

# Trilogy Study: The benefits and feasibility of an Emissions Trading Scheme based on benchmarks and actual production

Cover note Trilogy Study for CEPS Benchmark Study  
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In our 2008 Trilogy Study we have evaluated the emissions trading allowance allocation method of dynamic benchmarking (benchmark times actual or recent production) versus static benchmarking (benchmark times a frozen historic production) and auctioning. The three parts deal with different elements and issues, which play an important role in the academic and political discussion about the best possible approach within an emissions trading regime:

## Part I

In most literature dynamic benchmarking and the guarantee of the total cap are regarded as incompatible. But part I shows, how – if required – the total cap can be ensured when benchmarks with actual or recent production are used for allocation. Three methods are presented. Not many other authors have looked at this possibility. We know of Philippe Quirion and Caroline Fischer (see some elaboration and references in part III).

There are more methods conceivable. One example should be mentioned here: additional allowances – if needed, in case the allocation is based on (increased) actual or recent production (recent could be the production of the preceding year, as planned in Australia) can be taken from the New Entrants Reserve (NER). In the EU context, this option seems legally possible within the adopted EU ETS Directive for 2013-2020, as a simple solution for the Comitology process concerning new entrants and closures. For investment security, the NER should be replenished by lowering the auctioning volumes of all Member States pro rata parte. This requires a small change of the EU ETS Directive to be done in 2010.

## Part II

Here the relations between allocation based on actual or recent production, the carbon price signal, carbon leakage and possible windfall profits are evaluated.

## Part III

Here various voiced concerns of using ex-post adjustment to actual production are analysed. It appears that these concerns are neither valid nor based on facts. Similar concerns were expressed in the past against benchmarking as such.

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In the meantime the debate about the precise rules of the future EU ETS has progressed and the current economic crisis has brought more insights into the functioning of the system as installed. Therefore the argumentation below in favour of the dynamic benchmarking approach is highlighted in addition to the arguments presented in the Trilogy Study.

## Supply response – today's lack of – in the EU ETS

The Trilogy Study only shortly touches on this important issue. But more recently this became more topical. The recent developments have shown that a supply response is vital to ensure effectiveness in order to address the dynamic nature of markets in real life. Some recent literature is highlighted here.

Today the GHG emissions trading market in the EU is the only commodity market without supply response to changing demand, see *"Caps and floors for the EU ETS: a practical carbon price"* (Prof. Dieter Helm, New College, Oxford, 4 September 2008), *"Empowering the EU ETS market: safeguarding against price volatility and carbon leakage"* (Prof. Stefan Schleicher, University of Graz, January 2009), *"The EU ETS Review: unfinished business"* (Mark Lewis and Isabelle Curien, Deutsche Bank, 23 February 2009) and *"Reinforcing carbon markets under uncertainty: the role of reserve price auctions and other options"*, (Prof. Michael Grubb, 4 March 2009).

These authors but also legislators, for example the UK government, are worried about over-allocation and a lack of a consistent long term carbon price signal. In fact, over-allocation of allowances will not be related to soft benchmarks but will be the consequence of the ex-ante frozen historic production volume data to be used for the allocation of allowances when actual production is lower (now in phase II 2008-2012: because of the use of historical emissions' data).

An allocation of allowances based on benchmarks and actual production to the contrary has an inherent supply response making it recession proof. At a lower production during recessions the quantity of allowances is adjusted downwards accordingly. In contrast, the plans for a present frozen allocation (the total cap) based on benchmarks and production data of 2005-2007 for a period of as long as fifteen years later until 2020 lack any supply response.

In the EU ETS next to benchmarking also auctioning plays an important role. Some regulation of the auction volumes is also needed to provide an adequate supply response. In the present EU ETS Directive a possible excess of the New Entrants Reserve (NER) will be auctioned, which is of course the opposite of a sensible supply response as it reinforces the risk of price collapse. Prof. Michael Grubb suggested that revenues will not be affected significantly (a lower volume will result in a higher price; the market can only deliver according to actual need).

In sum, the worry of the EU Commission and Member States for over-allocation is more related to the planned lack of management of the vast auctioning volumes and the planned allocation with benchmarks with outdated historical production data – so both without supply response – than to the perception that “stringent benchmarks are needed to avoid over-allocation”.

The absence of a supply response would only be justified if the -21% would be an end in itself. But it isn't. The 2020 target is only a staging post on the way to a low carbon economy. The precise result in 2020, be it -21% (the EU ETS target) or -18% or -25% or whatever, is far less important than the momentum of companies acting to reduce emissions.

Too low but also too high carbon prices should be avoided; then the momentum of reducing emissions is always maintained. Avoiding too high prices is for example foreseen in the emerging US ETS. A meaningful complementary carbon tax – as sometimes suggested – is obviously contrary to the policy of the EU to avoid loss of competitiveness and carbon leakage.

In absence of a supply response, economic recessions may lead to low allowances' prices and undermine the objectives of the scheme drastically (see also Trilogy Part II, chapter II.11.2 bottom of page 14). This would undermine the credibility and sustainability of the EU ETS.

If on the other hand, a more stringent EU ETS target would be adopted after Copenhagen (from -21% to -25% for example) and if for example the renewables target of 20% would not be met, the allowances' prices would skyrocket. Too high CO<sub>2</sub>-prices would be detrimental for European industry in absence of a truly global carbon market causing carbon leakage even with dynamic benchmarking. This would also undermine the sustainability of the EU ETS too.

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Furthermore, attention is drawn to the following issues below which have been elaborated in the Trilogy and which still play an important role in the present debate.

**Why historical grandfathering was abandoned and benchmarks came in?** (see part II of the Trilogy)

Next to scarcity of allowances also the allocation method is vital to ensure an effective ETS. Mr. Jos Delbeke (EU Commission) made this point, seconded by Prof. Michael Grubb (Climate Strategies) (Point Carbon “Carbon Market Insights, Copenhagen, 13 March 2007) when he said: *“There were economists who told us, scarcity of allowances is enough for an effective carbon market. These economists were wrong; we have learned that the allocation method is equally vital”*. Therefore historical grandfathering was abandoned in the EU ETS.

The reason is elaborated in chapter II.11.3 and appendix II.2: lowering emissions leads to fewer allowances in a next trading period if a project is executed early enough (the “too early action” or

“update” problem). For example Dr. Felix Matthes (Öko-Institut) showed that this leads to a serious distortion of the carbon price signal. Product benchmarks (neutral for technology, fuel, size and age of plant) solve this update problem.

**Misunderstanding: more stringent benchmarks, better environmental effectiveness** (see part II of the Trilogy)

This misunderstanding is evaluated under static production in chapter II.11.3. More stringent benchmarks are not better for environmental effectiveness. However, more stringent benchmarks are worse for competitiveness and the risk of carbon leakage; the latter two aspects were the very reason to grant free allocation. The stringency (level) of the benchmarks falls out of the equation as the incentive for a project to reduce emissions consists of avoided purchases plus sales of allowances.

Example: a project can reduce emissions from 900 to 600 kg CO<sub>2</sub>/unit of product.

If benchmark = 750 kg CO<sub>2</sub>/unit: incentive =  $(900 - 750) + (750 - 600) = 300$  CO<sub>2</sub>/unit of product.

If benchmark = 650 kg CO<sub>2</sub>/unit: incentive =  $(900 - 650) + (650 - 600) = 300$  CO<sub>2</sub>/unit of product.

Product benchmarks – independent of their stringency – provide predictability for investments to reduce emissions, next to a meaningful CO<sub>2</sub>-price as discussed above under supply response. Therefore, it also is important that for projects without a Community-wide benchmark, a company will be allowed to ask a Company benchmark in case of a project to avoid the updating problem.

This analysis has also been done for dynamic production, see chapter II.12.3. It appears that dynamic benchmarking works exactly like auctioning (chapter II.12.2), in contrast with static benchmarking (chapter II.12.1). The dynamic approach is highly relevant, because increase of market share by more efficient producers is the normal market logic.

The aim of the Directive is clearly to incentivise such dynamic development. Article 10a (1) says: *“to ensure that allocation ... gives incentives for reductions in greenhouse gas emissions and energy efficient techniques”*, which clearly gives a legal ground for dynamic benchmarking.

**EU ETS: benchmark average best 10% installations as target in 2013 or in 2020?**

As explained above, more stringent benchmarks are worse for competitiveness and the risk of carbon leakage. These two aspects were the very reason to grant free allocation. The average of the 10% best installations is a very stringent benchmark because it is for many manufacturing installations a very difficult goal to achieve in a period of ten years.

The preparation of significant investments with proven technologies to reduce emissions takes typically 5-7 years (feasibility studies, basic engineering, detailed engineering, procurement and building). Building most often takes place before and during planned maintenance shut downs, which means an interval of about 6 years. For new, breakthrough, technologies the development time of the technology is 10-15 years and often longer (ref. CCS time objective EU Commission).

For this reason the “best 10%” target should be set for 2020. What does the Directive say?

The EU ETS Directive article 10a (1) defines the benchmark qualitatively: *“... determine Community-wide ex-ante benchmarks ..., by taking account of the most energy efficient techniques, substitutes, alternative production processes, high efficiency cogeneration, efficient recovery of waste gases, use of biomass and capture and storage of carbon dioxide, where such facilities are available, ...”*.

Article 10a (2) defines the benchmark quantitatively: *“In defining the principles for setting ex-ante benchmarks in individual sectors or sub-sectors, the starting point shall be the average performance of the 10% most efficient installations in a sector or sub-sector in the Community in the years 2007-2008.”*

Article 10a (5) defines: *“A uniform cross-sectoral correction factor shall be applied if necessary.”* This cross-sectoral correction factor is needed if the allocation with the benchmarks exceeds the maximum amount of allowances available for industry as defined in article 10a (5).

By determining the performance curve of a product, the elements as stipulated in article 10a (1) are taken into account<sup>1</sup>. There is neither objective nor legal basis to go beyond the “10% best” benchmark. But it is to be noted that article 10a (2) does not specify that the average of the 10% best installations shall be applied as from 2013.

By setting the weighted average performance as the benchmark in 2013 with a linear path to the “10% best” in 2020, companies get time to adapt for this very ambitious target while unnecessary auctioning costs are avoided, thus giving more resources for the necessary investments. The cross-sectoral correction factor would of course still be in place.

Wouldn't it be silly if a significant part of the allowances' volume available for free allocation to industry would in fact be auctioned, because an unnecessarily stringent benchmark – not improving effectiveness – would be applied as from day one in the third trading phase?

**Carbon price signal, carbon leakage and possible windfall profits** (see part II of the Trilogy)  
Climate Strategies among others have presented that there are three solutions to avoid/minimise carbon leakage:

- (1) Global carbon market - that is of course the solution we all want.
- (2) Border Adjustments - we present some problems and heard many more in later meetings with experts, for example during the Climate Strategies' meeting on 19-20 February 2009 in Berlin (re-export, political acceptability by developing countries, etc.).
- (3) Benchmarks with recent or actual production.

On many occasions – European Parliament, Climate Strategies meetings – it has often been stated concerning option three: “but then there is loss of carbon price signal, so the allocation must be ex-ante frozen”.

We analyse that there are two carbon price signals: one we call the “product carbon price signal”<sup>2</sup> which is less prominent with a direct link to actual production and the other one is the “production carbon price signal”, which is not affected with good benchmarks.

We conclude that the reasoning of the loss of carbon price signal is not consistent: With ex-ante frozen allocation there is either the same carbon leakage as under auctioning (when the opportunity-costs are fully incorporated in the product price) or there is loss of the (product) carbon price signal (when the opportunity-costs are not incorporated in the product price).

So, if we want to avoid carbon leakage as well as industry windfall profits a direct relation to actual or recent production is necessary.

**There are already a lot of ex-post elements in the EU ETS Directive of December 2008**

Ex-post is not a simple “no-go” in the EU emissions trading scheme, to the contrary as the following elements below show:

(1) New entrants rules - although quite imperfect. Companies had many troubles with receiving allowances from the NER in phase 1 and 2. There were e.g. many legal cases in the Netherlands. New entrant rules are by nature arbitrary: why is a threshold of 10% expansion justified, which means no allowances at all for a lower expansion. As mentioned above, it is environmentally perverse that no allowances are allocated for debottlenecking or better use of existing capacity.

2) Closure rule - quite imperfect too so far. It is unclear, what is really meant by “closed”? What happens, if the site as such is still there but one plant within it is really closed? Minus 100% is closed, but what at minus 90%, 70%, 50%, and so forth?

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<sup>1</sup> Cogeneration not as such in the product benchmarks, but cogeneration is stimulated by treating heat from boilers and cogeneration equally (see Ecofys/Fraunhofer/Öko-Institut report). Then the auctioning cost for the electricity part is favourable (see also EU Commission non-paper about cogeneration). Concerning capture and storage of carbon dioxide, for virtually all products this technology is not yet applied in 2007/8.

<sup>2</sup> Allocation without this product carbon price signal is in economic literature referred to as an allocation with a “production subsidy”.

3) The reward for the CCS pilots will be done for the actual realised sequestered CO<sub>2</sub> volume each year. And rightfully so! Ex-ante is just a forecast, which can be lower in practice.

4) The "Polish" derogation rules for electricity are in fact a kind of ex-post solution: no sales of allowances allowed in case of lower production.

5) Art. 10a (19) of the EU ETS Directive, which came in very late:

Measures will be adopted in Comitology for *"defining installations that partially cease to operate or significantly reduce their capacity and for adapting, as appropriate, the level of free allocations given to them accordingly".*

Any threshold (minus 10%, minus 30%, or whatever) would be a fully arbitrary decision and in conflict with "accordingly" when installations "partially cease to operate", thus providing a second legal basis in favour of dynamic benchmarking (next to article 10a (1) mentioned above).

Dynamic benchmarking for products with a benchmark is the simple and robust solution for the Comitology process for new entrants and closures giving predictability and investment security for companies. Allowances for higher production can be taken from the NER and excess allowances from lower production can flow into the NER.

### **Ex-post to actual production is the normal practice in the economy**

In part II we make the comparison with CDM and JI (chapter II.3.2). A company gets CERs or ERUs only for the real emission reductions - so related to actual production - compared to the baseline. For example, if a wind farm in China produces less electricity than planned, there are fewer CERs accordingly. No one considers changing this practice into an ex-ante system.

The same is true for paying corporate or personal income tax in any country (chapter II.3.1). In the end these taxes are paid based on the ex-post evaluation what the real income was.

Can we imagine anyone willing – or having – to pay the income tax until 2020 based on his high income of say 2005-2007?

If Border Adjustments would ever be applied, these adjustments would be levied for actual realised imports and exports. Frozen Border Adjustments based on historical imports and exports are of course not fit for purpose and will therefore not be considered.

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### **The way forward: step by step to a fully linked global carbon market**

For 2020 an effective EU ETS needs to be put in place, which must be credible in the global arena of the Copenhagen process. Solving present shortcomings of the EU ETS is therefore vital in the process to a fully linked global carbon market. Requiring absolute caps that do not allow for adequate and fair growth for advanced developing nations (China, India, Mexico, Brazil, etc.) is also not a realistic proposal (chapter II.6). Regionally differentiated benchmarks are naturally emerging in developed nations and are appealing for developing nations. With respect to the supply response, an unregulated CO<sub>2</sub> market seems hardly likely in the US. And signs concerning dynamic benchmarking from US, Canada, Australia and Japan are encouraging.

Any comments on the Trilogy Study are more than welcome.

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