# GLOBALIZATION, CLIMATE CHANGE AND CARBON MARKETS

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**Abstract**
*Climate change is pictured like the most threatening environmental outcome of the recent industry driven economic and social development. Fighting against climate change has a great legitimacy and the public at large seldom question the necessity of governmental intervention in this respect. The global financial crisis and the globalized markets are external factors that tailored some unexpected results of climate policy implementation in the European Union. Thus, along with expected progress in emission abatement, some companies improved their economic and financial indicators on the carbon market. The paper reveals the mechanism of this process, outlines some quantitative milestones and concludes that the public at large might loss some of the commitment to climate change mitigation by finding itself in the role of main financial supporter of the climate policy.*
**Keywords**
*climate policy, carbon market, allowances, carbon leakage, windfall profits.*

## Introduction

The economic opportunities created by the implementation of the environmental policies are not among the most attractive investments. Nevertheless, the framework created by the diversified political options at national level, on the one hand, and the liberalization economic exchanges, on the other hand, enabled windfall profits for several actors. These have been materialized especially within the context of climate policy and resulted in lower effectiveness of these policies.

On the largest carbon market – the market created by the emission trading scheme of the European Union (EU ETS) – there are large economic actors from the energy and iron and steel industry that use the global competitiveness reasoning built on the carbon leakage outcome for obtaining more permits than they need, some of them being that are transformed in windfall profits on the financial market, with minimal interventions for emission reduction. This evolution was hardly predicted during policy making, but it was readily noticed and reported by environmental watchers.

At what extent the EU ETS will succeed in reaching the ambitious goals of the Europe 2020 Strategy depends on how environmental and economic policies interact on global markets. Some aspects of these interactions will be highlighted in order to clarify the main sources of windfall profits and how they could be related with the threat of carbon leakage.

## 1. Climate change and climate policy

Climate change is an environmental issue occurring due to an increase in the radiative forcing of the atmosphere determined by air born pollutants that accumulate over long periods of time at global level. This increase in radiative (climate) forcing leads to changes in the general circulation of the atmosphere, which is mainly responsible for the non-periodic changes of weather at local and regional levels (Bogdan, 1983). The changes of weather patterns are not connected directly with the amount of pollution produced in a certain area. The policy relevant characteristic of this physical mechanism is that the

climate change effects will impact equally on both polluters and non-polluters. It should be kept in mind that climate change has an uneven impact and it is possible that regions with no or little harmful emissions will be affected more than the ones with significant emissions and vice versa. In fact, the most vulnerable nations to climate change are developing countries with less than ten per cent in the global greenhouse gas emissions, while the largest polluters (such as USA, China, Russia) are less exposed to harmful effects (Petrescu, 2013).

Despite the high priority of climate change on policy agenda, at least on the environmental policy agenda, the public support for mitigation measures is disproportioned. The patterns of weather and climate, on the one hand, and the private costs of mitigation, on the other hand, explain a less intense public support.

Climate is very diverse, with large variation between the extremes of a certain parameters occurring even within small territories. For instance, in Romania, the inhabitants of Bucharest are accustomed with very high temperatures in summer (even beyond 40 Celsius degrees), while for the inhabitants of Brasov 30 Celsius degree indicate a very hot summer day. Further, seasonal differences are contrasting ones, especially within the continental temperate climate. Therefore, distinguishing between normal non-periodical weather patterns and the ones induced by climate change is sometimes difficult even at expert level and fuels bias among public at large. As long as private costs are regarded, most of the mitigation measures attempt to internalize the costs of climate change. Although this is occurring at the level of producers, they transfer the costs to final consumers. Thus, the public ends up concluding that climate change mitigation is expensive and could hinder his/her wellbeing. It should not be neglected the timescale issue. Thus, climate change determined damages will happen in a quite indefinite future (usually mentioned as decades, seldom as years), while climate change mitigation costs are already a supplementary financial burden. Thus, it is almost unavoidable the interpretation that ones are paying for nothing.

Despite climate policy and action, the physical mechanism of climate change is still a hot scientific debate. The imminence of catastrophic events for humankind, predicted even for short timeframes, imposed operational clarifications that gathered enough reasons to apply the precautionary principle and to proceed toward policy making and enforcement.

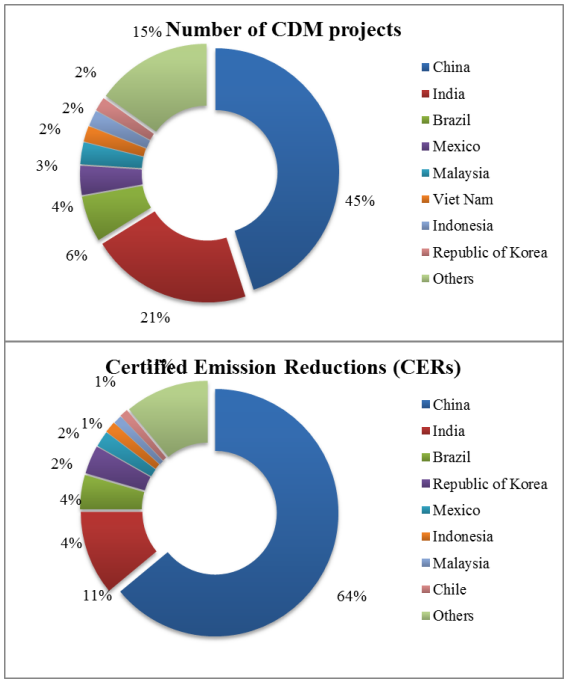
Climate policy is a major environmental concern and it is strong enough to stand against economic crises and social emergencies. This solid position is given by the fact that its mitigation is impacting on one core economic sector – energy generation. Most of humankind's energy is obtained by burning fossil fuels. The release of carbon dioxide is therefore strongly correlated with the energy consumption. Fighting climate change means to reduce fossil fuel burning or to create the so-called carbon sinks. Both are major technical challenges, but the main barriers are in fact economic and social ones.

Scientific bias and public reluctance did not prevented climate policy to be enforced. Its main intervention to reduce emissions is a market based mechanism designed as a cap-and-trade system. This establishes a cap of emissions that is divided in allowances, respectively carbon permits. Usually a carbon permit covers a tone of carbon dioxide equivalent emissions. Further the allowances are allocated to all polluters who are trading these allowances between them. To acquire new allowances to cover supplementary emissions a polluter is forced to increase costs. This could be avoided if the polluter chooses to invest in less carbon-intensive technology instead of buying new allowances. In fact, climate policy creates a novel market that allows externalities associated with greenhouse gas emissions to be transacted, creating an economic incentive for investments in cleaner technologies.

Clean Development Mechanism and EU ETS are examples of such emission trading systems.
Emission reduction is also reached by a reversed market based policy tools, the carbon tax. In this case, each unit of carbon dioxide emission is subject to a supplementary tax that is then collected to create financial resources for climate mitigation measures such as afforestation, thermal insulation of buildings, technological research and others.

## 2. Carbon markets

Since 1992 then the United Nations Framework Convention on Climate Change (UNFCCC) was prepared and agreed on by the majority of the world's states important progresses could be recorded for the elaboration and implementation of the climate policy. This was supported by a more and more comprehensive and targeted focus on knowledge development instrumented by the Intergovernmental Panel on Climate Change (IPCC) toward an increasing integration in major economic processes.
Carbon markets are not developed naturally by the interplays of major economic actors. They were created by climate policy as a cost-effective tool to boost low carbon intensity investments. Under the Kyoto Protocol it was developed the Clean Development Mechanism, which is considered a regulatory market, along with the EU ETS that covers EU's main greenhouse gas emitters. Beside these markets, there are voluntary markets established by companies, individuals, or events.

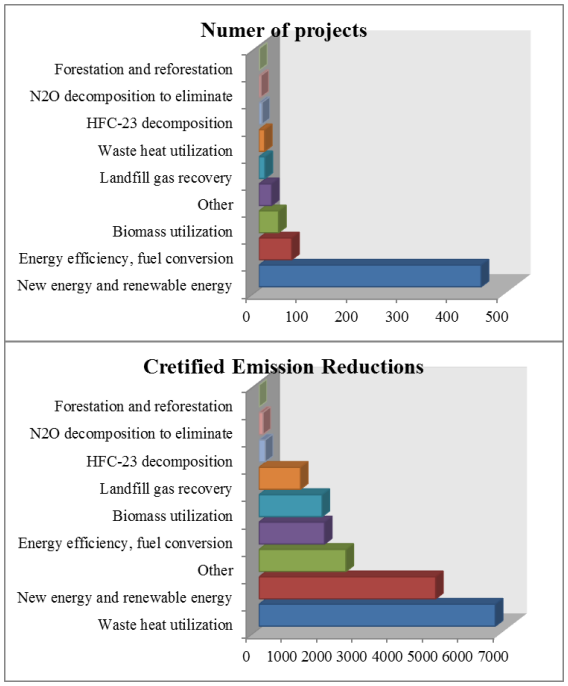



Source: own representation using UNFCCC data

**Fig. 1 The largest CDM projects host countries by number and by CERs**

The Clean Development Mechanism (CDM) was defined within the Kyoto Protocol, being the first global, environmental investment and credit scheme. It provides a standardized emission offset instrument, represented by the certified emission reduction (CER). A

country that assumes emission reduction targets could obtain CERs by investing in an emission reduction project in developing countries. For each tone of carbon dioxide that is offset the investing country receives a CER that is counted towards meeting the Kyoto targets. Investment projects include renewable energy plants, zero energy buildings and others. The underpinning principle of the mechanism is that reduction of emissions should be made firstly where it could be achieved with the smallest cost.
China is the main destination of carbon offset projects, the number of which increased from one year to another reaching more than 1500 projects accounting for 320 million CERs in 2011. Other CDM supported countries are India, Mexico, Malaysia, Viet Nam, Indonesia, Republic of Korea, Chile accounting for 85% of projects and almost 90% of CERS (fig.1).
As long as the project type is regarded, renewable energy projects are the most numerous, while waste heat utilization projects accounts for most of the CERs. Other effective projects for carbon offset include energy efficiency, biomass and landfill gas recovery projects (fig.2).




Source: own representation using UNFCCC data

**Fig. 2 The CDM projects by carbon offset types in numbers and CERs**

After almost ten years, the CDM attracted more than 215 billion USD investment in mitigation and proved that CDM is an effective market based mechanism to fight against climate change. CDM projects are implemented in 81 countries worldwide and include a broad variety of types such as: biomass plants, solar power projects, industrial projects, wind farm projects. CDM recorded more than 7500 registered projects, the most recent major achievement being the Los Cocos Wind Farm Project located in south-western province of Pedernales in the Dominican Republic. This project is expected to generate 74.2 MWh of electricity and displace 54.183 tonnes of carbon dioxide emissions from electricity produced previously in fossil fuel power plants.

The demand for carbon credits comes from developed countries where the polluting industries are operating. USA and UK are the most demanding countries on voluntary markets. In case of CDM the demand is built up by polluting industries from UK, Spain, Germany, France, Netherlands, Sweden, Switzerland, Japan, Canada, Finland, and Norway.
The EU ETS is a scheme set up by the EU in order to meet Kyoto targets. It works on the same principles of cap-and-trade for greenhouse gases. Instead of countries, the allowances are distributed among companies (power plants, factories etc.). Since 2013 the emission cap is shrinking by 1.74% each year. Thus the overall emissions will be lower with 21% in 2020 than in 2005. Aviation has a separate cap of emissions, which is established for 2013-2020. The scheme covers 45% of EU's greenhouse gas emissions and allows the interaction of eleven thousand energy-intensive heavy industry companies and aviation companies.
Each company that is included in the scheme receives a certain number of certificates that is established by a standard procedure. In case that its emission exceed the amount covered by allowances the company will buy allowances from other company, facing a supplementary cost. Allowances could be transferred from one year to another. Companies could also invest in emission avoiding projects from around the world but within certain limits. It is assumed that companies will fall short in allowances and face the need to buy them from the market or avoid this cost by investing in less carbon intensive technologies. If a company considers that have more allowance than it is needed, it could decide to sell them. In fact these options are presented in EU documents (EC-Climate Action, 2013) as follows:

- Investment in more-efficient technology and/or shift to less carbon-intensive energy sources in order to reduce emissions;
- Purchase of extra allowances or credits on the market;

EU-ETS covers carbon dioxide emissions from power industry, major energy intensive industry, and from airlines operation. Nitrous oxide and other greenhouse gases emitted by aluminium production are also covered. The participation to the scheme is compulsory for all companies acting in these sectors. In some Member States there is applied a size limit too, according to that only installations that exceed a certain size should be covered.
The first two phases (I: 2005-2007; II: 2008-2012) of allowance emissions was made for free, meaning that companies had acquired the calculated number of allowances. Starting with 2013 the allowances are no more allocated only for free, the main procedure to be implemented being the one auctioning. Nevertheless, free allocation will be phased-out only in 2027.
For power plants the free allocation was phased-out in eight Member States and replaced with green investment projects until 2019 for countries that became later part of EU (Romania, Hungary, Bulgaria, Poland etc.). Thus, almost half of the allowances (40%) were bought, not allocated for free. Further, the allocation of allowances will be made using industry benchmarks instead of National Allocation Plans (NAPs).
In case of manufacturing industry, free allocation prevails, even after 2013. From this year, 80% of the allowances were allocated from free, but their number will decrease by 30% each year until 2020 then all allowances will be bought.
The voluntary market was much smaller than the regulatory ones, but records high growth rates and is estimated to have an important potential in emission reductions. Total voluntary markets amount for 576 million USD in value and 95 Mt carbon dioxide equivalents in 2011 compared with 175 billion USD, respectively 10094 Mt carbon dioxide equivalents for the regulated markets (Benessaiah, 2012).

## 3. Competitive strategies on global markets

Globalization is on-going at the scale and intensity of a phenomenon, the power of its drivers being a challenge for both research and business administration. There are many answers regarding why globalization is occurring. Among them economic motivations are granted with the largest contribution, being underpinned by the goal pf profit maximization. Underneath there are laying a number of decisions that engage huge amounts of materials and energy, but above all of money in global transactions. The transparency of decision making is quite poor fuelling speculations around the capacity of the market mechanism in fulfilling its role for the balanced repartition of costs and benefits. These are justified, if we take in account that there are disparities between the economic and social development levels of countries.

The advance in the progress way has different paths from one country to another but is expected as an outcome of governmental policies, regardless to the underpinning ideologies. At what extent this goal is accomplished depends on many factors that are analysed in various settings. Fact is, more and more companies decide to enter the global market and adopt various strategies in this respect.

The global market is globalizing because physical distances are shrinking due to internet, but also transportation technology and because companies are engaging in a race to occupy first position in more and more countries.

A company is motivated to enter the global market because in this way it will have access to new customers, valuable natural resources, or cheap human resources. Further, it could capitalize on resource strengths and spread business risk over a wider market base.

Global competition conditions are met then a product is marketed in many foreign countries and is expanding operations into additional country markets. The same rivals are competing in the same national markets pursuing world-wide leadership. In such conditions, the firm's competitive position in one country is affected by its position in other countries, while the competitive advantage is based on the entire world-wide operation.

The most usual strategies adopted by companies entering the global markets include: export, licensing, franchising, global strategy underpinned by low cost, differentiation, focus or a combination of them, and strategic alliances. The best strategy for a product that has a globalized market is the global strategy, which could consider three options:

- Locating activities in such a way that either cost minimization or product differentiation is achieved;
- Transfer of competencies and capabilities from domestic to foreign markets;
- Coordinating dispersed activities in a way that cannot be done by any domestic competitor.

The short-term financial mind set, pointed as financial myopia by Pinto (2010), intensifies the rush of cost-cutting. This is accomplished especially in countries with lower wages, taxes or environmental restrains. Although the most of the gain is obtained in case of human resources, the edges of global competition leave little room for other costs to be neglected too. Thus the differences in the restrictiveness of environmental regulation still have a role to play in relocation decisions.

The pollution haven effect was confirmed for many pollutants that include air born ones like acid rain precursors (nitrogenous oxides, sulphur dioxide) and hazardous waste treatment and disposal (Michel, 2010; Bran and Ioan, 2009). Nevertheless, in case of ozone depleting substances and of greenhouse gases, the stringency of the regulation is not mirrored by relocation decisions. Michel (2010) argues that this could be determined by the loose implementation that leaves room for cost effective measures or even no measures without relocation.

## 4. Carbon leakage and windfall profits within the European carbon market

Environmental policies ultimate goal is to transform environment related transactions in meaningful profit sources that are amongst the first options of the investors. Before the last phase of carbon allowance emissions in 2013 strong criticism emerged regarding the effectiveness of the EU-ETS, but more importantly on the so called distributional or side effects. Out of context these could be interpreted as an accomplishment of the goal of great profit making by environmental business, since the carbon market created good opportunities for many companies to gain windfall profits.

When a company faces cost increases for inputs, it could choose one of the following options:

- Absorb the cost by reducing the profit margin;
- Reduce the cost by improving the efficiency of operations;
- Transfer novel costs to the consumer.

The supplementary costs determined by the carbon market were targeted to steer companies to the second option. What was the actual choice of companies deserves a closer look, since few of the real outcomes were anticipated in the design and implementation of the EU ETS.

Windfall profits are distributional effects of a major concern for any governmental intervention, including the ones that intend to incentivise environmental performance. In case of EU ETS the opportunity for windfall profits emerged as a result of corporate pressure on policy making, divergent interests reflected in the national allocation plans, and the peculiarities of the main economic actors and their products in local and global contexts.

The corporate pressure of major actors that should face the cost increase associated with carbon trading was strong enough to influence the design of the EU ETS, including the level of the cap and how allowances (EUAs) are allocated to companies. A strong reasoning for supporting the favourable measures raised the question of carbon leakage, especially for industrial electricity consumers.

Carbon leakage is a pollution haven business model according to that companies that face higher environmental costs in their host countries will relocate their production in other states where such costs are lower. Thus the factories and plants will continue release the same amount of greenhouse gases (carbon leakage), but not on the territory of the host country, in this case the EU, but on another territory. In addition, the relocation has a very important social impact too, since it will close up thousands of jobs in EU. Carbon leakage allows meeting emission goals associated with a certain territory, but the environmental effectiveness is cancelled since the global amount of emissions is not reduced.

The threat of carbon leakage was recognized in an early stage by the European Commission. Thus, in 2009 it was established a list of companies that are most exposed to carbon leakage, list applicable for five years. The list is a result of a wide consultation with many stakeholders and it comprises many energy intensive production sectors. These include iron and steel, cement, refinery, paper and pulp, and even food industry.

According to a recent review prepared by Venmans (2012), carbon leakage could take two forms, such as:

- Trade-driven carbon leakage: passing carbon costs in selling prices creates market share loss, favouring exports, or if the profit margin is lowered it will compromise the European investment in new production capacity;
- Energy price driven carbon leakage: the implementation of European climate policy affects world prices for fossil fuels and favour higher consumption of these fuels in the rest of the world;

Fact is the pollution haven effect was not confirmed for greenhouse gas emissions (Michel, 2010). Moreover, the assessment of the most affected industries reveals that the rate of carbon leakage is in fact rather low. Venmans (2012) states that trade-driven carbon leakage was not observed, and long term estimates are divergent.

The EU ETS allowances were established considering previous emission trends of major sources such as power generation and large burning installations from the manufacturing industry, plus aviation. The data was collected and reported by the producers and underwent various cross-checking processes and became input for NAPs. NAPs comprised mainly over estimations of the emission and the EU wide caps established in the first two phases were rather high. This process is known as over-allocation and it has a direct negative impact on the abatement level. It is favoured by lack of transparency and could jeopardise the functioning of the entire system. For instance, in 2006, then verified emissions were published the price of allowances collapsed since actors realised that they do not need more allowances to buy and because banking allowances from one period to another was not possible. According to Anderson and di Maria (2010), 6% of the first allocation phase allowances were over allocation.

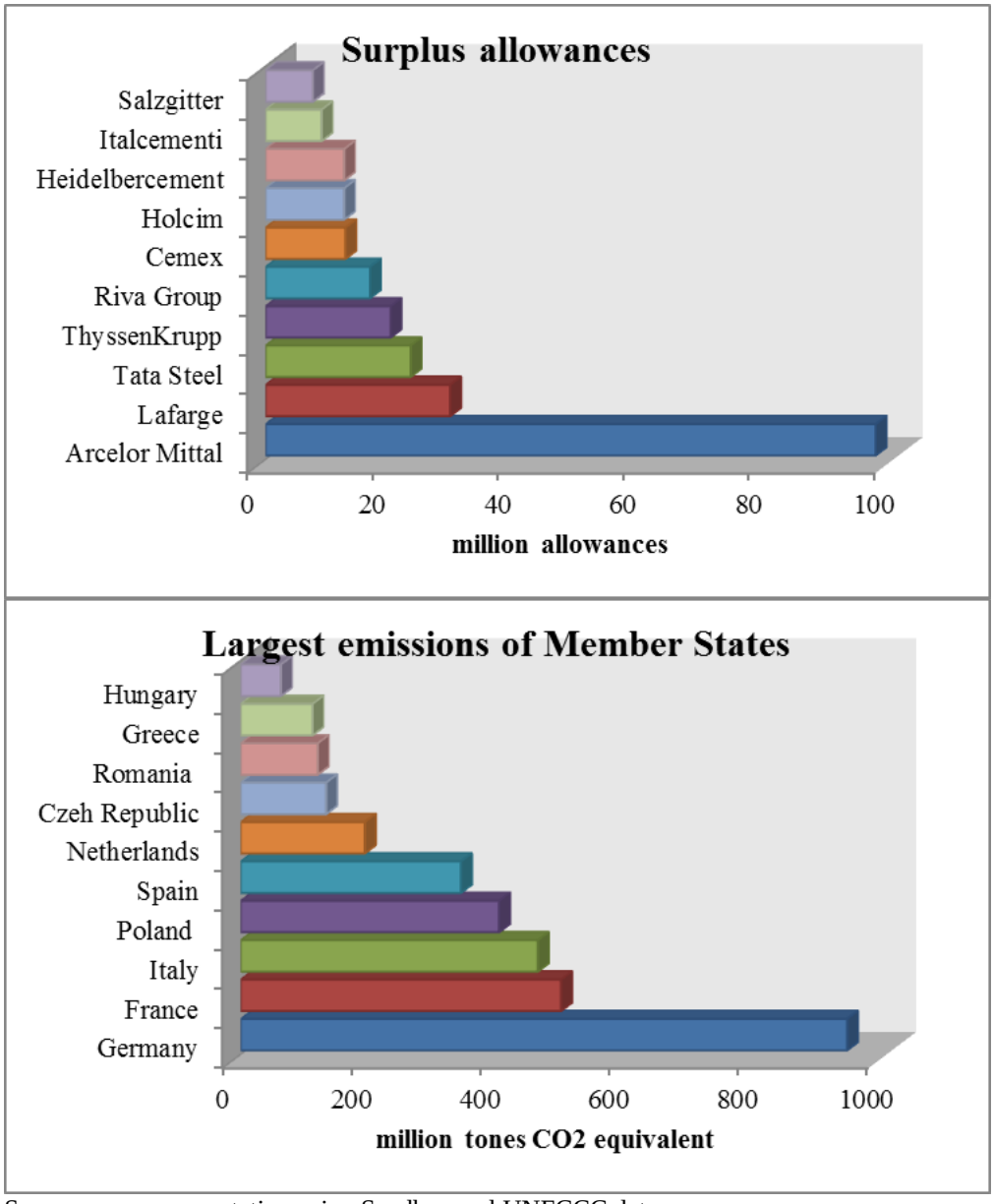
**Table 1 Windfall profits of EU ETS**

| Sector/Phase/Country | Windfall profit estimations |
|---|---|
| Power generation, phase I, Great Britain, France, Belgium | 5.3-7.0 billion euro per year |
| Power generation, phase II, Great Britain | 1.0 billion pounds per year |
| Power generation, EU 20 | 35.0 bilion euro |
| Largest 10, phase II | 4.1 billion euro |
| Refiner, Iron and steel, phase I | 14.0 billion euro |

Source: Elsworth, R., Worthington, B., Buick, M., Craston, P., Bryne, M. 2011. *Carbon fat cats 2011. The companies profiting from the EU Emissions Trading Scheme*, Sandbag.

Despite precautions, windfall profits broke out, and major industrial actors transformed their strategic positions in important earnings with no supplementary costs associated with technological improvement. How large these windfall profits were is illustrated by data presented in table 1.

There were identified the so called “fat cats”, the companies that accumulated huge number of allowances. Their market behaviour could threaten the functionality of the EU ETS according to Elsworth et al. (2011). The allowance accumulation reaches 240 million held by only ten companies, foreseen to grow up to 330 million. This covers the annual emissions of many smaller Member States of the EU, like Austria (80 million tonnes); Belgium (117 million tonnes); Bulgaria (61 million tonnes); Romania (119 million tonnes) etc.




Source: own representation using Sandbag and UNFCCC data

**Fig. 3 The allowance surplus of "fat cats" vs the largest emission Member States**

The allowance surplus of the "fat cats" covers around 5% of EU's total emissions, and is around ten per cent compared with the ten largest emitter Member States (fig.3).

By transforming allowances in money, it results that these companies shared a 4 billion euro profit in 2010 equalling the environmental budget of the EU in the same period of time. Today, the size of the profit has shrunken to 1.4 billion, but do to the tightening of the cap within phase III (2013-2020) it is expected an increase in prices, even beyond 2010

levels. Therefore, by doing nothing the profit of these companies will further raise along with the increase of the carbon price. Moreover, during this time, since companies are not threatened with the cost increase determined by new investments in technology, could trade the allowances on the market and earn more profit out of them. The main mechanisms that are used by companies to make windfall profits out of EUAs are:

- Sell surplus EUAs: ArcelorMittal and Lafarge sold EUAs for 172, respectively 300 million euro;
- Lend EUAs to traders: like money, emission allowances could be lent to banks and brokers who can further trade them on speculative markets;
- Transfer EUAs costs to consumers: although were distributed for free in the first two phases of the EU ETS, some companies calculated their value and included them as costs for their products;
- Exchange EUAs for CERs: taking the opportunity of price differences, companies could choose which way is best for them and could exchange EUAs by CERs. Thus for meeting emission targets a company by CERs and bank its own EUAs.

Phase III is expected to reduce this distributional effect. However, the "fat cats" also have a great lobby power and they might have an influence on standard setting for the benchmarking process. Nevertheless, the first option of reducing profit margin and the second one of investing in eco-efficiency are already phased-out given the success of EUAs cost transfer to consumers.

**Conclusions**

Fighting climate change is a long political and economic debate. The general agreement on the necessity and urgency of climate mitigation efforts is beyond question. Most of the world's states are signed a global agreement in this respect. Nevertheless, the latest rounds for climate policy negotiations are scenes of strong opposition and each goal is fiercely negotiated.

The main tools used for the implementation of climate policy are the carbon markets that are regulatory (compulsory) or voluntary. Clean Development Mechanism and EU ETS are the current regulatory markets where the emissions could be traded as CERs (Certified Emission Reductions), respectively EUAs (European Union Allowances). Despite careful design, the interplay of economic actors in this arena did not go as it was expected and the future of these markets is already questioned. Hence, in Europe, the EU ETS allowed large emitter companies from iron and steel and cement sector to earn windfall profits with no or little action taken toward emission reductions. Further, the carbon price is very low, and the effects of cap tightening are expected to revitalise the area. Meanwhile companies are gaining windfall profits by transferring costs to consumers, invoking the threat of carbon leakage and intensify their lobby for preserving this unexpected opportunity.

The outcome of climate policy is a higher price on energy that is transferred to consumers who will act in consequence. Further, emission abatements are also made, but a great part of them was reached by reducing production due to crisis than by investing in low carbon technologies. For the public at large this could be a higher price due to a discourse, rather than a technological change.

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