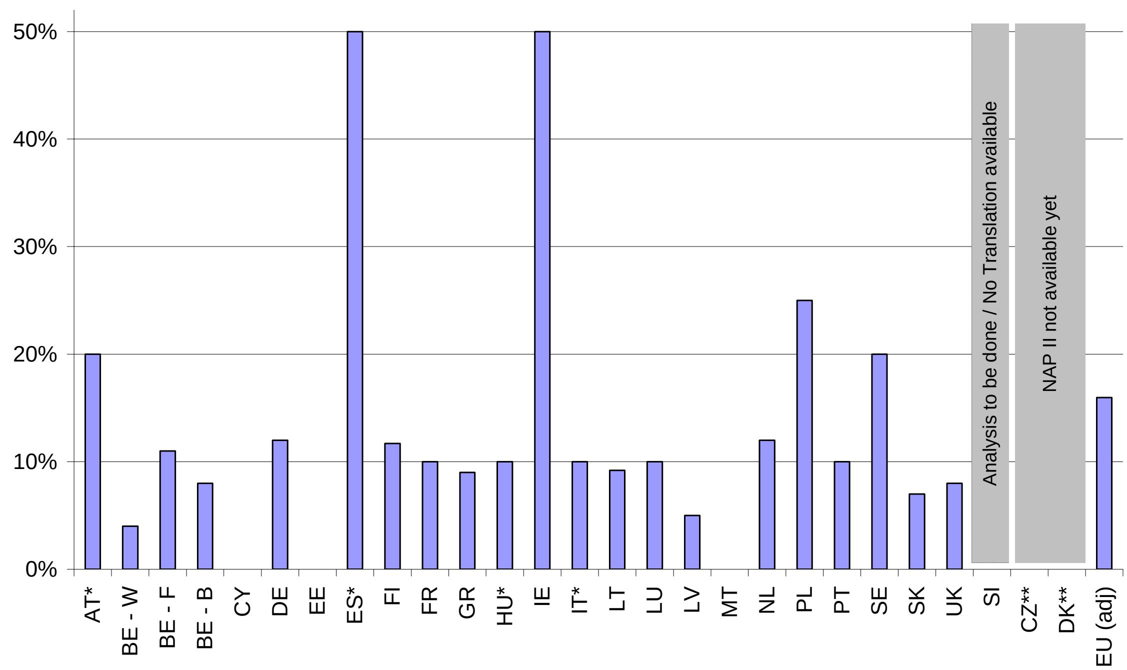


**Figure 4: National limits of using JI/CDM credits for EU ETS compliance as % of emissions/allocations at installation level ("EU adj" excludes CZ, DK, SI)**

## 4. The basis for free allocation

The successful cap and trade programs for $SO_2$ and $NO_X$ in the USA allocate emission allowances to existing facilities typically based on emissions in a fixed historic base period and then auction the remaining allowances; however, they do not allocate allowances for free to new installations. Thus, in most cases the free allowance allocation to existing installations (actually: companies, since in US programmes allocation tends to be related to company, rather than on installation as in EU ETS) constitutes a lump sum transfer which does not create distortions for the effectiveness of the scheme.

In the European context, the limited availability of data, unknown mid- and long-term emissions reduction targets and distributional considerations (regarding the allocation of allowances valued at around 30 billion Euros) prevented such a one-off allocation using one historic base period. Table 1 illustrates that the 'historic' base period for allowance allocation for the period 2008-2012 has shifted to take account of the most recent data (including the year 2005) in many Member States:

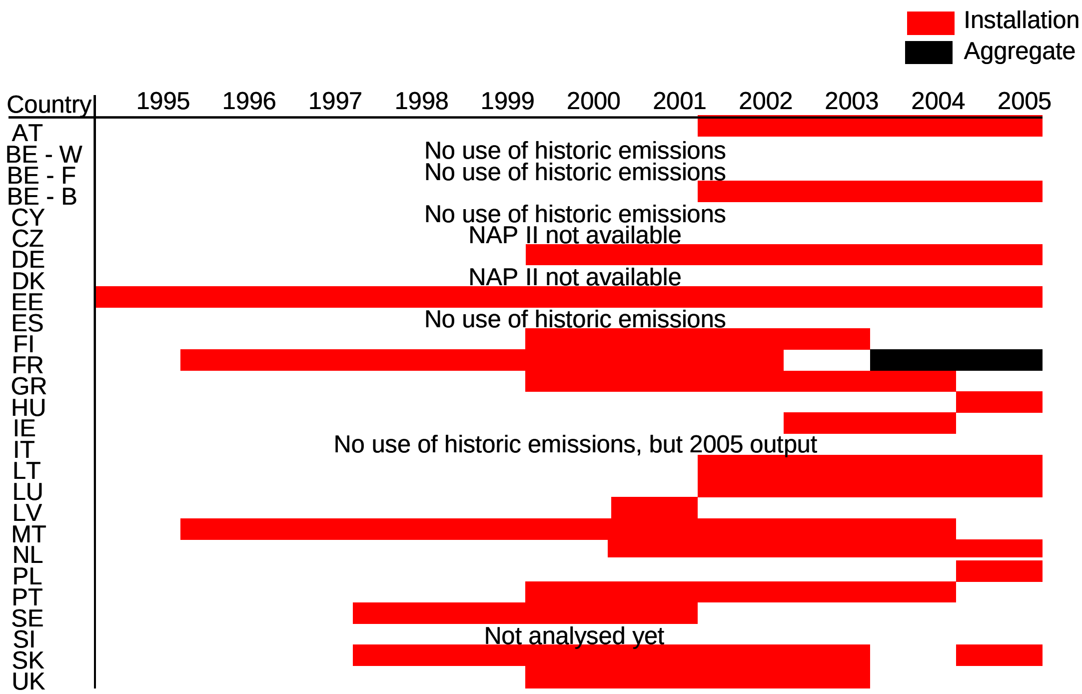


**Table 1: Base period for allowance allocation for Power Sector.**

If allowances are not allocated using a fixed historic base line or an auction then Table 2 illustrates the different categories that can describe alternative allocation approaches (Grubb and Neuhoff 2006). As we move further down the 'pyramid of distortions', additional types of distortions result from the allocation procedure. The distortions only directly apply to existing facilities. But if investors in new installations expect that they will in the future be coved by similar provisions, then the provisions also result in distortions of investment decisions for new installations.

| | | **Impacts** | More expenditure on extending plant life (and potential minimum-run) relative to new build | | Increase operation of (higher) emitting plants | Less efficiency improvements |
|---|---|---|---|---|---|---|
| **Allowance allocation method** | | **Distortions** | Discourage plant closure | Discourage closure of higher emitting plants | $CO_2$-inefficient fuel choice and plant operation | Reduce incentives for efficiency improvements |
| Auction | | | | | | |
| Uniform benchmark | Installed capacity | | X | | | |
| | Output projection | | X | X | | |
| | Historic output | | X | X | (X)[8] | |
| Technology/ Fuel-specific Benchmark | Installed capacity | | X | X | | |
| | Output projection | | X | X | | |
| | Historic output | | X | X | X | |
| Emissions Based | Emissions projection | | X | X | | X |
| | Historic emissions | | X | X | X | X |

**Table 2: Effect of allocation methods to existing installations in the power sector**

Following these classifications, we have assessed the performance of the allocation plans of different Member States. In Table 3 we depict the methodology used to determine the allocation to existing facilities in the power and other sectors.

[8] Only non-distorting if all technologies, including non-fossil fuel, receive free allowances.

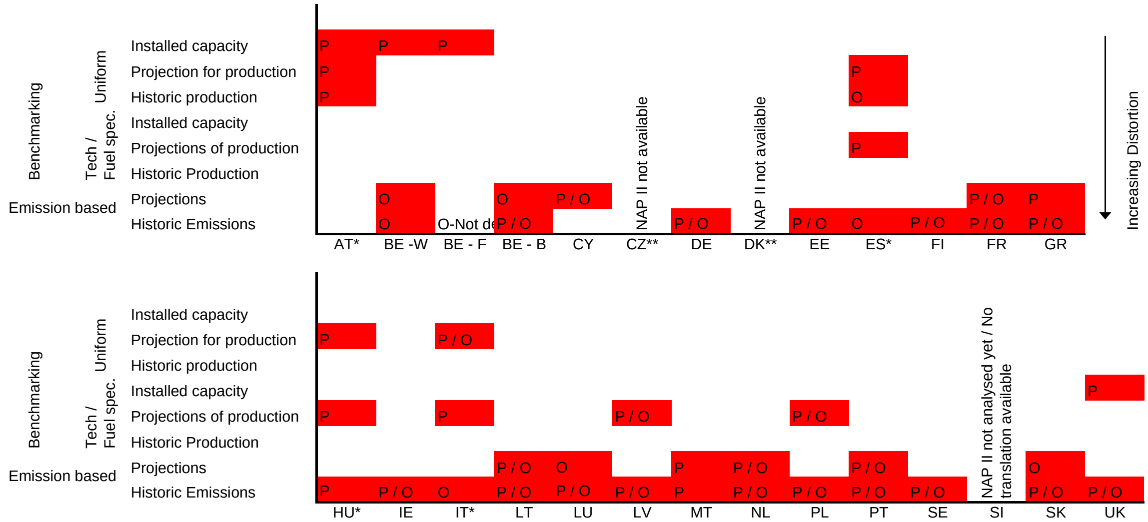


**Table 3: Pyramid of distortions applied to existing installations, power (P) and others (O)**

Distortions from allocation today are largely due to expectations about allocation in the future. For private sector decision-makers, estimates of future allocation are inevitably based on allocation under status quo. If emission levels in 2000-2005 are made the basis for the allocation in the period 2008-2012, then plant operators may expected that emissions in the period 2005-2010 will be the basis for the allocation post-2012. This creates a typical early action issue: that is to say, allocation undermines the incentives to invest in emission reductions because such investment may be 'punished' during future allowance allocation. As allocation plans for Phase II continue to allocate most allowances to existing facilities based on historic emissions, the early action problem remains to be addressed. Some countries experiment with benchmark approaches – and thus could possibly increase the confidence of private sector investors that future allowance allocation methodology will improve in terms of economic efficiency and environmental effectiveness.

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Table 4 provides the same analysis for the allocation methodology to new entrants, again separately for the power sector (P) and other sectors (O). It illustrates the variety of approaches selected by different Member States. The big challenge, again, are the distortions that follow from private sector expectations regarding the allocation methodologies in subsequent periods. Thus the assessment of the allocation for the existing installations also carries significance for investment decisions for new facilities.

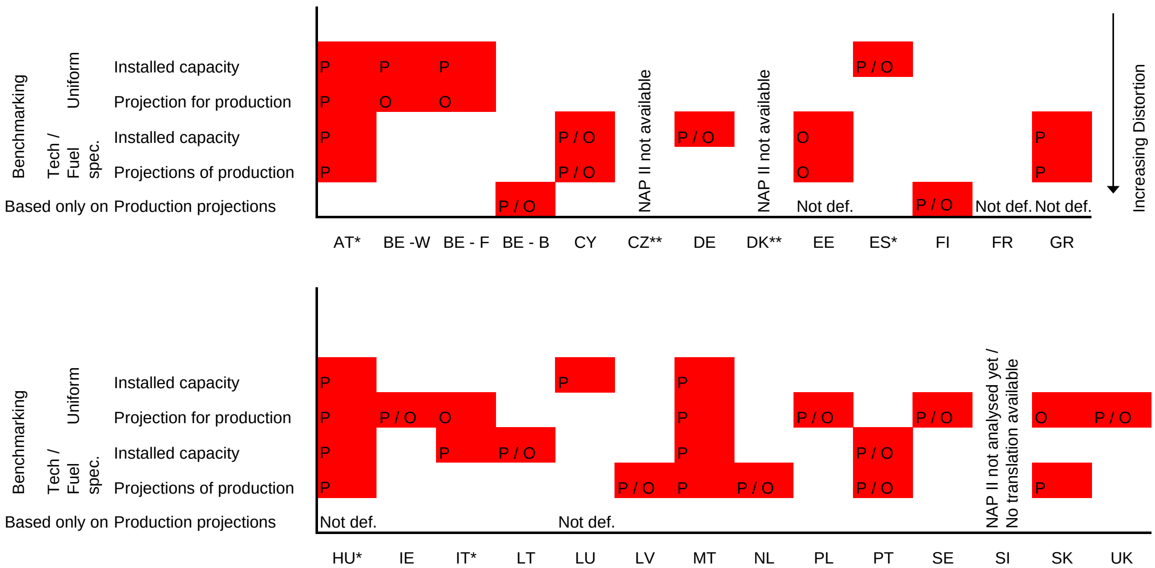


**Table 4: Pyramid of distortions applied to new installations, power (P), others (O)**

## Conclusion

We have quantified the volume of free allowances that different National Allocation Plans envisage to allocate to the power sector. It varies widely across Member States and technologies. This can create strong distortions of investment decisions. The level of free allocation seems rather high, given that in most EU countries the electricity market is liberalised and electricity generators are thus in a position to pass through the opportunity costs of $CO_2$ allowances. Thus, a significant reduction of free allowance allocation to the power sector seems viable for Phase II of the NAPs. This would allow for a reduction of the overall cap and thus ensure sufficient scarcity of $CO_2$ allowances to ensure a viable emission market that drives low carbon investment decisions.

A reduction of free allowance allocation, mainly to the power sector, could in addition allow for an increased use of the auctioning of $CO_2$ allowances. Auction volumes vary significantly across Member States. In all Member States potential for an increase to 10% envisaged by the directive remains. If a tighter cap and sufficiently stringent overall caps, stringent limits on CDM and JI inflows and 10% auctions were implemented, then a price floor in the auction - agreed between EU Member States - could also establish a price floor for EU allowances and thus facilitate low carbon investments.

A comparison of the volume of CDM and JI credits that individual installations are allowed to use to cover their $CO_2$ emissions shows large discrepancies between Member States. A more stringent approach seems required to satisfy the supplementarity criteria of the Directive and also to avoid too much exposure of the EU ETS market to the uncertainties regarding Japanese and Canadian demand for JI and CDM credits.

Most allowances are still allocated relative to historic emissions. If the private sector takes this as an indicator for future allowance allocation, then we may face a serious early action problem. Some Member States have started to explore different benchmarking approaches, mainly for the power sector. This has the potential to reduce, but not eliminate, the economic distortions from free allowance allocation. Thus, to ensure the effectiveness of EU ETS in the coming years it seems to be very important to be able to provide credible evidence to the private sector that free allowance allocation will be drastically reduced post-2012.

The EU Directive on Emission Trading requires that Member States notify their National Allocation Plans to the Commission to be assessed relating to State aid criteria. There are some concerns that the excessive allocation to sectors that both pass on opportunity costs and receive free allowance allocation cannot be aligned with EC law State aid criteria (Johnston 2006). One solution might be to treat the resulting benefits as a transitional payment to compensate for the transition costs of the environmental regulation. This would, however, require a strong commitment to phasing out free allocation post-2012 – and would thus also address the early action problem.

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