

# The political economy of a tradable GHG permit market in the European Union

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## Summary:

The EU has committed itself to meet an 8% greenhouse gas (GHG) reduction target level following the Kyoto agreement. Therefore, the EU Commission has just proposed a new directive establishing a framework for GHG emissions trading within the European Union. This proposal is the outcome of a policy process started by the EU Commission and its Green Paper from March 2000. The main industrial stakeholders all had the opportunity to comment on the Green Paper and from their positions we will analyse how far they are winners or losers compared to the final directive proposal. Here, we find that the dominant interest groups indeed influenced the final design of an EU GHG market. This industrial rent-seeking most prominently lead to a grandfathered permit allocation rule like the one found in the US tradable permit systems.

**JEL Classification:** Q28, H2, H4

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## **1: Introduction**

The European energy sector has for some time been facing the dual challenge of opening markets and tightening of environmental controls – especially with regard to CO<sub>2</sub> emissions. This dual challenge demands new approaches from all actors both energy companies and legislators. The traditional command and control regulation is not adequate for the new market conditions. For a while, a common European CO<sub>2</sub> tax seemed to be the solution, but it proved impossible to implement this new tax. Thus, tradable greenhouse gas (GHG) permits, in particular with relation to CO<sub>2</sub> emissions, are an interesting alternative to consider when addressing the new situation, CEU (2000). Tradable permits have successfully been implemented in the United States to reduce SO<sub>2</sub> emissions (Svendsen, 1998;1999).

The prerequisite for the development of effective GHG trade models, which have a chance of being implemented, is to understand the political economy of the EU. This topic has not been treated satisfactorily in the public choice literature yet. Two books have so far tried to look at EU lobbying in general within a political economy setting, namely Greenwood and Aspinwall (1998) and Mazey and Richardson (1993). However, no literature has so far analyzed the political economy of a tradable CO<sub>2</sub> permit market in the European Union.

This is important because any environmental policy has to pass through a political decision process. If the policy is not designed in a politically acceptable way, the original proposal will be changed beyond recognition and away from its cost-effective design during the political decision-making process, Daugbjerg and Svendsen (2001) and Svendsen (1998). Thus, the intention of this paper is to try to analyse the possible ways in which the effective design of a tradable CO<sub>2</sub> permit market can be affected by the interactions between private corporations and the Institutions of the European Community. The underlying assumption is that actors' interaction are guided by considerations of self-interest in that they attempt to achieve their goals, such as maximising their resources, in a specific context of institutional rules (Héritier, 2000).

The main case here is the EU efforts to meet the 8% GHG reduction Kyoto target level. Here, the EU Commission has just proposed a new directive establishing a framework for greenhouse gas emissions trading within the European Union (CEU, 2001). The proposal for a GHG-directive is the outcome of a policy process started by the EU-Commission in March 2000 with the Green Paper on greenhouse emissions trading within the European Union (CEU, 2000). The stakeholders all had the opportunity to comment on the Green Paper and from their positions we will analyse how far they are winners or losers compared to the proposal.

The policy process from a Green Paper to a proposal is indeed influenced by the private stakeholders (Haite and Mullins, 2001), although the influence is through or in competition with the other General Directorates. The European Parliament and the national governments dominate the policy process when the directive is proposed. In this later part of the process, which has just begun, the private stakeholders must to a higher degree go through the politicians in the EU-parliament or the national parliament and government.

We deal with the actors mentioned in the green paper as the most preferred participants. The Commission is more open to listen to the opinion from stakeholders they want to regulate. The most preferred participants are the electricity and heat sector, the iron and steel sector, refining, chemicals, building materials (glass/pottery/cement) and paper/pulp/printing.

We focus on the industrial groupings as environmental organizations and consumer organizations tend to be weak and without much lobbying power in the political arena. Compared to the size and budget of industrial interest groups, the environmental interest groups are only of minor importance in relation to EU policy making (Michaelowa, 1998). This suggestion is confirmed by the empirical results in Daubjerg and Svendsen (2001).

Thus our main question is: *Can the final GHG directive design proposal be explained by potential industrial winners and losers involved in the policy making process?*

We attempt to answer this main question in the following way. First, Section 2 describes the change in design from the Green Paper to the final directive proposal. Then, Section 3 analyses the political positions of the dominant industrial interest groups. Identifying winners and losers in the political process may help explain any change in design. Finally, Section 4 concludes the paper.

In spite of the fact that our discussions on political formations and interests and resulting policy recommendations are second best in strict economic terms, they are the best economic designs *given* that they must be politically feasible. So, if we can answer the main question, it leads to a better understanding of how an effective design proposal of a tradable permit market should be designed to stand a chance of being implemented as well.

## **2: Green Paper and final directive proposal.**

To describe the possible change in design, we use the overall structure in the green paper to plot in the positions of dominant industrial interest groups. The 10 questions in the Green Paper are divided in four main groups. The first four questions concern the *target group*. Questions 5 and 6 are about *allocation* of permits. Questions 7 and 8 addresses emissions trading and the potential *mix with other instruments*. Finally, questions 9 and 10 cover the *compliance* issue. The difference between the original Green Paper proposal (before lobbyism) and the final directive proposal (after lobbyism) is shown in detail in Table 1 below.

Overall, the main changes from the Green paper to the final proposal are the following. First, the *target group* has been limited to include emissions of CO<sub>2</sub> from a specific number of sectors specified on the community level. The regulation is mandatory and starts in 2005. The sectors included are combustion installations above 20 MW instead of 50 MW, coke ovens, refineries, production and processing of ferrous metals, mineral industry (building materials), and other activities such as paper and pulp. The chemistry is the only sector excluded compared to the green

paper, further are combustion of hazardous and municipal waste and the emissions from demonstration and research projects excluded. The sectors included in the target group emit roughly half of total CO<sub>2</sub> emissions in the EU whereas the electricity and heat industry alone emits one-third (CEU, 2000a).

On the second issue of *allocation*, the Green Paper lists a number of possibilities such as auctioning-off permits to the highest bidding parties. The final choice in the directive proposal is allocation free of charge in the form of grandfathering based on benchmarking or a historic baseline, which is clearly the solution that benefits industry the most in general. This rule of grandfathering and free initial allocation minimizes private reduction costs to industry and creates a (financial) barrier to entry in relation to new market entrants as they have to buy all their needed permits from existing firms (see Tietenberg 1985; Svendsen 1998; Daugbjerg and Svendsen 2001). The quantities allocated are decided on the national level taking the burden sharing agreement into account.

The third issue of *mix with other instruments* is not finally settled yet. Emissions trading is supposed to be complementary to taxes. Project based emissions and links to other trading systems are held out until the international rules are settled. More uncertain is how emission trading should be mixed with e.g. negotiated agreements and renewable certificates.

Finally, the fourth issue of *compliance* is consistent with the original Green Paper proposal. Only difference is that the actual penalty size and banking periods have been spelled out in detail. Especially is early action taking into consideration by leaving it up to the member state whether permits from the first period can be carried over to the next period from 2008-2012.

**Table 1: Comparison of Green Paper and final directive proposal.**

	<b>Green paper</b>	<b>Final directive proposal</b>
When	2005	2005
1. Target group	Inclusion of all 6 gases from electricity/heat (50 MW), iron and steel., refining, chemicals, glass/pottery/ cement and paper/pulp/printing.  Three possible ways to include sectors A common community program? A co-ordinated program: 1. Opt-in? 2. Opt out?  Enlargement of the EU?	Only CO2 from energy combustion installations exceeding 20 MW, coke ovens, refineries, production and processing of iron and steel building materials (cement, pottery , glass), and paper and pulp.  Community decides the sectors to include and as a general rule no opt-in or opt-out possibilities  Enlargement: New MS part of the system, if they enter before program comes into force. Otherwise mutual recognition.
2. Initial allocation	1. MS define quantity ? 2. Allocation to companies by MS? 3. Allocation by grandfathering or auction?	1. MS makes initial allocation taking into account the burden sharing agreement. 2/3. Directive establishes a common method in the form of <i>grandfathering</i> in the first period
3. How to mix emissions trading with other instruments.	Is emissions trading supplementary or complementary?	Environmental agreements: Go well together with emissions trading  Energy taxation: complementary instruments for covering the totality of emissions.  Community regulation: amendment of IPPC is necessary  Links to other programs: mutual recognition.  Links to renewable certificates: Certificates regulate the additional benefit from RE. MS take account of renewable energy targets, state aid question.
4. Compliance	Size of penalty?  Compliance at company level or at MS level ?	Penalty in the first period is 50 € and 100 € in the second.  MS shall determine sanctions for other breaches of the directive.  Banking during periods but MS decide whether banking from the first period from 2005-2007 to the second period is allowed.

Source: The authors.

Note on abbreviations: IPPC: Integrated Pollution Prevention and Control (EU-directive), MS: Member state, RE: Renewable energy.

### **3: Industrial interest groups**

We will try to identify actual losers and winners when comparing the Green Paper proposal and the final directive proposal. The positions stated are all drawn from hearings on the Green Paper (DG Environment, 2000). When we refer to a position of a stakeholder, the Green Paper hearing is the source. Otherwise, the source is mentioned.

We will focus on the dominant industrial lobbying organisations representing the largest emitters. Generally speaking, lobbies representing large emitters will try to keep costs as low as possible or even gain additional rents. This means they favour subsidies such as grandfathering, preferably with an emissions target that responds to organic growth of the company in a flexible way. Otherwise, voluntary agreements are the favoured instrument. Voluntary agreements are always hard to assess because it is close to impossible to know what would have happened to the level of emissions if the agreement had not entered into force (the baseline level of emissions is counterfactual). For the same reason, (Michaelowa, 1998) suggest that voluntary agreements allow labelling the autonomous rise in energy efficiency through cost-saving innovation as climate-policy-induced activity (?).

The reference for the evaluation of the sectors is the proposed directive and purpose of the following analysis is to state whether a sector according to their hearing answer is a winner or a loser. Here, we define ‘winners’ as actors that influence the frames and the scope of the market in their favour thus achieving a net gain from rent-seeking. This approach is in line with the theoretical framework of Tullock (1967) and Olson (1965). Related to our four groupings the actors will argue for a voluntary program in the target group. If the sector is a seller they will find it attractive to be a part of the program. If they see them selves as a buyer they might be better off with domestic regulation in the form of negotiated agreements or standard regulation. On allocation, the free allocation of permits (‘grandfathering’) would, like in the US, be a crucial issue and probably heavily influenced by lobbyism, see Svendsen (1998). On the mix with other instruments the actors will prefer the use of negotiated agreements for cap setting and taxes are complimentary. On the compliance issue the actors will prefer none or only a small penalty and flexibility in the form of banking and carry over from the first period to the second thereby rewarding early action.

The industrial producers are overall organised in UNICE (Union of Industrial and Employers’ Confederations of Europe) as well as the electricity generators are organised in Eurelectric. But the members in both organisations are very different and have there own specialised organisations. Therefore, it is legitimate to distinguish

among the members of Eurelectric and UNICE and their official opinion, which to a large degree is influenced by the largest members. The same situation is found in Association of Oil and Gas Producers (OGP) representing the Oil and Gas industry, where Eurogas to a larger degree represents the distribution and EUROPIA represents the refineries. The electricity sector is divided into large producers, nuclear utilities, small CHP and DH, biomass and wind. We start with the electricity producers (Section 3.1) and then move on to the refining sector (Section 3.2), Iron and steel (Section 3.3), Paper and pulp (Section 3.4), Building materials (Section 3.5), and Chemistry (Section 3.6)

### **3.1 Electricity producers**

We have chosen to differentiate between large and small producers of electricity because they are represented by different organisations in the EU and have diverging interests.

#### **3.1.1 Large producers**

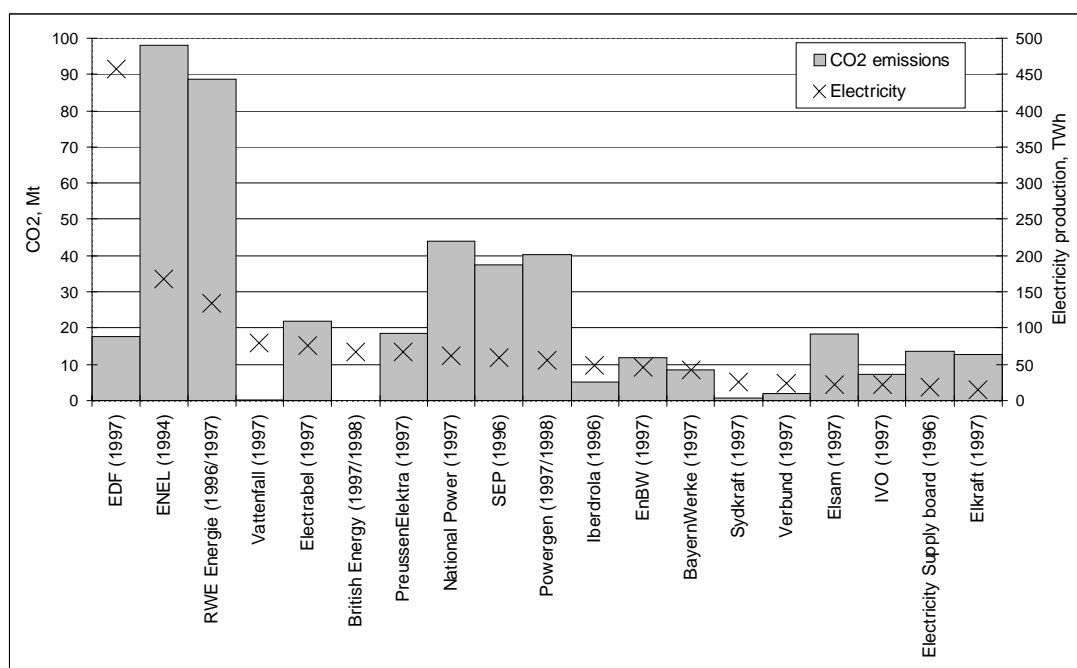
They are mentioned as the main emitting sector and the most important sector for the program. Without the sector there would be no program. The opinion of the large producers is mainly represented by EURELECTRIC. Due to the important role of this organization, we will first make some general remarks before turning to the four design issues.

EURELECTRIC is the association of the European Union Electricity Supply Industry. As noted by (Greenwood and Webster, 2000), liberalisation of public sector monopoly sectors, classically, disintegrates the unity of homogenous business interest associations, as the structure of members interests changes, typically resulting in the development of specialist niche associations. Hence, a response to liberalisation of the electricity sector in Europe was the creation of specialist sectors representing electricity traders, municipal producers, transmission and system operators, and renewable energy.



Climate change mitigation is an area where the business interests of the Members of EURELECTRIC are very different. The opposing interests of the largest electricity producers in the EU become very apparent by comparing electricity production and CO<sub>2</sub> emissions, which has been done in Figure 1 below.

Figure 1: Production of electricity and CO<sub>2</sub> emissions from largest firms.



Source: Annual and Environmental Reports from individual companies, see Varming et al. (2000).

As can be seen, there are large differences between companies with a high share of nuclear or hydro capacity and companies with a high share of production from fossil fuels. The mergers between more of the companies above in the last years have not decreased the difference. This clearly limits the ability of a lobbying organisation to influence on policies in this area. However, the organisation can gain some credibility in this policy area because of the lack of a clear-cut agenda.

A main concern of EURELECTRIC is that the electricity sector will be required to reduce emissions much more than other sectors. With respect to CO<sub>2</sub> emissions, the

electricity sector should be recognised as a sector that has already done a lot, and in the long term, electricity offers the possibility of minimal emissions.

Concerning the four design issues in the Green Paper, Eurelectric proposes a voluntary cap and trade system where the target group should include as many sectors as possible. From 2005-2007 an opt-out possibility is preferable but the member states must determine commitments and regulation comparable to emissions trading. The inclusion of all 6 gases is preferable

Second, the best method of allocation is grandfathering based on historical emissions. A national allocation of the amount of permits is necessary when taking the principle of subsidiarity into consideration. Further the program should reward early action.

Third, emission trading is complementary and other instruments as taxes are more appropriate for small and mobile emitters. It is necessary to link absolute and relative targets. Fourth, monitoring, reporting and verification should be harmonised on a community level but is the responsibility of the member states. Here, a penalty must be harmonised on a community level.

In conclusion, the large electricity producers are winners on 3 subjects but a loser on, maybe the most important issues related to a voluntary or mandatory program. They won on grandfathering and the allocation of quantities by the member states. Reward for early action are laid in the hands of the national governments, who are to decide the use of carry over from the 1<sup>st</sup> period to the 2<sup>nd</sup>. The market would be more flexible if project based emissions were a part of the program but if the accession countries join the EU before the start of the program then a mandatory system could go hand in hand with investments in the new member states and turn the electricity sector into a seller sector.

### **3.1.2 Nuclear**

The nuclear industry in Europe is organised in the European Atomic Forum (Foratom). Given that nuclear energy produces 35 % of Europe's electricity today (European Energy Outlook, 2000) and that the demand for electricity is projected to grow in the years to come, nuclear has to be part of the solution to climate change.

Concerning the design issues, Foratom supports a mandatory system at the community level. It should work upstream including the whole chain from extraction to combustion in the power sector instead of the proposed downstream system. Foratom is very concerned that they would be unable to participate in the system and argue for an opt-in program open for all.

Furthermore, Foratom fears that nuclear utilities owned by a large electricity producer are excluded and prefers allocation to entities and not only companies or sectors. The quantities should be regulated at community level and allocated with the same method. Also, credit for early action must be included in the method of allocation. Benchmarking or auctioning will give the nuclear utilities a competitive advantage compared to other generators.

Concerning potential mix with financial instruments such as green taxation, this option is rejected because it has a negative impact on competitiveness and raises the costs of meeting the emissions reductions targets. Finally, a EU-wide monitoring and reporting program for the nuclear sector and the EU is already existing and these experiences are most valuable in the EU GHG emission trade setting.

In conclusion, nuclear power is an abatement sector and prefers a mandatory system but will still be a loser on the allocation issues. First the quantities allocated are decided by the member states and second the permits are given to companies by grandfathering and not entities by auctioning.

### **3.1.3 Small scale CHP**

CHP is represented by Cogen and Euroheat and Power (EHP) respectively. Cogen mainly represents industrial CHP and the producers of CHP technology, and Euroheat and Power represents public and municipal owned CHP and district heating (DH). Some of the members in Cogen and EHP use large amounts of biomass and EHP indirectly represent their interests as well. The small CHP sector stand to lose in the liberalised energy markets because the environmental benefit from co-production is not supported.

First, concerning the choice of target group, Cogen and EHP support the program starting in 2005. Without emission trading it is not possible to account for environmental benefit in combination with cross-border trade. Also, Cogen and EHP agree with the proposal in the green paper, but combustion units lower than 50 MW should also be included. Otherwise a large number of new and existing plants will be excluded from the system. Cogen suggests that there should be no minimum limit at all. Cogen also wants to expand the system to Food and Drink, Airports and Public Buildings. Both interest groups support a community program without opting out and opting in possibilities.

Second, about allocation the EHP wants the member states to decide the quantity allocated according to community guidelines whereas Cogen supports an allocation on community level. Both support the use of benchmarking because it rewards early action and efficient production methods. Auctioning is appropriate in the long term.

Third, both interest groups think that a mix between taxes and emissions trading could make sense if the tax program is designed to benefit the environment and not government revenues. Fourth, the compliance issue must be solved by rules strongly harmonised at the community level.

In conclusion, the small CHP producers are winners. They wanted to be a part of the cap and trade program and succeeded. In the Green Paper they were mentioned as too small and too complicated to control and monitor. They partly lost on the choice of allocation method. They suggested auctioning and to a lesser degree benchmarking, which is a possibility. They still want extra attention and subsidising from the EU or national government, but it is unclear whether they can receive other kinds of national support. CEU are already planning a directive proposal to define and certify CHP production to be released in 2002. Further they wanted EU regulated monitoring and verification, which they did not get. If the accession countries are adopted in the EU, the CHP producers will lose and will argue for support on a national or EU-level.

### **3.2 Refining**

The oil and gas industry is represented by the International Association of Gas and Oil Producers (OGP). The daughter organisation, EUROPIA, represents the refineries and is the author behind the answer.

Clearly, given the 'right' implementation of the Kyoto Protocol, gas could be a major potential business opportunity for the gas industry. The carbon intensity of gas is about half the size of coal and an increased share of natural gas use is needed to support the Kyoto targets. In this respect, the gas lobby is almost like an abatement lobby.

Overall, the oil and gas lobby state in their replies that all sectors should on a voluntary basis be able to participate in emissions trading before 2008 and on a mandatory basis afterwards without the possibility to opt in and out. Not only refineries but also oil and gas producers in the EU and EEA should be included and GHG should be tradable.

In their position to allocation they argue for free allocation and the inclusion of both absolute and relative targets. There should be no ceiling on trade and the use of project-based reductions should not be restricted. Sinks and sequestration should be

allowed or at least considered. Concerning mix with other instruments, emissions trading should be seen as complimentary to other instruments and regulation. Finally, on the compliance issue, both lobbies argue that no penalty should be applied in a voluntary system.

In conclusion, the oil and gas sector supports emissions trading and a dash for gas is foreseen. But the refinery sector has lost on two issues except allocation for free and complementarity to other instruments. It is in their interest to create a flexible and wide a market as possible to decrease the price for a permit. The emission from the sector might be relative small, but the consumption of gas is a target for public taxation. In the long run, the gas distributors stand to be winners. The inclusion of the project based reductions or the accession countries will only strengthen their position. The options for sequestration and storage in oil fields might open up for new opportunities and turn the sector into a large abatement actor. Finally, they are very eager to avoid any specific measures towards the problem with fugitive methane emissions from the gas chain and a voluntary agreement is the right way to deal with the issue.

### **3.3 Steel and Iron**

European Confederation of Iron and Steel Industries (EUROFER) represents 96% of the iron and steel industries in Europe. The answers from EUROFER are background for the description of the attitude to emissions trading in the steel industry. The last 4% of the Iron and Steel industry is represented by European Independent Steelworks Association (IESA) and they are against any kind of emissions trading with the argument it will only distort instead of promote emissions reductions.

The target group should be as wide as possible and contain not only industrial sectors. The steel lobby states that its producers are exposed to global competition and that emissions trading must not limit their future production. The iron and steel industry has always had a strong incentive to improve its energy efficiency and the potential for further improvements is limited. Steel and iron production is energy intensive and

ways to raise productivity and reduce the use of energy is the same as reducing costs. Second, relative targets should be set by benchmarking and negotiated agreements on a national level. Also, trading should be done at company and not at sector level. The program should include project-based mechanisms and thereby use the potential for transferring energy efficient processes. The allocation must take early actions and voluntary agreements into account. Third, emissions trading should replace traditional standard regulation. Fourth, global guidelines for measurement, monitoring, reporting and verification are needed.

In conclusion, the iron and steel industry has lost. It was hoping for a voluntary program, the use of relative targets and project based reductions, but none of that is a part of the final proposal. The potentials for abatement through technological improvements are small and they are buyers of permits. Only by widening the program with other non-industrial sectors with higher abatement costs they might be able to reduce their costs.

### **3.4 Paper and pulp**

Confederation of European paper industry (CEPI) represents the pulp and paper industry in all of Europe. The position of CEPI is also supported by the Confederation of European Forrester Owners, CEPF.

CEPI thinks that the target group should be as wide as possible and should also include the transport sector. CEPI supports an early start in 2005 where opting out and starting with a few sectors might be necessary for acceptance. The allocation rule should be based on common guidelines on EU-level and most crucially through grandfathering based on a common baseline. Target levels should be set by negotiation on a national level in accordance with national agreements. Also, the inclusion of sinks is important and no ceiling on trading and banking from early action should be allowed. Other instruments for CO<sub>2</sub> mitigation are alternatives and therefore not simultaneously applicable measures. Compliance can be ensured by EU-rules for monitoring, verification and control.

In conclusion, the pulp and paper industry has lost. The sector wanted a voluntary system, where targets are set by negotiation and compliance should be on a community level. The inclusion of sinks would either bring them cheaper raw materials or give them a possibility to use the CO<sub>2</sub>-reductions in their own commitment.

### **3.5 Building materials**

The cement industry is represented by CEMBUREAU and the ceramic industry by CERAMIE-UNIE. The answers from the ceramic sector are not very detailed and are to a large degree similar to the cement industry.

Overall, they are in favour of an early but voluntary start of the program in 2005. The same sectors and companies should be covered in all member states. Opting in and out should not be allowed. It is important to look at the possibility for a baseline and credit program. In order to avoid distortions of competition a co-ordinated framework on EU-level is needed. Auctioning is not favourable because it is tantamount to a tax, though the ceramic industry is in favour of auctioning. Target levels should be set in national agreements and be in compliance with domestic policies and state aid guidelines. Concerning mix of instruments, it is probably not possible to combine taxes or regulatory standards with emissions trading. Rather, negotiated agreements could be the link between relative and absolute targets. Finally, there is no need for new EU-regulation to secure compliance. Monitoring and verification should be undertaken by the member states.

In conclusion, the cement and ceramic industry has all in all lost in two out of four of the subjects. Again the industry is not in compliance with a mandatory and absolute target in a program starting in 2005, although they recognise that only a few sectors and them selves are a part of the program. Further they did not get their most preferred choice of allocation.



### **3.6 Chemistry**

The European Chemical Industry Council (CEFIC) represents the chemical industry in Europe. It is the umbrella organisation for the national chemical federations and chemical companies in Europe. It represents more than 40.000 companies and a net turnover on € 40 billion.

The chemistry sector lobby does not want to be a part of a Community program. The industry stress that emissions trading will constraint their competitiveness and their ability to grow. They are energy intensive and act on a global market and there are high risks of carbon leakage. The sector has already improved their efficiency through a Voluntary Energy Efficiency programme and further end of pipe abatement is not economically feasible. Allocation of reductions should only be made on a voluntary and national basis. The targets should be relative and based on energy efficiency or GHG intensity. These agreements should be negotiated with the trade associations. Permits should be allocated to companies and project reductions should be coupled with emissions trading. Thereby allowing a European or even global trading program and not only a national program. Also, it is important to reward early action. Emission trading is only one instrument among many other possibilities.

In conclusion, compared to the final proposal, the chemical industry is not a part of the proposal and is regulated by national and voluntary and relative targets. Because the amount of producers is very large, they do not emit CO<sub>2</sub> and it is too complex and expensive to monitor and control them.

### 3 Conclusion

Our main research question was whether the final GHG directive design proposal could be explained by potential industrial winners and losers involved in the policy making process.

A first answer is "no", because almost all industrial sectors wanted a voluntary system and only the sectors not included in the system are winners. According to the political economy the proposal must be amended before it can be accepted. Further the most conflictual issue of allocation and banking has been left to the national governments, and leaving an issue to the national governments is often the same as leaving the issue unanswered and open for negotiations. In general, EU has given more notice to the practical implementation of the system than to the requests from the lobby organisations.

However, given that a emission trading system was to be established, we moved on to answer the main question by focusing on traditional industrial sectors and the energy sector. Our 'first-round' observation was that the chemistry sector avoided becoming a part of the final program and thereby the extra cost of having to undertake abatement efforts, see Table 2 below.

**Table 2: Winners and losers in final directive proposal.**

<b>Winner</b>	<b>Loser</b>			
<b>Not part of the program</b>	<b>1 subject</b>	<b>2 subjects</b>	<b>3 subjects</b>	<b>4 subjects</b>
Chemistry	Large electricity producers, nuclear	Iron and steel, building materials, pulp and paper, refineries	small scale CHP	None

Source: The authors.

However, the reason for excluding the chemistry sector was administrative rather than political. It did not pay to monitor and control the chemistry sector for administrative reasons because of its many small producers and the fact that they generally emitted all 6 GHG's.

Although the chemistry sector is described as a winner they might lose. The alternative is national taxes and standard regulation, which might be worse than emissions trading. However, emission target levels for the actors involved in permit trade may also be tightened in the future thus imposing extra and non-foreseen costs on polluters. Also, sectors outside the program will probably not be confronted with harder regulation, then the option for the sector to negotiate a more advantageous regulation on national level is better than on an EU-level together with other large industrial sectors. If the CO<sub>2</sub>-price on the market should turn out to be less than the costs of national regulation, they can opt-in after 2008.

Among the ‘first-round losers’, we move on to identify winners and losers within the program itself by comparing them to the projected CO<sub>2</sub> price on 20-25 Euro/tonnes CO<sub>2</sub> found in an EU sector study (Block, de Jager and Hendrics, 2001). Note how Table 2 showed that the large electricity producers and nuclear utilities were winners within the program as they lost in only one out of the four design issues. Followed by the industrial producers with 2 lost issues and CHP with 3 lost issues. When introducing CO<sub>2</sub> permit trade, which political actors succeeded then in influencing the final design in a specific direction according to its hearing statements and the proposed directive? Table 3 reviews these results.

**Table 3: Potential sellers and buyers of permits.**

<b>Sellers (winner)</b>	Nuclear, large electricity producers, small scale CHP.
<b>Buyers (loser)</b>	Refineries, iron and steel, building materials, pulp and paper,

Source: The authors.

By ‘sellers’ we mean sectors, which have access to cheap technical possibilities generally. It will generally pay them reduce emissions and sell permits in the market. In contrast, ‘buyers’ are those sectors that overall will have to buy permits in the market as they face more costly technical solutions for reducing their own emissions. As can be seen, the industry stands to be the buyer in general, whereas the large power producers and nuclear sector stand to be the potential sellers inside the program. Most prominently, we observed that grandfathering and free initial

allocation was chosen among a number of permit allocation rules. This choice favoured industry in general as it minimizes private reduction costs and creates a (financial) barrier to entry in relation to new market entrants which are forced to buy all their needed permits from existing firms. Thus, this design feature points in particular at the presence of strong industrial rent-seeking. A similar result can be found in the US where all tradable permit systems use grandfathering as permit allocation rule, see Svendsen (1998).

The electricity sector is the largest and most important sector for the implementation of the program and the directive did therefore support their interests. The electricity sector has, as shown by Varming et al. (2000), numerous and cheap options for CO<sub>2</sub> reduction compared to other industrial sectors using fossil fuels for energy production. This argument is illustrated by the fact that industrial representatives such as UNICE and DG Enterprise were most active in lobbying and opposing the final directive proposal, which for this reason, was significantly delayed (ENDS, 2001).

The general idea in this paper was that rent-seeking would affect the design of emission trading in favour of well-organized interest groups. How can we then explain that the large electricity producers became winners by being sellers and losing on one out of four subjects, whereas the other industrial sectors and small scale CHP became losers on two or three out of four subjects (see Table 2 above)?

This empirical result fits the Olson (1965) theory of group size neatly. Because the large electricity producers form a small group, it is easier for them to lobby through EURELECTRIC than it is for the small firms in the losing fraction. In the case of the latter, the individual net gain from undertaking the collective good of non-participation in this case will turn out negative for a small actor, see Svendsen (1998). Though the UNICE was supposed to represent the industrial losers as well, it dropped out because the big multinationals were no longer part of the system. The sectors then only had the voice of their own associations. The same is the case with the refineries, which were not directly supported by OPG but only through the smaller association of refineries (Europa).

In perspective, the opposing industrial sectors may be softened by giving them some kind of special rewards (or selective incentives) in the Olsonian sense (ibid.). One way would be to change the system from a cap and trade to a credit and baseline approach, where you are rewarded for reductions but not punished for exceeding your baseline. This system has been implemented in the UK and approved by the EU state aid guidelines. Another possibility would be a reduction in taxes but it requires that the actors were imposed to taxes before the start of the program. This kind of program is suggested in France. A last but not least desirable method to implement a mandatory system would be to make the targets relative, thereby not limiting the possibilities for growth. German industry and large electricity generators support this solution. We have not mentioned the position of the national governments but they will to a large degree influence the coming discussion.

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