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ECONOMIC  
IMPLICATIONS OF  
DIFFERENCES IN  
MEMBER STATE  
REGULATIONS FOR  
THE EUROPEAN  
UNION EMISSION  
TRADE SYSTEM

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**Tiivistelmä:** Tässä tutkimuksessa käsitellään EU:n päästökauppajärjestelmään liittyvän regulaation taloudellisia vaikutuksia ja erityisesti jäsenmaiden välillä olevien erojen seurauksia. Tutkimus on osa laajempaa tutkimusta (Upston-Hooper et al, 2006), joka käsittelee EU:n päästökauppajärjestelmän laillisia aspekteja. Tutkimus kuuluu TEKES:n rahoittamaan CLIMBUS-ohjelmaan.

**Asiasanat:** Kilpailuvaikutukset, päästökauppa, regulaatio

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**Abstract:** This report discusses the economic implications of the regulatory organisation of the European Emission Trade System (EU ETS) in the member states, and more in particular the consequences of differences between national regulations. It is part of a larger study regarding juridical aspects of the implementation of EU-ETS (Upston-Hooper et al, 2006), which has been carried out in the framework of the CLIMBUS programme funded by TEKES.

**Key Words:** Emission trading, level playing field, regulation

## Summary

This report reviews selected regulatory differences between EU member countries with respect to the national implementation of the EU Emission Trade System (EU-ETS). The report was done in the framework of a larger study which was part of the CLIMBUS programme of TEKES. The main study was coordinated by University of Joensuu.

The present study deals more in particular with the way rules are specified with respect to the accountability of various parties in the system as well as with respect to taxation of actions that involve either the transfer or the adding of value as well as the accumulation of capital (as contained in the permits held) in conjunction with emission trade activities. This means that the study is *neither* dealing with decisions regarding the use of opting out for certain (parts of) sectors *nor* with the allocation of the volume of assigned amount units within the EU-ETS sectors and between the EU-ETS sectors and the rest of the economy.

Apart from the initial allocation, differences in national regulation do not seem to lead to substantial macro-economic advantages or disadvantages. The caution should be added that only four countries were reviewed closely, whereas for a larger range of countries only more superficial information was available.

Even though macro-economic effects of regulatory differences seem to be very modest, the differences could cause significant international biases at the sector and company level. Up to now however there is still little empirical evidence on penalties imposed by regulators or courts. Neither did new entrant reserves run out already.

Some of the effects, that cause non-level playing fields, tie in with the dynamics of the liberalised electricity markets. This might exacerbate the original effects.

Auctioning a part of the initial allocation would reduce the problems with respect to different treatments of new entrants in various member states. In a wider perspective, i.e. considering other rent seeking problems related to the method of initial allocation, partial auctioning seems to have attenuating effects for several problems in cap-and-trade systems. Yet, a proper analysis of such alternative allocation approaches goes beyond the scope of the present study.

The regulation and management of international common-pool resources is an ongoing learning process, notably during the earlier years of such a system. In that respect it seems recommendable to organise the regulation at EU level and in Member States in such a way that it can take up insights from learning as quickly as possible. In practice this means that evaluation cycles should be full cycle (ex ante, monitoring, ex post) in all member states as well as for the EU as a whole, and it should be more oriented toward remediation rather than being pejorative.

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# 1. Introduction

This report discusses the economic implications of the regulatory organisation of the European Emission Trade System (EU ETS) in the member states, and more in particular the consequences of differences between national regulations. It is part of a larger study regarding juridical aspects of the implementation of EU ETS (Upston-Hooper et al, 2006).

Up to now economic analysis of EU ETS has been mostly dealing with macro-economic assessments of emission trade given assumptions on fully informed actors, a trade system with zero transaction cost, and equal rules in all member states. The reviews in this study and other studies of the regulations for the period 2005-2007 in various member countries have demonstrated that regulations do differ. These reviews and the experiences so far in EU ETS have spurred the European Commission to insist on more harmonisation in the regulations across member states.

The present study deals more in particular with the way rules are specified with respect to the accountability of various parties in the system as well as with respect to taxation of actions that involve either the transfer or the adding of value as well as the accumulation of capital (as contained in the permits held) in conjunction with emission trade activities. This means that the study is *neither* dealing with decisions regarding the use of opting out for certain (parts of) sectors *nor* with the allocation of the volume of assigned amount units within the EU-ETS sectors and between the EU-ETS sectors and the rest of the economy.

Prior to the identification of economically meaningful differences in chapter 3 there will be first a more general reflection in chapter 2 on the nature of the climate system and the emission trade system from an economic and governance viewpoint. This general reflection produces already several insights why mismatches are practically inevitable and what one can learn from anticipating such frictions. Furthermore, the report will also refer to other regulatory reviews of EU-ETS, such as of Gilbert et al (2004) and PriceWaterhouse (2005). After the identification in chapter 3 the analysis of the implications of the identified differences is presented in chapter 4. Concluding remarks are made in chapter 5.

## 2. Problems of international common pool resources

### 2.1 From a free good to a common-pool resource

The climate system used to be a typical example of a ‘free good’, meaning that its services could be consumed to any extent desired without payment, whereas its services would continue to be provided without need for compensation. In other words the climate system was for a long time regarded as practically inexhaustible.

The past one and half decade a scientific consensus emerged regarding man made influences on the climate system, stating that greenhouse gas emissions<sup>1</sup> from human activities (notably fossil fuel use and agriculture) are affecting the functioning of the global climate system. The projected changes in the services of the climate system, often summarised in the catch word ‘global warming’, are a so-called external effect of human (i.e. economic) activities. This means that in some respects the climate is not anymore a free good, since its use beyond a certain level incurs costs on many. The climate system as such still provides services, but not of the quality mankind would prefer<sup>2</sup>. This means that the climate system changed from a free good into a *common-pool resource*. A common-pool resource is sort of public good of which:

- the production capacity is *undividable*
- the consumption unfolds in *rivalry*;
- the *access* is impossible or difficult to regulate.

In the absence of some common property management of the resource there is a large risk of overexploitation of the resource. Assuming that many users will have an interest in maximising their use of the resource, overexploitation can easily occur. After initial higher benefits everybody is plunged into a poorer state, than what would be a sustainable level if no overexploitation occurred. If the common-pool resource is not the predominant source of welfare, whereas the regeneration cycles are fairly short (a few years at most), societies may learn over time (through voluntary cooperative behaviour) how to deal with the limitations. Yet, even then technical and social innovations can upset the balance. For complex and/or long term phenomena common management regimes virtually never

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<sup>1</sup> . Carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous-oxide (N<sub>2</sub>O), and various fluorocarbons (HFC and others)

<sup>2</sup> . Usually a common-pool resource problem was linked to the volume of services. In the case of the climate system it is not volume, but the composition and quality of the service package which is at stake.



arise automatically. Climate change and the options to alleviate the degree of change are evidently very complex.

There is an extensive history on the use and abuse of common-pool resources. The text book example is the ‘tragedy of the commons’ (Hardin, 1968), originally referring to overgrazing of common pasture land. Fish stocks are also a typical example of a common-pool resource. Over time methods have been developed to prevent fatal degradation of such resource bases. One way or the other these methods boil down to the idea that the stakeholders agree on limitations regarding the use of the resource, involving both an overall limit (e.g. per annum) and some kind of quota for each user. A major improvement was the introduction of the idea of *tradable quota*, since this allows for optimisation of resource allocation (both of the quota and other resources such as capital and labour) across society. The introduction of the European Emission Trade System (EU-ETS) is an example of such a tradable quota system. It is however in many ways far from perfect.

## **2.2 Conflict resolution precedes optimal control**

It is not a surprise that EU-ETS is far from perfect. The management of common-pool resources appears to be challenging. Many ecological and economic studies focus on the effectiveness and efficiency of a management regime for a common-pool resource. Yet, in order to succeed in establishing and maintaining a meaningful management system, the stakeholders first have to go through a process of convergence. This means that in the initial stages of the process of (re)creating co-operation insights from sociology, social-psychology and political science may be more relevant than those from ecologic and economic sciences. The society in which stakeholders operate should understand what a common-pool resource entails and it should have the right pre-conditions for a successful negotiation process regarding restraints in the (short term) benefits of the stakeholders. Societies usually have to go through a learning process before a solution arises. The shaping of the solution will *inter alia* depend on a society’s track record with respect to private versus communal (public) arrangements, centralised versus decentralised arrangements, and sharing versus competitive arrangements. Law is the formalisation of these arrangements.

In a policy domain such as for climate change the complexity is enormous and hence the management structure becomes also complex. For example, Kaul and Le Goulven (2003) indicate that for many transboundary problems the traditional way of communication via Ministries of Foreign Affairs and embassies is insufficient since many specific ministries, such as Environment, Transport, Agriculture, are often involved as well. So, there are coordination challenges in and across countries, whereas divisions of tasks over ministries and public sector steering mechanisms and styles usually vary across countries.

Environmental policy portfolios can contain various types of instruments. Usually a distinction is made between *command and control measures* (e.g. energy efficiency requirements for new buildings), *fiscal measures* (taxes and subsidies), *self-regulatory frameworks* (voluntary agreements, revolving funds), and *tradable quota systems*. Command and control measures are the most interventionist from the point of view of market functioning, even though wrongly designed fiscal measures can also cause major market distortions. Self-regulatory frameworks and tradable quota are – by definition – strongly leaning on market functioning. Yet, in a tradable quota system the setting of the cap can have a strong interventionist character, depending on the method of determination of sector and company and/or installation specific caps. When comparing EU member states on the composition of their policy mix significant differences in instrumental preference can be found. For example, Perrels and Oranen (2005) scanned various member countries on energy efficiency policies, and found that some countries rely much more on market based instruments than others. Also Eckersley (1995) points at the fact, that there are significant differences across countries regarding the judgement of the appropriateness of various policy instruments.

The use of market based instruments, in particular tradable quota, is now quickly abounding in the EU. Apart from EU-ETS there green certificate markets and white certificate markets. However, despite this apparent increased interest for such instruments close inspection of the implementation of these instruments illustrates that countries appear to have quite different understanding of the key functionalities of those instruments (Perrels and Oranen, 2005; Langniss and Klink, 2005; Voogt et al, 2005)). This has also become apparent in the implementation of EU-ETS (Gilbert et al, 2004). Some countries, such as the UK, regard it as essential that EU-ETS as such works properly, implying inter alia that states should show restraint with respect to the amount grandfathered in the initial allocation. Many other countries tend to be very concerned about the position of the own industry and hence are inclined to be less strict in the initial allocation. The initial allocation by country is probably the single most important cost factor, which also affects competitive positions<sup>3</sup>.

Even though there seems to have taken place a considerable amount of harmonisation of legislation across EU member states, the way social contracts, such as EU ETS, are dealt with differs still significantly. This means that within a common framework such as the directive for EU-ETS, the national implementation of that framework will differ across the member states, due to both different societal conditions and different linking possibilities to existing legislation. Furthermore, even if the rules are the same, the interpretation of the rules may still differ. This differentiation at a more detailed level within a common overall

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<sup>3</sup> . Another important factor is the projection of the baseline emission scenario of a country. A higher baseline invites to grant more permits during the initial allocation.

framework has implications for the economic evaluation of the regulatory differences in EU-ETS as is purported in this study. Differences in regulations can be assessed with respect to their potential for causing systematic cost differences between companies, sectors and countries, but it is better to refrain from judgments whether one alternative is preferable over the other one. The answer to the latter question will vary with the vantage point of the analyst. An exception could be made for regulations that could compromise the integrity of EU-ETS. This would be the case if:

- the effectiveness regarding attainment of the environmental objectives of EU-ETS is adversely affected
- the (national) regulation makes EU-ETS liable to cheating and/or enhances risks for one or several parties
- the regulation entails significant inequitable effects within a sector or between countries.

If one or more of these criteria is relevant an observed difference in regulations merits further assessment. For the eventual judgement will count inter alia whether the effects will have any level of significance in practice and whether these effects are likely to occur.

## 3. Identification of economically possibly relevant differences

### 3.1 Introduction

A part of the overall project to which this report belongs was a detailed juridical review of regulatory and legal aspects of the national implementation of the EU emission trade system in Finland, Germany, Sweden and the United Kingdom. On the basis of the four review reports a comparison has been made of the national legal and regulatory frameworks for the enablement of trade in CO<sub>2</sub> emission allowances. The country review reports are available as annexes to the main synthesis report (Upston-Hooper et al, 2006).

The comparison has been made with an interest in possible economic impacts in mind. This means that certain features or effects, that may be important from the point of view of theory and practice of legislation, are nevertheless left out because their economic impact is either supposedly negligible at a macro-economic level and/or is very unclear in terms of economic causation structure. Furthermore, the size of the initial allocation to EU-ETS sectors by country is not a part of this study, but – as said in chapter 2 – it is a regulatory choice with large cost effects.

For none of the obligated parties<sup>4</sup> the trade in emission allowances is their prime business. It is nevertheless an inescapable cost element that is to be handled as cost-efficiently as possible. The trade is dominated by large companies that will seek to professionalise and rationalise the emission trade as much as possible. With these features in mind it can be assumed that a very large majority of the market participants rather wants to avoid incidents, and consequently would not be interested in chasing relatively small benefits by testing the boundaries of the law<sup>5</sup>. Presumably incidents and disputes will be mostly born out of (unintended) misunderstandings and technical failures (in information exchange systems)<sup>6</sup>.

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<sup>4</sup> . Obligated parties are companies in designated sectors and with emitting installations that are to be covered by allowances from the EU Emission Trade System.

<sup>5</sup> . Compared to the turnover of many market participants the benefits from cheating would be quite small if not negligible, whereas the risk of damage to reputation may constitute a substantial cost. Indirect benefits of EU ETS due to grandfathering in conjunction with market power on electricity and gas markets is more important, but another issue.

<sup>6</sup> . There is the issue of speculative trade. Large companies from directly or indirectly affected sectors could try to drive up the allowance price by buying very significant amounts and sell them later profitable to obligated parties, thereby trying to gain an advantage over competitors. The July 2005 price peak may have been the result of speculative purchases. The apparent fall of the price, which followed soon after the peak, however also shows the high risk of such speculation. A remedy to this could be the obligation to publish details about purchases larger than a certain size (in tons CO<sub>2</sub> and/or share of country's/sector's/company's obligation).

From the country reports can be inferred that it will require a certain amount of effort (man hours, purchases of services and auxiliary products, learning time, etc.) to arrive at an adequate level of understanding concerning the obligations, procedures, technicalities, risk factors and price mechanisms in emission trade. Since a good part of these elements have a (semi)fixed cost character there are very significant economies of scale in emission trade operations. Consequently, smaller obligated parties face higher transaction cost (in relation to their turnover) and may have to depend more on purchased emission trade services. In turn this means that there is some general economic interest to ensure the quality of these services is good, while at the same time there is sufficient competition among these services. In practice it means that the market for emission permit trade should be really operating as one European market, for which the national regulations are no impediment to emission trade transactions between parties from different countries, nor should it lead to preferential positions of particular brokers and other service providers.

Last but not least it should be stressed that the country reviews are based on desk studies of current regulations and legislation, not on empirical material regarding disputes. Only recently some first cases are emerging. For example in the UK obligated parties, that failed to have their 2005 emissions sufficiently covered by permits, were recently fined by the country's Environmental Agency (Energyforum, 7-12-2006).

### **3.2 Comments to the selected issues**

Eight issues were selected as being potentially relevant from an economic point of view. Table 1 in Annex 1 provides an overview.

1. Pooling of emission quota by different obligated parties would indeed very easily lead to collusion in smaller economies, hence the absence of pooling in Finland and Sweden, in contrast to the adoption in the UK and Germany. Pooling enables more flexibility and can therefore lower the cost for obligated parties. This in particular true if also other flexibility is allowed, such as balancing of new and closing capacity in the UK (albeit in a restricted form). In as far as pooling would lead to lower allowance prices throughout the EU, the benefits would trickle down to all. For export oriented ETS sectors such as steel and paper, the local cost benefit of pooling may be larger than the generic benefit of lower allowance prices. Under such conditions pooling constitutes a systematic advantage for export oriented sectors in larger member states in comparison to those in smaller ones. The benefits of pooling are difficult to assess quantitatively, if no detailed case wise information is available.

2. A larger new entrants' reserve (NER) goes at the expense of the permit volume meant for the incumbent obligated parties, and consequently is not necessarily an (overall) cost reducing measure. Apart from the size of the NER, countries differ with respect to various provisions e.g. in case of more demand from new entrants than the NER can provide for. In that case new entrants in Germany do not incur cost (apart from VAT; see point 5), whereas in other countries, notably Sweden and Finland entrants would incur cost.

The UK also allows balancing of permits between new and closed down units if the owner is the same. In Finland permits from closed down units are added to the new entrant reserve, and thereby could indirectly return to the holder to cover the need for a new unit. If closure and new capacity are treated totally separately in terms of issuing and retracting tradable emission rights, there is a risk that the system invites to keep old (carbon intensive) capacity open in the electricity generation sector, even though at low use rates. Most initial allocation programmes take account of the emission performance of existing capacity in the recent past, and add some gradual changes to that historical average in order to project a future baseline development.

3. The existence or absence of specific registry regulations, as such, does not necessarily imply cost differences between member states. However, absence of specific rules implies more uncertainty (unpredictability) in the event of a dispute. Uncertainty embodies a potential cost in this case or may lead to less parties in the registry (and hence less (local) trade). Finland is the only country in this survey, which does not have any specific regulation (i.e. depends on existing (generic) regulation). The UK and Germany seem to have the most elaborate rulebooks. The clarity (and predictability) of the trade regulations is particularly relevant in conjunction with the possibilities for dispute settlement and compensation (point 4).
4. The possibilities to seek cost compensation when third parties cause damage, is particularly interesting in conjunction with the previous point (3). In each country a different situation results for obligated parties. It seems that in Germany the regulatory uncertainty is low, whereas the possibilities to get compensation for losses caused by third parties, private and public, is rather good. In the UK there is also lower regulatory uncertainty, but compensation is rather unsure in case the opposite party is a public authority. Participation in the UK trade system for EU-ETS includes the signing of a waiver, which protects the public sector from claims related to failures in the trade system. Only wilful misconduct or criminal acts would remain valid grounds for charges against a UK public authority. In Finland there is more regulatory uncertainty (indefiniteness), whereas compensation in case of a dispute between private parties may be difficult. On the other hand compensation in conjunction with actions of public bodies has clearer legal grounds in Finland. The consequence might be that in a dispute between private parties it could pay

off to try involve public bodies in Finland (e.g. on the charge of deficient regulatory frameworks).

In none of the country survey reports is clarified to what extent stranded cost is acknowledged as a reason for compensation. In as far as there is no legal framework, the political track record regarding (political) decisions to grant compensations for (obvious) stranded cost may be informative in this respect.

If an obligated party in EU-ETS fails to turn in a sufficient amount of emission rights to cover all emissions in a certain year, the sanction during the period 2005-2007 is 40 € per ton CO<sub>2</sub> which is not covered by a permit. For the period 2008-2012 the penalty is 100 € per ton CO<sub>2</sub>. Furthermore, the failing amount of permits has to be bought in the next period. This is further dealt with under point 7.

With reference to both points 3 and 4 one can also wonder whether member states have already indicated how to handle the cost following from non-compliance of the Kyoto Protocol. If a country falls short due to surplus emissions in a non-ETS sector for which no other sector agreement exists (e.g. of the kind applied in Denmark and the Netherlands), the state – and eventually the tax payer – has to carry the cost of a penalty. If the national non-compliance is attributable to one or more obligated parties within EU ETS, public authorities could consider to demand compensation from the failing parties on top of their sanctions within the EU-ETS system (if these have failed, in turn, due to third parties, a chain of claims may occur).

5. In practice value added tax (VAT) for initial allocation has been irrelevant in phase I (2005-2007) as grandfathering by a public body is regarded as an action exempt from VAT in all countries. For phase II (2008-2012) many countries are planning to auction a part of the initial allocation and hence cost differences may arise for obligated parties in different countries. According to the current draft NAP Finland does not plan to auction permits.
6. In principle all member states seem to follow the guidelines of the EU VAT committee regarding VAT on permit trade transactions. In practice this can still cause cost differences, because:
  - a. member states apply different VAT rates;
  - b. member states seem to head for different shares for CDM and AIJ permits in their total allotment, and different ways of obtaining those (via purchasing state agencies or via brokerage services where the eventual holder is an obligated party); yet the links with the Linking directive are not specified in the country reviews.

The differences in VAT rates per country can not be regarded as affecting competitiveness since obligated parties from any country can trade via third countries.

7. Only in Germany penalties for obligated parties holding insufficient amounts of permits are tax deductible. Depending on the relation between actual permit price and an obligated party's abatement cost, this deduction option may in exceptional cases lower the threshold of non-compliance for German obligated parties.
8. Even though all member states organise consultation rounds for various stakeholder groups, there are nevertheless telling differences in the placement of regulatory responsibilities in various member states, implying that the prime initiative is either at the side of the environmental stakeholders or at the side of (key) economic stakeholders (energy and heavy industry). Sweden however seems to have gone a long way in formalising the balance of power between stakeholder groups.



## **4. Illustration of cost effects of selected differences**

### **4.1 Introduction**

From the identified differences presented in chapter 3 some seem to have the potential to create systematic cost differences between countries, even though in most cases the cost differences may remain rather small if not negligible. In addition, there is a difference between risks for larger cost for a single firm, but still marginal effects for the economy at large. In some cases, such as for pooling, smaller countries could be in a disadvantaged position, but this difference is very hard to quantify without extensive detailed data.

On the basis of these considerations the following points have been selected for further assessment, preferably including quantifications:

- no.2 – the New Entrant Reserve (NER)
- no.7 – rolling off non-compliance costs

For each issue first a conceptual clarification will be presented concerning the way extra costs and cost differences are created. Subsequently a quantification of possible cost levels is presented.

### **4.2 The New Entrant Reserve (NER)**

There are two issues at stake. In the first place a NER can have rather different effects in different countries, depending on whether the marginal abatement cost of incumbents in EU-ETS are above or below the (anticipated) permit price. Since the absolute and relative sizes of the NER's vary over EU member states, this may be a source of additional cost differences. For example the NER of the UK is remarkably larger (both in percentage terms and in absolute figures) than of most other countries.

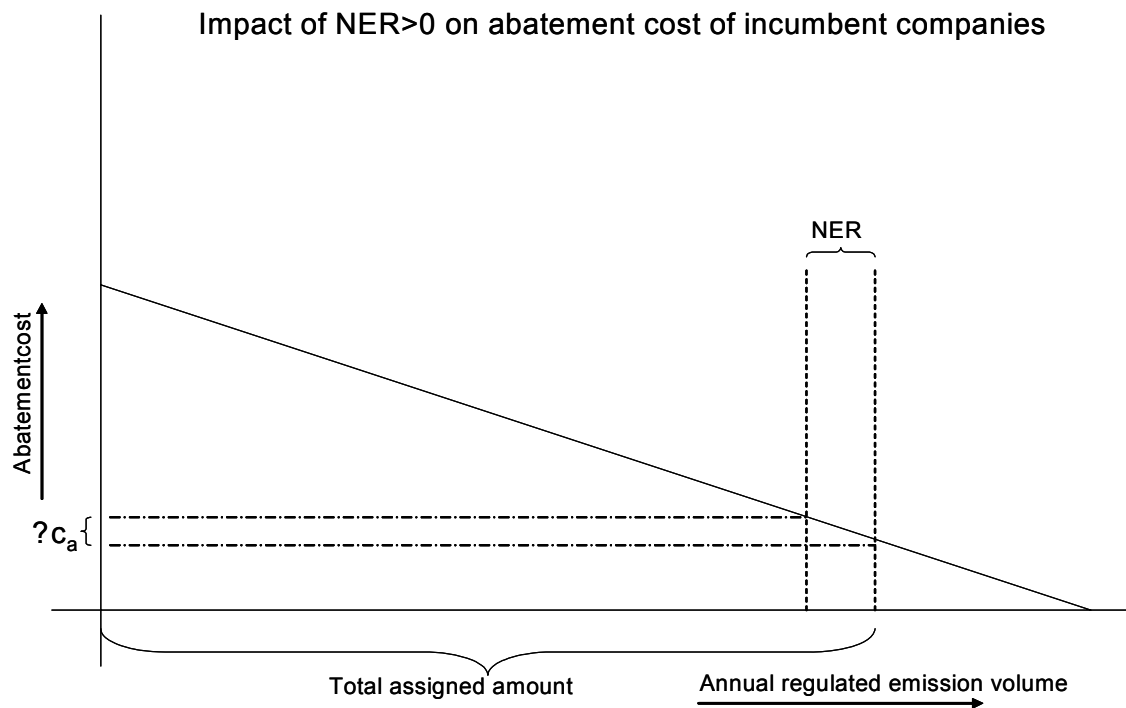
In addition only Germany guarantees new entrants the provision of permits for free. If the NER would be empty the German state would buy the necessary permits on the market, while refraining from charging the cost to the new entrant. This is potentially market distorting for several reasons:

1. it favours new entrants in Germany over those in other countries
2. it easily works out as a disincentive for decarbonisation in new production capacity

3. even though the state will scan the permit market for the best possible offer, the guarantee implies a purchase obligation and consequently it may drive up the permit price

It should be realised however that the guarantee may not have to be exercised, whereas the amounts involved are small. So, in practice price and cost distortions could be small.

The effect of the NER on incumbents is shown in the figures below. Figure 1 shows the first generic effect on marginal abatement cost. Figure 2 shows the response of incumbents if the permit price is below the marginal abatement cost of the country considered, whereas figure 3 shows the case when the permit price is higher than marginal abatement cost. In the former case there is an actual extra cost (outlay) for incumbents, namely the quantity of the NER times the permit price, possibly corrected for a permit price rise if the caused demand effect is non-negligible (see also figure 5). In the latter case (fig.3) there are no extra outlays, but there is a reduced sales potential of permits from profitable abatement options. In that case it depends on where the incumbent companies' abatement cost are located, how the impacts work out. This is further detailed in figure 4



*Figure 1. How the NER is taken from the assigned amount and therefore increases marginal abatement cost for incumbents*

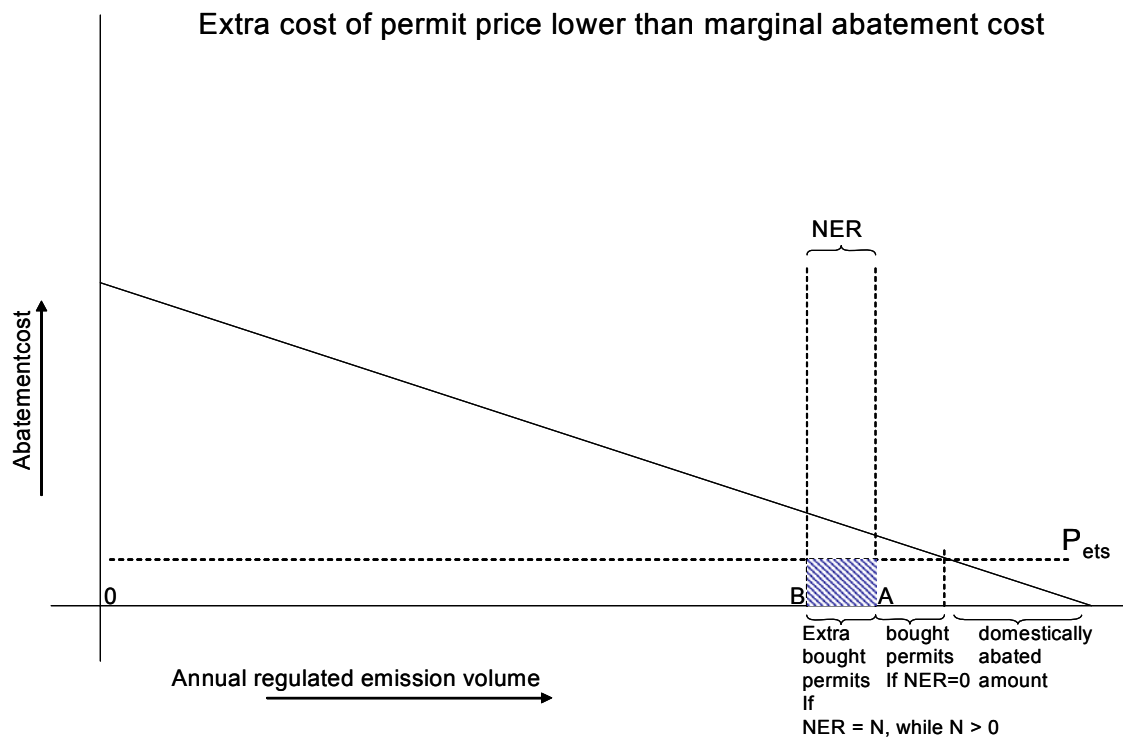


Figure 2. *How displaced permits allotted to the NER induce incumbents to buy more permits from the market, as this is cheaper than own abatement, so the rising marginal abatement cost has no actual effect, only the size of the NER does*

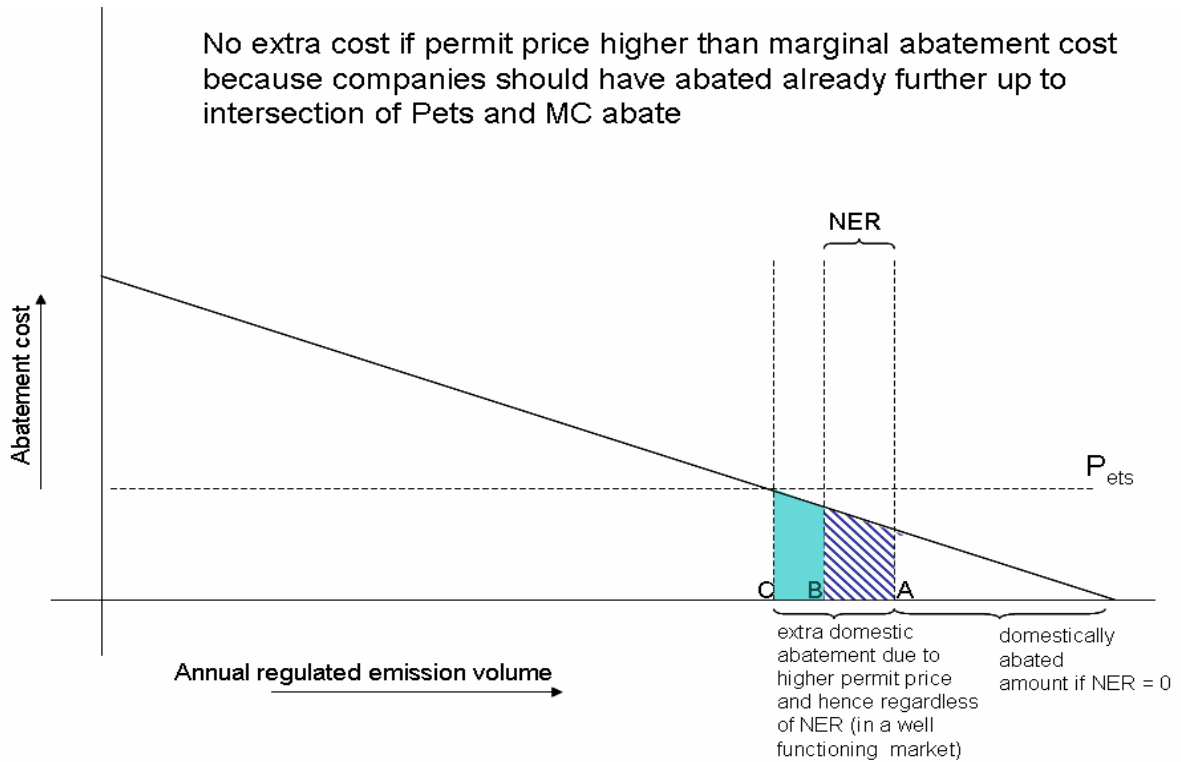


Figure 3. *How displaced permits allotted to the NER reduce the incumbents' potential to sell permits from their profitable abatement potential*

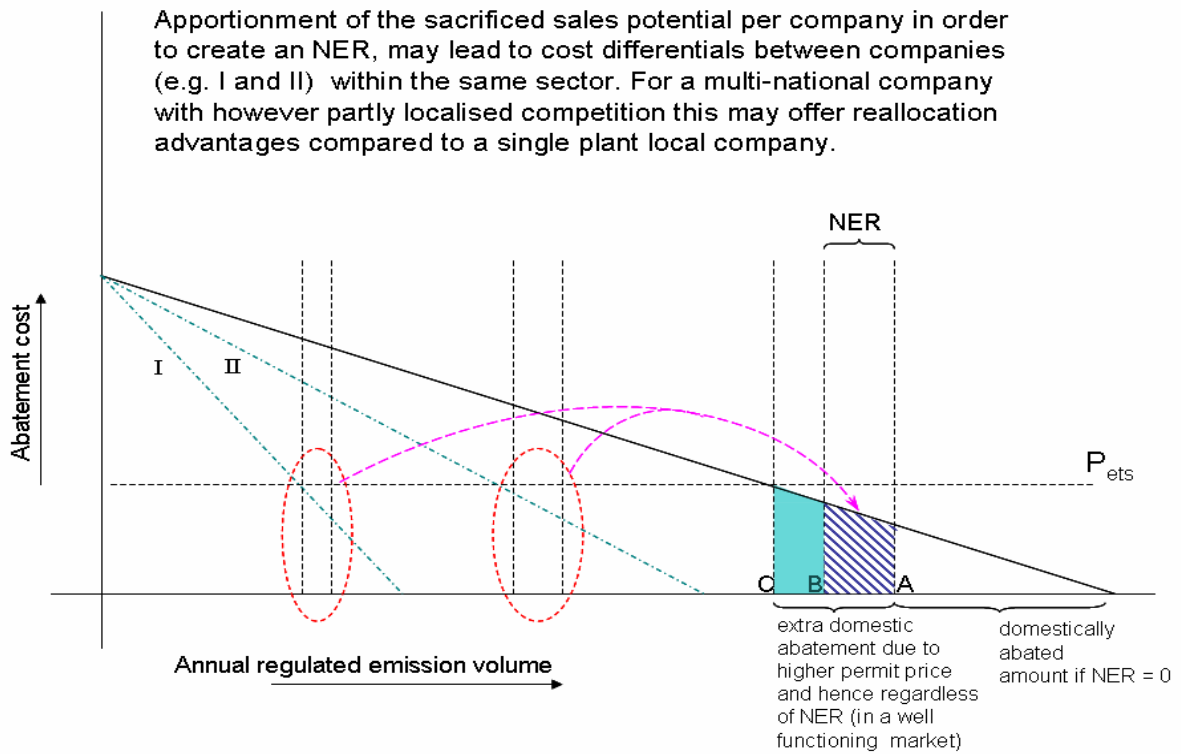


Figure 4. *How sharing the displacement of the NER between incumbents may easily lead to cost differences*

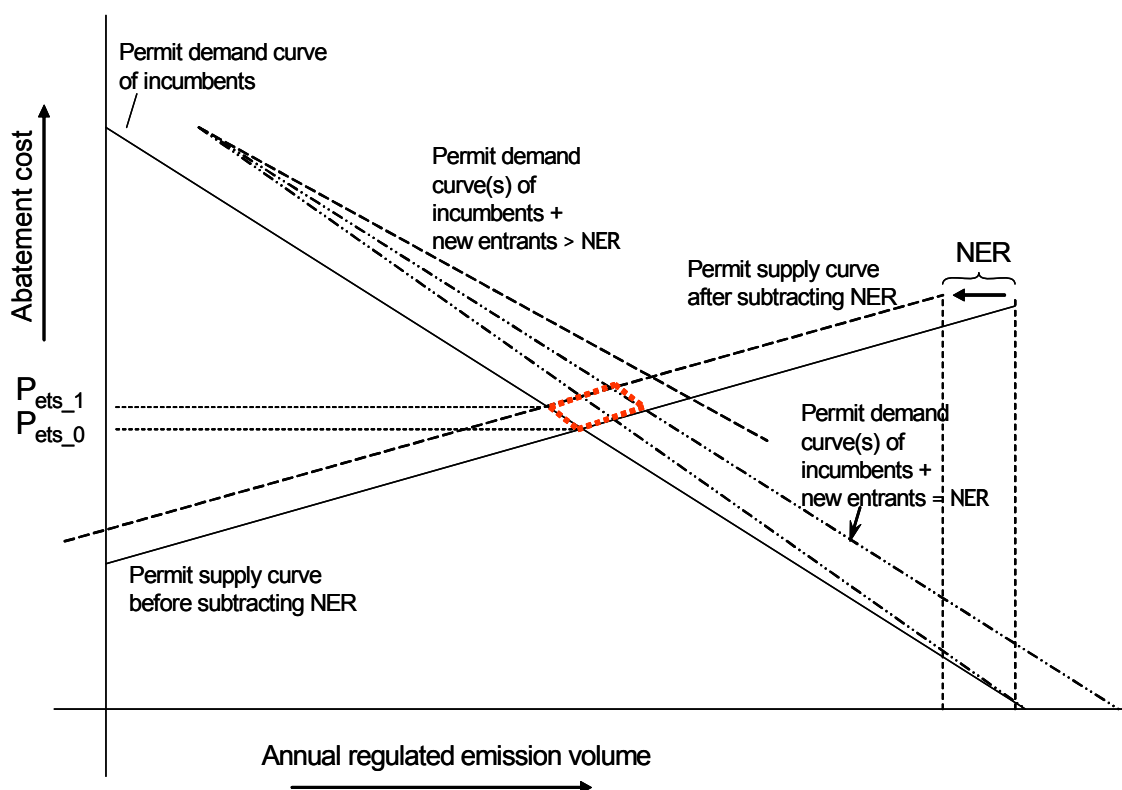


Figure 5. Comparing the ex-ante (NER) and ex-post approach of new entrants' effects on EU-ETS

Figure 5 illustrates the effects of a large country's sizeable NER on the permit price. For smaller countries we can assume that the price effect remains virtually negligible, while a very tight NER in a larger country would not affect so much either. One should however distinguish between the initial effect and the later effects. If a sizeable NER is set aside the permit supply curve shifts to the left implying higher permit prices for the incumbents. Yet, assuming the system has been launched through 'grandfathering' trade only gradually develops as demand for extra permits and supply of surplus permits starts to emerge. If the NER is exhausted at about the same pace as the market develops, the supply curve moves back to its original position, while the demand curve shifts to the right due to new demand of entrants (which however is initially exactly met by the supply from the NER). So, other things being equal in a perfect foresight world there would be no lasting effect from the NER, meaning that absence of the NER would have led to the same (eventual) price, albeit with another distribution of costs and benefits.

However, there is no perfect foresight, whereas there are time (preference) cost, therefore it does matter that initially the prices are higher due to the establishment of the NER (provided it has some significant size). The gradual issuing of set-aside permits from the NER indeed moves the supply curve back to its original position, but we are not sure how the demand curve behaves. The relevant

area in which the permit price could be assumed to move is indicated by the diamond shaped area linking the 'old' and 'new' demand and supply curves. It depends on the abatement cost curves of the new entrants and on the way permit granting rules are applied to new entrants, whether the permit price goes up or down.

If the need for permits for new entrants is larger than the NER the price will rise anyhow. However, in Germany the state is the obliged buyer, while in other Member countries the entrant has to purchase itself. The price rise effect is in principle the same, however the state cannot make a trade-off between own abatement cost (or technology choice in case of a totally new plant) and the permit price. Obviously in this case the new entrant in Germany has a significant advantage over any other entrant in the same situation elsewhere, because the demand is not the balance between the grandfathered amount and the additional need, but the full assigned amount should be acquired.

Suppose the need is 3 MT at a price of € 20 per ton CO<sub>2</sub> (this corresponds approximately with the annual permit need of a 600 MW coal plant). On the basis of these assumptions it would mean 60 million Euro extra cost for a new entrant outside Germany.

Obviously the choice for grandfathering the entire initial allocation exacerbates the level playing field problems with respect to new entrants. However, the solution, a NER, easily creates new options for arbitrage. A better solution would be a partial auction at the beginning of new period and a partial auction later on for new entrants in order to balance between instrumental efficiency and industrial equity. Bovenberg et al (2003) showed that in such a policy approach the auctioned share in the initial allocation relates to the level of the abatement target (as percentage reduction from a baseline). The minimum share grandfathered (meaning: not auctioned) is 20%~25%. This share gradually increases with a tightening target with some leeway depending on the exact policy design. In this fashion a -25% target would need a grandfathered share in the initial allocation of somewhere between 22% and 40%.

The aggregate amount set aside for the NER's of all Member countries for the period 2005-2007 is about 250 MT. This is a *modest but not negligible* share (4%) of the total cap for the obligated parties in EU-ETS, which amounts to approx. 6500 MT. However, compared to the (net) need for purchases in the period 2005-2008 the amount is even very significant (possibly approaching 50%).

The differences in the degree to which balancing can be applied, have similar effects as the differences in the NER have.

### 4.3 Non-compliance as deductible cost

A shortfall of an obligated party in EU ETS is supposed to occur only at the end of a year, which may coincide with the end of a commitment period and is – by definition – not foreseeable, at least not well in advance. If it would be foreseeable regulators would probably step in earlier. It is also rather unlikely that the shortfall in held permits is large in comparison to the size of the emission cap of the involved member state and even more so in comparison to the overall EU ETS permit market. Therefore it can be assumed that the shortfall would not lead to noticeably lower prices in the just concluded commitment period.

The largest swings in annual emissions occur in countries that usually can rely on a sizeable amount of hydropower (indigenous or imported), but in years with far below average precipitation have to use much more fossil fuel based power generation. Finland, Denmark and Italy are notable examples. Yet, a pan-European drought is less likely, while involved companies and countries will also step up their efforts to use more alternative fuels (biomass) and obtain more emission permits via the various flexible mechanisms. This means that from an initial extra need for permits of for example 15 MT a shortfall remains of e.g. 5 MT.

With the above assumptions the cost effects pertain to the purchase of the failing amount of permits and the payment of a fine. Depending on the kind of year (i.e. coinciding with the end of a commitment period) and the impact of the failing obligated party (a company) on a country's overall target achievement the following situations can be distinguished.

1. at the end of a year, but not end of commitment period – only an obligated party risks a fine (40 or 100 Euro per ton CO<sub>2</sub> depending on the commitment period)
2. at the end of a commitment period
  - a. the involved country meets its overall target – only the company risks fine (40 or 100 Euro per ton CO<sub>2</sub> depending on the commitment period)
  - b. the involved country fails its overall target, at least partly due to company failure – the company risks a fine in EU ETS (40 or 100 per ton), and the country may be fined in the framework of the Kyoto Protocol (Expressed as additional percentage of the assigned amount to be reduced in the next commitment period).

Germany seems to be one of the few if not the only EU member state where fines following from non-compliance can be included in the options for a company tax reduction. This would mean that the effective fine is about 30% lower. For the

period 2005-2006 the effective fine would be approximately 28 Euro per ton of uncovered CO<sub>2</sub>, instead of 40 euro. This simply means that the threshold for non-compliance is significantly reduced, as it may be at some point simply cheaper to pay the fines (and purchase the missing amount in a next period) than try to comply by buying before the closure of the commitment period in a probably very tight market.

Against the advantage for companies stands a higher cost for the public sector, which has to accommodate a loss in tax revenue equal to the tax rebate granted for imposed fines. Using the above mentioned indication that non-compliance for one company is unlikely to exceed 5MT, and assuming a permit price of 20 Euro per ton, the total cost incurred amount to:

1. for compensatory purchase of permits (in the next period):  $5 \times 10^6 \times 20 = 100$  million euro
2. for fines.:
  - $5 \times 10^6 \times 40 = 200$  million euro in other Member States than Germany
  - $5 \times 10^6 \times 28 = 140$  million euro in Germany

For example in Finland the total cost for a company would amount to 300 million Euro and in Germany 60 million Euro less. (ex post permit purchase and fines together).

### **Example**

Consider cost effects for two power companies in Finland and Germany respectively. A 5 MT shortfall in assigned amounts occurs, costs include: fines paid to the EU, ex-post purchase of missing permits, and a tax deduction effect. This can be related this to the turnover and profit of a power company, and the induced effects on prices can be considered.

5 MT corresponds with 4 TWh coal power based generation.

Assumptions for Finland: wholesale el. price: 46 €/MWh; unit-cost coal (excl. EU-ETS): 34 €/MWh, fuel cost: 16€/MWh, passed permit cost (85%) 11€/MWh hence the dark spread = 19€/MWh.<sup>7</sup>

On the basis of these assumptions: overall margin was = 13 Euro/MWh

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<sup>7</sup> . Assumptions are based on the 2006 trends in the NordPool area, cost and pass-through figures are obtained from Honkatukia et al (2006).



Assumptions for Germany: wholesale el. price: 51 €/MWh; unit-cost coal: 34 €/MWh, fuel cost: 16€/MWh, passed permit cost (70%) 9€/MWh hence the dark spread = 28€/MWh.<sup>8</sup>

On the basis of these assumptions overall margin was = 13 Euro/MWh

*Non-compliance cost to a Finnish company:*

5.000.000 x (20 + 40) = 300 mln. euro cost at the beginning of the next period.

Suppose that the grandfathering covers 80% of actual need, so only 1/5 of total need to be bought in next period

production:	4 TWh
conversion efficiency:	40%
sales price:	46 €/MWh
unit-cost excl. EU-ETS:	34 €/MWh
EU-ETS permit price:	20 €/MWh
unit-cost addition due to 85% pass through of EU-ETS:	11 €/MWh
sales revenue:	184 mln. euro
production cost, excl. EU-ETS:	136 mln. euro
1 MT purchase of EU-ETS:	20 mln. euro
operating profit (pre-tax):	28 mln.euro

In the case of a small producer, who owns not much else capacity besides the coal unit, the imposed obligation and fine would be fatal. Even when refraining from cost of interest the operating profit implies a pay back time of 11 years. For a larger producer, in particular when hydro or other cheap power is in the portfolio, the extra costs are significant, but not fatal.

*Non-compliance cost to a German company:*

5.000.000 x (20 + 28) = 240 mln. euro cost at the beginning of the next period.

Suppose grandfathering covers 80% of actual need, so only 1/5 of total need to be bought in next period.

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<sup>8</sup> Assumptions are based on the 2006 trends in the EEX area, cost and pass-through figures are obtained from Sijm et al (2006).

production:	4 TWh
conversion efficiency:	40%
sales price:	51 €/MWh
unit-cost excl. EU-ETS:	34 €/MWh
EU-ETS permit price:	20 €/MWh
unit-cost addition due to 70% pass through of EU-ETS:	9 €/MWh
sales revenue:	204 mln. euro
production cost, excl. EU-ETS:	136 mln. euro
1 MT purchase of EU-ETS:	20 mln. euro
operating profit (pre-tax)	48 mln.euro

In the case of a small producer, who owns not much else capacity besides the coal unit, the imposed obligation might be fatal. Even when refraining from cost of interest the operating profit implies a pay back time of 5 years. For a larger producer, in particular when hydro or other cheap power is in the portfolio, the extra costs are significant, but not fatal.

#### **4.4 Other issues not quantifiable at this stage**

Both from the review in chapter 3 and from the synthesis report of the main study can be inferred that countries with larger economies have possibly some degree of advantage with respect to regulatory harmonisation or convergence across the EU. An important part of the companies involved in EU-ETS is operating in several countries. Larger economies are likely to have a larger share of the EU-ETS obligated parties operating in their countries, and consequently the involved multi-national companies will tend to accommodate their carbon management operations in the first place with those larger economies, e.g. with respect to accounting rules.

On the other hand larger member states often have more complicated (layered) governance structures and as a consequence administrative procedures may be more costly in terms of efforts needed from obligated parties. There are signs of this also with respect to the administrative structures of EU-ETS in various member countries. This effect would partly offset the above mentioned size benefit of larger countries regarding regulatory convergence.

The ease with which emission permits can be traded in a member country and the ease with which third country validation is acknowledged may affect the development of trading services and related services in member countries. As a consequence in some member states the service sector that is created to facilitate the

operations in EU-ETS may flourish significantly more than in other countries. At the same time however also here size effects of countries may kick in to some extent.

The macro-economic significance of the above mentioned points is most probably quite limited, but would need very extensive and dedicated research in order to be able to produce any sensible quantitative estimates.

## 5. Concluding remarks

Apart from the initial allocation, differences in national regulation do not seem to lead to substantial macro-economic advantages or disadvantages. To this conclusion should be added the caution that only four countries were reviewed closely, whereas for a larger range of countries only more superficial information was available.

Even though macro-economic effects of regulatory differences seem to be very modest, the differences could cause significant international biases at the sector and company level. Up to now however there is still little empirical evidence on penalties imposed by regulators or courts. Neither did new entrant reserves run out already.

Some of the effects, which cause non-level playing fields, tie in with the dynamics of the liberalised electricity markets. This could sometimes exacerbate the original effect.

Auctioning a part of the initial allocation would reduce the problems with respect to different treatments of new entrants in various member states. In a wider perspective, i.e. considering other rent seeking problems related to the method of initial allocation, partial auctioning seems to have attenuating effects for several problems in cap-and-trade systems. Yet, a proper analysis of such alternative allocation approaches goes beyond the scope of the present study.

The regulation and management of international common-pool resources is an ongoing learning process, notably during the earlier years of such a system. In that respect it seems recommendable to organise the regulation at EU level and in Member States in such a way that it can take up insights from learning as quickly as possible. In practice this means that evaluation cycles should be full cycle (ex ante, monitoring, ex post) in all member states as well as for the EU as a whole, and it should be more oriented toward remediation rather than being pejorative.

As regards the three criteria mentioned at the end of chapter 2 it can be concluded that the first criterion, ‘the effectiveness regarding attainment of the environmental objectives of EU-ETS is adversely affected’, is generally not seriously affected by the regulatory differences. However the other two criteria, ‘the national regulation makes EU-ETS liable to cheating and/or enhances risks for one or several parties’ and ‘the regulation entails significant inequitable effects within a sector or between countries’ seem to be at stake in several occasions.

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## Annex 1 – Overview tables of regulatory differences

<i>issue</i>	<b>Finland</b>	<b>UK</b>	<b>Germany</b>	<b>Sweden</b>
1. Pooling of permits by two or more obligated parties	Not allowed in the current nor the next period	Not allowed in phase I, but will be in phase II albeit conditionally	Allowed both in phase I and phase II, on the condition that pooled installations fall in the same category as listed in Annex I of the EU directive	Not allowed in the current nor the next period
2. New entrants' reserves N.B.! bear in mind that the NER is deducted from the total allotment of a country	2.5 Mt for phase I; when NER is exhausted entrants have to buy from the market. On the other hand unused permits from installations closed during commitment period are added to the NER. TA: 138 MT 2005-2007	56.8 MT for phase I; balancing between closure and new capacity is allowed to some extent in case of same owner TA: 200 MT 2005-2007	9 Mt for phase I. In case of exhaustion of the NER the state acquires new allowances for new entrants. TA: 500 MT 2005-2007	2.2 Mt for phase I. No information about how to deal with an exhausted NER. TA: 22 MT 2005-2007
3. Rules and guidelines for the permit registry	No specific rules or regulations; Differences in opinion, non-criminal misconduct, etc. are to be handled via an administrative court	A set of terms and conditions is to be signed by all who wish to use the registry. It inter alia limits the liability of the registry and directly related public authorities	A set of terms and conditions has been issued. It inter alia limits the liability of the registry and directly related public authorities	There is a Registry Ordinance decreeing that account holders should subscribe to the terms and conditions set out by the Registry (but whether there is actually such a set is not confirmed in the report).
4. Tort law and cost recovery	Cost recovery of financial losses in relation to tort cases only possible in case of punishable act and/or a public agency has been causing it. <i>It is unclear whether stranded cost is an accepted basis for compensation. Yet, the climate policy based 2010 coal ban debate hints in that direction.</i>	Cost recovery is possible via tort law, however in case the liable party is a public body, the possibilities to get compensation are limited. <i>It is unclear whether stranded cost is an accepted basis for compensation.</i>	Cost recovery is possible via tort law, also when the liable party is a public body. <i>It is unclear whether stranded cost is an accepted basis for compensation.</i>	Same as in Finland.
5. VAT and permit supply	VAT is not applicable regardless of the way of issuing permits (i.e. grandfathering or auctioning)	VAT is not applicable to grandfathering, but in case of auctioning VAT <i>might</i> be applicable	VAT is not applicable to grandfathering, and neither – in all likelihood – to auctioning. A premature exhaustion of NER and the subsequent obligation to the state to buy permits would be subject to VAT (but the report does not mention whether this made	VAT is not applicable to grandfathering, but in case of auctioning VAT <i>might</i> be applicable (though the argumentation is not the same as for the UK or Germany).

			payable for the new entrant). Furthermore the German ETS law allows subcontracting of public agency activities to commercial agents, which would make the involved activities liable to VAT. No subcontracting has occurred so far.	
6. VAT and permit trade	The guidelines of the EU VAT committee are followed, implying that no exemption from VAT is given, but the VAT will be charged in the country of (legal) residence of the buyer. Please note that applicable VAT rates are not necessarily the same in each Member State. <i>It is not specified how the transactions (with non-member states) in the context of the Linking directive tie in with this.</i>	The guidelines of the EU VAT committee are followed, implying that no exemption from VAT is given, but the VAT will be charged in the country of (legal) residence of the buyer. Please note that applicable VAT rates are not necessarily the same in each Member State. <i>It is not specified how the transactions (with non-member states) in the context of the Linking directive tie in with this.</i>	The guidelines of the EU VAT committee are followed, implying that no exemption from VAT is given, but the VAT will be charged in the country of (legal) residence of the buyer. Please note that applicable VAT rates are not necessarily the same in each Member State. <i>It is not specified how the transactions (with non-member states) in the context of the Linking directive tie in with this.</i>	The guidelines of the EU VAT committee are followed, implying that no exemption from VAT is given, but the VAT will be charged in the country of (legal) residence of the buyer. Please note that applicable VAT rates are not necessarily the same in each Member State. <i>It is not specified how the transactions (with non-member states) in the context of the Linking directive tie in with this.</i>
7. Rolling off penalty cost (due to insufficient permits to cover all emissions).	Penalties due to an insufficient number of emission permits are <i>not deductible</i> from (corporate) income tax.	Penalties due to an insufficient number of emission permits are <i>not deductible</i> from (corporate) income tax.	Penalties due to an insufficient number of emission permits are most probably <i>deductible</i> from (corporate) income tax.	Penalties due to an insufficient number of emission permits are <i>not deductible</i> from (corporate) income tax.
8. Task distribution of key authorities	Principal ministry: DEFRA (Environment, Food, Rural affairs) Regulator <ul style="list-style-type: none"> <li>Environmental Agency (also holds the registry)</li> <li>Scottish Environmental Protection Agency</li> <li>Secretary of State (off shore installations)</li> </ul>	Principal ministry: KTM (Trade & Industry) Regulator <ul style="list-style-type: none"> <li>Energy market authority (EMV) (also the registry holder)</li> </ul>	Principal ministry: BMU (Environment, Nature protection, Reactor safety) Regulator <ul style="list-style-type: none"> <li>German emission trading authority (DEHSt) (also the registry holder)</li> </ul>	Principal overseeing ministry: MM (Environment) and ND (Industry, Employment, Communication) <ul style="list-style-type: none"> <li>Environmental protection agency (Naturvårdsverket) (permitting authority &amp; NAPs)</li> <li>Swedish Energy Authority (registry holder)</li> </ul>



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