Installations versus Companies. Making the right choice in the design of an Emissions Trading Scheme

Policy Paper

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1. Introduction

The design of an emissions trading scheme (ETS) is a complex task which needs to reflect fundamental economic aspects and practicalities as well as regulatory and legal traditions, structural aspects of the regulated sectors and, last but not least, a wide range of political considerations.

Among the broad range of design options, the issue of whether to regulate installations or companies is one of the most discussed. With a view to the current operating emissions trading schemes for greenhouse gases, there is clear evidence that the recent real-world implementation approaches (e.g. EU ETS, California ETS, RGGI ETS) have predominantly been installation-based schemes. Only the (failed) Australian attempt to set up and run an ETS was founded on a company-based approach. However, for the new phase of ETS implementations in the emerging economies (China, South Korea etc.) the question is again arising of whether installations or companies should be sub-ject to regulation by an ETS.

Given the key importance of the decision for or against an installation- or company-based approach, a careful consideration of the different aspects of this decision which goes beyond the blueprints of existing emissions trading schemes (which might be based on comparable fundamentals, circumstances or framework conditions that do not necessarily also apply for other jurisdictions) is indispensable.

This paper discusses the issue of installation- versus company-based approaches for an ETS with respect to different design issues of an ETS implementation.

2. Key elements of the process chain of an emissions trading scheme

The set-up and operation of an emissions trading scheme can be divided into a generic series of process steps. For key elements of this process chain[1], the issue of an installation- or company-based ETS design is of special importance and will be analysed and discussed in the following.

1. Coverage

The coverage of an ETS describes the top-down perspective on the sectors that are to be regulated by an ETS. It is usually based on national greenhouse gas inventories and/or national energy balances and respective modelling on more aggregate levels and relatively rough sectoral differentiation. The defini-tion of the coverage of an ETS defines the contribution of the ETS to a potentially overarching target to decrease or limit greenhouse gas emissions and creates one of the fundamentals for the design of a national policy mix.

2. Scope and point of regulation

The scope of an ETS describes the bottom-up perspectives on the entities that are to be regulated by the ETS. The regulation by an ETS includes, on the one hand, the obligation to measure or calculate emissions, verify them and report them to the respective authority. On the other hand, it includes the obligation to surrender an amount of allowances equivalent to the reported emissions in a certain period. The definition of the scope of an ETS relies on precise bot-tom-up definitions of the regulated entities. Based on this definition, the respective bottom-up data can be compiled which are key prerequisites to defining a consistent and appropriate cap for the ETS.

There are three general options (and the respective hybrid options) for defining the scope of an ETS:

- for an installation-based scheme the scope addresses specific instal-lations with well-defined system boundaries;
- for a company-based scheme the scope addresses specific compa-nies without any respect to the installations run by these companies;
- a specific version of company-based scheme is the activity-based scope whereby a specific activity is subject to regulation by the ETS; this scope is usually applied to upstream implementations of ETS whereby not the release of greenhouse gas emissions to the atmosphere is regulated but rather a certain activity, the feed-in (production, import etc.) of carbon into a system where the respective fuel is burned in the downstream part of the supply chain.

3. Cap setting

Cap setting is the process of defining the precise total number of allowances available to the scheme in a certain period. Usually the cap setting relies on a combined consideration of coverage and scope. The contribution of the ETS to deliver compliance to an overarching emission reduction or limitation goal can be derived from the perspective of coverage. An appropriate combination of coverage and scope definitions and data will allow the

1 Other elements of the ETS process chain such as compliance or flexibility and price containment mechanisms or linking and the use of offset credits for compliance are not listed here due to less signif-icant interactions with the issue of installation- or company-based ETS designs. They are nevertheless of key importance in the general ETS design.

transformation of more aggregate emission reduction or limitation targets into the determination of an ETS's parameters.

Although the existing emissions trading schemes are based on absolute caps, a broader range of cap-setting options must be considered:

- absolute caps: the number of allowances is fixed in absolute terms and will be not changed for the duration of a certain commitment period; this might include options in which such a cap is derived from an overarching target based on intensity targets;
- indexed caps: the number of allowances for a certain commitment period is dynamic and relies on a pre-defined base trend (GDP etc.);
- both approaches can be combined with flexibility options: these mechanisms allow for a certain amount of allowances to be withheld from the market or for an additional amount of allowances to enter the market, both for pre-defined circumstances or based on pre-defined procedures (to avoid a surplus of allowances or to limit allowance prices).

4. Allocation and point of allocation

Allocation is the process of distributing allowances. Two different dimensions of allocation need to be considered.

The first dimension is the general allocation approach (with the possibility of combining different options to make hybrid approaches):

- auctioning: allowances are sold to the market by tenders or other forms of sales;
- free allocation based on historic emissions (often specified as grandfathering): allowances are allocated free of charge to the regulated entities based on respective historic emissions; a specific feature of many grandfathering allocation schemes is the combination with special provisions to reward early action and new entrants;
- free allocation based on benchmarking: allowances are allocated free of charge to the regulated entities based on historic activities (e.g. production data) and pre-defined emission benchmarks.

The second dimension refers to different options for potential updates of (free) allocation:

- no updating: the free allocation of allowances will under no circumstances be adjusted for very long periods (beyond a commitment period);
- updating between commitment periods: the free allocation will be updated for each commitment period, usually on a multi-annual basis;
- high-frequent updating: the free allocation will be updated with high frequency also within a commitment period and usually on an annual basis (output-based or dynamic allocation);
- updating for specific circumstances: the free allocation will be updated if certain circumstances occur, e.g. when various forms of plant closure provisions do not allow the issuance of allocated allowances to installations or plants which have been shut down or in which production has been reduced significantly.

Ideally both dimensions should be combined in such a way that the behaviour of regulated entities should not have any impact on the level of free allocation granted to them (which would distort the price signal and the economic efficiency of the scheme). In the real word, the design should address at least a minimization of the respective distortions.

Both dimensions need to be assessed in an integrated manner. Different allocation approaches address not only issues of distribution, fairness or compensation but can also have major impacts on the economic efficiency of the ETS (especially if updating provisions play a major role in the scheme).It should be highlighted that the point of regulation is not necessarily equal to the point of allocation.

5. Trading

Trading is the essential part of the system which enables price discovery. With trading the equilibrium price for a certain demand and supply configuration will emerge, representing the marginal costs of emission abatement for a certain emission reduction or limitation target (assuming no distortions from certain allocation provisions like benchmarking).

The trading arrangements of an ETS address at least three dimensions. The first dimension refers to the eligible entities for trading (with the possibility of hybrid approaches):

- trading for regulated entities only: for this option only regulated entities would be allowed to take part in trading activities;
- trading for a broader range of entities (with eligibility for up to all private and legal persons): for this option, entities other than the ETS-regulated ones would also be allowed to take part in trading activities, serve as intermediates or deliver hedging products.

Beyond the eligibility of certain entities for trading the design of trading provisions could be based on different approaches (again with the possibility of hy-brid options):

- mandatory trading platforms: for this option, trading activities would be limited to one or more trading platforms (exchanges etc.);
- free trading arrangements: for this option, trading activities would be possible as over-the-counter (OTC) trades or on any other trading platform.

Last but not least, the legal nature of allowances has a major impact on market oversight, taxation, accounting etc.:

- allowances as commodities: for this option, allowances would be treated as commodities and face the same oversight and regulation as other commodities;
- allowances as financial tools: for this option, allowances would be treated as financial tools and face the some oversight and regulation as other financial tools.

The legal nature of allowance has major impacts on many practical implementation issues for some parts of the process chain of an ETS.

6. Monitoring, reporting and verification

The precise and consistent measurement and calculation of emissions and, if necessary, other activities as well as the respective verifications are fundamental prerequisites for an ETS. Data monitoring, reporting and verification for a certain scope of activities create the basis for cap-setting, allocation and compliance as well as for many parts of the trading part of the process chain of an ETS. The specification of MRV heavily depends on the scope of the ETS and the point of regulation as well as the allocation approach.

Some of these key elements of the ETS process chain interact with others but it nevertheless makes sense to discuss them separately in this paper (while respecting their interactions).

3. Detailed discussion of key elements of the process chain

The decision in favour or against an installation- or company based ETS design has different effects or implications for the key elements of the ETS process chain:

1. Coverage

The choice of an installation- or company-based ETS design has no implications on the coverage of an ETS. This results mainly from the nature of coverage definitions as a top-down feature which has no ties to bottom-up design choices like installation- or company-based designs of an ETS.

2. Scope and point of regulation

In contradiction to the choices made on coverage, the decision to implement an installation-based ETS design or a company-based one could have major implications for the scope of the ETS. This results essentially from three types of potentially porous system boundaries:

- In many economies the system boundaries of economic sectors are not consistent with the system boundaries of companies. Although there might be sectors which fit consistently with the sectoral differentiation of the national accounts (e.g. large parts of the power sector), there are industrial conglomerates in many economies for which the range of products is attributed to different sectors. If the ETS is not designed as an economy-wide ETS, serious distortions might arise in a company-based system if situations can occur where certain specialised companies are not subject to regulation by the ETS because they fall outside of the coverage of the scheme and at the same time industrial conglomerates are fully regulated by the ETS because (major) parts of their production must be attributed to sectors which fall under the coverage of the scheme but at the same time certain (minor) shares of their production is attributed to sectors which do not fall under the coverage of the scheme. A typical case for this inconsistency is the building materials industry. If some companies are regulated by the ETS and others are not and all compete in the same market for the same product, this might create (at the least) competition distortions but potentially also perverse incentives.

This challenge of sectoral inconsistencies and distortions for company-based ETS designs is of less importance if the ETS is organised as an economy-wide scheme or if the relevant sectors have many specialised companies and no larger industrial conglomerates. If this is not the case, a preference may arise for installation-based ETS designs which allow a better attribution to certain sectors or products that shall be regulated by a (partial) ETS.

- In most ETS designs, there are certain minimum thresholds for the scope of the system in order to avoid the participation of (very) small installations. Although an ideal type of a company-based design would not consider such capacity thresholds in reality, such thresholds have been set up even in ETS designs which in general follow the company-based approach (e.g. the Australian ETS plans). If such thresholds are foreseen for participation in the ETS - which are usually linked to capacities or emissions of certain installations - a company-based ETS design would necessarily need some complementary elements of an installation-based system, which would effectively lead to a type of hybrid system design.

As a result, a careful assessment is needed regarding how far the advantages of an company-based ETS design could also materialise if this approach either does not allow the introduction of thresholds for participation in the ETS (with all its implications for sectoral bounda-ries etc.) or leads to the need for a more complex, hybrid

approach. Consequently, the relevance of this dimension for an assessment of installation- versus company-based ETS designs depends heavily on the structure of assets for the sectors which are planned to be regulated by an ETS.

- In some plans for ETS designs, an overall cap for the ETS shall be distributed to subnational jurisdictions. If there are companies which operate installations in two or more jurisdictions, this might hamper a consistent cap-setting for these jurisdictions if no attribution of certain installations to the respective jurisdictions takes place, which will probably require an additional installation-related data monitoring.

With regard to the definition of scope, installation-based ETS designs will allow more consistent approaches. Company-based designs will require at least the integration of some installation-related components to avoid distortions from system boundary issues if these are relevant (multi-sector conglomerates, small installations, multi-jurisdictional companies etc.). On the one hand, company-based approaches could make the implementation of the ETS more complex than installation-based ETS approaches from the perspective of consistent system boundaries within the defined scope of the scheme.

On the other hand, an installation-based approach will require a broad range of procedural and legal definitions and practices on how installations should be differentiated. Based on the existing practical evidence from the operating ETS, this is an important issue – especially for schemes where complex industrial installations (chemical and metallurgical installations, refineries etc.) shall also fall under the scope of the scheme.

A key problem of a company-based ETS is last but not least restructuring. When companies split off emission intensive activities (e.g. the production of cement clinker), this might lead in partial emissions trading schemes to situa-tions whereby a larger share their emissions is no longer covered by the scope of the scheme anymore.

3. Cap setting

Cap-setting for an ETS will require efforts to make coverage and scope definitions consistent in terms of base level emissions as well as the ambition for emission reductions or limitations. In this sense all issues related to the scope of an ETS also need to be reflected in the cap setting.

4. Allocation and point of allocation

The choice between company-based or installation-based design for an ETS has major consequences for the possibilities to implement certain allocation provisions.

Concerning the first dimension of allocation provisions (general allocation approach), the relevant implications are as follows:

- auctioning: If allowances are sold to the market, the difference between company-based and installation-based ETS designs is obviously not relevant in terms of allocation;

- free allocation based on historic emissions: Differences between company-based and installation-based ETS designs must only be considered if grandfathering is complemented with special provisions for rewarding early action or new entrants, which need to be based on a consistent set of installations and thus requires an additional analysis of installations-specific data even in the case of an in general company-based ETS design;

- free allocation based on benchmarking: If the benchmarking scheme is consistently based on a technology-neutral approach, does not reflect any fuel or technology specifics and is used for relatively simple processes, there are no differences between company- or installation-based ETS designs if the respective activity data can be consistently reported on a company level.[2] If, however, the benchmarking approach is not strictly technology-neutral or more complex, benchmarking approaches need to be implemented (e.g. for complex chemical or metallurgical processes, refineries etc.) and an installation-specific approach will be necessary either in the framework of an installation-based ETS design in general or as installations-specific add-ons to a company-based ETS design.

A more complex situation arises from the second dimension of allocation approaches, which refers to updating approaches:

- no updating: If the initial allocation is under no circumstances subject to any updating, no differences between company- or installation-based ETS designs need to be considered;

- updating between commitment periods: If the allocation is updated between the commitment periods, the consistency with company- or installation-based ETS designs depends more on the general allocation approach (grandfathering or benchmarking) than on the updating process;

- high-frequent updating: For output-based or dynamic allocation approaches, the consistency with company- or installation-based ETS designs also depends more on the general allocation approach (grandfathering or benchmarking) than on the updating process;

- updating for specific circumstances: As the updating approaches for new installations and/or plant closure have direct links to installations, installation-based ETS designs are more appropriate in this case than company-based ETS designs; in the framework of company-based ETS designs, installation-specific add-ons would be needed to handle specific allocations for new installation and/or plant closure or significant reduction of production.

With regard to allocation, company- and installation-specific allocation approaches can be rated equal if the allocation approach does not include technology-specific or complex benchmarking approaches and/or specific provi-sions for new entrants and/or plant closure or significant reduction of production.

5. Trading

Trading activities under an ETS will be undertaken by legal entities or potentially by individual persons. In a narrow sense, company- or installation-based ETS designs will have no direct impact on the trading element of the ETS process chain. However, the transparency of the market and as a consequence the liquidity of the market can be significantly increased if the status of supply and demand is available on a more disaggregated level. The more the system covers large and integrated companies and/or industrial conglomerates, the more important the increased transparency of an installation-based ETS design (with a high level of data disclosure on emissions and allocation data) will be compared to a company-based approach.

2 It should be highlighted that benchmarking schemes should be based as far as possible on physical products. Benchmarking approaches which rely on value added as activity data often lead to distortions between companies and/or installations if the prices for the respective products differ significantly be-cause of branding, image or export issues. If a certain product achieves higher prices because of these issues, the respective value added is higher although the products might have been produced in instal-lations which are identical to those that produce physically the same but economically lower-profile outputs.

6. Monitoring, reporting and verification

For monitoring, reporting and verification (MRV) the differences between company- and installation-based ETS designs will have the most significant implications. The differences result less from the reporting and verification part of the MRV chain and more from the monitoring part.

An installation-based ETS design will require the precise definition of all relevant installations and the respective equipment for precise and consistent measurements at an installation level. In many cases, additional equipment needs to be installed and/or new procedures need to be established to separate emission, activity (if it comes to benchmarking or plant closure provisions) and/or allocation data on the level of installations.

For company-based ETS designs in their pure form, the need for additional monitoring equipment and/or procedures will be less significant because the key data will typically be available from the general accounting systems of the company. This is, however, not guaranteed if the company-based ETS design needs to be complemented by some installation-specific provisions which may especially result from specific allocation approaches as benchmarking and/or certain updating provisions (new entrant allocation and/or plant closure provi-sions or equivalent procedures in the case of significant reductions of production).

With regard to reporting and verification, the difference between company- and installation-based ETS designs is mainly relevant with regard to the efforts (and costs) of a broader range of necessary transactions for data checks and submission.

4. Conclusions

The choice between company- and installation based ETS designs has implications on different levels:

- Company-based ETS designs in their pure form will require fewer efforts than installation-based ETS designs with regard to procedural and legal specification (the definition of an installation) and emission monitoring, reporting and verification. However, a company-based ETS will realistically only work when auctioning is implemented.

- In theory, company-based ETS designs are also suited to other, less complex allocation provisions (grandfathering in its pure form). However, in real world implementation new entrant or early action provisions are likely to be implemented, which require installation-based approaches or installation-specific add-ons to company-based approaches. If industrial sectors with more complex production processes are targeted (e.g. chemical and metallurgical indus-try, refineries), if it is intended that more advanced allocation provisions (benchmarking, provision for rewarding early action etc.) are used or if certain updating provisions shall be implemented (new entrant allocation, provisions for plant closure or significant reduction of production) comprehensive installa-tion-based ETS designs or at least respective add-ons to company-based approaches are more suitable.

- Installation-based ETS designs are more appropriate if issues of system boundaries in their different dimensions are significant for the scope of the scheme (sector attribution of large industrial conglomerates, minimum emission thresholds, breakdown of caps to different jurisdictions). This issue is also manageable within a company-based ETS design but would require complementary provisions, which will often have strong links to installations.

- A decision in favour of installation-based approaches can enhance market transparency and liquidity, especially if the scheme covers large enterprises and/or industrial sectors with complex production processes and/or large industrial conglomerates.

Bearing in mind that in real-world emission trading schemes, at least some of the provisions mentioned above will be part of the ETS design, the implementation of an installation-based ETS design outweighs the advantages of company-based approaches in many cases since:

- some of its features will be needed at least as add-ons for company-based ETS approaches;

- installation-based ETS designs offer broader and more flexible options to enhance the schemes over time for the different segments of the ETS process chain.

The review of real world (implemented) emission trading schemes underlines this view since they are either installation-based schemes in a pure form or company-based schemes with strong installation-specific add-ons.

If, however, a decision in favour of a company-based ETS design is taken based on timing or other practical considerations, the ETS should be designed in such a way that the (stepwise) advancement to an installation-based approach can be achieved over time, thus creating an enabling framework for more advanced and liquidity-orientated ETS designs.

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