Methodological design and institutional arrangements for auctions in the EU Emission Trading System (EU-ETS)

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Methodological design and institutional arrangements for auctions in the EU Emission Trading System (EU-ETS)

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1 Introduction

In Germany, emission allowances (European Union Allowances, EUAs) for the first trading period (2005-2007) were allocated completely free of charge. In the second trading period (2008-2012) annual volumes of 40 million EUAs will be sold (Article 19 ZuG (Zuteilungsgesetz – The German Allocation Act) 2012). After an initial phase during which EUAs have been sold by the state-owned bank KfW Bankengruppe on different stock exchanges, allowance auctioning should be conducted from 2010 at the latest. This requires a statutory ordinance to determine the rules and designate the competent authority for conducting the auction procedure. The European Commission's proposal for a new Directive on Emissions Trading envisages that, from 2013 onwards, auctioning will be the basic principle for allocating emission allowances. Auctioning of the entire allocation of allowances is to become the rule for installations in the electricity sector; for installations in other sectors there is to be a gradual transition towards full auctioning. The Commission expects that in 2013 at least two-thirds of the total volume of allowances will be auctioned.

This paper discusses unresolved methodological and institutional questions concerning the design of a system for auctioning EUAs in Germany for the second and third trading periods (Art. 5 para. 3 ZuG 2012). To ensure some continuity in the auctioning procedure and to gain experience, design principles that are important for the third trading period should, if possible, be implemented in time for the second trading period. Nevertheless, it should not be assumed that the procedural rules and institutional arrangements will be identical in both periods. In particular, given that all EU Member States will be auctioning allowances from 2013 onwards, there is a need to identify harmonisation and coordination requirements which should be incorporated, at least in part, in the Emissions Trading Directive respectively in the intended Auctioning Regulation for the third trading period. For auctions of allowances in Germany during the second trading period, a corresponding draft ordinance will be presented in the first half of 2009. This could already incorporate some of the harmonisation aspects identified.

Chapter 2 deals with open questions relating to methodological aspects of auction design. Chapter 3 begins with a discussion of how far auctions in the EU should be held centrally or organised by individual Member States on a decentralised basis, at single or multiple venues as the case may be. It goes on to describe and evaluate the institutional options for auctions in Germany. Chapter 4 provides a rough estimate of the costs associated with auctions conducted by different institutions. Chapter 5 identifies the needs for harmonisation and coordination over the design and conduct of auctions. Finally, the conclusions are summarised in Chapter 6.

2 Questions on the methodology of auctions

2.1 Methodological fundamentals

In order to conduct the auctions and for the purposes of the forthcoming statutory ordinance, decisions on methodological design need to be made. The points that remain open are discussed below.

2.1.1 Frequency

Under the terms of the Allocation Act 2012 (Art. 21 ZuG 2012), the annual volume of EUAs available for auctioning should be offered for sale at regular intervals and in equal tranches. The number of annual auction dates and the volume of EUAs to be auctioned on each occasion remain to be determined.

With a small number of auctions per year and correspondingly larger tranches, it is likely that more bidders would be able to purchase emission allowances at auctions (including smaller bidders). However, more frequent auctions would assist participants' hedging strategies[1] and reduce their cash-flow burden. Furthermore, smaller tranches reduce the risk of any impact on the secondary market. In view of the small overall volume of EUAs to be auctioned in Europe in the second trading period (less than 4% of the total emissions budget for the EU), the risk of any market distortion from this source is not all that great. But impacts are also dependent on the timing of auctions in individual Member States. Scheduling conflicts should be avoided as far as possible. In the third trading period, in particular, due to the high proportion of allowances to be auctioned (the Commission proposal anticipates that at least two-thirds of the total volume will be auctioned from 2013 onwards), coordination of auction dates and volumes among the Member States will be essential.

In the UK and Austria, auctions will take place quarterly. The UK accounts for some four to five million EUAs per auction, and Austria for 100,000. In view of the higher volumes to be auctioned in Germany and the experience gained to date from KfW's sale of EUAs in daily exchange trading (of equal volumes per week), more frequent auctions are considered appropriate. For Germany the volumes offered per auction would be approx. 3.3 million EUAs if auctions were held monthly, and around 770,000 EUAs if auctions were weekly. Taking the UK volumes as a yardstick, the most suitable approach for Germany would seem to be monthly auctions.

From 2013, depending on the experience of the second trading period (with regard to market impact and auction costs), more frequent auctions are also conceivable. From 2013, the quota allocated by auction will rise from year to year, partly because a

[1] Hedging is the purchase or sale of derivatives (e.g. futures or options) to safeguard against unfavourable price movements.

growing share of the quota for 'industrial installations' will be auctioned. 'Front loading', i.e. bringing auctions forward in time and leaving a declining number of allowances to be auctioned in the remaining trading period, is not considered to be absolutely necessary, given the existence of a functioning futures market. Nor should front loading be necessary within an annual cycle. However, the first auction date of a year should take place in good time before the deadline for surrendering emission allowances for the previous year's emissions.

Conclusion: In the second trading period, it is advisable to hold auctions approximately monthly. In the third trading period, auctions could take place more frequently if appropriate.

2.1.2 Eligible participants

According to Article 21 ZuG 2012 the auction must be non-discriminatory. Therefore all participants should have access to EU emissions trading, i.e. all holders of accounts at European registries (installation operators, financial services providers, NGOs and private individuals). As regards methodology, no research need is identified in this area; aspects of implementation and coordination are discussed in Chapters 3 and 5.

2.1.3 Price formation

a) The suggested *auction type* is a (one-sided) static auction with a *closed order book* (i.e. participants only have knowledge of their own bids). This is a simple and low-cost procedure which is robust to market power. Dynamic auctions are more suitable for 'price discovery' but with regular auctions and a functioning secondary market (including, in the third trading period, banking from the second trading period; intertemporal arbitrage) these do not weigh heavily as a criterion.

b) Price formation should be realised by means of a *uniform-price auction* in which all successful bidders pay the same clearing price. The clearing price is the price at which the sum of the bid quantities matches or first exceeds the volume of EUAs offered in the auction in question. Uniform-price auctions were used in Ireland and Hungary in the first trading period and are planned for the UK, Austria and elsewhere for the second trading period.

In the event that the total of all bids (demand for allowances) in an auction is lower than the volume offered, the selling price may correspond to the reserve price. The residual quantity is offered at the next auction in addition to the volume scheduled to be offered at that auction. The proposed procedure does not conflict with the provision that equal tranches should be offered at every auction.

c) An *allocation rule* is necessary because successful bids can only be satisfied up to the point where the quantity of EUAs on offer is exhausted. Where *identical bids* are received at the selling price, successful bids can be determined by means of tie-breakers, as follows:

i) Allocation by a random process (as in the Regional Greenhouse Gas Initiative (RGGI) in the USA);

ii) Allocation on the principle of 'first-come, first-served', i.e. to earlier bidders first (as in Austria);

iii) Allocation in proportion to bid quantities (as in the UK).

Proposals i) and iii) can be classified as 'fair'; by the criterion that the highest number of bidders should be successful, proportional allocation under proposal iii) would be preferable.

d) *For small bidders like SMEs,* any possible concessions in connection with auctions should be discussed. One way of ensuring that even small bidders can bid successfully in an auction is a practice known as 'non-competitive bids', which the UK plans to use during the second trading period. In the first stage of the procedure, a certain percentage of the amount to be auctioned (e.g. 30% in the UK) will be reserved for small bidders. Every participant now has the possibility of submitting a 'small' volume bid (without a price bid) which must not, however, exceed a predetermined maximum volume (in the UK: 10,000 EUAs). The selling price for the non-competitive bids emerges in the second stage of the auction, when the clearing price is established by the competitive bidding round. Should the non-competitive bids exceed the total of EUAs allocated, bids of up to 1000 EUAs will be processed first, invoking the 'first-come, first-served' principle if necessary. Should the allocated emissions budget exceed the demand from non-competitive bidders, the residual quantity is transferred to the auction allocation for the second, competitive-bidding stage.

Although non-competitive bids permit even small bids to be satisfied, the two-stage procedure does make the process more complex. Also, the benefits are probably rather slight, because small bidders have alternative means of obtaining allowances via intermediaries (at potentially low transaction costs). Moreover, non-competitive bids would not facilitate the original objective of encouraging SMEs to gain auction experience.

Non-competitive bids should not be pursued further in the first instance. On the basis of experience from the second trading period (including the British procedure) a decision can be made on whether to introduce such an arrangement for third trading period.

In order to keep the costs of participation as low as possible for small bidders, it may be possible to build in concessions regarding the lodging of security deposits.

Conclusion: The proposed type of auction is a (one-sided) static uniform-price auction with a closed order book. Where multiple bids match the selling price, a proportional allocation should take place if necessary. The necessity for concessions for small bidders (SMEs) and the nature of any such concessions should be discussed further once initial experience has been gained.

2.1.4 Reserve price

Setting a reserve price is a means of counteracting 'bid shading' and other forms of strategic behaviour (e.g. collusive agreements) aimed at keeping the clearing price as low as possible. Furthermore, a reserve price can function as a clrearing price, triggered when the total bids in an auction indicate a lower level of demand than the volume of allowances offered.[2] In this situation, no clearing price is generated by a static uniform-price auction. Other functions have been ascribed to a reserve price at different times, e.g. increasing planning and investment security or ensuring (minimum) auction revenues, can barely be fulfilled where a functioning secondary market exists: participants are not compelled to buy allowances at an auction; a reserve price higher than the price in the secondary market would attract zero demand (and zero auction revenue). That is to say, an 'inflated' reserve price is not a means of generating minimum revenues which could also pose constitutional problems. At the same time, with a functioning secondary market, the risk of the reserve price being misused as a 'focal point' for strategic bidding behaviour should be minimal. In principle, where a liquid secondary market exists, the clearing price at auction is unlikely to deviate significantly from the current price in the secondary market.

It is necessary to distinguish between absolute reserve prices and those specified in relative terms (i.e. relative to the market price). Absolute reserve prices (particularly over a longer period) are fundamentally problematic because the market trend is not known in advance and it is impossible to decouple auction outcomes from general market events. Relative reserve prices may be worth considering as a precaution against unforeseen influences on auctions; they are not a universal requirement and should not be pitched at too slight a discount to market prices.

In the first trading period in Ireland, a reserve price was set for the first two auctions but not made public. The third auction of the first trading period was conducted without a reserve price at all. The UK system contains provisions to the effect that a reserve price *can* be set for auctions in the second trading period, determined by means of a percentage discount to the current market price on the most liquid trading exchange. In Austria, a reserve price must be set, which is aligned with the current market price and which also has to be published. In the RGGI system, the reserve price is fixed at $ 1.86 per CO_2 allowance.

Conclusion: It is not considered imperative to set a reserve price. No adverse impacts are to be expected as long as the reserve price is not stipulated as an absolute figure with longer-term validity but specified as a percentage variance from the market price. If a reserve price has to be set, it should be coupled to the latest market price and incorporate a sufficient margin for variations (e.g. variation of –10% or –20%). The

[2] This kind of rule is applied in the Regional Greenhouse Gas Initiative (RGGI) system. Within the RGGI, ten states in the northeastern USA have joined forces in an emissions trading system that will be launched in the year 2009 and is initially restricted to power generators.

reserve price should be published. Possible residual quantities should be carried forward to increase the volume of allowances offered in the following auction.

2.1.5 Maximum price

From a systemic perspective, a maximum price is unacceptable in a market economic instrument since it prevents the price mechanism from bringing supply and demand into equilibrium. Setting a maximum price for auctions would, of course, impose a ceiling on the costs of purchasing allowances. 'Market overheating' could not be prevented even so, since it could equally occur on the secondary market. No maximum price should be stipulated on the secondary market, however. Moreover, in the eventuality of a binding maximum price, rules for rationing would have to be defined. This would add further complexity to the system.

As before, a distinction can be made between maximum prices stipulated in absolute terms and relative maximum prices. Absolute maximum prices should not be permitted. If relative maximum prices are set, the differential should be sufficiently high (e.g. +30%). Maximum prices are not necessary, however.

Conclusion: No maximum prices should be imposed for auctions in either the second or the third trading period. Member States should only be permitted to stipulate maximum prices in relative terms.

2.1.6 Minimum bid quantities

Small minimum bid quantities promote flexibility and are particularly attractive for smaller participants. They are associated with higher specific transaction costs, however. Where transaction costs are high for participants, this would be reflected in the size of bid quantities (especially from small bidders) so that minimum lot sizes would not necessarily need to be prescribed. Where the auctioneer's transaction costs are high, the stipulated lot sizes might be considered too large from the viewpoint of small participants. It can be speculated that the 'optimum' minimum lot size from the viewpoint of SMEs depends partly on the price of EUAs (costs of capital, costs of liquidity).

On the secondary market for allowances in the first trading period, contract volumes generally levelled out at between 5000 and 10,000 EUAs. In the first trading period, the minimum bid quantity for Ireland's auction was originally set at 500 EUAs. Since no bidders took up the minimum volume, in the last auction of the first trading period the minimum bid quantity was raised to 1000 allowances. In the second trading period the lot size in Austria will be 100 EUAs. In the UK it is set at 1 EUA for the non-competitive bids. For the competitive bids, no provisions on minimum bid quantity have been specified (although only intermediaries are authorised to participate in the competitive auction in the UK, cf. 3.3.2). In the RGGI the minimum bid quantity is 1000 EUAs.

Conclusion: To ease the participation of SMEs in auctions during the second trading period, the minimum bid quantity should not be set too high. A minimum bid quantity of

100 EUAs is suggested. The unit of denomination should be 1 EUA. For the third trading period, all decisions can be reviewed on the basis of experience from the second trading period. An EU-wide cap on minimum bid quantities (e.g. 1000 EUAs) could be stipulated in the Member States.

2.1.7 Upper limit on bid quantity per bidder

The goal of setting a maximum total bid quantity per bidder in an auction might be to prevent abuse of market power. Ultimately, however, this would require a laborious EU-wide verification of ownership structures (including interests in companies) and increase the complexity of the system, thereby hindering access to auctions. Furthermore, in the context of a liquid secondary market and the relatively small volumes of allowances auctioned at very frequent intervals, the risk of a 'short squeeze' should be negligible.

So far, no past or forthcoming auctions within the European Union Emission Trading System (EU ETS) have imposed any effective restriction on the maximum bid quantity per bidder. In the RGGI (with a far smaller number of participants than the EU ETS), in contrast, no bidder in an auction may bid for more than 25% of the total volume of allowances offered in all auctions. Ownership interests are verified in the course of qualifying for admission to the auction.

Conclusion: The possible bid quantity per bidder need not be limited. The EU Directive could regulate that a Member State (or all Member States) set a limit on bid quantity per bidder as a proportion of the volume available in the given auction (or of the total volume for all auctions).

2.2 Amount and type of security deposit

The first point to note is that the legislator's options for influencing the stipulations on the nature and amount of any security deposit required depend primarily on which institution will conduct the auctions (cf. Chapter 3). If the 'core business' of the auction is conducted by public institutions, corresponding stipulations can be passed directly. If conducted by private institutions, this is mainly possible by indirect means, for example by means of criteria within the terms of an invitation to tender (possibly with special regulations for SMEs).

2.2.1 Function of security deposits

The auctioneer basically bears a default risk, namely that of a 'winner' involuntarily or wilfully failing to honour its payment obligations. The first case is based on a participant's inability to pay, the second on unwillingness to pay. The latter can ultimately be attributed to strategic behaviour by the bidder. If at the end of the auction the prices of allowances are such that the established auction clearing price is higher than the market price, bidders could view their bids rather like an option and not honour their payment obligations. Furthermore, highly inflated bids can lead to a high auction price which sends a strong demand signal to the derivatives market with a

corresponding impact on trading prices. Holders of derivatives contracts can profit from this. The consequences of a default would be serious: unclear trading volume, unclear market price, negative impact on the secondary market, high transaction costs of taking legal action, and abuse of the auction as a means of price manipulation in other markets. However, strategic practices are detectable and in some cases illegal, and so the likelihood of their occurrence should be relatively low. Moreover, with a functioning secondary market, the possibilities of manipulating other markets by means of the auction outcome are negligible.

Nevertheless, structures should be created which offer the least possible incentives for such misconduct and which assure the auctioneer a reasonable certainty of payment.

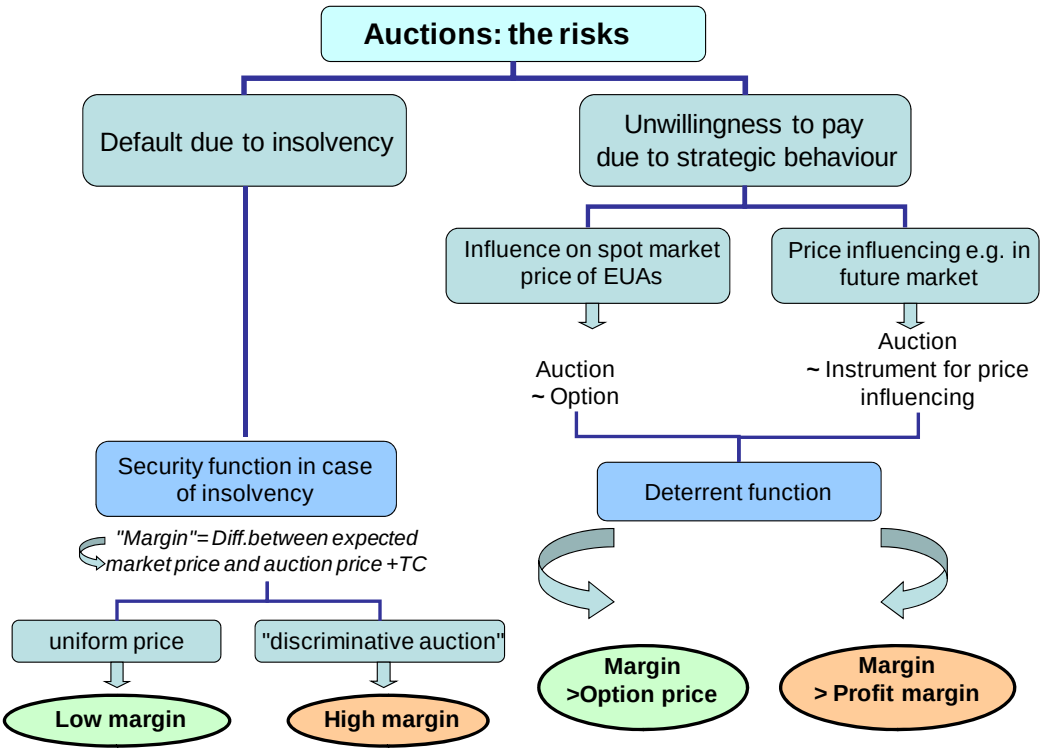
This is the purpose of security deposits, which perform two functions:

- To serve as collateral in the event of default;
- To deter strategic behaviour.

The diagram in Figure 1 shows payment defaults and the corresponding function of security deposits. It should be borne in mind, however, that security deposits represent a certain barrier to market entry, because depending on the chosen arrangements they tie up liquidity or give rise to high costs, e.g. for the provision of financial deposits, guarantees etc., and can therefore represent a deterrent, particularly to small firms.

There are several options for the design of the security deposit, which need to be evaluated in conjunction with the chosen form of auction and institutional implementation.

Figure 1: Overview of auction risks



Source: In-house material (Fraunhofer ISI)

Below, the design options are listed firstly according to amount and secondly according to the type of security deposit, and subjected to qualitative analysis with reference to the criteria of liquidity, transaction costs, access for SMEs and the security and deterrent function.

2.2.2 Amount of security deposit

a) Flat-rate amount

The security deposit is charged as a flat-rate amount. The administrative load is minimal because there is no need whatsoever for calculations or comparisons between the security deposit and the bid. From the perspective of bidders, the setting of a low flat-rate amount would be beneficial since it would barely tie up liquidity, thus minimising (opportunity) costs. In this way the barriers to access in the form of transaction costs for SMEs can be kept low. Flat-rate amounts have a discriminatory impact on smaller firms since they only require small quantities of allowances, for which they have to meet relatively high capital commitment costs. From the viewpoint of large companies, low flat-amount security deposits are insignificant and could, in the eventuality of strategic behaviour, be written off as the fee for an option or more than compensated by profits achieved in the futures market. The deterrent function is ineffective here. In the event of insolvency, flat-rate amount security deposits only cover the auctioneer's risk if bids are relatively small. For large bids, however, a flat amount offers the auctioneer only a modicum of security.

b) Relative security deposit

An alternative to the flat amount is a security deposit relative to the planned bid amount. A predetermined percentage of the bid can be lodged as margin. The restriction of liquidity depends on the chosen percentage rate and the planned amount of the bid. Under this arrangement, capital would be tied up in accordance with participants' size (assuming that their size is reflected in their bids) and small companies would bear a correspondingly smaller burden of transaction costs. Whether the security deposit performs its collateralisation and deterrent function is coupled to the percentage rate. The drawback of this format is the higher administrative load to determine the absolute security deposit and the danger of selecting an ineffective or an excessive and hence prohibitive percentage rate. Furthermore, transaction costs arise for settling the payment of the outstanding balance.

c) Total bid amount

Alternatively bidders can be required to deposit the entire bid amount. This option fulfils the collateralisation and deterrent function to a disproportionate degree, for in the event of default, the auctioneer's costs amount to the difference between the auction clearing price and market price of the EUAs multiplied by the volume purchased at auction plus other transaction costs. With a functioning secondary market, the allowances could be

sold immediately, so a 100% security deposit would normally exceed these costs significantly. Apart from reducing liquidity, this option also results in relatively high opportunity costs for the bidder. The administrative and organisational load is estimated to be low if the entire purchase price can be offset directly against the security deposit – provided this is not lodged in the form of transferable securities or guarantee credits.

d) Stock exchange: Margin[3] as collateralisation

An alternative to the options listed above is the possibility of calculating the auctioneer's actual risks and requiring a security deposit of that amount. The default risk is composed of the organisational, administrative costs of security realisation and additional transaction costs of the non-paid allowances together with the price difference of open positions between auction clearing and current market price multiplied by the volume of EUAs purchased at auction. This security deposit covers the auctioneer's costs and minimises the potential 'profits' from speculative behaviour. The security and deterrent functions operate effectively with this form of collateral. Other advantages are the low transaction costs and low restrictions on liquidity for bidders, especially for SMEs, if they trade e.g. via non-clearing members; however, the auctioneer's administrative and organisational load, and hence transaction costs, are high. Under separate auctions not linked to the secondary market, a reconciliation of 'long' and 'short' positions can be dispensed with and the margin would equate to nothing more than a percentage-based security deposit. For that reason, this option is only suitable for over a certain minimum number of bidders or a minimum turnover volume, and given both EUA 'long and short' positions. 'Margin' is in widespread use in stock-market transactions, where it covers the open positions in cash and securities.

Table 1 gives a qualitative evaluation of the individual options for the amount of the security deposit. As a result it can be stated that, assuming a minimum number of participants, the margin has the greatest advantages. An overall verdict is always dependent on additional framework conditions such as the institutional setting, the type of security deposits and the type of auction chosen.

Table 1: Comparison chart – amount and type of security deposit

	Transaction costs		**Liquidity**	**SMEs**	**Security function**	**Deterrent function**
	Auctioneer	Bidder				
Amount						
Low flat-rate	**+**	**+**	**+**	**+**	**-**	**-**

[3] Margin corresponds to a deposit or collateral posted in cash or securities which is required in the course of exchange trading as security for exchange-traded options and futures deals.

amount					for large companies	for large companies
Relative amount	-	-	(+)	(+)	(+)	(+)
Total bid	()	()	-	(-)	+ exceeded	+ exceeded
Margin	-	+	+	+	+	+
Type						
Guarantee credit	()	()	(+)	(+)	(+)	(+)
Contractual penalty	--	+	++	++	--	++
Securities	(+)	(+)	(+)	(-)	+	+
Giro account/ Savings deposits	()	()	(-)	+	+	+
EUAs at DEHSt	-	+	+	+	+	+
Bank payment card	()	()	()	+	+	+

Source: In-house material (Fraunhofer ISI)

2.2.3 Type of security deposit

a) Provision of a guarantee by a bank

If the security deposit is provided in the form of a guarantee credit,[4] the transaction costs depend on the conditions imposed by the issuing bank and the creditworthiness of the borrower. Normally interest rates from 0.25% to 3% of the guaranteed amount are incurred. Should the issuing bank deem a savings deposit necessary as loan collateral, the liquidity of the bidder is restricted but apart from the guarantee commission no other opportunity costs are incurred. In principle every company has access to a guarantee credit. However the costs of a bank guarantee are also dependent upon the size of the loan and/or the volume and intensity of the business relationship between the bank and the company. Here smaller companies might tend to have somewhat higher transaction costs in relation to the security deposit.

b) Contractual non-performance penalty

This form of security deposit is the most expensive in terms of the transaction costs it generates for the auctioneer. Pursuing legal proceedings for breaches of contract is laborious and costly, with no guarantee of compensation for the costs incurred. A contractual penalty certainly has a deterrent effect against strategic behaviour by

[4] A guarantee credit is understood to mean a guarantee or surety issued by a financial institution.

companies but is not a means of averting insolvencies and resultant losses to the auctioneer. Considering the aspects of SME access and (bidders') liquidity and transaction costs, this is certainly a low-cost method of collateralisation. Nevertheless, for the reasons listed above, it is not recommended.

c) Securities portfolio (including debt securities), cash deposits

The usual security deposits for stock-exchange transactions, in addition to bank guarantees, are deposits in the form of transferable securities or cash. Cash deposits and deposits in the form of securities only have a liquidity-restricting effect if they are held for speculative purposes. Transaction costs are incurred for the provision of the deposit account and as a result of foregone interest. The securities portfolio could represent a barrier to entry if an SME does not have sufficient transferable securities. Both forms of deposit perform a security and deterrent function.

d) Use of EUAs held in ETS account as collateral

Alternatively to the usual types of security deposit it is possible to use the previously transferred/purchased EUAs listed in the registry as security. This option certainly generates low transaction costs for bidders, causes no liquidity restrictions or barriers to entry, assuring the performance of transactions and preventing strategic behaviour as long as bidders hold sufficient EUAs. Sufficient holdings of EUAs at the DEHSt registry are the prerequisite for meaningful implementation of this security deposit option. The transaction costs of this type of deposit are relatively low only if the DEHSt itself assumes the function of an auctioneer or is tightly integrated into the process. Otherwise this variant leads to high transaction costs for the auctioneer.

e) Bank payment card

In Great Britain the bank payment card is under discussion as a means for SMEs to lodge security. Regardless of the exact form of the bank payment card, here the bidder is subject to fees for the card and/or commission payments for the arrangement of a line of credit or the costs of foregone interest on cash deposits. The cash deposit variant is subject to a liquidity-restricting effect, but causes no identifiable barriers to entry for SMEs. As long as the banks issuing the bank cards demand sufficient collateral for the bank payment card, this also performs the deterrent and collateralisation function.

The practicability of the various security deposit options should be considered in light of the respective institutional framework conditions. Compatibility with the EU ETS Registry Regulation is assured in that registries perform the function of logging the acquisition, surrender and sale of EUAs, while security deposits fall within the working remit of the auctioneer. Clearing houses such as the ECC maintain accounts at DEHSt, to which entries can be posted at any time (entries posted to personal and operator accounts at the national registry are always confirmed by means of a debit/credit entry in the central Community Independent Transaction Log).

A definitive evaluation of the security deposits described is not possible per se. This issue must be considered in conjunction with the overall design of the auction.

Nevertheless, in order to gain a quantitative idea of costs alongside the qualitative evaluation, approximate figures have been compiled for the different options.

Liquidity costs of the different options

The costs of tied-up liquidity or capital commitment are listed in Table 2. The results in Table 2 represent possible types of security deposits which are handled by different financial intermediaries in a variety of ways. They give an idea of the scale of costs but do not in any way represent the exact costs of the security deposit.

The calculations are based on the following approaches:

Considering the period, in days, from lodging security to the auction date (X=5; alternatively X=2) for all bidders, plus additional days to settlement (Y=2) for winning bidders;

In practice, banks determine interest or early withdrawal penalties mathematically based on the annualised rate, which is then calculated on a monthly basis and finally apportioned to individual days (with all months standardised to 30 days). The opportunity cost of cash deposits is treated as a nominal 5% per annum (fixed-term deposit rate).

The cost of capital commitment is calculated as follows: = (X+Y)/30 * r/12 *s*B, with

X+Y = capital commitment period (here 7 or 4 days),

r = annual interest rate (e.g. 5%),

s = security deposit in % (s= 10% or s = 100%),

B = maximum value of bids for a particular auction.

With a commitment period of 7 days and an interest rate of 5%, costs of 0.1% of the traded volume would be incurred in the example. Hence, even for a 100% security deposit, the costs would only be marginal (well below one percent of the trading value).

Table 2: Estimated costs of security deposits (for successful bidders)

Time from bidding deadline to auction: 5 days						
1000 EUAs (B):	25,000 €					
Time from bidding deadline to auction, X:	5					
Time from auction to settlement, Y:	2					
			Amount of security deposit s			
Type of security deposit	Costs**	poss. extra costs	10%	100%	20,000 €	Margin, z.B. 5%
Cash deposit r	5%	deposit interest	2.43	24.31	19.44	1.22
Guarantee r	2%	admin.fee	0.97	9.72	7.78	0.49
Credit card (with credit line)	1.5%	1-3% /transaction	37.50	375.00	300.00	18.75
Securities, r	1%	*	0.49	4.86	3.89	0.24
Time from bidding deadline to auction: 2 days						
1000 EUAS (B):	25,000 €					
Time from bidding deadline to auction, X:	2					
Time from auction to settlement, Y:	2					
			Amount of security deposit s			
Type of security deposit	Costs**	poss. extra costs	10%	100%	20,000 €	Margin, z.B. 5%
Cash deposit r	5%	deposit interest	1.39	13.89	11.11	0.69
Guarantee r	2%	admin.fee	0.56	5.56	4.44	0.28
Credit card (with credit line)	1.5%	1-3% /transaction	37.50	375.00	300.00	18.75
Securities, r	1%	*	0.28	2.78	2.22	0.14

*It is assumed that only a pre-existing securities portfolio will be used as a security deposit. It is further assumed that securities are not traded on a daily basis so that 'collateralisation' is possible and opportunity costs are low. Hence, for collateralisation via a securities portfolio, max. 1% of the total is estimated for administration charges and costs.
**Costs are in relation to the transaction amount and the length of time the security deposit is required, except for the credit card option.

Source: Own calculations (Fraunhofer ISI)

The results show that the amount of costs depend heavily on the type of security deposit, the settlement period and the required deposit-to-bid ratio. Under the assumptions made, however, costs can be said to be low. The calculation emphasises that the time to settlement has a clear influence on the costs of the security deposit. Generally a percentage-based security deposit with an existing securities portfolio is cheapest for the bidder, provided that transaction costs for collateralisation of the portfolio do not exceed 1% of the bid amount. For guarantees, the costs critically depend on whether and in what amount an administration fee is charged (not taken into account in this example). Some financial institutions pay interest on cash deposits at the overnight rate, rendering the opportunity costs very low. The margin calculation only differs from a percentage-based security deposit in the event of a stock-exchange transaction, in which case the selling and buying positions of all the products traded by the exchange participant can be offset and just the open positions collateralised. In this case the margin is the cheapest option. It should be emphasised that losers as well as successful bidders incur costs for collaterals, but the time to settlement is only from submission of the bid to the close of the auction. Collateralisation via a credit card depends heavily on the terms and conditions of the credit card contract. Discussions with financial institutions have shown that these arrangements can take a prolific and diverse range of forms. Depending on the financial institution and the firm, the costs of settlement via credit card can amount to up to 3% of the transaction volume or equivalent charges in the form of annual fees. Credit card terms and conditions are ultimately a matter for negotiation, although smaller firms are certainly not able to negotiate the same conditions as larger companies. Although for the purpose of these

calculations costs are estimated at 'only' 1.5% of the transaction volume, they demonstrate that under such conditions, collateralisation via credit card is not an option worth discussing. If a credit card method was favoured, special agreements would need to be reached for this purpose with costs priced as a fraction of the transaction volume in basis points.

2.2.4 Experience with security deposits in other countries

a) EU ETS

Ireland: To prevent speculative behaviour, in the first round of auctioning in Ireland (February 2006) a cash deposit of EUR 3000 had to be furnished. The system aimed for settlement within five days. Overall the flat-rate deposit of EUR 3000 was viewed as too low to provide security against payment defaults. In the second round of auctioning, the security deposit was therefore raised to EUR 15,000 and the settlement period was set at two days.

Hungary: In Hungary a 100% security deposit was required, which had to be furnished two days before the auction date (December 2006). The settlement of the auction stretched over eight days, the number of bidders was relatively low and transaction costs on the high side, at EUR 0.05 to EUR 0.2 per EUA.

Austria: For the auctioning of allowances in Austria, a 100% security deposit is envisaged, which has to be lodged in cash two days before the auction.

United Kingdom: For the forthcoming auction of EUAs, two ways are planned in which SMEs can participate in the auction and provide collateral for their payment liabilities. For non-competitive bidding (mainly SMEs) a 100% advance payment must be furnished (possibly via a bank payment card). All other participants (indirect bidders, including SMEs) participate via intermediaries. These assume the screening and hence also the security function. The intermediaries, known as Primary Participants (PP), may demand security deposits or advance payments from the indirect bidders to collateralise their bids. The mode of calculation of the collateralisation is not stipulated but specific terms must be agreed in writing between the PP and the indirect bidder. The transaction costs incurred by the PP for checking the credit standing of indirect bidders cannot be charged on to them.

b) RGGI

The first auction took place at the end of September 2008. The participants must undergo a qualification process in which they must lodge financial collateral in the form of debt securities, cash deposits (non-interest-bearing) or guarantees five days before the auction date, equal to 100% of their bid. Six days after the auction the unsuccessful bidders' deposits are returned. The bidders can choose from among the forms of collateral specified.

Conclusion: A flat-rate security deposit should be avoided because it places a disproportionately high burden on small bidders and – if set low – exerts no deterrent effect against strategic behaviour. A contractual penalty is another less than

satisfactory option, particularly in view of the high costs of prosecuting claims. The use of EUAs as security would be of interest only if DEHSt were acting as the auctioneer. The necessary prerequisites do not appear to be in place for a stock exchange margin solution outside the established stock exchange system. If auctioning took place on an exchange (e.g. EEX), the margin solution would be the lowest-cost solution for the companies which are already active on the stock exchange. In that case, special regulations (possibly collateral furnished via credit cards) would have to apply for other participants. If the institutional setting of the auction is somewhere other than a stock exchange, a relative security deposit at a low percentage (e.g. between 10% and 30%) is an option, since the existence of a functioning secondary market minimises the auctioneer's actual financial risk in the event of default as well as the opportunities for strategic behaviour. Participants could be given free choice of their means of collateral (transferable securities, cash deposits, bank guarantee).

3 Institutional implementation of auctions

This chapter deals with questions concerning the institutional implementation of EUA auctions. These implementation questions relate both to the second and the third trading period. In the current trading period, the existing arrangements for the sale of German EUAs on the secondary market will be replaced with auctions on the basis of a national ordinance. This will be done with the intention of gathering experience for the third trading period when auctions will take place on a larger scale, the framework conditions for which remain to be determined in the course of the amendment of the European Emissions Trading Directive. The following section begins by formulating general requirements and criteria of relevance to the conduct of auctions and to the institutions involved. Next it discusses the extent to which auctions in Europe should be conducted on a centralised or decentralised basis, in terms of both institutional setting and geographical location. After examining the existing arrangements and experience gained to date in individual Member States, it presents and compares different institutional options for Germany. The main question here is which public or private institution could be assigned the task of conducting the auction, and how the interplay of different actors can be regulated.

3.1 Requirements and criteria for institutional implementation

The institutional implementation of auctions must be undertaken with due regard to a range of requirements to be met by actors and procedures, which give rise to various criteria for the institutional arrangements.

All the task areas connected with the administration of emission-allowance auctions must be regulated and assigned to designated institutions, dividing tasks between them where appropriate. The full task chain includes the following main steps (within which a distinction should be drawn between one-off and recurring tasks):

- Provision of an appropriate, user-friendly trading platform (one-off);
- Establishing eligibility criteria for possible participants (one-off);
- Planning and announcement of auctions and conditions including rules and scheduling of auctions (one-off);
- Coordination with institutions in other Member States;
- Individual screening of direct and indirect participants;
- Marketing and customer support;
- Checking of bids;
- Technical conduct of auctions;
- Supplying information about the results to participants;
- Releasing information about the results to the public;

- Financial settlement of successful transactions;
- Transfer of EUAs between accounts;
- Supervision and monitoring of procedures and results;
- Coordination of the institutions involved;
- Reporting to the government and the public;
- Evaluation and, where required, further development of the system.

These steps call for a range of competencies that may have to be covered through the interplay of several institutions, from the public sector, the private sector, or both.

In the assignment of tasks, numerous requirements for the overall administration of auctions should be observed:

- Conditions, processes and outcomes should be transparent and trustworthy for participants and the public;
- Access to auctions and the conduct of auctions must be non-discriminatory; where relevant, this applies equally with regard to indirect participants (via intermediaries);
- The administrative process should be fair to smaller as well as larger participants;
- The impact of market power should be minimised;
- The actors engaged with the institutional implementation must act objectively and impartially;
- Transactions must be securely processed with regard to the finances, the EUAs to be transferred and the data concerned;
- Auctions must be conducted and settled in short time windows, which requires rapid information-processing and evaluation routines;
- The rules, procedures and processes should be sufficiently flexible for necessary adjustments (particularly on the basis of amended European or national provisions);
- Institutional structures for the second period should also be viable for the third period wherever possible;
- The total costs of the auction including transaction and monitoring costs should be as low as possible for the operative institutions and for participants.

Against the background of the specified task areas and requirements for the overall administration of auctions, the institutions involved in conducting them need to satisfy the following main requirements, which also represent important selection criteria:

- The institution should possess professional competence and experience as well as appropriate human resources and technical equipment for the task area in question;

- The institution should be reliable, trustworthy, objective and neutral, preserving independence from the market interests of participants;
- The scheme and performance of tasks should be cost-efficient, taking account of (additional) costs to the institutions involved, coordination with other institutions and total costs incurred by direct and, where relevant, indirect participants.

3.2 Centralisation versus decentralisation

In deciding on the institutional mechanisms for the auctioning of EUAs, one fundamental question concerns the degree of centralisation or decentralisation of procedures in Europe. Three distinct aspects need to be considered:

a) Auctioning by a central body at EU level or by nationally-designated bodies;

b) Regional distribution of auction venues;

c) Eligibility of auction participants nationally delimited or EU-wide.

a) For the second period, which is currently in progress, the Member States are in charge of the sale or auctioning of EUAs. For the third period, in contrast, the question arises as to whether auctions should be run centrally by a European institution or whether this responsibility should continue to be devolved to the Member States. A fully centralised auction under the responsibility of an EU institution could reduce overall auction costs, produce more efficient auction outcomes and, at the same time, ensure uniform modalities in Europe. In this event, the (net) auction revenues – rather than the EUAs to be auctioned – would have to be distributed among the Member States by an appropriate mechanism. The European Commission would then be responsible for the auction in the first instance, while the auction could be conducted with the help of the European Central Bank, for example (see below).

However, a fully centralised auction could generate higher transaction costs for participating companies than a decentralised system. Furthermore, political acceptance of a central solution might be lower in some Member States. Therefore even in the third period, auctions under the responsibility of the individual Member States remain an option to be considered. In this event, important modalities which relate particularly to openness, transparency and non-discrimination, to conditions of participation, supervision and monitoring, and possibly auctioning methods, should be harmonised throughout Europe, and particular questions such as the scheduling of auctions should be coordinated (see Chapter 5).

b) Especially in the case of nationally organised auctions,[5] decisions need to be made on how auction venues should be regionally distributed. It is conceivable – but not a requirement – that a Member State may wish to operate or use platforms in several locations. As this can increase overall costs as well as the need for coordination, a Member State is likely to restrict itself to one auction venue. For larger countries like Germany, there could be good supervisory reasons for the choice of one national auction venue. Smaller countries, on the other hand, could refrain from having their own national platforms if access to other auctions is guaranteed.

c) If the individual Member States are responsible for the auctions, it is necessary to specify who is permitted to take part in their respective auctions. In principle, auctions should be open to all persons who hold a registry account, either directly or at least indirectly via intermediaries. On this point, opinions still differ (e.g. in Austria) on whether participants from other Member States should be allowed to participate in 'national auctions'. For objective reasons, any exclusion of account holders from other Member States should be avoided altogether.[6] Further arguments favouring this approach are that it increases liquidity, and that auction prices (because of arbitrage transactions) are not expected to differ substantially from prices in secondary markets (cf. Chapter 2). Otherwise even the smaller countries could be forced to set up their own platforms. In time for the second period, the cross-border openness of auctions should be uniformly coordinated throughout the EU or, failing that, agreed bilaterally. For the third period, this should be prescribed (in the Directive) from the outset.

3.3 Arrangements and experience to date

In the first trading period, sales of EUAs were of negligible significance. In the second trading period currently in progress, they are gaining in importance. So far, varying developments have taken place in individual Member States.

3.3.1 … in Germany

In Germany, EUAs for the first period 2005-2007 were allocated completely free of charge. In the second period (2008-2012) 40 million EUAs are being offered for sale per year (Art. 19 ZuG 2012). The procedure for the sale is regulated in Article 21 ZuG 2012 [unofficial translation; authors' emphasis]:

(1) The allowances are sold either at market price at the trading venues for allowances or, from the year 2010 at the latest, by means of an auction. In the case of sale,

[5] Another option is to organise auctions centrally but to conduct them decentrally only (by holding auctions at different venues).

[6] One motivation for not wishing to allow participants from other countries could be the fear that domestic bidders, especially small operators, could be crowded out. In any case, coordination between the Member States on this issue would certainly be necessary.

allowances are offered continuously at the trading venues with the aim of minimising market impact. In the case of auctioning, in the years 2008 to 2012 the available volume of 40 million allowances per year are offered at regular intervals in equal tranches.

(2) The Federal Government is authorised to pass regulations on an auctioning procedure by means of a statutory ordinance not requiring Bundesrat approval. The statutory ordinance requires approval from the Bundestag. The statutory ordinance should designate the competent authority and stipulate rules for the conduct of the auction procedure; these must be objective, transparent and non-discriminatory and contain precautions against the influencing of price formation by the behaviour of individual bidders.

(3) The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, in agreement with the Federal Ministry of Finance, commissions a suitable authority to administer the procedure according to paragraph 1 sentence 1. In the case of auctioning, the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety makes the auction dates known in the electronic Federal Gazette at least two months in advance according to paragraph 1 sentence 3; when setting auction dates, overlappings with auction dates in other Member States of the European Union should be avoided.

Currently the initial sale of allowances for the second trading period in Germany (2008 and 2009) takes the form of sale at market prices in the secondary market. In order to keep market impact to a minimum, EUAs should be offered continuously in trading marketplaces. In December 2007 the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) in agreement with the Federal Ministry of Finance commissioned the state-owned bank KfW Bankengruppe (cf. 3.4.4) to conduct this sale. To perform this role, KfW became accredited to trade on the European Climate Exchange (ECX) in London and the European Energy Exchange (EEX) in Leipzig. KfW sells allowances on each trading day, spread across the hours of trading. The volume available for 2008, amounting to 40 million EUAs, was offered for sale up to mid-November 2008 in equal weekly tranches in due consideration of market liquidity. At an average selling price of EUR 23.33 per EUA, the total value amounted to EUR 933.3 million (BMU 2008).

Since it was not initially possible to create EUAs for 2008 in the German national registry, sales in 2008 were conducted via the futures market only.

In November 2008, selling volumes were between 82,000 and 242,000 allowances per day. Again in November, the average prices achieved by KfW were close to the average prices at the ECX London, the average difference being +0.11% or EUR 0.02 (with a range between -0.11% and +0.33%). Across the total volume, there was no difference from the volume-weighted average price on the London exchange in 2008.

The sale of EUAs to date can be evaluated as a thoroughly positive experience. The administrative cost is relatively low in relation to the volumes transacted. The procedure is relatively simple and delivers a high degree of price transparency. Its

special merit is that it enables every participant in the Emission Trading System throughout Europe to purchase allowances directly on the exchanges or indirectly via an intermediary.

3.3.2 … in other countries

In other countries, a variety of plans and preparations are being made for the auctioning of EUAs, since no uniform European regulations are available as yet.

In Austria, auctioning is conducted by a private institution with the requisite experience. To this end, a two-stage tendering process was carried out at the end of 2007, which was won by the Dutch company CLIMEX (see Section 3.4.8).

In Austria during the second trading period a total of 2 million EUAs will be auctioned. This equates to 0.4 million per year, only a very small volume in comparison to Germany (40 million per year). The (draft) Austrian auctioning ordinance for the second trading period also contains the following provisions:

- Possible participants: all account holders which have set up an account with a registry connected to Europe's emissions trading registry, the Community Independent Transaction Log (CITL);
- Collateral: 100% of bid value furnished two days before the relevant auction;
- Trading venue: auction via the internet by a suitable body in possession of the necessary expertise;
- Order book: closed order-book auction, during which bidders can only see their own bids;
- Bid quantities: a minimum of 100 EUAs; a maximum of the entire volume offered; the volume must correspond to an integral multiple of the minimum bid quantity;
- Minimum bid price: adjusted to current market prices;
- Determination of price/volume allocation: uniform price determined by ranking bids in order of price, highest to lowest; in the event of identical (lowest) bid prices, the quantity is allocated to the bid received earlier;
- Residual quantities if any: reserved for sale at a later date.

The tender[7] for implementation of the auction encompassed all aspects of administering the auction, particularly

- conducting at least two auctions annually using a suitable auction design,

[7] The weighted award criteria were price (70%), quality (25%) and market observation (5%). The quality criteria considered were: technical quality of the auction system (5%), measures to achieve the best possible price (10%), support of the contracting body's clients (5%), and plausibility of the specified procedure for the option of Europe-wide auctioning (5%).

- issuing notifications and communicating auction results,
- secure and transparent financial settlement of successful transactions,
- supporting transfer of purchased CO_2 emission allowances to buyers' accounts,
- marketing and PR activities,
- customer support and information.

The aim, so far as possible, is to be able to reach all market participants throughout Austria, avoiding any disadvantage to individual sectors or small enterprises. The option of conducting the auctions on a Europe-wide basis should be kept open.

The auctioning system to be used should be fair, secure, fast, transparent, easily accessible and user-friendly. The objectivity, neutrality and security of the auction platform, the auction system and auction procedures must be guaranteed.

The operative institution and its staff must meet the criteria of objectivity, neutrality and independence from participants in the emissions trading market.

In the United Kingdom and in the Netherlands, the auctions are conducted by the State Treasury Agencies, which already conduct auctions of government bonds. The first auction in the United Kingdom was conducted on 19 November 2008. Almost 4 million EUAs were sold at a unit price of EUR 16.15. In total, some 85 million EUAs should be auctioned in the United Kingdom during Phase 2.

In the Netherlands, the start date for auctions has been postponed. Responsibility has been assigned to the Dutch State Treasury Agency (Agentschap van het ministerie van Financiën, www.dutchstate.nl), which normally sells government bonds, savings bonds, etc.

In the United Kingdom, the Department for Environment, Food and Rural Affairs (Defra) is responsible for the overall administration of the auctions.[8] The technical implementation of the actual auctioning process is conducted within this framework by the UK Debt Management Office (DMO) in its role as the Executive Agency of Her Majesty's Treasury. Defra's particular duties include checking the bidder's details on registry accounts and overseeing the transfer of allowances to accounts. Defra is also responsible for the process of approving auction participants.

Auctions should always be announced two months in advance, and take place within a two-hour time window. Auction dates should be fixed in consultation with other Member States to avoid scheduling conflicts. The volume to be auctioned is always announced one month in advance. A reserve price is set for the auction in order to reduce the risks of unforeseen developments. Bid quantities must be stated in integral units of 1000 EUAs.

[8] The Regulations and Scheme of HM Treasury came into force and were published in July 2008. Cf. http://www.defra.gov.uk/environment/climatechange/trading/eu/operators/auctioning.htm

Auctions should basically be open to all holders of a registry account. Intermediaries should take responsibility for the laborious individual screening checks in order to keep administrative costs down. Defra is accepting applications for Primary Participant status from 15.8.2008 (www.defra.gov.uk/environment/climatechange/trading/eu/). Primary Participants can submit direct bids in auctions and act as intermediaries for indirect bidders. Applicants must be holders of a registry account, have an office base within the European Economic Area and satisfy certain conditions to ensure competent and secure performance of the intermediary function. The list of Primary Participants is published on the DMO website.

Intermediaries should have a fundamental obligation to accept bids from all registry account holders as indirect bidders. Intermediaries are not permitted to charge fees for indirect bids but can demand advance payments from indirect bidders. However, after the first round of UK emissions auctioning, intermediaries complained about the inability to recover the costs of screening indirect bidders.

Taking an overall view, the intermediaries will play a pivotal role in the British auctioning system and will have to bear a high degree of responsibility for its fair, non-discriminatory, transparent and secure administration. It seems important to ensure that these are independent agents who can guarantee a sufficient degree of neutrality within the process.

3.4 Institutional options

In the following section, different institutional options are described from the German perspective. Particular consideration is given to state or private institutions that could, if required, fulfil core tasks in the administration of auctions.

3.4.1 European Central Bank (ECB)

The European Central Bank (ECB, www.ecb.int), a supranational institution with headquarters in Frankfurt am Main, has been responsible for the implementation of monetary policy in the euro area since 1999. Its primary task is to maintain price stability in the euro area. Membership of the monetary union is subject to fulfilment of what are known as the convergence criteria. So far 15 countries have joined the euro area; the following twelve EU Member States are not yet members: Bulgaria, the Czech Republic, Denmark, Estonia, Latvia, Lithuania, Hungary, Poland, Romania, Slovakia, Sweden and the United Kingdom. The Eurosystem consists of the ECB and the central banks of the countries that have introduced the euro, whereas the European System of Central Banks (ESCB) comprises the national central banks of the other Member States in addition. The ECB performs its tasks together with the national central banks, fundamentally adhering to the principle of decentralisation.

In the framework of its monetary policy instruments the Eurosystem carries out open market operations, offers standing facilities and requires financial institutions to hold minimum reserves in accounts in the Eurosystem (ECB 2006). Open market operations (in the form of standard tenders, quick tenders or bilateral procedures) are initiated by

the ECB. Counterparties of the ECB must fulfil a range of conditions. It is only possible to access the standing facilities and the open market operations of the Eurosystem via standard tenders through the relevant national central bank. For operations executed by means of quick tenders and bilateral procedures (except currency swaps), every national central bank chooses a certain number of counterparties which fulfil the general eligibility criteria.

The European Central Bank could be a possible candidate for the operation of emission allowance auctions in the third period, if auctions should be conducted on a Europe-wide basis (cf. Jos Delbeke in: Carbon Market Europe. 20 June 2008). In view of its specific structures and its focus on the euro area, however, there are some reservations about its suitability for such a role. If one central auctioning system in Europe were pursued in future – though not deemed necessary from the current perspective – it would seem more advisable to use or set up special emissions trading structures to achieve this.

3.4.2 Deutsche Bundesbank

The Deutsche Bundesbank, based in Frankfurt am Main, is directly accountable to the federal government and a legal person governed by public law; as the central bank of the Federal Republic of Germany it is an integral part of the European System of Central Banks (Art. 2, Art. 3 Bundesbank Act). Its main tasks concern the monetary policy of the Eurosystem, along with the financial and currency system, banking supervision, cashless payments and cash management (www.bundesbank.de). In addition to its Central Office in Frankfurt it has nine Regional Offices and 47 branches. The Deutsche Bundesbank exercises its legal powers independently without instructions from the federal government. The Bundesbank's scope of business is defined in the Bundesbank Act Articles 19 to 25 (and hence, any broadening of its scope would require an amendment of the law).

An expertise by the FiFo Institute for Public Economics (2008) proposed use of the Deutsche Bundesbank's OMTOS platform for the auctioning of EUAs. OMTOS (Open Market Tender Operation System) is used for the execution of the Eurosystem's open market operations, having replaced the previous Automatic Bidding System (ABS) in November 2005. It provides authorised participants with a simple and low-cost means of participating in ESCB open market tenders and hence obtaining central bank money directly (www.bundesbank.de/omtos/omtos.en.php).

OMTOS is a Java-based web application. All that users require is a standard PC with an operating system and a browser. Modern security standards ensure compliance with high standards of data protection and data security. Like all system components for which the Deutsche Bundesbank is responsible, it is designed with built-in redundancy and physical separation. Other than the cost of the Internet connection, no costs are incurred for participating in open market operations on OMTOS.

OMTOS is a special interactive service on ExtraNet, the Bundesbank's e-business platform (www.bundesbank.de/extranet/extranet.en.php).

Another special service on ExtraNet is the Bund Bidding System (BBS), an auction platform for German Federal securities or 'Bund issues' (www.bundesbank.de/bbs/bbs.en.php). BBS is an electronic primary market platform of the Bundesbank which enables fast, convenient and stable administration of Bund issues by tender. In April 2005 it replaced the previous Automatic Bidding System (ABS) in this area.

On behalf of the German Finance Agency (see below) and for the account of the Federal Government, the Bundesbank operates the auctions that constitute the tender procedure for one-off issues of government securities (Treasury discount paper, Federal Treasury notes, five-year Federal notes, Federal bonds), assists with the sale of tap issues (finance notes, Federal savings notes) and conducts market-smoothing operations through Germany's physical stock exchanges (www.bundesbank.de/kredit/kredit.en.php). Members of the Bund Issues Auction Group (see below) are authorised to bid in these auctions.

Restricting access to such a group of bidders would hardly be appropriate for the auctioning of EUAs, since only certain banks could then participate directly and all registry account holders would be dependent on the services of these intermediaries.

To draw an interim conclusion, from a technical viewpoint the use of the Bundesbank ExtraNet could be considered as a tenable option for the auctioning of EUAs in Germany. In that event, however, direct use of OPTOS or BBS would not be recommended, but rather the creation and provision of an additional (parallel) customised service aimed at a different group of participants. As far as legally possible, the Bundesbank would conduct the auction on behalf of another institution, which specifies the modalities and would have to be responsible for additional administrative tasks associated with the auction. It must be emphasised, however, that conducting such auctions would objectively exceed the Bundesbank's present statutory remit.

3.4.3 German Finance Agency

The Federal Republic of Germany – Finance Agency (German Finance Agency) in Frankfurt am Main was founded in September 2000 to perform functions in connection with budget funding and short-term liquidity funding for the German Federal Government. The sole shareholder is the Federal Republic of Germany, represented by the Federal Ministry of Finance. The German Finance Agency is the central service provider for the Federal Republic of Germany's borrowing and debt management (www.deutsche-finanzagentur.de). Its tasks include services in connection with the issuance of Federal Government securities, borrowing in the form of promissory notes, the use of derivative financial instruments and money market transactions to balance the Federal Republic of Germany's account at the Deutsche Bundesbank. Since August 2006 it has also been responsible for private client services in connection with Federal Government securities and for administering the Federal Debt Register.

Acting for the account of the Federal Government, the German Finance Agency, through the Deutsche Bundesbank, offers Federal bonds, five-year Federal notes,

Federal Treasury notes and Treasury discount paper for sale by auction (known as the tendering system). The terms and conditions of individual issues are announced by means of an invitation to tender which is published via press releases, financial information services and the Bund Bidding System (BBS) of the Deutsche Bundesbank (cf. Auction rules for the issue of Federal bonds, five-year Federal notes, Federal Treasury notes and Treasury discount paper, as of October 2007).

The group of potential bidders is not restricted, but direct participation is limited to members of the Bund Issues Auction Group defined by the German Finance Agency (German resident financial institutions, securities trading firms, securities trading banks and German branches of foreign undertakings). Prerequisites of membership are that monetary settlement of auction transactions can be effected via a giro account at a branch of the Deutsche Bundesbank and delivery via an account at Clearstream Banking AG Frankfurt. There is no legal right of admission to the Auction Group. A member must be prepared to take up at least 0.05% of the total issue amounts allotted, weighted by duration, at auctions in one calendar year.

Bids must be transmitted electronically within a specified bidding deadline through the Deutsche Bundesbank's Bund Bidding System (BBS). Bids must be submitted for a par value amount of at least EUR 1 million or an integral multiple thereof.

In the year 2007 the German Finance Agency placed Federal government securities (Federal bonds, five-year Federal notes, Federal Treasury notes, Treasury discount paper and inflation-linked German government securities) via the Bund Issues Auction Group in 36 auctions. In 2008 (as in 2007) the Bund Issues Auction Group consisted of 33 members, which are ranked annually by their weighted allocation amounts (German Finance Agency, press release, 18 December 2007).

The composition of the Auction Group meets the specific objectives for the sale of Federal securities, but bears little relation to the requirements for the auctioning of EUAs. All other parties would be completely dependent on intermediaries, which begs the additional question of whether the existing members of the Bund Issues Auction Group would satisfy all the criteria applicable to intermediaries engaging in primary EUA trading (including that of independence).

Against this backdrop, the German Finance Agency seems to meet few of the criteria for a suitable institution to take charge of EUA auctioning. As matters stand now, it would only have the technical capacity in partnership with the Deutsche Bundesbank, and objectively its competencies – and indeed the object of its activities – are concentrated in the area of Federal securities and not emissions trading.

3.4.4 Kreditanstalt für Wiederaufbau (KfW)

Kreditanstalt für Wiederaufbau (KfW) is a public-law institution owned by the Federal Republic of Germany (80%) and the federal states (20%) (Art. 1 Law Concerning the KfW). It is mandated by the state to perform promotional functions in areas such as small and medium-sized enterprise, liberal professions and business start-ups, venture capital, housing, environmental protection, infrastructure, technical progress and

innovation, internationally agreed promotional programmes and development cooperation. Responsibility for supervision of KfW is exercised by the Federal Ministry of Finance in conjunction with the Federal Ministry of Economics and Technology. KfW is subdivided into the promotional arm KfW Förderbank, the SME financing arm KfW Mittelstandsbank, the international project and export financing arm KfW IPEX-Bank, and the development financing institutions KfW Entwicklungsbank and DEG.

KfW has a long record of involvement in different areas of environmental and climate protection. In the first phase it was responsible for the purchase of EUAs to replenish the reserve. As outlined in Section 3.3.1, it is currently mandated by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) to sell EUAs for the second trading period in the secondary market. By 2010 at the latest, this daily offering of allowances for sale in the course of normal trading will be replaced by regular, e.g. monthly, auctions. During this period the total volume will remain unchanged, but it will be multiplied in the third period.

KfW possesses experience in the area of emissions trading but not in holding its own auctions of EUAs. While its current selling practices make use of existing marketplaces, it would have to set up an appropriate auctioning system from scratch before it could hold auctions.

3.4.5 Federal Network Agency

The Federal Network Agency for Electricity, Gas, Telecommunications, Post and Railway, based in Bonn, is a separate higher federal authority within the domain of the German Federal Ministry of Economics and Technology. Since July 2005 it has exercised regulatory responsibilities for networks in the energy industry, in telecommunications and postal services and, since January 2006, for Germany's railway infrastructure (www.bundesnetzagentur.de).

There are two initial reasons for considering the Federal Network Agency as a potential institution to auction EUAs: a substantial amount of the Agency's work is in the energy sector, which is of major importance to emissions trading. Also, it has previously conducted a number of auctions in the telecommunications sector. However, its responsibilities in the energy sector are relevant to electricity and gas networks, whereas electricity generation is the primary focus of emissions trading whilst industrial companies are also involved. Furthermore, the one-off auctions in the telecommunications sector (especially the spectacular auctioning of UMTS spectrum licenses in the year 2000) bear little comparison with the regular cycle of emission-allowance auctioning. Based on the absence of allied technical expertise or responsibilities at the Federal Network Agency, it should not be considered any further as a possible auctioneer of EUAs.

3.4.6 Federal Environment Agency/German Emissions Trading Authority

The German Emissions Trading Authority (DEHSt) is an organisational unit (Division E) of the Federal Environment Agency (UBA), the central environmental authority in

Germany since 1974. The most important tasks of the UBA consist of scientific support to the German Federal Government, the enforcement of environmental laws and informing the public about environmental protection (www.umweltbundesamt.de).

Founded in 2004, the DEHSt is the competent national authority for emissions trading as well as for the project-based mechanisms of the Kyoto Protocol – Joint Implementation (JI) and the Clean Development Mechanism (CDM). The tasks it performs are defined principally in the German Greenhouse Gas Emission Allowance Trading Act (TEHG), in the Allocation Laws (ZuG 2007 and ZuG 2012) and in the Project Mechanisms Act (ProMechG). DEHSt works closely with operators of installations that are subject to the Emission Trading System, and with verifiers, and serves as the point of contact on emissions trading for the Federal Environment Ministry and Germany's federal states. It also contributes to the ongoing development of the emissions trading system (www.dehst.de).

Data exchange with DEHSt, e.g. for applications, allocation of EUAs, management of accounts in the national registry and annual emissions reporting is predominantly electronic, and makes use of different databases and platforms (DEHSt 2008). The IT infrastructure at DEHSt was developed rapidly – with support from a consultancy (INFORA GmbH) and using many basic components from the BundOnline 2005 e-government initiative – as a series of stand-alone applications, combined under a modular architecture into a complex system. Largely for service-oriented reasons, operational management of the database and application is carried out by external providers (DEHSt 2008).

DEHSt has no previous direct experience in the trading or auctioning of EUAs. The current market sale of EUAs for the second trading period is being handled by KfW, which was also mandated to purchase EUAs to replenish the reserve for the first period in 2007.

To be able to conduct independent auctions, a suitable platform would first have to be developed and installed at DEHSt. Equally it would be possible to outsource the provision or the operation of such a platform, although this could further increase the complexity of the system.

Alternatively, DEHSt's role in auctioning could be limited to activities in cooperation with another public or private institution which takes charge of the core tasks of auctioning including financial clearing and settlement.

In this context, the tasks assigned to DEHSt could include the supervisory, monitoring and reporting functions, such as authorising direct and indirect participants, vetting intermediaries, verifying transactions, providing the interface to the registry, compiling evaluation reports and supporting BMU in updating the standards for auctions. Furthermore it could support coordination with the European Commission and other Member States.

It should be emphasised at this juncture that conducting auctions, in itself, is not a function that necessarily has to be performed by state authorities. Instead, the (non-

sovereign) services could equally be provided by private institutions within a predefined framework.

3.4.7 Existing emissions trading venues (exchanges such as EEX)

Emission allowances have so far been traded on different exchanges and in non-exchange (over-the-counter) dealing. In addition to spot trading of current EUAs, trading also takes place in derivatives such as emissions futures. Exchanges like the ECX and the EEX are playing an increasing role (Figure 2). Therefore they are obvious venues at which to conduct the future auctioning of EUAs.

In Germany, EUAs are traded at the European Energy Exchange AG (EEX) in Leipzig. The EEX was established in 2002 by a merger of two German electricity exchanges and has since grown strongly in terms of numbers of participants and trading volumes. It is well on the way towards its stated aim of becoming a major European trading venue. The prices quoted on the EEX already serve as an important reference for private and public purposes (www.eex.de).

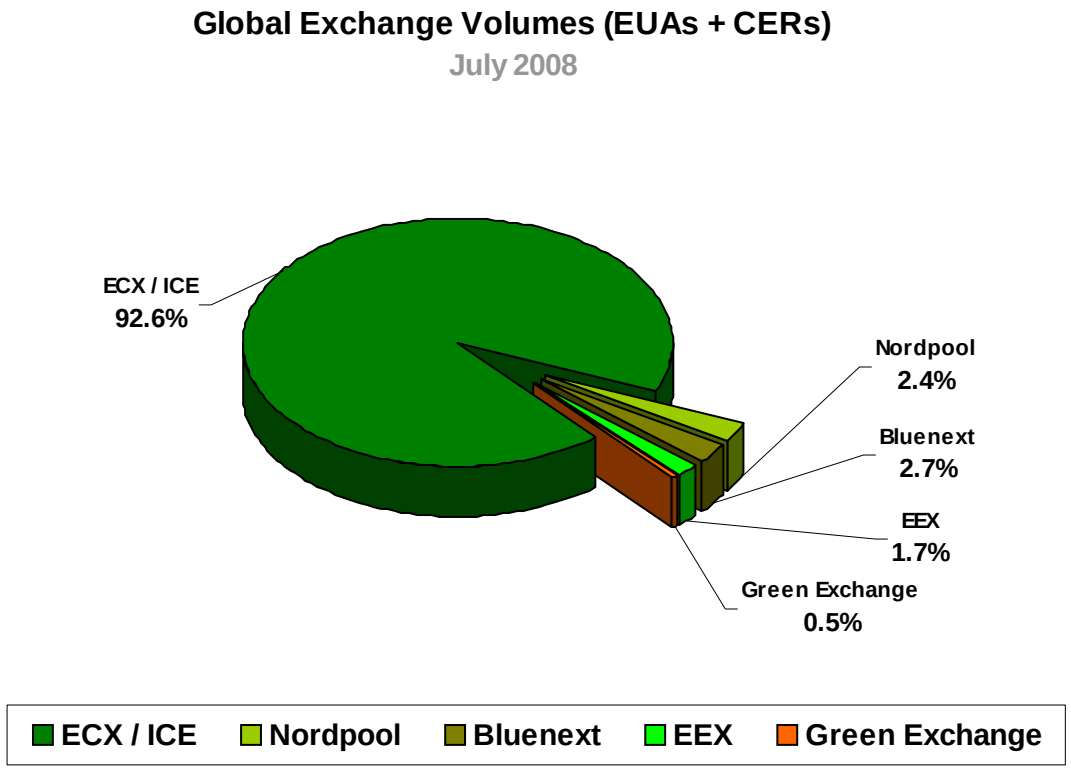
Energy commodities traded on the EEX include electricity (intraday, day-ahead, Phelix futures, Phelix options, German power futures, French power futures), gas (gas day-ahead, gas futures) and coal (coal futures). There are also markets in emission allowances (EU emission allowances, EU carbon futures since 5.12.2007, EU carbon options since 14.4.2008) and emissions credits (CER futures since 26.3.2008).[9]

The EEX is an exchange pursuant to the German Stock Exchange Act and a regulated market within the meaning of the European Markets in Financial Instruments Directive (MiFID). The responsible supervisory authority for the EEX is the Saxon State Ministry for Economic Affairs and Labour (SMWA) in Dresden. Only properly qualified people are permitted to trade on the EEX. Part of the qualification process involves a two-day training programme (previously one-day, omitting options trading) including a test.

The list of participants currently runs to 211 companies; including those which operate in more than one market concurrently, 149 are active in the power spot market, 141 in (other) spot markets and 129 in derivatives. Exchange participants come from different sectors and countries, including many energy companies and banks, e.g. Vattenfall and Deutsche Bank, which are active in almost all market segments and product groups. KfW is another participant which is able to engage in exchange-based and OTC trading of EU carbon futures, EU carbon options and CER futures.

[9] In the area of futures and options contracts based on emissions allowances and carbon credits, since December 2007 EEX has cooperated with Eurex, a leading derivatives exchange operated jointly by Deutsche Börse AG and SWX Swiss Exchange.

Figure 2: Trading volumes on different exchanges



Source: http://www.europeanclimateexchange.com/

Trading in EUAs on the EEX to date

Contracts for EU emission allowances (EUAs) can be traded on the spot market at the EEX. In addition to exchange trading, it is also possible to register non-exchange trades for over-the-counter (OTC) clearing. Spot contracts have a contract volume of 1 EUA and are traded to two decimal places in EUR/EUA, i.e. the smallest price increment is EUR 0.01/EUA (EEX 2007).

The buyer of a spot contract acquires emission allowances which are entered in the central depository account of European Commodity Clearing AG (ECC) at DEHSt. The buyer then has the right to instruct ECC to transfer these EUAs within two trading days from its central depository account at DEHSt to an account nominated by the buyer at one of the EU Member State registries. The seller of a spot contract sells EUAs which are entered in ECC's central depository account at DEHSt. At the same time the seller assigns to the buyer the right to transfer the EUAs. The EEX spot market quotes a daily settlement price which essentially corresponds to the market price of the last deal transacted on the trading day.

The EEX futures market (European carbon futures) likewise provides facilities for exchange trading and for the registration of non-exchange deals for OTC clearing. On reaching a deal, buyers and sellers of European carbon futures agree to supply and pay for a given volume of EUAs at the agreed price on a certain date in the future. Here the contract volume is 1000 EUAs. Prices of futures contracts are quoted in EUR/EUA to two decimal places. At the end of a trading day, a settlement price is quoted for the given futures contract, which essentially corresponds to the market price of the last of the day. For the second trading period, futures contracts with maturity dates of December 2008, December 2009, December 2010, December 2011 and December 2012 can be traded.

The clearing structure consists of the ECC and several banks, known as the clearing members. The ECC is involved as a central counterparty in every trade and thus assumes the counterparty credit risk. Trading participants deal with a clearing member of their choice, which in turn deals with the ECC. For obligations entered into as a result of trades, trading participants must post collateral with their clearing member, and clearing members with the ECC.

The ECC maintains an account in trust for exchange participants at the national registry. In addition, the ECC maintains internal accounts for the clearing members, and these in turn maintain equivalent accounts for the exchange participants making use of their services.

Collateral requirements on the spot market are calculated by netting out an exchange participant's amounts receivable and liabilities, in both cash and EUAs, from all contracts not yet fulfilled. A 'current liquidating margin' is calculated for these positions, which equates to the losses or gains from closing them out immediately. Furthermore, exchange participants must lodge an 'additional margin' to cover potential liquidation losses on EUAs in the event of unfavourable intra-day movements in market prices.

For futures trading, both 'spread margin' and 'additional margin' must be posted as collateral, to cover the risk of the maximum costs of closing out all of an exchange participant's open positions on the next trading day, assuming worst-case price changes.

In 2008, a total of 78.3 million EUAs were traded on the EEX (2007: 22.7 million EUAs). These break down further into 0.7 million EUAs for the first trading period (spot market to the end of March 2008) and 77.6 million EUAs for the second trading period (futures market only, initially).

Possible auctions at the EEX

As yet, emission allowance auctioning does not take place at the EEX.[10] It would, however, present a favourable environment to capitalise on its existing know-how and infrastructure for auctions.

In this event, the EEX would function as a kind of electronic auctioneer. The role of 'passive seller' of the EUAs, the holder of the account to which the EUAs would be posted, could be assumed by DEHSt or KfW. That question notwithstanding, other auction-related tasks could still fall within the DEHSt's sphere of responsibility.

The eligible group of participants does not need to be restricted to existing trading participants only. Essentially it would be possible for all persons holding an EUA registry account and wishing to take part in auctions to apply for membership of the exchange. Those who were not clearing members themselves would first have to choose a clearing partner (a bank), in line with existing practice. In a similar way, the modalities for furnishing collateral could be aligned with existing rules.

To simplify arrangements, a special product category could be defined so as to enable a simplified, category-specific access arrangement for the sole purpose of participating in spot-market emission allowance auctions. For it must be borne in mind, firstly, that spot-market transactions in emission allowances are much simpler than, for instance, spot-market trading in electricity products, which are differentiated into hourly or block contracts for different time periods and hence more complex. Secondly, there would be no need for a participant in primary auctions to be suitably qualified for trading in futures or even options, which are more complex by far and make higher demands upon market participants.

Whereas it should be fundamentally possible for interested participants to gain direct access to auctions, there should also be a facility for indirect participation via intermediaries. This approach could be of greatest interest to SMEs, if the purchase of EUAs is only of incidental significance to their business. Generally the most likely intermediaries would be banks already trusted by the potential indirect client. For SMEs, KfW would also be a candidate for this role. Large energy supply companies with their own trading departments would certainly also have a high degree of competence but would not be independent, giving rise to a risk of strategic behaviour (particularly given knowledge of indirect bidders' bids). For this reason, they are less suitable as intermediaries.

Over and above the possibility of indirect participation, thought should be given to whether SMEs should be granted certain special rights in auctions, which could then be exercised either in the course of direct participation or via intermediaries. These special rights might consist of a non-competitive bidding facility, for example, giving SMEs first

[10] Auctions are conducted in the electricity spot market at EEX, however, for day-ahead hourly contracts.

refusal on the available EUAs (but at prices established by the competitive process). However, special regulations barely seem necessary if both the regular auctions and the secondary market are functioning well. Before more complex special regulations are implemented, experience could initially be gathered during a start-up phase; a subsequent review could determine whether SMEs were really disadvantaged by auctions.[11]

If the option of a primary auction at the EEX proceeds to the concrete design stage, it would also be necessary to decide on the extent and amount of fees that participants would incur for approval and bidding. Registration of participants and maintenance of market access represent fixed costs, while trading gives rise to variable costs. Existing registered participants will not incur additional fixed costs. One possibility of relieving participants of these fees would be to finance the transaction costs incurred by the exchange and, possibly, by intermediaries out of the state's auction revenues. One further consideration, however, is that the desirable endeavour to open such auctions to the whole of the EU may result in a high proportion of participants from other Member States, which could make any general financing from German auction revenues seem unfair. The Member States would have to consult with one another on this matter and raise it as an issue for future harmonisation.

If a private institution is preselected for the auctioning of EUAs, however, it will also be necessary to examine whether such services must be procured by (EU-wide) public tender, and any stipulated conditions.

3.4.8 Other private providers

In addition to existing exchanges like the EEX in Leipzig, other potential candidates include private providers which already offer or could offer services like the auctioning of emission allowances.

One of these is the Climex Alliance (previously New Values; already mentioned under 'Austria'), which was founded in 2003 (www.climex.com). Its shareholders, in addition to Climex management, are the companies Rabobank, STX Services, TenneT and Vertis Environmental Finance (owner and operator of the euets.com platform). In 2004, Climex developed an online trading platform for various environmental products including NO_x emission rights for the local Dutch market and guarantees of origin for renewable electricity. A further platform was developed to prepare for implementation of the Kyoto Protocol. In cooperation with the Asia Carbon Exchange (ACX-Change), New Values conducted the world's first online auction of carbon credits from CDM projects (Certified Emission Reductions, CERs).

Since 2008 Climex has offered spot-trading in EUAs and CERs as well as regular auctions of EUAs, CERs, Emission Reduction Units (ERUs) and Verified Emission

[11] In this context, the procedure and experience in the United Kingdom should also be observed.

Reductions (VERs), along with services in the electricity, gas and green certificates segments.

The Climex trading platform currently has 102 members (the directory of members is published on its website under www.climex.com/participants.aspx).

In the first period, two auctions were conducted for Hungary (in December 2006 and March 2007) on the euets.com platform, in which a total of 2.4 million EUAs were sold. Access was open to any holder of a registry account via a partner of the Climex Alliance (Fazekas 2008). The auction type was a uniform-price auction with a reserve price. In the first auction, the reserve price was calculated from the previous day's market price minus 90 cents; in the second auction it was based on 85% of the previous day's futures price for December 2007. Bids were not visible to other bidders.

In September 2007 EUAs were also auctioned on behalf of Lithuania. The auction was organised by Vertis and conducted on the Climex platform (following a similar procedure to the Hungarian auction). A total of 0.552 million EUAs were sold. Due to the market situation at the end of the first trading period, however, the price obtained was only EUR 0.06 per EUA, resulting in total proceeds of only EUR 33,120.

In the second trading period, auctions of a total of 2 million EUAs (0.4 million per year) will be conducted via Climex on behalf of Austria (see 3.3.2).

In all the cases mentioned, however, the auction volume is considerably lower than the volume to be sold or auctioned in Germany in the second trading period (40 million EUAs per year). Moreover, several times that volume should be auctioned in Germany in the third trading period.

It is conceivable that with regard to an enlarged trading volume in the third trading period further professional trading actors will emerge who might equally merit consideration as providers of primary auctions of EUAs.

Regarding the particular modalities of auctions on such platforms, the points made above with reference to EEX auctions (including discussion of the treatment of SMEs) are essentially valid for other providers.

3.5 Conclusion: Comparison of institutional options

Starting with a set of requirements and criteria for institutional implementation, in the previous section a total of eight institutions have been described and discussed with a view to establishing their possible function within the overall process of auctioning EUAs. The following is a summary of the key points of emphasis for each of the institutions under consideration:

- The specific structures of the *European Central Bank (ECB)* and its focus on the euro area leave some reservations about its suitability for emission allowance auctioning. If one central auctioning system in Europe were pursued in future – though not deemed necessary from the current perspective – it

would seem more advisable to use or set up special emissions trading structures, based elsewhere, to achieve this.

- The *Deutsche Bundesbank* could potentially provide a technology platform for the conduct of EUA auctions in Germany by giving access to its ExtraNet. In this case, however, direct use of the existing OPTOS or BBS service systems would not be recommended, but rather the creation and provision of an additional (parallel) customised service aimed at a different group of participants. As far as legally possible, the Bundesbank would conduct the auction on behalf of another institution, which specifies the modalities and would have to be responsible for further clearing and settlement tasks associated with the auction. Objectively, however, the conduct of such auctions would exceed the Bundebank's present statutory remit.
- The *German Finance Agency* seems to meet few of the criteria for a suitable institution to take charge of EUA auctioning. As matters stand now, it would only have the technical capacity in partnership with the Deutsche Bundesbank, and objectively its competencies – and indeed the object of its activities – are concentrated in the area of Federal securities and not emissions trading. In particular, the Bund Issues Auction Group would not be the appropriate target group, and the scheme would ultimately rely wholly on intermediaries (with indirect auction access only).
- *Kreditanstalt für Wiederaufbau (KfW)* possesses experience in the area of emissions trading but not in conducting its own auctions of EUAs. While its current selling practices make use of existing marketplaces, it would have to set up an appropriate auctioning system from scratch before it could hold auctions. It could take on supporting functions if required.
- The *Federal Network Agency* for Electricity, Gas, Telecommunications, Post and Railway has only limited expertise relevant to emission allowances, along with experience of a different nature in the field of auctions. Therefore it should not be considered any further as a possible auctioneer of EUAs.
- The *German Emissions Trading Authority (DEHSt)* at the Federal Environment Agency (UBA) could only conduct independent auctions if a suitable platform were first developed and installed. Outsourcing the provision or the operation of such a platform would tend to increase the complexity of the system still further. A better option would be cooperation with another institution which took overall responsibility for the core tasks associated with auctioning. DEHSt could, if required, take charge of the supervisory, monitoring and reporting functions (e.g. authorising direct and indirect participants, vetting intermediaries, verifying transactions, providing the interface to the registry, compiling evaluation reports and supporting BMU in updating the standards for auctions). In addition, it could support coordination with the European Commission and other Member States.

Conducting auctions, in itself, is *not a state function*. Instead, the (non-sovereign) services could equally be provided by private institutions within a predefined

framework. In this connection, it would first be necessary to clarify public tendering requirements.

- Institutions like the *European Energy Exchange* (EEX) in Leipzig[12] offer a favourable environment with potential for using existing know-how and infrastructure for the future auctioning of EUAs. Eligible participants would by no means be restricted to existing trading participants, but arrangements could incorporate the principle of open access to all holders of an EUA registry account wishing to participate in auctions. Modalities, e.g. for furnishing collateral, could follow the rules that already apply to trading in EUAs. Possible concessions for SMEs as direct or indirect participants would also be conceivable in this framework.
- A similar assessment is equally valid for other private providers such as *Climex*, which already has experience in trading and in auctions of EUAs, but on a scale that does not bear comparison with the trading volumes in Germany in the second trading period, and certainly not the third trading period.

Of the eight institutional options considered here, the core function of the actual auction could best be performed by an exchange such as the last two named (or any other private providers). Within this framework, KfW and DEHSt would be considered for tasks of a supporting or complementary nature (including monitoring and reporting).

The public institutions of the Bundesbank and the German Finance Agency, which deal with the marketing of Federal securities, are less suited to operate an auction of EUAs. This type of system design (much like the British system) would lead to a situation where banks acting as intermediaries would be the only participants in auctions, and installation operators themselves could only take part in auctions indirectly. This would also be an unsatisfactory solution for the second trading period since it would only go part-way to accomplishing the aim of allowing market participants to gain auction experience.

As the analysis in Section 3.1 has shown, the implementation of auctions presents a variety of tasks to which specific requirements and criteria are attached. On the other hand, the likely candidates taken under consideration fulfil the individual criteria to different degrees according to their core competencies. Therefore hybrid systems for conducting auctions should be considered, with tasks shared out to a greater or lesser degree between several institutions.

The most appropriate approach is to combine the competencies and experience of the three following institutions:

- A professional trading platform (e.g. EEX, Climex, ECX, Nordpool, etc.);
- A public financial services provider (KfW);

[12] Or any other specialised exchange

- A competent authority for the emissions trading sector (UBA/DEHSt).

Of these, the trading platform is an indispensable core function. The allocation of tasks to KfW and DEHSt is substitutable to some extent, e.g. in the matter of which one acts as the ‘passive seller’ or which one is assigned the detailed monitoring functions. In any case, DEHSt would need to be integrated in the process in a supporting role, e.g. in connection with the registry and with regular reporting.

For any option, it is necessary to decide on the period of time for which the tasks of auctioning should be transferred to certain private or public institutions. As a matter of principle, provision should be made for a review and a decision on reawarding the responsibilities. For the second trading period, this should be scheduled for some time before the period ends (2012, or early 2013 if end-of-period activities are taken into account). For the third trading period, arrangements could be finalised for three or four years, followed by a review and a reaward decision if necessary.

With regard to the institutional implementation of auctions, further needs arise for coordination with other Member States and for harmonisation at European level for the third trading period (see Chapter 5).

4 Costs of auctions

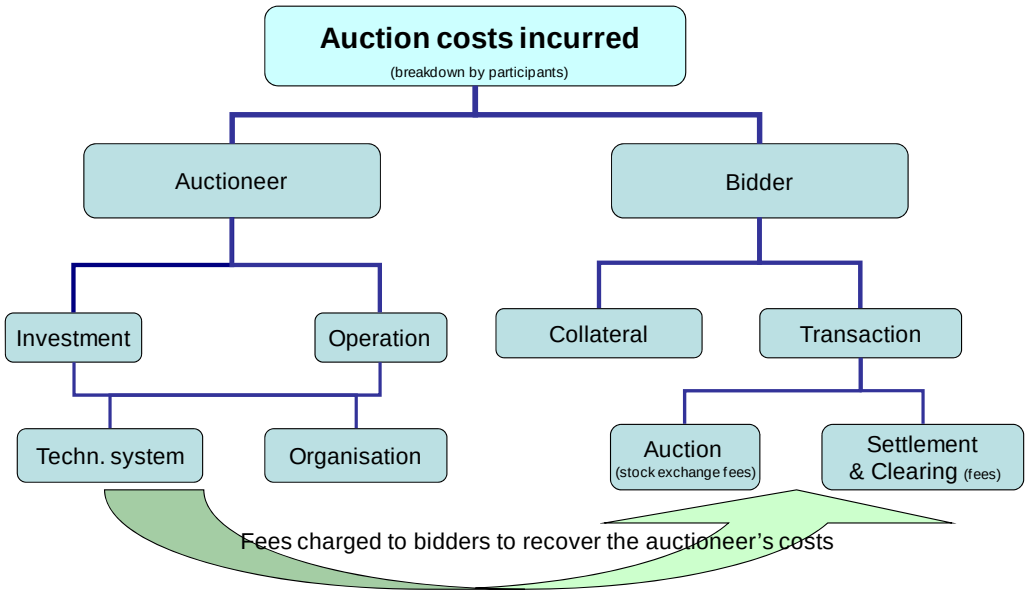
The level of costs and their refinancing are questions of relevance for the acceptance and efficiency of the procedure. As a principle, the costs of the system should be financed from the auction proceeds, i.e. fixed or variable costs should be kept as low as possible.

To assess efficiency, normally the costs of the procedure are compared with its expected or actual benefit. The same approach is applied to evaluate the different design options for EUA auctions, although here the variety of options for combining auction types with alternative security deposits, institutional settings and individual arrangements on the part of financial institutions acting as intermediaries mean that a wide range of variation in costs could be expected. This analysis is restricted to two selected combinations: auctioning of EUAs by the uniform-price method via an exchange (here: EEX[13]) with clearing and settlement via the ECC (called the 'exchange option'), and auctioning via an agency by the uniform-price procedure with a relative security deposit (called the 'agency option'). It should be noted that a great many design options exist and that financial intermediaries operate a large number of different charging practices for uniform-price auction services via the EEX and the ECC. These are not fully reflected in the limited selection of examples referred to here. The amounts quoted make no claim to be exact costings but are rather intended as a first rough estimate of the scale of magnitude.

Basically, a schematic diagram of the costs for different auction participants divides into two strands: the costs incurred by the auctioneer for setting up and operating the auctioning system and the costs to bidders of participating in the auction. Auctioneer's costs can be subdivided again into the costs of investing in and operating the technical system, and the costs of organisation and administration. Bidders incur a cost for the security deposit and the transaction on the one hand, and their own internal costs of administration and communication. The latter are ignored for the purposes of this analysis, being company-specific and very difficult to assess. The costs to the unsuccessful bidder are limited to the costs of furnishing the security deposit. The breakdown of costs into different cost strands is shown in Figure 3. Here it should be borne in mind that the investment and operating costs of the auctioneer are (partly) compensated through fees that the auctioneer can charge to the bidder, or in other words, the bidders' costs can ultimately reflect a share of the auctioneer's costs.

[13] Here EEX is just used as representative for any other private provider

Figure 3 Strands of costs for auction participants



Source: In-house material (Fraunhofer ISI)

4.1 Estimated costs of an exchange option

Under the 'exchange option', the costs analysed are those incurred by companies if the technical, organisational and administrative aspects of the auction are based at the EEX and transacted via its clearing partner ECC. A distinction must be made between direct and indirect participants. Large companies will often be exchange members or traders on the EEX themselves (direct participants) whereas smaller companies will be more likely to participate in the auction indirectly via an intermediary (indirect participants), a financial institution in this case.

Analysis of the costs incurred by an indirect participant – e.g. an SME – is based on the service-pricing tariffs of financial institutions for exchange transactions on the EEX. In interviews with representatives of financial institutions, however, it emerged that the itemised costs for indirect-participant transactions vary greatly from one intermediary to another. Not only are different fees or flat amounts listed for the purchase, clearing and settlement of the transaction, but the terms and conditions surrounding security deposits are equally varied (cf. Chapter 2).

With regard to transaction fees there are several alternative arrangements. One arrangement comprises a commission (0.2-0.5% of market price) for the purchase of the EUA, a brokerage fee (approx. 0.8%) and a clearing fee (EUR 3-8 per transaction) for clearing and settlement. Other arrangements include a flat fee per 1000 EUAs for purchase, clearing and settlement, or a combination of a fee per EUA (e.g. EUR 0.03-0.1) and charges based on the portfolio value. A cost breakdown or itemised costing of this kind is not imperative. Total fees for the purchase of EUAs including clearing and

settlement of the transaction can be expected to amount to around EUR 70 per lot. However, only the existing corporate clientele of the financial intermediaries could obtain its services on these terms and conditions, because the payable admission fees do not cover the intermediaries' actual transaction costs.

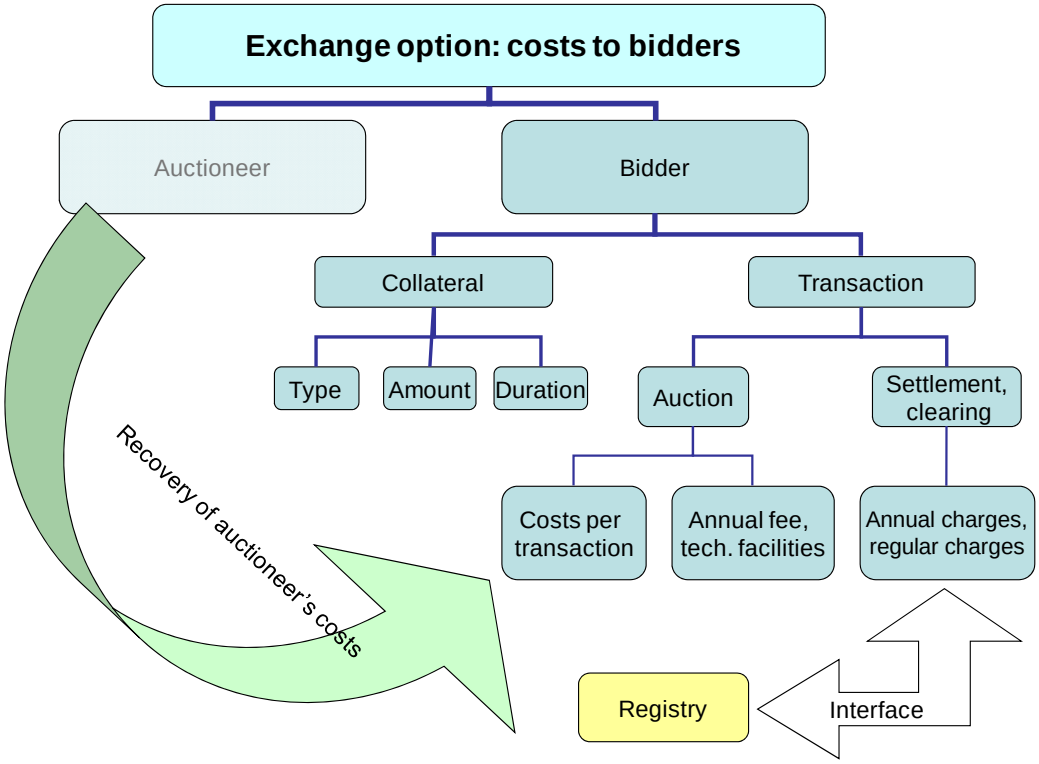
Since the ECC already holds an account with DEHSt, it may be used for posting entries in the national registry without incurring additional costs. Portfolio fees are not taken into account here, since all EUAs are entered in the national registry and there is no compulsion to hold other securities.

Further, a company can participate directly in EEX exchange trading, either by applying to become a trading member (direct exchange participant) itself or by contracting another party to trade on its behalf. This approach entails charges for the provision of the technical platform[14] (EUR 7800 – 57,600), for transactions (EUR 0.01/tCO_2) and an annual fee to the EEX (EUR 5000). A direct participant requires the services of an ECC clearing member to clear transactions via the ECC (unless the company is a clearing member itself). This again entails charges (EUR 12,500 fee for a clearing member). In the light of these costs, only companies with a large trading volume would deal directly on the exchange; for all others, the costs of access and annual fees would be prohibitively high. The costs of furnishing collateral are set out in Chapter 2 and, under the 'exchange option', do not differ notably from those of an indirect participant.

For a breakdown of the costs incurred by the auctioneer under the exchange solution, the requisite information is unavailable. It can be assumed, however, that the costs that incur, e.g. at the EEX and ECC, more or less equate to the charges and fees payable. The introduction of EUA auctioning at existing exchanges would only require them to make minor investments, however, because the technical and organisational setup is largely in place already as a result of the healthy secondary-market trade. Figure 4 shows a schematic diagram of the various costs.

[14] For access to and use of the technical system.

Figure 4: Costs of auctioning via an exchange



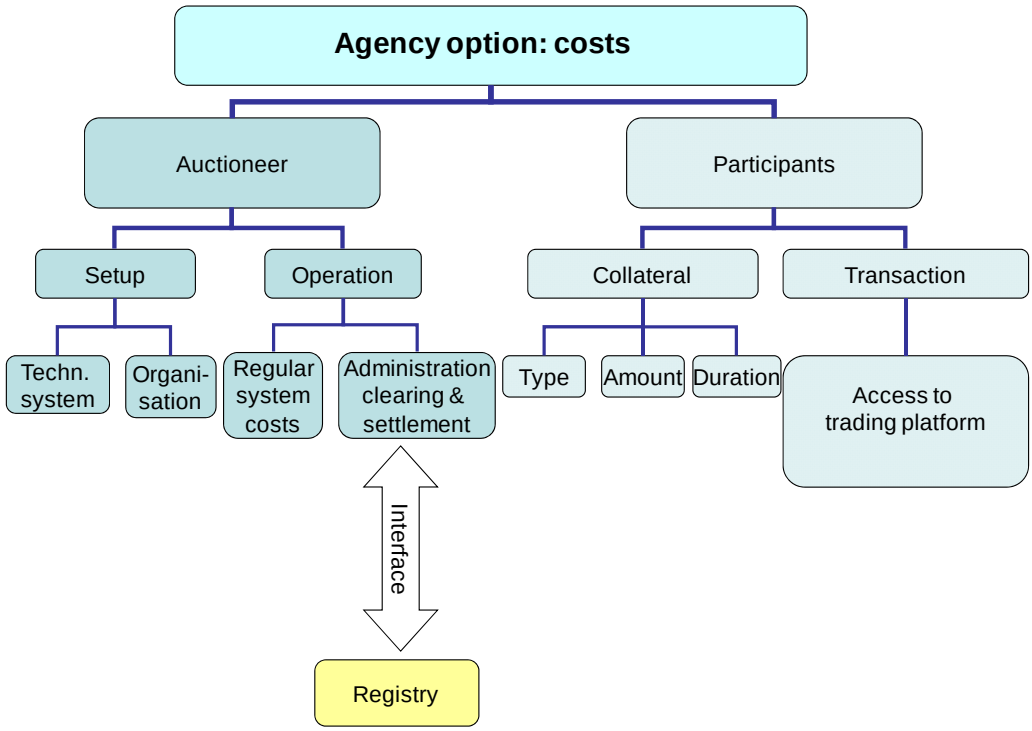
Source: In-house material (Fraunhofer ISI)

4.2 Estimated costs of an agency option

The 'agency option' presented next represents a solution which locates the auction process within an institution that has not hitherto offered a suitable trading platform for EUAs on the (secondary) market; for instance, the German Finance Agency, the Deutsche Bundesbank or KfW. The auctioneer's costs under this option consist of the costs of introducing the electronic platform, developing and installing the software, designing the administrative procedures, the administrative and technical running costs of the auction process and the costs of security, clearing, and transfer of EUAs if necessary. Estimates for the United Kingdom put the costs of software development at between EUR 190,000 and 750,000, conducting the auction at EUR 25,000 per auction plus another EUR 495,000 per year for the transfer and administration of allowances. In addition to the costs of furnishing collateral, bidders incur costs for electronic access to the auction platform, and further costs for company-specific communication and administration processes. As with the exchange solution above, these latter costs will not be analysed further although they are unlikely to vary a great deal. In the United Kingdom they are estimated at 0.1% of the transaction volume. Figure 5 shows the

costs associated with the agency option and indicates possible costs that bidders may incur.

Figure 5: Costs of auctioning via an agency



Source: In-house material (Fraunhofer ISI)

The approximate costs of the design options considered are set out in Table 3. The data is based on expert interviews with commercial banks already operating as ECC clearing banks within the framework of EUA trading, as well as publicly available information from other institutions (EEX, ECC and Defra). The total is a statement of the cost per lot (1000 EUAs). At first glance the agency option seems the lower-cost solution with regard to smaller companies. A model cannot be chosen on the basis of these estimates, however, because by no means have all possible design options been explored for all the variants of indirect participants, especially with regard to the implications of auctioning a growing volume of EUAs. The estimates from the United Kingdom are based on the assumption of a static uniform-price auction. The individual cost positions for indirect and direct participants are based on statements by financial intermediaries and our own research findings, and are subject to possible price changes. They are best characterised as approximations and not to be read as exact costings. Their purpose is to reflect the approximate scale of magnitude of the likely costs of the auction under each institutional configuration.

Table 3: Example breakdown of costs for two selected options, with a number of variants, in EUR per lot (1000 EUAs)

		Indirect exchange participants			Direct exchange participants	Agency
Exchange Option		Variat a)	Variant b)	Variant c)	Costs/Lot	Costs/Lot
Lot size in EUAs	1,000					
Bid for 1,000 EUAs	25,000 €					
Auction frequency per year		12	12	12	12	12
Number of lots per auction		1	1	1	100	3330
Useful life in years					10	10
Commission, brokerage, clearing (0,20-0,5%, 0,8‰, 5€)	0.35%	88 €				
Flat fees per lot for purchase and clearing	70 €		70 €			
Purchase, cleaning and settelment per t CO2	0.05 €			50 €		
Other administration charges	0.06%			15 €		
EEX annual fee for EUA spot market	5,000 €				4 €	
Technical charge, annual, web access	7,800 €				7 €	
Transaction costs per t CO2	0.01 €				10 €	
Training costs (one-off) spread over 10 years	800 €				0.1 €	
Clearing charge*	1,000 €				1 €	
Total		**88 €**	**70 €**	**65 €**	**22 €**	
Agency Option**						
Technical system setup EUR 190-750k€	750,000 €					2 €
Operational costs per auction	25,000 €					8 €
Other annual costs	495,000 €					12 €
Participants' transaction costs per volume	0.1%					25 €
Total						**47 €**

* Exact figures could not be verified by interview

** Costs based on UK estimates, exchange rate: EUR/GBP=1,25

Source: Estimates by Fraunhofer ISI

4.3 Assessments of the costs of institutional solutions for the UK

In preparation for making decisions on the methodological design and institutional arrangements for Phase II auctioning in the UK, the costs of several options were (roughly) assessed. In the United Kingdom, several auction design and implementation options are under discussion, which are summarised below.

a) Sale on the secondary market

On the assumption that EUAs are sold on an exchange by means of 'market orders', and accepting the other assumptions made, costs to the government and to buyers (one-off and ongoing fees for admission to and participation in the exchange) for the second trading period are put at around EUR 3 million (net present value in 2007 euros) (cf. UK 2008).[15]

[15] Exchange rate used: EUR/GBP=1.25.

Among the advantages of 'market orders' are their high transparency and the fact that they convert rapidly into transactions and increase the liquidity and depth of the secondary market. The latter points tend to improve the efficiency of the secondary market and reduce volatility. However, the lot sizes (observed so far) are too large for smaller participants.

b) Simple static uniform-price auction

For a static uniform-price auction, the one-off costs of developing the auctioning software are estimated at between EUR 190,000-750,000. Additional costs of EUR 25,000 per auction (four times per year) are anticipated for conducting the process, advisory services to bidders, and costs to the auctioneer. On top of that, annual costs come to about EUR 495,000, and both participants and the state must reckon with transaction costs of 0.1% of the (monetary) transaction volume. In total these amount to EUR 2.4–3 million (net present value).

c) Two-stage uniform-price auction (incl. non-competitive bids)

The two-stage uniform-price auction includes concessions for small bidders. As under b), however, the costs fall into the lower end of the estimated range because the administrative costs are lower (hypothesis: intermediaries collect the bids from smaller bidders and so reduce the costs of conducting the auction). The risk of payment default is assumed by intermediaries who are experienced in risk management. The procedure is as under b), except that the intermediaries (appointed by the UK Debt Management Office – DMO) accept bids from participants and bid on their behalf in the auction. This corresponds to the existing auction design for the issue of government bonds. Furthermore, from 2009 this option also makes provision for what are called 'non-competitive bids'. This means that a certain proportion (e.g. 30%) of allowances are allocated to the fulfilment of small bids (e.g. below 10,000 EUAs). Bidders may only submit one bid, and the price to be paid is determined in the subsequent phase of 'competitive bidding' for the remaining quantity.

Provisional conclusion:

Due to the uncertainty of the available cost data, it is impossible to make a definitive statement on the auctioning costs under the different institutional solutions analysed. The findings so far suggest the conclusion that from the viewpoint of costs, an exchange solution is particularly advantageous for larger companies. For smaller participants this solution would only be less costly than an agency solution if the costs of participation could be significantly reduced. In relation to the value of the EUAs to be auctioned, however, the estimated costs of all the options analysed are low. Such cost comparisons should not therefore be a crucial factor in the choice of model.

5 Identification of needs for coordination and harmonisation

Particularly looking ahead to the third trading period and the forthcoming revision of the EU Emissions Trading Directive, there is a need for harmonisation and coordination in relation to the methodological design and institutional arrangements of auctions conducted on a decentralised basis. With regard to the need for harmonisation and the possible provisions for the third trading period, the opportunity should be taken to learn from the experience of auction methods and institutions in the second trading period. This means that, on the one hand, the Directive should allow a certain degree of flexibility. On the other hand, it should also be noted that variations in the methodological and institutional design of auctioning systems in different Member States will generate more diverse experience than if all the systems were very similar. At the same time, it is necessary to prevent 'lock-in' effects which favour the continuance of established systems even when they are acknowledged to be in need of an overhaul.

Against this background, the following points can be made on the need for coordination *on methodological design* with other Member States and on the requirements for harmonisation at European level *for the third trading period*:

- Since the regulations on security deposits depend on the auctioneer, initially no need for coordination is seen. In the absence of restrictions on access to auctions, the participants may engage in 'arbitrage behaviour' in their choice of auction venue, resulting in eventual alignment of the rules on collateral. It is quite conceivable that information would be exchanged about whether individual participants had honoured their payment obligations. To what extent and on what legal grounds such an exchange of data and information would be allowed would have to be examined by legal experts. Furthermore, thought could be given to harmonised sanction mechanisms (temporary exclusion from subsequent auctions in all Member States).
- Auction dates should be coordinated among the Member States. Scheduling conflicts could be avoided by means of prior coordination (at least three months in advance). That said, the necessity of coordinating dates diminishes as the frequency and regularity of auctions increases.
- It is not seen as imperative to limit the maximum bid quantity. Nevertheless, as a precaution against possible or future misuse of market power – either at a single auction, in the market for EUAs as a whole, or to accrue market power in the product market (e.g. electricity) – limiting the bid quantity should not be prohibited either. For the eventuality that several Member States restrict the maximum bid quantity per participant, a need for coordination arises, e.g. exchanging information about the number of EUAs purchased per auction or to verify the ownership structure of participating companies.

- Coordination on the setting of reserve prices is not imperative. Since reserve prices are only advisable in the form of relative prices, if at all, a corresponding rule could be incorporated in the Directive. The same applies to the obligatory publication of any reserve price.
- Since the setting of an absolute maximum price contravenes the logic of the Trading System, any such upper limit could be prohibited in the Directive.
- For reasons of transparency and acceptance, auction results (prices, winners, quantities won) should be announced publicly. Alternatively it would also be conceivable to pass (sensitive) parts of this information to an independent auditing body only. A need for coordination is also seen with regard to bidding strategies, so as to facilitate detection of any possible misuse of market power. The Directive should oblige the auctioneers to report such information to a suitable authority which can then initiate an investigation of the results and strategies from the viewpoint of competition.

With regard to the *institutional* implementation, coordination on the following questions is required for the *second trading period*:

- Should account-holders from other Member States be able to participate directly or indirectly in national auctions?
  Recommendation: Access to all auctions should also be open to participants (holding a registry account) from other Member States. Should a general agreement prove impossible, this point should be agreed bilaterally, particularly between the larger Member States.
- Should there be uniform rules concerning special regulations for SMEs?
  Recommendation: Before introducing such special regulations, experience should be gathered first. If rules proved necessary, this should be coordinated among Member States if possible.
- Should fees be charged for the auction?
  Recommendation: If Member States adopt a coordinated approach, the auction costs could be financed from the auction proceeds.
- Clearing: If account holders from other Member States take part in auctions, there is a need for coordination on the transfer of EUAs to the auction winners' registry accounts (transfer process, exchange of information, deadlines, etc.)

For the *third trading period*, certain points require harmonisation within the EU Directive and further coordination is called for. At least the following fundamental principles should be incorporated in the EU Directive:

- Transparency of conditions, procedures and results;
- Open (direct or indirect) access to auctions;
- Non-discriminatory treatment of particular groups of participants;

- Avoiding distortions of competition between operative institutions, which impair the efficiency of the system;
- Neutrality of auction organisers and intermediaries;
- Monitoring and reporting requirements.

Beyond this, by way of preparation of the procedures for the third period, more specific details should be discussed and, where possible, coordinated. Alongside technical details such as the coordination of dates or questions of enforcement, particular matters for discussion are questions of the compatibility of different national institutional implementations.

From today's perspective, auctioning will gain substantially in importance during the third period and generate sizeable funding streams. By that time at the latest, compartmentalisation of national auctions will no longer be possible. Cross-border competition will emerge between auction venues. Solutions oriented solely towards national responsibilities and existing institutional structures could create barriers, sooner or later, which prospective bidders systematically evade by going to other countries, giving rise to imbalances.

For these reasons, where possible, all Member States should place more emphasis from the outset on options based on open trading exchanges rather than auction mechanisms run by particular state authorities, which operate predominantly via intermediaries. With this in mind, agreement should be reached not only on the openness of auctions but also on the principle of direct access wherever feasible. This principle should also be incorporated in the Directive.

6 Conclusion

In the first period of the European Emission Trading System, just a small fraction of EUAs were auctioned. In Germany, none were auctioned at all. Auctions are playing a more prominent role in the second period and will be the dominant mechanism from the third period onwards. This paper analyses the methodological and institutional aspects of auctions in the second and third period. The foremost concern is how auctions should be conducted in Germany during the second period, on the basis of a national statutory ordinance, under arrangements which should basically remain viable for the third period as well. At the same time, questions of European harmonisation and coordination are raised, which need to be discussed particularly in the context of the amendment of the EU Directive.

With regard to the **methodological fundamentals**, the following suggestions are made:

- According to Article 21 ZuG 2012, the annual volume of emission allowances available for auctioning in Germany during the second period should be offered for sale at regular intervals and in equal tranches. It is suggested that the **frequency** of auctions should be monthly. In the third trading period, it is possible that more frequent auctions could be advisable.
- **Access to auctions** should be open to all holders of an EU Member State registry account. This should be coordinated internationally for the second period and clearly stipulated in the Directive for the third period.
- The suggested **type of auction** is a (one-sided) static uniform-price auction with a closed order book. Where multiple bids match the selling price, EUAs should be allotted proportionally if necessary.
- The necessity for **concessions for small bidders** (SMEs) in the third period, and the nature of any such concessions, should be discussed further once initial experience has been gained (with non-competitive bidding in the UK, for instance).
- It is not necessary to prescribe **reserve prices**. If reserve prices are set, these should be coupled to the latest market price and incorporate a sufficient differential for variations (e.g. variation of –10% or –20%). Reserve prices should be published. Any residual quantities can be sold in subsequent auctions.
- Neither for the second nor for the third trading period should **maximum prices** be imposed for auctions in Germany. Member States should be permitted to set maximum prices in relative terms only – if at all – but not to impose absolute upper limits.
- **Minimum bid quantities** are not imperative. Should there be a need to stipulate them in order to limit transaction costs, a minimum bid quantity of 100 EUAs is suggested for Germany. The possible denomination unit of the bid

quantity should be 1 EUA. For the third period, all decisions can be reviewed on the basis of experience from the second trading period. An EU-wide cap on minimum bid quantities (e.g. 1000 EUAs) could be stipulated in the Member States to afford some protection to SMEs.

- There is no need to impose any **restriction on the total bid quantity per bidder** in an auction. A provision could be included in the EU Directive enabling a Member State to limit the total bid quantity per bidder to a proportion of the total available volume in the given auction.
- For the financial collateralisation of bids, **security deposits** are a necessary and accepted method. Security deposits should be kept to the minimum amount and duration necessary so as to minimise the costs of tied-up liquidity. The means of influencing provisions on the type and amount of security deposit depend primarily on which institution conducts the auctions. For public institutions, direct provisions can be laid down. For private institutions, this is only possible by indirect means; by specifying criteria in an invitation to tender, for example. Where possible, a relative security deposit set at a low percentage (e.g. 25%) should be chosen, since the existence of a functioning secondary market minimises both the auctioneer's actual financial risk in the event of default and the opportunities for strategic behaviour. Choice of the means of collateral (securities, cash deposits, bank guarantee) could be left to the participants.

For the **institutional implementation** of auctions, all the task areas connected with the administration of EUA auctions must be regulated and assigned to designated institutions, dividing tasks between them where appropriate. Task areas include the provision of an appropriate, user-friendly trading platform; establishing the eligibility criteria for possible participants; planning and announcement of auctions and conditions; coordination with institutions in other Member States; individual screening of direct and indirect participants; marketing and customer support activities; checking of bids; technical conduct of auctions; supplying information about the results to participants and the public; financial settlement of successful transactions; transfer of emission allowances between accounts; supervision and monitoring of procedures and results; coordination of the institutions involved; reporting to the government and the public; evaluation and, where required, further development of the system. These steps call for a range of competencies, which may have to be covered through the interplay of several institutions from the public or private sector.

Institutions involved in conducting auctions must be expected to meet the following **requirements**:

- The institution should possess professional competence and experience as well as appropriate human resources and technical equipment for the task area in question;
- The institution should be reliable, trustworthy, objective and neutral, preserving independence from the market interests of participants;

- The scheme and performance of tasks should be cost-efficient, taking account of (additional) costs to the institutions involved, coordination with other institutions and total costs incurred by direct and, where relevant, indirect participants.

In the second trading period, the Member States are in charge of the auctioning of EUAs. For the third period, in contrast, the question arises as to whether auctions should be conducted centrally by a European institution, in which case auction proceeds would be distributed instead of allowance volumes. But (particularly) when auction volumes increase, open auctions are also possible on a decentralised basis. In this event, important modalities, particularly those relating to openness, transparency and non-discrimination, to conditions of participation, to supervision and monitoring, and possibly auctioning designs, should be harmonised throughout Europe, and specific questions such as the scheduling of auctions should be coordinated. Whereas larger countries like Germany could primarily use their own auction venues, smaller countries could dispense with platforms of their own. In any event, an important precondition is open and non-discriminatory access to all auctions.

Starting with a set of requirements and criteria for institutional implementation, a total of eight **institutions** have been described and discussed with a view to establishing their possible function within the overall process of auctioning emission allowances:

- The specific structures of the *European Central Bank (ECB)* and its focus on the euro area leave some reservations about its suitability for emission allowance auctioning. If one central auctioning system in Europe were pursued in future – though not deemed necessary from the current perspective – it would seem more advisable to use or set up special emissions trading structures, based elsewhere, to achieve this.
- The *Deutsche Bundesbank* could potentially offer a technology platform for EUA auctions in Germany by giving access to its ExtraNet. To enable this, special structures and cooperation arrangements would have to be built up. Objectively, however, conducting such auctions would exceed the present statutory remit of the Bundesbank.
- The *German Finance Agency* seems to meet few of the criteria for a suitable institution to take charge of EUA auctioning. As matters stand now, it would only have the technical capacity in partnership with the Deutsche Bundesbank, and objectively its competencies and clientele are not concentrated in the emissions trading sector.
- *Kreditanstalt für Wiederaufbau (KfW)* possesses experience in the area of emissions trading but not in conducting its own auctions of emission allowances. While its current selling practices make use of existing marketplaces, it would have to set up an appropriate auctioning system from scratch before it could hold auctions. It could take on supporting functions if required.

- The *Federal Network Agency* for Electricity, Gas, Telecommunications, Post and Railway has only limited expertise relevant to emission allowances, along with experience of a different nature in the field of auctions. Therefore it should not be considered any further as a possible auctioneer of emission allowances.
- The *German Emissions Trading Authority at the Federal Environment Agency (DEHSt)* could only operate independent auctions if a suitable platform were first developed and installed. It would be better to establish cooperation with another institution which takes overall responsibility for the core tasks of the auction. DEHSt could, if required, take on supervisory, monitoring and reporting functions.
- Institutions like the *European Energy Exchange* (EEX) in Leipzig[16] offer a favourable environment with potential for capitalising on existing know-how and infrastructure for the future auctioning of EUAs. The eligible group of participants would by no means consist only of existing trading participants; arrangements could incorporate the principle of open access.
- A similar assessment applies to other private providers such as *Climex*[17], which already has experience in trading and in emission allowance auctions, but not on a scale that compares with the trading volumes in Germany in the second trading period, let alone those of the third trading period.

Auctions by public institutions such as the Bundesbank or the German Finance Agency would (much like the British system) lead to a situation where banks acting as intermediaries would be the only direct participants in auctions, and installation operators themselves could only take part in auctions indirectly. For the second trading period, this would remain an unsatisfactory solution since it would only go part-way to accomplishing the aim of allowing market participants to gain auction experience.

Conducting auctions, in itself, is *not a state function*. Instead, the (non-sovereign) services could equally be provided by private institutions within a predefined framework. In this regard, it would first be necessary to clarify the tendering requirements. The core function of the actual auction could best be performed by companies such as EEX or Climex. Within this framework, KfW and DEHSt would be considered for tasks of a supporting or complementary nature (including monitoring and reporting).

The allocation of tasks should initially be valid until the end of the second period, and should be reviewed during that time. Arrangements for the third period could initially be finalised for three or four years, followed by a review and reaward if necessary.

The **costs of auctions** can only be assessed very roughly as yet. In relation to the auction proceeds, however, the costs of conducting the process are relatively low.

[16] Or any other specialised exchange

[17] Or any other private provider

Hence, this aspect should not be given too much weight in the choice of the operative institution. More attention must be paid to the costs incurred by participants, which are lowest when access and procedures are simple and transparent. Unfortunately, the data available do not permit a definitive statement on the auctioning costs under the different institutional solutions analysed. The findings suggest the conclusion that, from the viewpoint of costs, an exchange solution is particularly advantageous for larger companies. In relation to the value of the EUAs to be auctioned, however, the estimated costs of all the options analysed are low. Such cost comparisons should not therefore be a crucial factor in the choice of model.

Certain aspects of the conduct of auctions must be coordinated with other Member States in the second trading period. For the third trading period, further **harmonisation and coordination** efforts are called for.

Coordination on the following points is required immediately for the second trading period:

- Access to all auctions should also be open to persons (with a registry account) from other Member States. Should a general agreement prove impossible, this point should be agreed bilaterally, particularly between the larger Member States.
- Before introducing special regulations for SMEs, e.g. in the form of non-competitive bids, experience should be gathered first. If such rules proved necessary, this matter should be coordinated among Member States if possible.
- If Member States adopt a coordinated approach, the auction costs could be financed from the auction proceeds. Otherwise the charging of fees should be coordinated among the Member States.

For the third trading period, certain points require harmonisation within the EU Directive, and further coordination efforts are called for. At least the following fundamental principles should be incorporated in the EU Directive:

- Transparency of conditions, procedures and results;
- Open (direct or indirect) access to auctions;
- Non-discriminatory treatment of particular groups of participants;
- Neutrality of auction organisers and intermediaries;
- Monitoring and reporting requirements.

Looking ahead to the third trading period, the following conclusions can be drawn with regard to methodological design:

- The auction dates should be coordinated among the Member States, particularly if auctions are held infrequently. Scheduling conflicts could be avoided by means of prior coordination (at least three months in advance).
- To prevent possible or future misuse of market power, there should be no prohibition on restricting the maximum bid quantity. In the eventuality that

- Since reserve prices are only advisable in the form of relative prices, if at all, a provision to this effect could be incorporated in the Directive. The same applies to the obligation to publish a reserve price.
- The setting of any absolute maximum price should be prohibited.

For reasons of transparency and acceptance, auction results (prices, winners, quantities won) should be announced publicly. To prevent abuse, information on participants' bidding strategies should be part of the information that flows between auctioneers. The Directive should oblige the auctioneers to report such information to a suitable authority which can then initiate a further investigation of the results and strategies from the viewpoint of competition.

Because little experience from the auctioning of emission allowances will have become available by the time the new EU Directive is adopted, and because existing experience (including experience from other auctions) is only of limited relevance to the auctions in the third period (due, not least, to much higher volumes and the nature and number of participants), the Directive should allow for a certain degree of flexibility in the methodological design and institutional arrangements, to leave open the possibility of making necessary changes before or at the start of the third period. Beyond this, in the course of preparing the procedures for the third period, the specifics of the arrangements should be discussed and, where possible, coordinated. In addition to the methodological questions mentioned above and technical details like coordination of dates or questions of enforcement, particular matters for discussion are the compatibility of different national institutional implementations.

From today's perspective, auctioning will gain substantially in importance during the third period and generate sizeable funding streams. Therefore, where possible, all Member States should place more emphasis from the outset on options based on open trading exchanges rather than auction mechanisms run by particular state authorities which operate predominantly via intermediaries. With this in mind, agreement should be reached not only on the openness of auctions but also on the principle of direct access where feasible. This principle should also be incorporated in the Directive.

References

BMU & DEHSt (2008): German Emissions Trading Registry, User Manual.

BMU (2008): Release of EU Allowances in Germany. Monthly reports January 2008, November 2008. http://www.bmu.de/english/emissions_trading/doc/40929.php.

BMLFUW Austria (2008): Verordnung des Bundesministeriums für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft über die Versteigerung von Emissionszertifikaten für die Periode 2008-2012 (Versteigerungsverordnung 2. Periode), Entwurf und Erläuterungen [Ordinance of the Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management on the auctioning of emission allowances for the period 2008-2012 (Auctioning ordinance, 2nd period), draft and annotations].

Burtraw D., Goeree, J., Holt, C., Palmer, K. and Shobe, B. (2007): Auction Design for Selling CO2 Emission Allowances under the Regional Greenhouse Gas Initiative Phase 1, Research Report (Draft), May 25, 2007. trading/eu/pdf/guidance-note1.pdf.

Burtraw D., Goeree, J., Holt, C., Palmer, K. and Shobe, B. (2007): Auction Design for Selling CO2 Emission Allowances under the Regional Greenhouse Gas Initiative, Final Research Report, October 2007.

DEHSt (2008): Die Deutsche Emissionshandelsstelle als virtuelle Organisation. Informationen zur IT-Infrastruktur der DEHSt [The German Emissions Trading Authority as a virtual organisation. Information on the IT infrastructure of the DEHSt]. Berlin, February 2008.

Diekmann, J., Schleich, J. (2006): Auktionierung von Emissionsrechten - Eine Chance für mehr Gerechtigkeit und Effizienz im Emissionshandel [Auctioning of emission rights – a chance for more justice and efficiency in emissions trading], Zeitschrift für Energiewirtschaft 30 (4), 299-306.

ECB (2006): The Implementation of Monetary Policy in the Euro Area. General Documentation on Eurosystem Monetary Policy Instruments and Procedures. Frankfurt am Main, September 2006.

ECC (2008): Clearing Conditions of the European Commodity Clearing AG, Leipzig, March 2008.

ECC (2008): ECC-Margining, Leipzig, December 2007

ECC (2008): ECC Price List, Leipzig, March 2008

EEX (2008): EEX Exchange Rules, Leipzig, July 2008

EEX (2008): EEX-Group Price List, Leipzig, September 2008

EEX (2009): Market Data. www.eex.com

European Energy Exchange, EEX (2007): EEX Produktbroschüre. EU-Emissionsberechtigungen [EEX product brochure. EU emission allowances]. Leipzig, 29 January 2007.

Evans & Peck (2007): National Emissions Trading Task Force – Possible Design for a Greenhouse Gas Emissions Trading System. Further Definition of the Auction Proposals in the NETT, Discussion Paper, August 2007.

Fazekas, D. (2008): Auction Design, Implementation and Results of the European Union Emissions Trading Scheme. Corvinus University of Budapest, Hungary; Columbia University, New York.

Hepburn, C. et al (2006): Auctioning of EU ETS phase II allowances: how and why?, Climate Policy 6 (2006) 137-160.

Matthes F., Neuhoff, K. (2007): Auctioning in the European Union Emissions Trading Scheme. Final report, commissioned by WWF, Öko Institut e.V. and University of Cambridge, September 2007.

McMillan, J. (1994): Selling Spectrum Rights, The Journal of Economic Perspectives, Volume 8, Issue 3, (Summer 1994), 145-162.

Neuhoff, K. (2007): Auctions for CO2 allowances – a straw man proposal. Climate Strategies Workshop report, University of Cambridge, Electricity Policy Research Group, May 2007.

Official Journal of the European Union (2004): Commission Regulation (EC) No 2216/2004 for a standardised and secured system of registries.

RGGI (2008): CO_2 Allowance Auction. Notice for CO_2 Allowance Auction 1 on September 25, 2008. Published 24 July 2008., RGGI Inc., New York, New York.

UBA/DEHSt (2007): Entgeltliche Abgabe von Emissionsberechtigungen in der Handelsperiode 2008-2012: Verkauf oder Auktionierung? [Allocation of emission allowances for payment in the trading period 2008-2012: sale or auctioning?] Berlin, May.

UK Government (www.defra.gov.uk, 2008): The Community Emissions Trading Scheme (Allocation of Allowances for Payment), Regulations and Scheme 2008: www.defra.gov.uk/environment/climatechange/trading/eu/operators/auctioning.htm).