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The EU ETS Phase 3 preliminary amounts of free allowances

Introducing Phase 3 allowance allocating rules and the outcome of their application in the case of French installations

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The European Union Emissions Trading System (EU ETS) will undergo a radical change in Phase 3 (2013-2020). Allocation methodology will shift from grandfathering to a combination of auction and free benchmark based allowances allocation. Free allocation will be devoted to non-electricity generators, and will be linearly decreasing through Phase 3 with a view of no free allocation in 2027. Benchmark-based free allocation is meant to reward lowest CO_2 -intensive installations as opposed to grandfathering which allocated allowances based on historical emissions levels. Allowance redistribution at the installation level in Phase 3 compared to Phase 2 will thus be important. The determination of free allowances amounts to be allocated at the installation level in Phase 3 results from a sophisticated procedure as any non-electricity installation's allowance entitlement depends not only on its own characteristics (CO_2 performance, onsite performed activity) but also on all other EU ETS participating ones.

The paper focuses on free allowance allocation in Phase 3, first detailing how an installation's free allocation depends on all others', then how it can be determined. A case study of provisional free allocation of French installations participating in the EU ETS provides a concrete illustration of this new allocating system.

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1. Introduction

The European Union Emissions Trading System, the largest emissions permits cap and trade market (Ellerman & Buchner, 2007), will undergo a radical change in Phase 3. Allocation methodology will shift from grandfathering to a combination of auction-based and free benchmark-based allowances allocation. Roughly, electricity generators, so far representing about one half of the scheme's emissions, will not be allocated free emission permits: they will have to either reduce their emissions or buy permits on the primary and/or secondary Emission Unit Allowance markets to be compliant. Free allocation will be devoted to nonelectricity generators, and will be transitional: they will receive a decreasing amount of free allowance through the Phase, with a target of no free allocation by 2027 (European Commission, 2011a). Consequently, Phase 3 will inaugurate a new market configuration where the value of emission permits is redistributed among market participants and public authority: allowance auctioning will progressively become the allocation standard at the expense of free allocation, and emission permit primary and secondary markets will coexist. This will cause a change in the emission permit supply and demand structure and thus in permit transfers in between actors: some will have to pay for the first emitted tone of CO₂ and other will deal with allocation levels based on their CO₂ intensity rather than on their historical emissions. The shift, in the market's third Phase, from free allocation to auctions has been retained attention as the main change in allowance allocation. However, free allocation will still represent an important share in Phase 3's cap. Moreover, the move from grandfathering to benchmarking will cause major free allowance redistribution at the installation level. The paper thus focuses on Phase 3 free allocation and more specifically on free allocation related to benchmarking. In a first part, main rules and their implications on free allowance redistribution are put forward. Then, in a second part, a case study of the outcome of benchmark methodology applied to the French installations participating in the scheme is provided. Last part concludes.

2. Changes in Phase 3 allowance allocation

2.1. The importance of determining free amounts

2.1.1. Phase 3 cap decreases annually

In January 2008 the European Commission (EC) has proposed binding legislation to implement the "20-20-20" climate and energy targets to be met by 2020. One of these three targets, the European Union (EU) 20% emissions reduction target in 2020 compared to 1990 emissions level, translates into the European Union Emission Trading Scheme (EU ETS) as follows: the 2020 emission cap is reduced by 21% from 2005 estimated emissions level (European Commission, 2008). At the same time, Phase 3's first year (2013) cap is the quantity which, beginning in 2010, linearly decreases by a factor of 1.74%. This quantity is defined as the average annual total quantity of allowances issued by Member States for the 2008-12 period (European Commission, 2003). Accounting for the EU ETS perimeter extension in Phase 3^1 , the EC has set the total absolute cap for 2013 at 2 039 million Emission Unit Allowances (EUAs), decreasing by an annual amount of 37 million EUAs (European Commission, 2010).



2.1.2. Allocation goes from grandfathering to a combination of auctioning and benchmarks

Source: Climate Economics Chair

Phase 3 of the EU ETS will begin with a brand new mode of allocating EUAs. Two major changes are to occur: the shift to auction as the standard allocation mode and the shift to benchmarks for allowances to be allocated free of charge. Under the EU ETS, an EUA is a permit that an installation has to surrender for the emission of one ton of carbon dioxide

¹ The emissions of carbon dioxide and nitrous oxide from the production of aluminum and chemicals activities will be covered by the scheme from 2013.

 (CO_2) . So far, the bulk of allowances have been allocated for free. In the first phase of the market (2005-07 period) article 10 of Directive 2003/87/EC required that at least 95% of the cap to be allocated for free. This minimum was brought down to 90% for the second phase (2008-12). According to Member States National Allocation Plans (NAPs) auctioning should amount 3.4%² of the phase's cap (excluding New Entrant Reserve) in Phase 2. With the third Phase coming into play and the willingness to put into force the polluter pay principle, the amount of allowances to be allocated for free is about to shrink: installations considered as electricity generators, representing about half of the EU ETS emissions, will not be entitled free allowances and will consequently have either to reduce their emissions or turn to both EUA primary (auctions) and secondary markets to buy their rights to emit CO₂. Nonelectricity generators (installations belonging to the to the mining and quarrying sector, the manufacturing sector as well as district heating and high efficiency cogeneration) will still receive allowances for free, however based on benchmarks rather than grandfathering (they will also be able to participate in both primary and secondary EUA markets). Free allocation is set to be transitional and these amounts of free allowances will decrease annually throughout the Phase with the target to full auctioning by 2027. Note however that exemptions exist on both the transitional character of free allocation and the exclusion of electricity generators from free allocation: sectors deemed at risk of carbon leakage and some electricity generators in accessing Member States will be able to keep receiving free allowances (European Commission, 2003). We will discuss the case of carbon leakage later on in section 2.1.3.3. Phase 3 cap split between allowances to be auctioned and those to be allocated for free will depend on the amount of free allowances since, as stipulated by the EC, the annual amount of auctioned allowances corresponds to all allowances which are not allocated for free.

2.1.3. Free allowance amounts shape auctioned allowance ones

The EC has defined an upper bound for the allocation of free allowances (European Commission, 2003) in each year of Phase 3 (section 2.1.3.1). Two further elements, rising from the installation level, will set the exact annual amounts of allowances which will be allocated for free, within the latitude offered by the EC limit: benchmark stringency (section 2.1.3.2) and carbon leakage exposure (section 2.1.3.3).

2.1.3.1. Annual amounts of free allowances are capped

The annual amount of allowances to be allocated for free is the result of the meeting between a top-down EC defined upper limit (the annual maximum amounts of free allowances) and a bottom-up defined "administrative" request for free allowances (the preliminary amounts sum) which gathers all ETS participating installations' individual free allocation request (Figure 2).

² Approximately 350 million of EUAs should be auctioned out of the 10 billion EUA cap (European Commission, 2012).



Figure 2 Free allowances allocation process

Source: Climate Economics Chair

In other words, the EC defines, for each year of Phase 3, a maximum amount of allowances to be allocated for free: this is the upper limit. The methodology to establish the annual maximum amounts of free allowances in Phase 3 is detailed in annex 7.1. Based on this estimation, Phase 3 allocation potential outlook is shown in Figure 1 (where *Free allocation* corresponds to the upper limit for manufacturing installations set by the EC) which puts forward the first radical shift in allowance allocation in Phase 3: the steep increase in allowance auctioning.

2.1.3.2. Benchmark could limit allocated free allowances amounts below the upper limit However, setting a maximum does not mean that it will be reached necessarily, and it is possible that even less allowances are allocated for free. This would imply that the difference between the maximum amount of allowances to be allocated for free and the amount actually allocated is auctioned. Annual maximum amounts are compared to one value: the sum of all installations' individual free allowance requests (or preliminary amounts)³. Each installation's preliminary amount corresponds to the free allowance allocation the installation can legitimately claim according to the benchmark-based methodology (which is further developed in section 2.2).

From what is written above, it appears that two situations can occur. Indeed as the annual maximum amounts and the sum of Member States' preliminary amounts are determined independently from one another, there is no reason why they should be identical. Consequently and for a given year of Phase 3, either the sum of the preliminary amounts is below the annual maximum amount in which case the former remains intact; or it exceeds the annual maximum amount. In this case, the EC applies an annual cross sectoral correction

³ Member States gather their national installations' individual preliminary amounts in their respective National Implementation Measures (NIMs), which are then submitted to the EC.

factor (CSCF) to all preliminary amounts, in order to bring their sum back to the authorized annual maximum amount level. As the sum of the preliminary amounts is a constant quantity compared to a decreasing maximum amount over the period, the odds that the former exceed the latter increase with time.

Looking now at Phase 3 as a whole three configurations deriving from above remarks can emerge (see Box 1):

- 1. The sum of the preliminary amounts exceeds the upper limit as soon as the first year of Phase 3 in 2013. In this case, a CSCF is applied annually and preliminary amounts are reduced to the upper limit over the entirety of the Phase.
- 2. The sum of the preliminary amount exceeds the upper limit at a later stage in Phase 3. A CSCF applies from this date only.
- 3. The sum of the preliminary amounts is below the upper limit all Phase 3 long. It thus stays untouched by any CSCF.

Configurations 2 and 3 above clearly show that although annual maximum amounts of free allowances are defined, they may not be allocated in their entirety. What will determine the outcome of the top-down and bottom-up derived amounts confrontation is the stringency of the benchmarks: the stringer the more towards configuration 3. Finally, it clearly appears that all Member States must submit their NIMs to the EC so that annual CSCFs can be determined when necessary. Although the deadline was end of September 2011, only 24 countries have submitted their NIMs as of June 25, 2012.

2.1.3.3. Carbon leakage exposure marginally reduce actual free allocation

Full auctioning of allowances should be the rule in 2027 (European Commission, 2010). In order to reach this objective an annual carbon leakage exposure factor (CLEF) is applied to the preliminary amounts which then become final amounts. Two types of installations are distinguished and applied different CLEFs: those manufacturing products deemed at risk of carbon leakage⁴ and the others⁵. Only installations not deemed at risk of carbon leakage bear the free allocation transitional character: their preliminary amounts are applied a decreasing CLEF (Table 1). Those manufacturing products deemed at risk of carbon leakage see their preliminary amounts applied a CLEF constant over the Phase and equal to 1 (Table 2), which leaves them untouched.

⁴ Carbon leakage corresponds to the relocation of production in areas where CO₂ intensity is greater.

⁵ The EC has defined a list of products which are deemed at risk of carbon leakage (European Commission, 2011b). Current list runs through 2014 included (unless sector additions). A new carbon leakage list will be defined for the 2015-19 period. Until then, no sector can be removed from the current list. More information on the methodology to establish the carbon leakage list is provided at http://ec.europa.eu/clima/policies/ets/leakage/index_en.htm



Table 1 CLEF applied to preliminary amounts not subject to carbon leakage in Phase 3

	2013	2014	2015	2016	2017	2018	2019	2020
%	80	73	66	59	51	44	37	30
Source Annual VII (Engeneration Commission 2011a)								

Source: Annex VI, (European Commission, 2011a)

Table 2 CLEF applied to preliminary amounts subject to carbon leakage in Phase 3

	2013	2014	2015	2016	2017	2018	2019	2020
%	100	100	100	100	100	100	100	100
Source: Anner VI (European Commission 2011a)								

Source: Annex VI, (European Commission, 2011a)

The extent to which preliminary amounts are affected by the CLEFs thus depends on the share of preliminary amounts resulting from installations manufacturing products not deemed at risk of carbon leakage. It has been assessed that, at the EU scale, the emissions from the manufacturing of products considered not subject to carbon leakage represent about 10% of the manufacturing emissions only. Assuming the same proportions hold in the preliminary amounts sum, only 10% of it will be subject to decreasing CLEFs. Consequently, the transitional character of free allowance allocation should not be a major factor influencing the free/auctioned allowances balance over Phase 3.

2.1.3.4. Conclusion on free-auctioned allowances balance

The amount of annual free allowances is limited. Moreover it can be reduced by two factors (CSCF and CLEF) relying on benchmark stringency and carbon leakage exposure of manufactured products. Their application sequence is summarized in Box 2. As of June 2012, the impact of the benchmark stringency on annual maximum amounts is uncertain as all Member States haven not submitted their NIMs. This submission is necessary to compare the preliminary amounts sum with the EU-wide cap, and therefore to determine whether CSCFs are applicable or not. As shown in Box 1, a certain level benchmark stringency may not affect maximum amounts (configuration 1), whereas other may at various extents (configurations 2 and 3). It is the factor which has the potential highest impact on maximum annual amounts. Carbon leakage exposure will have limited impact on them as the vast majority of emissions result from the manufacture of products deemed at risk of carbon leakage. Corresponding preliminary amounts are thus untouched by the CLEF (CLEF equal to 1).

Annual minimum amounts of auctioned allowances can be estimated as the difference between Phase 3 annual cap and annual maximum amounts of free allowances. Approximately 10% of these annual maximum amounts will be somewhat cut by the CLEF factor; which will reduce preliminary amounts by 2% in 2013 to 7% in 2020. Preliminary amounts will be further reduced if CSCFs apply which requires that all Member States submit their NIMs to the EC. Determining the amount of auctioned allowances is thus contingent from establishing preliminary amounts, which is performed at the installation level. Section 2.2 therefore dives into the benchmark-based allowance allocation methodology and pinpoints the fact that, as much as grandfathering, historical dimension matters, all the more when an economic turmoil comes in.

Box 2CSCF and CLEF application sequence

Sequence is given for 2013 (maximum amount is assessed at 792 M EUAs, see annex 7.1). Two preliminary amounts sum scenarios are tested: one beyond annual maximum amount (case 1), one below (case 2).

- Preliminary amounts sum is first compared to annual maximum amounts (first column).
- In case 1, a CSCF applies to bring the sum back to the maximum amount level (second column). In case 2, preliminary amounts sum remains idle as already below maximum amount (no CSCF is applied).
- Then the CLEF is applied given the year of the Phase (third column). For 2013, CLEF is equal to 80%. This last column represents the final amount of allocated free allowances.



2.2. The preliminary amount quest

As mentioned above, free allocation of allowances has been the rule so far, which will change in Phase 3 with the introduction of allowance auctioning on a large scale. Free allocation is currently based on grandfathering for most of it. The amount of EUAs an installation has received so far was in proportion with its past emissions given the national cap set in the NAP⁶ of the installation's State. It has been observed that Member States had tended to over allocate non-electricity installations to reduce the impact of their exposure to international competition (Trotignon & Delbosc, 2008), . Still, the general allocating principle was the more emissions, the larger allocation entitlement. Thus, the second major change occurring in Phase 3, benchmarks, is expected to respond to this paradox, where biggest polluters are treated the same way as the smallest, by now considering installations' efficiency. The emission intensity concept (or the amount of emitted CO₂ per unit of output) is introduced to determine free allowance entitlement. This can be interpreted as the rewarding for early action towards more efficient technologies: considering two non-electricity installations with identical levels of emissions and different emission intensities, the most efficient one will be entitled more allowances free of charge than the less efficient one (Figure 4 - Emissions and Allocation to be read on the vertical left axis, Benchmark and Intensity on the vertical right axis). Nonetheless, it is showed in section 2.2.2.2 that the historical dimension (activity level rather than emissions level) still remains with benchmark methodology.





Source: Climate Economics Chair

2.2.1. Benchmarks definitions

Four kinds of benchmarks have been defined: product, heat, fuel and process emission benchmarks. The aim in developing these references was that a minimum number of product benchmarks would cover the largest share of non-electricity emissions. The two-year long

⁶ The quantity of allowances proposed in a Member State's NAP must be in line with its Kyoto Protocol emission reduction target.

stakeholders consultation effort of the EC has resulted, in 2011, in fifty-two product benchmarks, one heat, one fuel and one process emission benchmarks (European Commission, 2011f). A product benchmark corresponds to the average CO₂ intensity of the 10% most efficient installations over the 2007-08 period, at the EU scale, for the manufacture of the product in question. It therefore focuses on the output intensity (rather than input) in order to have the decarbonization incentive apply to the whole production chain. Where either the number of installations producing a specific good was insufficient or data unavailable, it was made use of existing technical literature such as Best Reference documents (BREF) from the European IPPC bureau. As a consequence of the product benchmark definition, installations of a same industrial sector are allocated on the same grounds of efficiency, thus annihilating any distortion within a sector and between Member States created by NAP-based allocation. It is under this new EU-wide harmonized allocation paradigm that installation operators will establish the preliminary amounts their installations' performances entitle them to receive from 2013 onwards.

2.2.2. Benchmarks use to establish installations' Phase 3 preliminary amounts





Figure 5 Benchmark choice to determine preliminary amounts

Product benchmarks cover an estimated 75 to 80% share of emissions from installations considered as non-electricity generators (European Commission, 2011f). Their uses are prioritized over other benchmarks types (Figure 5). When a manufactured product does not have its associated benchmark, the fallback approach is employed: additional allowances are allocated based either on heat or fuel consumption to manufacture the product, using heat or fuel benchmark values. Process emissions are accounted for in product benchmark but not in heat and fuel benchmarks. A process emission benchmark, rather a process emission coefficient, has thus been determined to accompany the fuel and heat ones when the fallback

Source: European Commission, (European Commission, 2011c)

approach applies. This coefficient is equal to 0.97, and has to be multiplied with historical process emissions to determine the amount of free allowances to be allocated to cover process emissions. Heat and fuel benchmarks values have been derived using a reference efficiency of natural gas.

2.2.2.2. Combining the benchmark with Historical Activity Level

The methodology to determine the amount of entitled free allowances, also called preliminary amounts, is given in Commission Decision (European Commission, 2011a) and guidance documents⁷ on the EC's website. Under the simplest configuration, that is an installation manufacturing a single good for which a product benchmark exists (e.g. production of clinker⁸), the preliminary amount is the result of the benchmark value multiplied by the installation's historical activity level (HAL). The latter is defined as the highest of the two production level medians over the 2005-08 and 2009-10 periods.



Figure 6 Allocation of two installations with different HALs and same CO₂ intensities

Source: Climate Economics Chair

2.2.2.3. Conclusion on benchmark methodology and implications in an economic downturn

Benchmark-based allowance allocation calls for one main comment. Under the seal of benchmark remains the concept of grandfathering now associated with production levels rather than emissions' (Figure 6). Therefore, the absolute level of the preliminary amount will be proportionate with the installation's output level of a past reference period, as grandfathering was. All things being equal (production levels identical to HALs, physical capital, carbon price feedback etc.), benchmark-based allocation led to the expectation of most installations (and thus the non-electricity sector as a whole) being allocated less free

⁷ Nine Guidance document GD1 to GD9 available at

http://ec.europa.eu/clima/policies/ets/benchmarking/documentation_en.htm

⁸ See Climate Economics in Progress, Chapter 6, box I-6, (Climate Economics Chair, 2011), for an assessment of the EU cement sector's HAL.

allowances than the emissions corresponding to their activity levels (i.e. due to most installations having CO_2 intensities above benchmark value).



Source: Eurostat

However, the economic turmoil has strongly affected EU activity levels since 2008 (Figure 7), making current ones below those from which HALs have been defined. As a consequence, the non-electricity sector will receive, in Phase 3's first years, a greater share of its emissions level in free allowances than if the economic crisis had not happened (again, all things being equal), thus modifying its EUA demand structure. At the installation scale, although situations may vary considerably from one plant to another, cases where less efficient than benchmark installations are over-allocated should be expected. At the sector scale, it is now unclear whether industrial emissions will reach and exceed preliminary amounts. Publically available NIMs of France allows for a first assessment of the changes from previous EU ETS Phases on industrial sectors' free allowance allocation introduced by benchmarks.

3. Phase **3** free allowance allocation: the case of France

Net position (e.g. of an installation, a sector etc.) is an *ex post* notion. It is derived from allocated free allowances and verified emissions. Verified emissions result from a market participant's arbitrage between marginal emission abatement cost and emission permit price; the latter resulting in emission permit supply-demand equilibrium or, said differently, in the degree of emission permit scarcity, at the EU ETS scale.

The following part of the paper uses the notion of *ex ante* net position, which corresponds to the emission permit surplus or deficit, all other things being equal, comparing 2013 free allowance allocations with 2011 emissions levels, instead of 2013 verified emissions. This notion is used to put into perspectives current emissions levels with the changes in free allocation volumes introduced in Phase 3, but does not prefigure of the sectors' *ex post* net positions.

Preliminary amounts from France's NIMs are used in the below analysis. These values are provisional and need to be considered as maximum. Indeed, should annual CSCFs apply, preliminary amounts would be diminished by these CSCFs. Furthermore, should any sector be removed from the carbon leakage list from 2015, Member States' Competent Authorities would have to update and resubmit their NIMs to the EC. Finally, any EUA surplus from Phase 2 banked into Phase 3 is not accounted for.



3.1. France's free allowance allocation cut by one third in Phase 3

Figure 8 France allocation and emissions in Phase 2 and Phase 3 (million)

Source: Climate Economics Chair from Ministère de l'écologie, du développement durable, du transport et du logement and CITL

When considering installations covered by the Scheme in both Phases 2 and 3, allocation will be cut by slightly more than one third (from an average 127 M EUA in Phase 2 to 83 M EUA in 2013) when Phase 3 starts (Figure 8). Most of this cut is bore by the power sector (sector E40 in Figure 9) which includes electricity installations that will not be allocated free

allowances. Remaining 9% allocation in Phase 3 for the power sector (sector E40) corresponds to allocation to district heat and cogeneration producers (see below section 3.6).



At the same time, the electricity sector's low CO₂ intensity tempers France's total allocation reduction. Indeed, UK's NIMs show that 2013 allocation level corresponds to a Phase 2 allocation 64% reduction (from 221 M EUA to 79 M EUA) which is due to the power sector's greater contribution to UK's emissions.



Manufacturing sector: long yesterday, could be short tomorrow 3.2.

Figure 10 Emissions and allocations of French manufacturing industry (million) Source: Climate Economics Chair from MEDDTL and CITL

Phase 3 installations belonging to the manufacturing sector (section D of NACE rev.1 statistical classification, which thus does not include district heat producing installations) have been responsible for 65% of France's Phase 3 perimeter EU ETS CO₂ emissions in the first four years of the second Phase. These emissions can be disaggregated into those from a) installations exposed to carbon leakage (CL) and b) those not exposed to carbon leakage (NCL), for which the CLEF decreases annually. The split between carbon-leakage emissions and non-carbon-leakage emissions is unbalanced, the former representing 93% of manufacturing sector emissions. French industry will, as a consequence, receive most of its preliminary amounts for free (absent any CSCF application).

Removing power sector's contribution to France's allocation and emissions reveals the effects of the economic downturn of manufacturing sectors' *ex ante* positions. On the one hand, preliminary amounts revealed by France's NIMs show, as displayed in Figure 10, that the manufacturing sector subject to carbon leakage sees its allocation decrease 14% in 2013, compared to the average annual allocation over the 2008-11 period. However, associating 2011 emissions data from the CITL with Phase 3 preliminary amounts also puts on view that this sector's emissions level is below its 2013 allocation, such that it would begin the first year of Phase 3 with an *ex ante* net long position if emissions grow, on average, less than 4.6%⁹ per year over the 2012-13 period. On the other hand, the amount of free allowances allocated to manufacturing installations not subject to carbon leakage decreases by 26% in 2013 which is now 1% only above their 2011 emissions (as opposed to 20% on average in the 2008-11 period)).





⁹ This average annual emission growth rate would lead the sector to hold an *ex ante* net balanced position in 2013.

Figure 11 illustrates allocation redistribution among manufacturing installations involved in Phase 3 free allowances allocating rules. Installations' allocation variations are sorted by quintiles. First quintile gathers the 510 manufacturing installations which allocation entitlement decrease ranges from 100% to 38% in 2013 compared to average observed allocation over 2008-11. This allocation reduction amounts to 5.8 million EUAs. Last quintile gathers manufacturing installations for which allocation variation increase ranges from 8% to 26258¹⁰% which corresponds to an allocation increase of 4.4 million EUAs.



3.3. Cement industry

Figure 12 Emissions and allocations of French cement industry (million)

Source: Climate Economics Chair from MEDDTL and CITL

As of 2011 and based on last compliance data, 30 cement producing installations¹¹ in France have been covered by the EU ETS since its implementation in 2005 (also, 20 lime producers¹²). Net position of the aggregate in the first Phase was 2% short, and compliance figures for the 2008-11 period show that, due to a greater level allocation in Phase 2 associated with the economic downturn, net position of the sector has shifted to being 18% long.

Clinker production activity belongs to the carbon leakage list (European Commission, 2011b) set by the EC; the amounts of free allowances are thus kept constant over Phase 3. France's NIMs show that the sum of the 30 installations' preliminary amounts reaches 13.4 MtCO₂, which is 6% above the sector's 2011 emission level. The sector as a whole thus holds an *ex ante* net balanced position if the average emission level annual growth equals 3% over the 2012-13 period.

¹⁰ The 26258% allocation increase in 2013 vs. average observed allocation over 2008-11 is due to one installation which preliminary amount in 2013 is 51 064 EUAs vs. 193 EUAs in Phase 2.

¹¹ Installations with 2651 code of NACE rev.1 statistical classification

¹² Installations with 2652 code of NACE rev.1 statistical classification



Figure 13 Sorted French cement installations estimated CO2 intensity (tCO2/t clinker)

Source: Climate Economics Chair from MEDDTL and CITL

The situation differs at the company level though. We have compared the aggregated preliminary amounts of each of the four cement producing companies (Lafarge, Holcim, Vicat and Cement Calcia¹³) with their HAL corresponding emissions, which we have defined as the highest of the two emission level medians over the 2005-08 and 2009-10 periods. This comparison exercise shows that one company has a preliminary amount 4% above its HAL corresponding emissions. This implies that its average installation is more efficient than the clinker benchmark value. The three other companies have preliminary amounts from 6 to 16% below their HALs corresponding emissions, implying average installations less efficient than the benchmark value. Results at the installation level are displayed in Figure 13.

We mentioned above the fact that the economic activity drop and associated emissions levels decreases would cause some less efficient than benchmark installations (installations above purple horizontal line in Figure 13) to hold allocation amounts above their 2011 emission ones. According to the same methodology as above, we show that all Ciments Calcia installations (except two circled ones) plus the three installations indicated by the blue arrows are in this case (Figure 13).

¹³ CITL provides each installation's company name



3.4. Iron and steel industry



Source: Climate Economics Chair from MEDDTL and CITL

As of 2011 and based on the available compliance data, about 20 installations manufacturing basic iron and steel and ferro-alloys¹⁴ in France have been covered by the EU ETS since its implementation in 2005. Net position of the aggregate in the first Phase was 6% long, and compliance figures for the 2008-11 period show that, due to the economic downturn and despite a slight decrease in allocation, net long position of the sector has increased to 21%. The sector is highly concentrated in terms of emission sourcing: out of the 20.3 MtCO₂ emitted from the manufacture of basic iron and steel in 2010, more than 96% have been originated by one single steelmaking company. The same proportion has applied since 2005.

The manufacture of basic iron and steel and of ferro-alloys is considered deemed at risk of carbon leakage; as for the clinker production activity, the amounts of free allowances to steelmaking installations are kept constant through Phase 3. The sum of the installations' preliminary amounts reaches 22.4 MtCO₂, which is 13% above the sector's 2011 emission level. The sector as a whole would hold an *ex ante* net balanced position with an average emission level annual growth of 7.3% over the 2012-13 period.

¹⁴ NACE code 2710



3.5. Pulp and paper industry



Source: Climate Economics Chair from MEDDTL and CITL

The pulp and paper gathers about 90 installations in Phase 2 which will also participate in the third Phase. As Figure 15 shows, the sector could bring into beginning of Phase 3 the 44% net long position it has held so far in Phase 2. However this has not to do with installations' efficiency only. Indeed, the study of the sector's installations' preliminary amounts is illustrative of the change of allocation methodology with regards to heat exchanges: as opposed to Phase 2, free allocation is given to heat producers under specific circumstances only and, as a general rule allowances are allocated to the heat consumer to ensure that the their amount is independent from the heat supply structure (European Commission, 2011d). Consequently, although the sum of the preliminary amounts (3.85 MtCO₂) is very similar to the average annual allocation in Phase 2 (3.94 MtCO₂), it includes the shift in heat allowance allocation, which redistribution within the sector is strong. It also includes the efficiency improvements of French installations. Since the sector is energy intensive, steady cost increases related to energy and raw material inputs has led the industry to invest in more efficient, low carbon technologies (Ministère de l'économie, de l'industrie et de l'emploi, 2008). This is made obvious through the energy mix and the shift towards the use of more natural gas and biomass instead of coal or oil (COPACEL, 2010). Figure 16 shows how installations have been affected by this change in heat allowances allocation methodology by deciles (highest decrease in allocation being -84%). One can observe that most installations of the sector will have an allocation decrease, which equivalent amount of allowances (1.34 MtCO₂) is close to the allocation increase of the remaining installations (1.18 MtCO₂). One can also suggest two comments:

1. Allocation decrease (left hand-side of the figure) can be explained by installations less efficient than product benchmark levels, as well as heat export to other ETS installations which results in allocating heat allowances to the latter instead of to the former.

2. Allocation increase (right hand side of the figure) might reveal more efficient than product benchmarks installations, as well as heat import for the production of non-benchmarked products from ETS installations.

All in all, this makes allocation levels comparison between the two Phases highly hypothetical as we do not have a precise knowledge of each installation's heat flows to/from other ETS installations.



Figure 16 Change in allowance allocation in French paper and pulp industry by deciles Source: Climate Economics Chair from MEDDTL and CITL





Figure 17 Emissions and allocations of French Power sector (million)

Source: Climate Economics Chair from MEDDTL and CITL

A distinction between power sector installations must be done: those considered electricity generators, which do not receive free allowances in Phase 3, and those, considered district heat producers and, high efficiency cogeneration installations (E + H in legend of Figure 17) which allowance entitlement corresponds to the average of 2008-12 allocation adjusted by the 1.74% factor (European Commission, 2003). This allocation will be declining through Phase 3. District heat producers and high efficiency cogeneration installations were responsible for 21% of the power sector's emissions over the 2008-11 period.

3.7. New installations

New entrants will benefit from free allocation as existing installations within the limits of the New Entrant Reserve (NER), which is fed in by a Phase 3 annual cap set aside of 5%. The access to the NER is based on a *first come first served basis* and unallocated allowances will be auctioned (European Commission, 2011e).

Roughly two configurations make an installation a new entrant. First, "greenfields" are new installations which enter the ETS for the first time after receiving a GHG permit from 30 June 2011 (or re-enters the ETS after cessation of operation and procurement of a new GHG permit after 30 June 2011). Second, an installation is also considered a new entrant if significant capacity extension has occurred before 30 June 2011 and after 1 January 2005. In the latter case, two criteria can serve as a measurement of capacity extension: either capacity increases at least 10% or required allocation increase is more than 50 000 allowances and 5% than initial allocation¹⁵.

In the case of France, about 268 new installations are about to enter the scheme in 2013, the bulk (262 installations) not being considered as electricity producers. These installations' preliminary amounts represent 10.1 million EUAs in 2013 (11% of 2013 preliminary amounts sum), 81% of which being constant over Phase 3, that is, allocated to installations deemed at risk of carbon leakage. Those not subject to carbon leakage will see their free entitlement in EUAs decrease from 2 million EUAs in 2013 to 1 million in 2020. No historical emission data is available for these installations hence 2013 compliance only will provide information on their respective net positions.

 $^{^{15}}$ EC Guidance Document $n^{\circ}7$

^{(&}lt;u>http://ec.europa.eu/clima/policies/ets/benchmarking/docs/gd7_new_entrants_en.pdf</u>) details preliminary amount determination for new entrants. Among changes, HAL is replaced by Activity Level (AL) which corresponds to the installation's initial capacity (determined by the installation operator) multiplied by a Standard Capacity Utilization Factor (SCUF, determined by the EC).

4. Conclusion

Phase 3 of the EU ETS will start on new allowance allocation grounds. An EU-wide cap is introduced (as opposed to national caps previously) and auction is supposed to become the basic principle for allocation. Exemption is made for non-electricity generators through benchmark-based free allocation. Benchmarks will replace grandfathering, targeting most efficient installations as opposed to largest emitters. Allowances not freely allocated will be auctioned; this is why the paper focuses on free allocation and the associated benchmark methodology, also on the manufacturing sector which will hold most of free allowances.

The European Commission (EC) has set a maximum amount of free allowances to be allocated (assessed at 792 MtCO₂ in 2013 for the manufacturing sector in the EU ETS). It was shown that this amount could be reduced depending on, principally, benchmark stringency and the potential application of annual cross sectoral corrector factors (CSCFs). These are yet to be determined, waiting for all Member States to submit their National Implementations Measures (NIMs) to the EC. It was also assumed (and confirmed by France's NIMs study) that free allocation transitional character, in the manufacturing sector, would marginally affect annual maximum free allowances amounts only as most of its emissions come from the manufacture of products deemed at risk of carbon leakage. Thus, determining the amount of free allowances which will actually be allocated has proved a very complex enterprise.

The study of France's NIMs provides several important messages. First, France sees its allocation decrease by about one third (35%) in 2013 compared to 2008-11 average allocation, and could further by lowered should CSCFs apply and/or sectors currently deemed at risk of carbon leakage not be included in the revised carbon leakage in 2015. This drop has been however tempered by the small share of the French power sector's emission level, due to the abundant electricity production from non-emitting nuclear energy. Second, the global economic downturn have put French cement and iron and steel sectors' 2011 emissions levels 6% and 13% below their respective Phase 3 allocations. This underlines the still historical dimension importance in benchmark-based allocation, bringing back fears of over-allocation in a context of low economic activity. Finally, it was showed that free allowances redistribution could be important among installations due to new allocation grounds.

Although comparative statics on a single country provide interesting insight through the concept of *ex ante* net position, the impacts of the economic crisis, as well as of Phase 3 new allocation dissemination, can be measured at the EU-wide scale only. Further work on benchmark-based allocation in Phase 3 will thus consider the EU-scale after the release of all Member States NIMs, and will make use of the EU ETS Zephyr-Flex model developed at the Climate Economics Chair.

5. Glossary

BREF: Best Reference Document	13
CITL: Community Independent Transaction Log	
CLEF: Carbon Leakage Exposure Factor	8
CSCF: Cross Sectoral Correction Factor	8
EC: European Commission	5
EU ETS: European Union Emissions Trading System	5
EU: European Union	5
EUA: Emission Unit Allowance	5
HAL: Historical Activity Level	14
MEDDTL: Ministère de l'Ecologie, du Développement Durable, du Transport et du Logement	17
NAP: National Allocation Plan	6
NIM: National Implementation Measures	7
UK: United Kingdom	17

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7. Annex

7.1. Potential Phase 3 maximum amount of available free allowances*

Article 10a(5) of (European Commission, 2003) defines the annual maximum amounts of free allowances to be allocated as the sum of the following two quantities (a and b):

- *a)* The annual Community-wide total quantity (**a1**), multiplied by the share of emissions from installations not considered electricity generators in the total average verified emissions, in the 2005-07 period, from installations covered by the ETS in the 2008-12 period (**a2**);
- *b)* The total average annual verified emissions in the 2005-07 period from installations which are only included in the ETS from 2013 onwards and are not considered electricity generators, adjusted by the 1.74% linear factor.

Quantity (a2) is calculated as follows: Phase 1 emissions from installations included in Phase 2, which NACE codes are related to "mining and quarrying" or "manufacturing" activities, are summed and compared to average Phase 1 emissions (Table 3)

Table 3 Maximum amount of available free allowance

	2005	2006	2007
EU ETS emissions (Mt CO ₂)	2,018	2,040	2,166
Manufacturing emissions (Mt CO ₂)	712	722	774
Share in EU ETS emissions (%)	35	35	36

Source: Climate Economics Chair from Community Independent Transaction Log (CITL)

Quantity (a1) is given in (European Commission, 2010) and is composed of two main amounts:

- i. The absolute Union-wide quantity of allowances issued in the 2008-12 period adjusted by the 1.74% linear factor. This amounts to 1 932 million in 2013;
- ii. The quantity of allowances issued in respect of installations that are included in the Union scheme from 2013 onwards and adjusted by the 1.74% linear factor. This amounts to almost 107 million in 2013.

Quantity a) is thus obtained multiplying quantity *i*. by quantity (a2). Quantity b) is assumed to be equal to quantity *ii*. Thus, a potential maximum amount of free allowances for manufacturing installations is obtained summing both quantities a) and b). This amounts to 792 million allowances in 2013, annually declining by a constant amount estimated at 15 million.

* We focus here on one segment of non-electricity installations: "mining and quarrying" and "manufacturing" ones, leaving aside free allowances dedicated to heat generators as these installations are more difficult to identify in the CITL. Therefore the maximum amount of free allowances which is determined in this box is to be associated with emissions from "mining and quarrying" and "manufacturing" activities only and should thus underestimate, a little, the real maximum amount of benchmark-based free allowances.

7.2. Time line of main rules related to free allocation in Phase 3



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