Europe Economics

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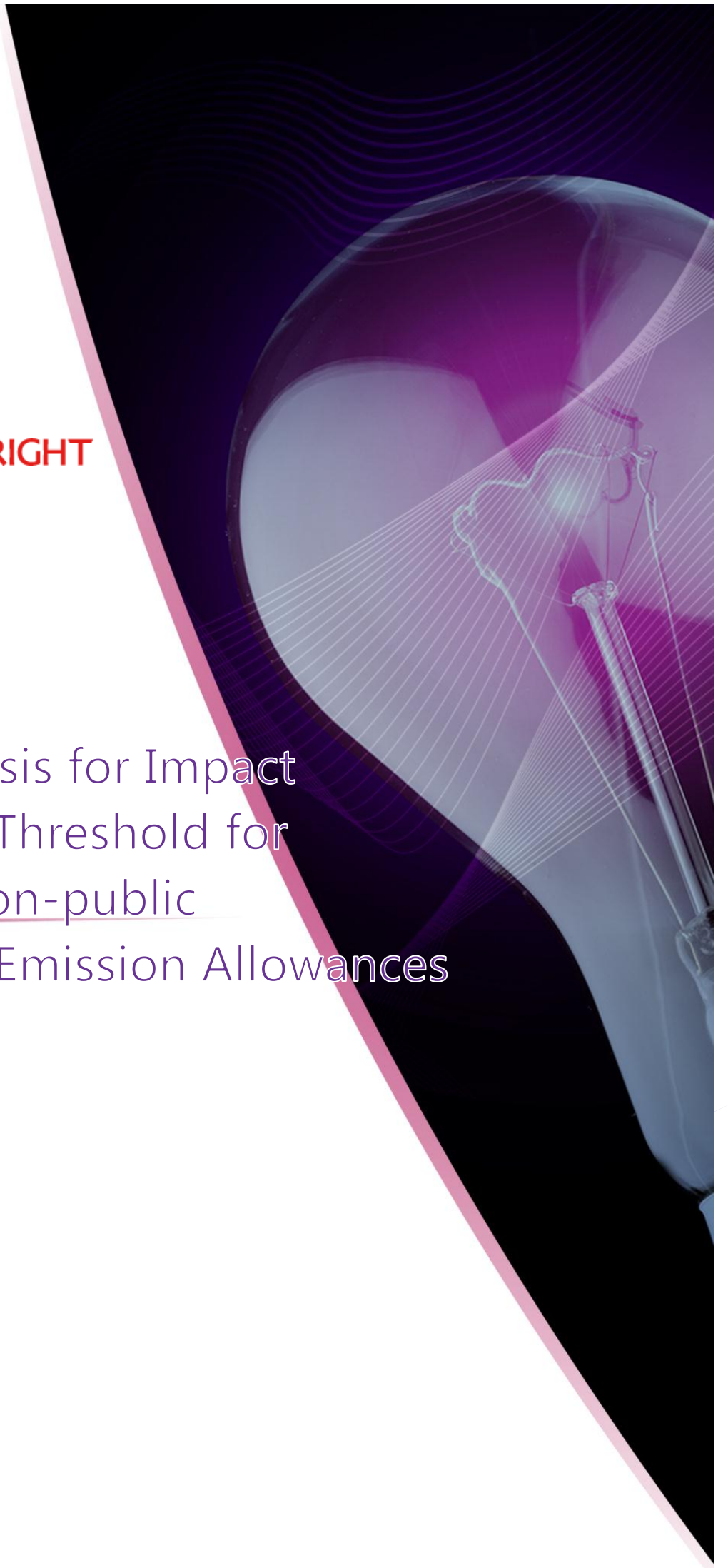

Economic Analysis for Impact Assessment on Threshold for Disclosure of Non-public Information on Emission Allowances

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1 Setting a Threshold for the Disclosure of Non-public Information on Emission Allowances

1.1 Market Abuse Regulation and its Application to the EU-ETS

Article 7(1)(c) of the Market Abuse Regulation (MAR)[1] defines inside information in relation to emission allowances or auctioned products based thereon as non-public information which, if made public, would have a significant effect on the prices of emissions allowances or their derivatives:

> information of a precise nature, which has not been made public, relating, directly or indirectly, to one or more such instruments, and which, if it were made public, would be likely to have a significant effect on the prices of such instruments or on the prices of related derivative financial instruments

According to Article 7(4) this means information that a reasonable investor would be likely to use as part of the basis of his/her investment decisions:

> For the purposes of paragraph 1, information which, if it were made public, would be likely to have a significant effect on the prices of financial instruments, derivative financial instruments, related spot commodity contracts, or auctioned products based on emission allowances shall mean information a reasonable investor would be likely to use as part of the basis of his or her investment decisions.

Furthermore, according to the second subparagraph:

> In the case of participants in the emission allowance market with aggregate emissions or rated thermal input at or below the threshold set in accordance with the second subparagraph of Article 17(2), information about their physical operations shall be deemed not to have a significant effect on the price of emission allowances, of auctioned products based thereon, or of derivative financial instruments.

Article 17(2) of the MAR states that:

[1] REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on market abuse (market abuse regulation) and repealing Directive 2003/6/EC of the European Parliament and of the Council and Commission Directives 2003/124/EC, 2003/125/EC and 2004/72/EC, 4 April 2014, hereafter MAR

> an emission allowance market participant shall publicly, effectively and in a timely manner disclose inside information concerning emissions allowances which it holds in respect of its business, including aviation activities or installations.

With regard to installations, such disclosure shall include relevant information about the capacity and utilisation of installations, including planned or unplanned unavailability of such installations.

A firm lacks an incentive to share such information — the social value of enhanced price discovery is essentially an externality to individual compliance buyers (not least because these are a fragmented group, with many relatively small players). If price- or investment-relevant information affecting emissions is not disclosed in a timely manner then this could hamper price discovery and the efficiency of the carbon market. This in turn could affect the carbon price, the integrity of the market and thus the overall goals of the EU ETS as an infrastructure for reducing carbon emissions in a cost-effective manner.

This disclosure of information shall *not* apply to a participant in the emission allowance market where the installations or aviation activities that it owns, controls or is responsible for, in the preceding year have had emissions not exceeding a minimum threshold of carbon dioxide equivalent and, where they carry out combustion activities, have had a rated thermal input not exceeding a minimum threshold.[2] In other words, those market participants, whose activity on an individual basis should have no material impact on investment decisions in the carbon market would be excluded from the disclosure requirement. This is

> "in order to avoid exposing the market to reporting that is not useful and to maintain cost-efficiency of the measure foreseen".[3]

1.2 Objectives of this Report

This threshold is effectively a materiality threshold in recognition that not all non-public information held by EU ETS participants about their physical operations will be considered material for the purposes of disclosure. To the extent that information about the physical operations is deemed to be non-material for the purposes of disclosure, it is also deemed not to have a significant effect on the price of the relevant instruments.[4]

The primary objective of this report is to identify possible options for setting this threshold and to assess the economic impacts of the various options identified. In order to achieve this we first consider the current situation as regards the non-public information held by emission allowance market participants and its materiality for price formation in emission allowances.

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[2] MAR, Article 17(2)

[3] MAR, Recital 51

[4] It is noted that all such participants are nevertheless covered by the prohibition of insider dealing in relation to any information they have access to and which is inside information (MAR, Recital 51)

The assessment also considers equivalent measures applicable to main categories of emission allowances market participants by virtue of other sectoral legislation (e.g. Regulation on wholesale energy market integrity and transparency, REMIT).

The threshold is not to be used to ascertain a significant effect of particular information on price,[5] but, to the contrary, it will tell when a significant effect on price *cannot* be expected. For example, non-public information held by a market participant above threshold value in relation to its physical operations will not be automatically regarded as having a significant effect on price.

The Market Abuse Regulation provides the framework for determining a threshold below which emission allowance market participants would be exempt from the information disclosure requirements. We emphasise that our work on the threshold, set out at 1.5, is strictly limited to the notion of disclosure of inside information for the purposes of emission allowances, and does not have any relevance to the interpretation of the notion of inside information for the purposes of other financial instruments.

We also provide a non-exhaustive list of typical disclosures expected from the various categories of non-exempt emission allowance market participants pursuant to Article 17(2) of the MAR. This is set out in section 1.6.

We begin with an overview of the non-public information which emission allowances market participants hold in respect of their businesses. The assessment takes into account the size of emissions of installations and aviation activities of market participants, or their parent or related undertakings (as appropriate), and the extent of their effect on the price formation of emission allowances or related derivatives.[6]

1.3 Background

This section presents an overview of price formation in the carbon market and the relative importance of company-specific non-public information and public information.

1.3.1 The drivers of commodity prices

The market in emission allowances is typically analysed as a form of commodity market. Before discussing those price drivers particular to emission allowances we briefly discuss price determination in commodity markets more generally.

The drivers of commodity prices are fundamentally those factors that affect the demand for and supply of the commodities in question. Simplistically, the price of a commodity will increase if there is a negative supply-shock that reduces the availability of the commodity, all else remaining equal. The price of a commodity will also increase if there is an increase in demand for that commodity, all else remaining equal. Production constraints (specifically difficulties in varying

[5] It has been commonly accepted in the past that fixed threshold of price movements or quantitative criteria alone are not a suitable means of determining the significance of a price movement. See CESR's 2nd set of guidance to MAD, Ref. CESR/06-562b.

[6] Emissions data used in our analysis is reported on a consolidated, company-level basis and therefore covers parent or related undertakings of installations where relevant.

supply to match changing demand) are a common factor affecting the supply and price volatility of commodities.

Demand for a particular commodity is partly specific to it, but also a function of overall economic activity.[7] This influence of (global) macroeconomic activity (i.e. GDP) makes it unsurprising that the empirical evidence suggests that primary commodity prices display a degree of co-movement, albeit that the degree of such co-movement varies over time and with the commodities being considered. Other common price determinants are real interest rates, uncertainty and risk.[8] A negative relationship between the real interest rate and commodity prices is suggested by Frankel (2008) and Svensson (2008). A rise in the real interest rate will reduce the present value of future returns of a commodity by raising the discount factor, leading to a fall in price today. Risk-averse investors may reduce their demand for a commodity with volatile prices and this would be related to a fall in its price. The role of uncertainty as a determinant of price is also confirmed by Dixit and Pindyck (1994).

Where a commodity is storable real interest rates have a particular effect by changing the cost of holding inventories. High real interest rates lower the demand for inventories, which in turn contributes to lower total demand for commodities, and lower prices.[9]

Public policy can also be influential: for example, trade policy changes have been found to influence both price levels, and in particular the price volatility, of agricultural commodities.[10]

We now turn to the price determinants of emission allowances in particular.

1.3.2 Specific factors affecting the price of emission allowances

The literature around the pricing of emission allowances identifies the following factors as the main price drivers:[11]

- Public policy, including the structure of the EU ETS;
- Macro-economic factors such as economic growth and other commodity prices; and
- Internal company-specific or installation-specific factors.

These factors are broadly in common with those for commodities in general. We now discuss these in turn. (Exogenous variables such as the weather, including temperature and precipitation are also cited: the effect of these is understood to be direct, i.e. warm or cold weather impacts

[7] Byne, Fazio & Fiess (2011), "Primary Commodity Prices – Co-movements, Common Factors and Fundamentals", Policy Research Working Paper 5578

[8] Byne, Fazio & Fiess (2011), "Primary Commodity Prices – Co-movements, Common Factors and Fundamentals", World Bank Policy Research Working Paper 5578

[9] Frankel (2013), "Estimated Effects of Speculation and Interest Rates in a "Carry Trade" Model of Commodity Prices" (https://www.imf.org/external/np/seminars/eng/2012/commodity/pdf/frankel.pdf)

[10] See the ULYSSES project examining food price volatility and its summary of current knowledge (http://www.fp7-ulysses.eu/about/approach.html#Iterative-modelling.html)

[11] For example, Alberola, Chevallier & Cheze (2007), "European Carbon Prices Fundamentals in 2005 – 2007: The effects of energy markets, Temperatures and Sectorial Production"

upon energy consumption, which has a relation to the demand for emission allowances and hence their price).

Public policy

Carbon markets have emerged as a result of public policy by governments and EU and international institutions, with the objective of using market mechanisms to achieve climate policy goals. Supply and demand in the EU carbon market is thus heavily influenced by public policy, which sets the structural features and key parameters within which the market must operate. The overall supply of emission allowances is capped by the EU ETS, and policies regarding the allocation of allowances by Member States influence, to some extent, how allowances are distributed (in addition to the auction mechanism).

Changes in policy, for example with regard to the setting of caps or the allocation of allowances, can alter the short- and long-term supply and demand of emission allowances, which can create fluctuations in carbon prices. This effect may be reinforced by market uncertainty about future policy developments, i.e. uncertainty about whether a particular policy proposal will be adopted or not. For instance, the first phase of the EU ETS shows high levels of EUA price variation which can be interpreted as a phase of high uncertainty. In comparison, the second phase shows a lower level of variation in EUA prices, which suggests a lower level of uncertainty as the market matured.[12]

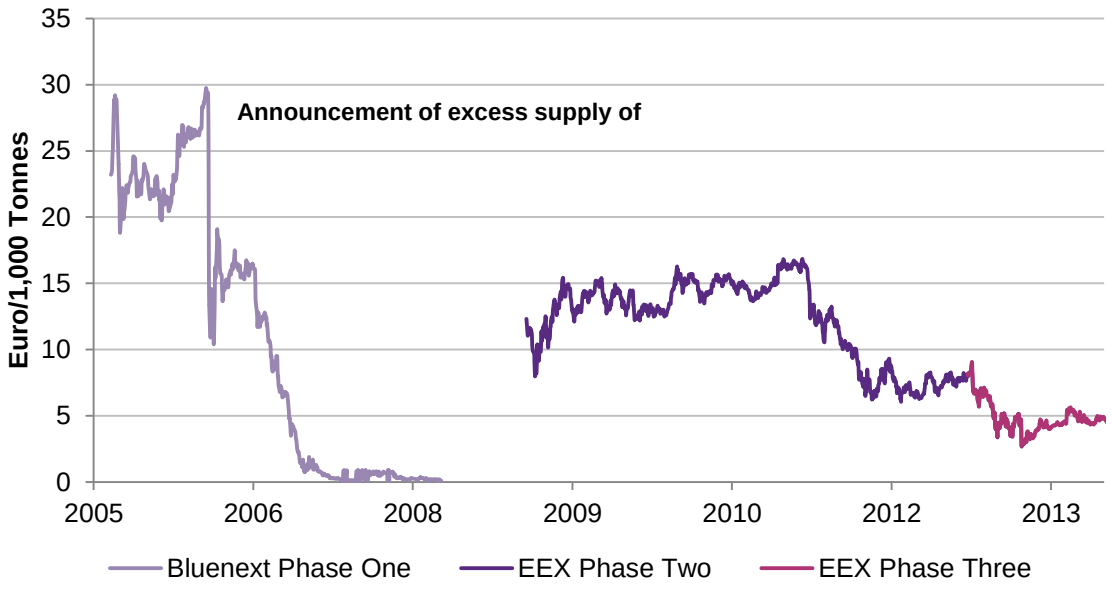
Structural changes to the EU ETS have also had an influence on the carbon price. For example, the introduction of the ability to bank allowances from one phase to the next has helped to stabilise the transition period between phases and avoid the collapse in price seen towards the end of Phase 1 in Figure 1.1 below. The length of the trading period can have an impact on the sensitivity of the carbon price to unexpected events like cold winter which create additional demands for energy and thus emission allowances.[13] (This is simply because factors such as these that could influence the price of emission allowances are averaged out over a longer period.) Bankability of emission allowances should minimise this effect.

Public policy can indirectly impact the demand for allowances, such as a country's investment in renewable energy sources which reduce the demand for coal-fired production.

[12] Lutz, Pigorsch & Rotfub (2013), "Nonlinearity in Cap-and-Trade Systems: The EUA Price and its Fundamentals", Centre for European Economic Research

[13] Carraro and Favero (2009), "The Economic and Financial Determinants of Carbon Prices", Journal of Economics and Finance, 59, 2009, no. 5

Figure 1.1: Evolution of EUA prices, 2005 – 2013 (daily spot price movement)



Source: Europe Economics analysis of Bloomberg statistics, market included: EEX, Bluenext

External factors

Economic performance (current and forecast GDP growth), movements in the Purchase Managers' Index (PMI) and industrial production (again current and forecast) can be expected to directly affect carbon consumption and hence the demand for emission allowances.[14] Monitoring how these variables develop (i.e. changed forecasts, or the variance of outturns against expectations) matter to price formation. Similarly market participants may consider stock market performance variables which also have predictive power: for instance, the European equity index was found to be positively correlated to EUA prices in both phases one and two.[15] Information on economic factors is publically available and would not be considered inside information, although the way in which companies respond to economic factors may not be publically known (e.g. if they change their fuel mix or production techniques).

Another influential driver of the price of emission allowances is the price of energy, such as of natural gas and coal.[16] Different energy inputs have different rates of carbon emission and it is the relative price ratio between two commodities that plays a role in carbon price formation. For instance, a falling price of gas relative to coal reduces the switching costs between the two fuels, and given gas is the lower emitting fuel, the price of carbon would be expected to fall with the reduction in demand for emission allowances.[17] Policy developments in Member States in relation

[14] Nordby (2011), "Price relationships between EUAs and energy and commodity prices", Norwegian University of Life Science

[15] Lutz, Pigorsch & Rotfub (2013), "Nonlinearity in Cap-and-Trade Systems: The EUA Price and its Fundamentals", Centre for European Economic Research

[16] Alberola, Chevallier & Cheze (2007), European Carbon Prices Fundamentals in 2005 – 2007: The effects of energy markets, Temperatures and Sectorial Production

[17] Carraro and Favero (2009), "The Economic and Financial Determinants of Carbon Prices", Journal of Economics and Finance, 59, 2009, no. 5

to fuel sources are also likely to have an impact on the demand for certain types of fuel and hence emissions. For example, the potential development of shale gas in the UK may change the current fuel mix among emitters and lead to lower emissions and thus lower demand for allowances.

Other external factors affecting the demand for energy, or other carbon-emitting processes, will indirectly affect the price of allowances. These could include, among other things, unexpected changes in weather (e.g. a prolonged cold winter) that increase the demand for energy.

In line with the findings referred to earlier, co-movement between allowance prices and wholesale electricity prices were found across exchange venues in different regions, with the strongest correlation found on EEX. Since the emission of CO_2 is highly linked to the price of oil (through oil's high correlation to the price of natural gas, which in turn determines the competitiveness between gas and coal), the movement in the oil price will also play an important role in the determination of the emissions price. Such a correlation is shown to be positive and statistically significant in a study by Nordby (2011).[18]

Overall, empirical evidence shows that commodity prices are likely to play a significant role in the formulation of future EUA prices, as the change in energy prices affects in particular the ability of power generators to switch between their fuel inputs and hence change their carbon emissions. In the EU ETS, the power and heat sector has a crucial role in influencing supply and demand. As utilities are the main players in this market, their need for carbon allowances and their buying strategies significantly influence the evolution of carbon prices.[19]

However, evidence does suggest an unstable relationship at times: the influence of energy price drivers is found to be unstable within phase one of the EU ETS. Alberola (2007) showed that the impact of various energy prices varied significantly before and after the first compliance year of phase one.[20] This price relationship instability may have been driven by other factors as well, such as uncertainty surrounding the beginning of the EU ETS.

Changes at installations not part of the EU ETS may also impact the carbon price. For example, a major outage of a nuclear power station (such as the German government's decision to close all nuclear power stations by 2022 following the Fukushima disaster) would have an impact, as the shortfall in nuclear energy output would need to be taken up primarily by fossil-fuelled power plants. The likely substitution with fossil fuels would increase carbon emissions and impose upward pressures on the price of emission allowances. For instance, the future value of EUAs (cf. the current price) was expected to increase by more than 10 per cent due to the German nuclear phase out.[21]

Outages of even large offshore wind farms are less likely to have an impact because they tend to affect only a small proportion of the capacity, at least at present. Again, the controlled release of

[18] Nordby (2011), "Price relationships between EUAs and energy and commodity prices", Norwegian University of Life Science

[19] World Bank analyst Carine Hemery, Energy Market Analyst, Orbeo

[20] Alberola, Chevallier & Cheze (2007), European Carbon Prices Fundamentals in 2005 – 2007: The effects of energy markets, Temperatures and Sectorial Production

[21] Roques & Ferrario (2011), "Implications of the Fukushima accident on the European Power sector", CERA, ifri.org/downloads/comptes_rendu/fichiers/96/ihsceraifri7julyweb.pdf

such information into the market is primarily a concern of the authorities — the concern in terms of non-public information would be the behavioural reaction by installation owners to such news.

Internal factors

Carbon emitters may experience changes in their expected CO_2 emissions and thus demand for allowances due to internal factors (i.e. those beyond changes in production caused by wider economic factors). These could include plant breakdowns or decisions to shift to different fuels.

The stakeholder engagement indeed indicated that significant corporate decisions affecting the status of availability and usage of industrial facilities could have a material market impact — and as such should be above any threshold if sufficiently large-scale. The type of such decisions could include:

- Outages, planned mothballing or closures.
- Investment decisions regarding the building of new plants.
- Changes in energy efficiency of large plants.
- Fuel-switching at individual plants.

Summary

Price changes can be driven by increased information in the market about the demand and supply of allowances, as found in the announcement of new information and events, e.g. the annual release of emissions data. According to the Prada Report, a lack of transparency relating to the supply of allowances would be detrimental to the attainment of market equilibrium by participants and could hamper the decision-making of investors in response to changes in market information.[22] The Prada report recommended informational improvements for carbon markets in Europe to achieve better market confidence and a more robust market price for CO_2.

The most significant impact of new information was seen in April 2006 during which the price of allowance fell rapidly right after the first publication of emissions data which suggested an excess supply of allowances (seen in Figure 1.1).[23] The effects of the excess supply were exacerbated by the inability of market participants to carry credits over to the next period. The introduction of banking of allowances has resulted in investors being less sensitive to announcements on the status of the market as they are no longer limited to a single phase period in which to buy, sell or yield allowances.

The table below summarises the factors influencing the price of emission allowances. These are separated into supply-side and demand-side factors. Supply-side factors are — in part — politically driven.[24] Factors on the demand-side are broadly shaped by market activities, such as fuel prices and production levels.

[22] Prada (2010), "The regulation of CO_2 markets", Emeritus General Inspector of Finance, France

[23] Nordby (2011), "Price relationships between EUAs and energy and commodity prices", Norwegian University of Life Science

[24] Betz, "What is driving price volatility in the EU ETS?" University of New South Wales, Australia.

Table 1.1: Summary of factors affecting the price of emissions

Supply Side	Demand Side
Total available EUAs	Fuel prices (particularly oil and gas) and the costs of abatement options
Supply of CDM credits (CERs)	Weather
Structural features of the EU ETS	Current and forecast GDP growth, including industrial production
	External events (such as earthquakes)
	Internal events (such as breakdown of power plant)

1.3.3 Role of non-public information in the carbon market

Information availability is an important criterion for the efficient operation of a financial market. It is necessary that companies release relevant (non-public) information as soon as it is available, and all those who wish to trade should have access to the same information at the same time. Non-public information in the carbon market is analogous to that in equity markets. Insider knowledge on a firm's net position in carbon allowances and its future carbon consumption would be known to only a selected group of employees, leading to an asymmetry of information in the market.

Under the EU ETS legislation, emissions data of the installations covered are only published only once a year and market participants therefore need to rely on emissions data from previous years and economic data to forecast demand for the current year. Sophisticated analytical tools on market price have been developed by leading investment banks and market analysts but these would only be accessible to their clients. Forecasts prepared by the banks have also indicated continuing market uncertainty and increased risk of price volatility.

In terms of non-public information in the carbon market the obligation to disclose inside information will be effectively placed on companies with large installations within the EU ETS, as it is they that possess the relevant information rather than the issuer. The information to be disclosed will normally concern the physical activity of the disclosing party (e.g. on capacity and utilisation).[25]

As discussed above, there are idiosyncratic factors, specific to individual firms or installations, that affect the carbon price and which are not necessarily publicly known. These factors are linked to productivity, production levels and production methods. The production process may experience an unexpected increase in emissions due to some problem in the facilities. This may not affect the overall production level or profit of a firm, but it may cause an increase in demand for allowances. Therefore unexpected production problems are another form of non-public information that may affect the allowance price.

[25] The latest Council text on MAR specifies that the information to be disclosed should not concern the disclosing party's own plans or strategies for trading emission allowances.

Many emission allowance market participants will carry on other commodities business so the information relating to those other activities, if they affect emissions, could also constitute inside information for the purposes of the ETS. Examples of relevant non-public knowledge could include:

- fuel-switching options available to a company with large installations which alter the company's demand for emission allowances;
- changes in production methods that impact emissions; and
- closures or capacity reductions/extensions of installations.

Financial firms may also have large positions in the carbon market which, if changed, could affect the price. However, as these are not carbon-using companies any information they have about carbon demand would not be considered for disclosure, and neither would information concerning any carbon market participants' own plans (including with respect to ETS installations) and strategies for trading.

1.4 Current Situation with Regards to the Disclosure of Non-public Information

In order to provide context to our analysis of the impact of different thresholds for information disclosure under MAR, we consider the current situation as regards the company-specific information which emission allowance market participants hold in respect of their businesses, and provide an overview of how this information is currently used (to the extent that it is available).

Our research on this topic includes a review of a wide range of analyst reports (specifically Point Carbon, Tschach Solutions, Barclays Carbon Reports, World Bank and Bloomberg) in order to assess the extent to which individual ETS operators have been judged to influence the market. Besides reference to general sectors of emitters (e.g. the heat and power sector is held to be the most influential in the carbon market), these analyst reports make no mention of the impact of actions taken by individual emitters. It is worth highlighting that this could be influenced by the restricted availability of such information at present.

Information held by market participants

Much of the information investors currently use in their decisions regarding the buying and selling of emission allowances relates to macro-economic variables, such as changes in economic circumstances (e.g. GDP and industrial production), and policy information about the supply of allowances or the structure of the EU ETS. These types of information are usually publicly available and, importantly, not uniquely held by individual firms.

This view is supported by those market participants who contributed to our survey exercise (a total of thirteen responses were received).[26] There was consensus among those firms participating in our fieldwork that the long-run prices in the EU ETS are largely determined by macroeconomic variables, and that in the shorter-term, the direction of prices is driven primarily by policy

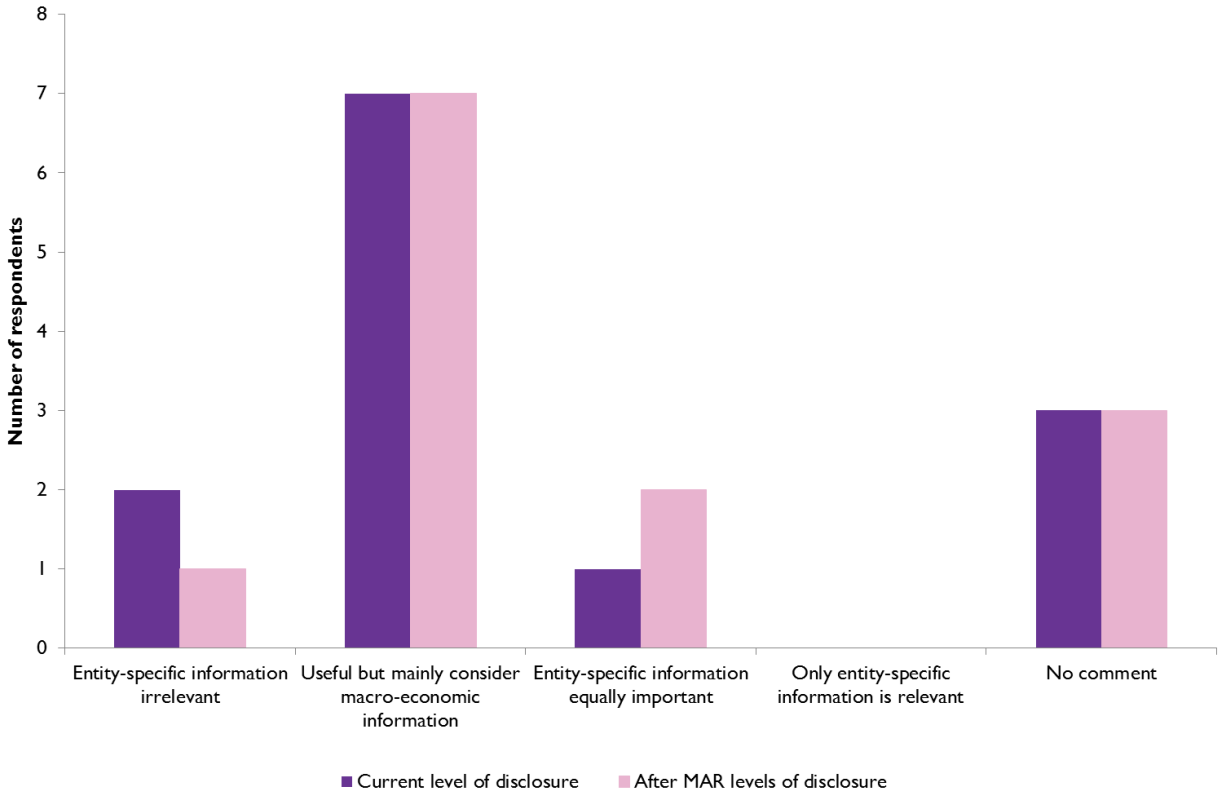
[26] At least two responses represented the views of a number of emissions traders and energy market participants.

developments. At present non-public information is ranked lower in terms of relative importance than macroeconomic data by those emissions allowance market participants taking part in our fieldwork. However, some participants (particularly market analysts) thought that as and when political changes and structural reforms to the EU ETS slow down, other variables may increase in their impact on the short-term carbon price — and this would include micro-economic variables such as production outages.

This is relevant to the setting of the threshold. MAR acknowledges that emission allowance market participants can hold information that may be considered as inside information. Most respondents to our fieldwork agreed with this (see Appendix for further details on the fieldwork conducted). However if such information plays only a secondary role in price formation it can be argued that the threshold set should pay heed to this.

When asked about the relevance of this information in a scenario where EU ETS operators *were* obliged to disclose all relevant non-public information (i.e. under the MAR regulations), the majority said that the importance of this information to their investment decisions would not increase (the Appendix has further details on the survey).

Figure 1.2: The importance of entity-specific information under current and proposed levels of information disclosure



However, as noted, this does not mean that the information that companies hold does not have a role in price formation, simply that it is secondary to other factors. There will be non-public and entity-specific information held by individual market participants which are entities with EU ETS compliance duties, which, once disclosed, could have an impact on investors' decisions. Typically, this information could be linked to productivity, production levels and production methods which

affect the demand for allowances and investors would be likely to use such information in their investment decisions because of the relative weight that such ETS operators have in contributing to the compliance-based global demand for emission allowances.

Existing disclosure requirements

Power generators are already required to disclose information on outages and power reductions as part of the REMIT regulations.[27] The Third Edition of ACER's (non-binding) guidance on the application of REMIT was published in October 2013. This document discusses the setting of an indicative threshold for the purpose of defining inside information, and concludes that inside information should be primarily understood to include — inter alia — disclosure requirements under Commission Regulation (EU) 543/2013. The latter requires that information relating to planned unavailability of 100 MW or more of, inter alia, a consumption or generation unit — i.e. broadly equivalent to the matters of interest — shall be made available to the public through the ENTSO-E transparency platform.[28]

Power market information is published on certain centralised systems. Examples include EEX's transparency platform (which publishes information from German, Austrian and Czech power generators), and the Balancing Mechanism Reporting System (which provides real-time data on how power flows on and off the UK Electricity Transmission System are balanced). Firms in the power and heat sector as defined by Carbon Market Data (CMD) accounted for 61 per cent of all verified emissions in 2011; the top six power and heat companies accounted for 25 per cent.[29] The iron and steel, cement and lime and the oil and gas sectors were the most significant in the remaining 39 per cent. The figure below shows companies in the CMD sample and their verified emissions as a percentage of total emissions in 2011. Considering those 16 companies whose emissions were more than one per cent of total emissions, only four were not energy companies.

Therefore a very large proportion of the most important carbon market participants, being energy and power firms, are already under an obligation to disclose information relevant to emissions, in that changes in energy generation are directly linkable to the production of CO_{2eq}.

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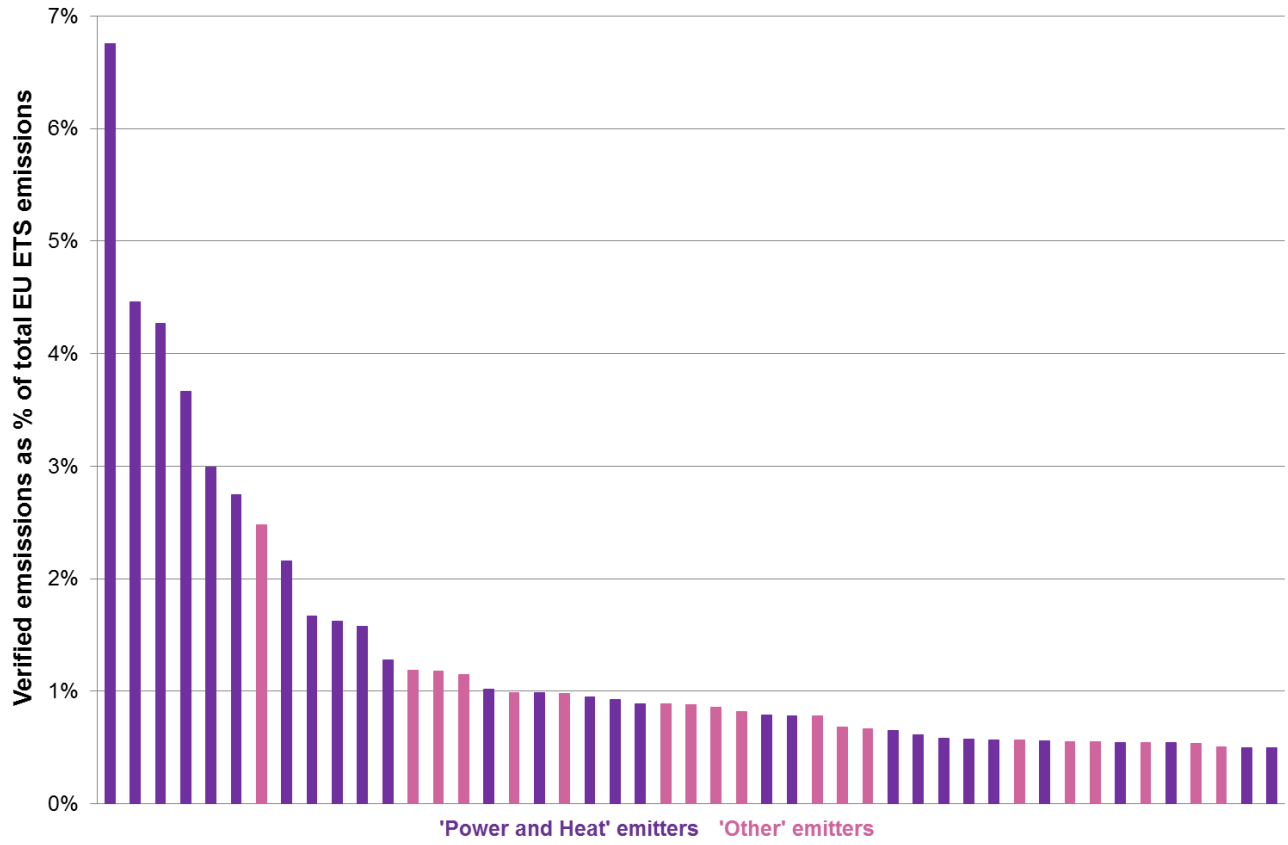
[27] Regulation (EU) No 1227/2011 of the European Parliament and of the Council of 25 October 2011 on Wholesale Energy Market Integrity and Transparency. Article 4(1) states that: "Market participants shall publicly disclose in an effective and timely manner inside information which they possess in respect of business or facilities which the market participant concerned, or its parent undertaking or related undertaking, owns or controls or for whose operational matters that market participant or undertaking is responsible, either in whole or in part. Such disclosure shall include information relevant to the capacity and use of facilities for production, storage, consumption or transmission of electricity or natural gas or related to the capacity and use of LNG facilities, including planned or unplanned unavailability of these facilities."

[28] ACER 'Guidance on the application of the definitions set out in Article 2 of Regulation (EU) No 1227/2011 of the European Parliament and of the Council of 25 October 2011 on wholesale energy market integrity and transparency'. We note that the 1st Edition (20 December 2011) was more explicit: "The classes of information to be published on a regular basis (annual, monthly, week-ahead forecasts, daily day-ahead and intra-day information) include data related to available transmission capacity, capacity used, aggregated realised commercial and physical flows and information on planned outages and unplanned outages of generation units larger than 100 MW."

[29] CMD's EU ETS Companies Database currently provides detailed on emissions for more than 900 companies in the EU ETS.

Figure 1.3: EU ETS participants with emissions greater than 0.5% of total emissions, 2011



Source: Carbon Market Data and Europe Economics analysis

Effect of non-public information on price formation

The available literature, for example the Prada report, suggests that there is a limited amount of information that is endogenous to the activity of operators in the carbon market and liable to cause a major asymmetry of information. This is due to the fragmentation of CO_2 emitters and the fact the market functions on an annual rhythm. The CMD data show that the total emissions of the largest emitting company accounted for under seven per cent of annual emissions in 2011, as seen in Figure 1.3 above. Investors appear to rely mainly on publically available information related to public policy and macroeconomic factors when making decisions about buying and selling allowances. As mentioned, however, most market participants who contributed to our stakeholder engagement thought that entity-specific information nevertheless is useful. We note that it is the *change* in expected emissions that would be of most interest to investors.

As noted, the majority of important emitters are already required to disclose firm-specific information as part of REMIT requirements. Not all non-public information held by EU ETS market participants, if disclosed, would be of interest to reasonable investors, a consideration that should influence the development of a materiality threshold for information disclosure under MAR.

1.5 Developing Policy Options for a Threshold for Disclosure of Information

Articles 7(4) and 17(2) MAR effectively stipulate that the non-public information on own physical operations held by market participants with emissions (or rated thermal input) below a certain threshold does not qualify as inside information and thus does not need to be disclosed to the public.

The aforementioned threshold is in effect a materiality threshold:

> "In the case of participants in the emission allowance market with aggregate emissions or rated thermal input at or below the threshold set, since the information about their physical operations is deemed to be non-material for disclosure it should also be deemed not to have a significant effect on the price of emission allowances, of auctioned products based thereon or of the derivative financial instruments related thereto." (MAR Recital 51)

This materiality threshold is to be used to simplify the application of MAR's inside information definition and the disclosure duty in a specific context where non-public information comes not from a single issuer but from a large number of entities on the compliance demand side. In this context MAR further notes that:

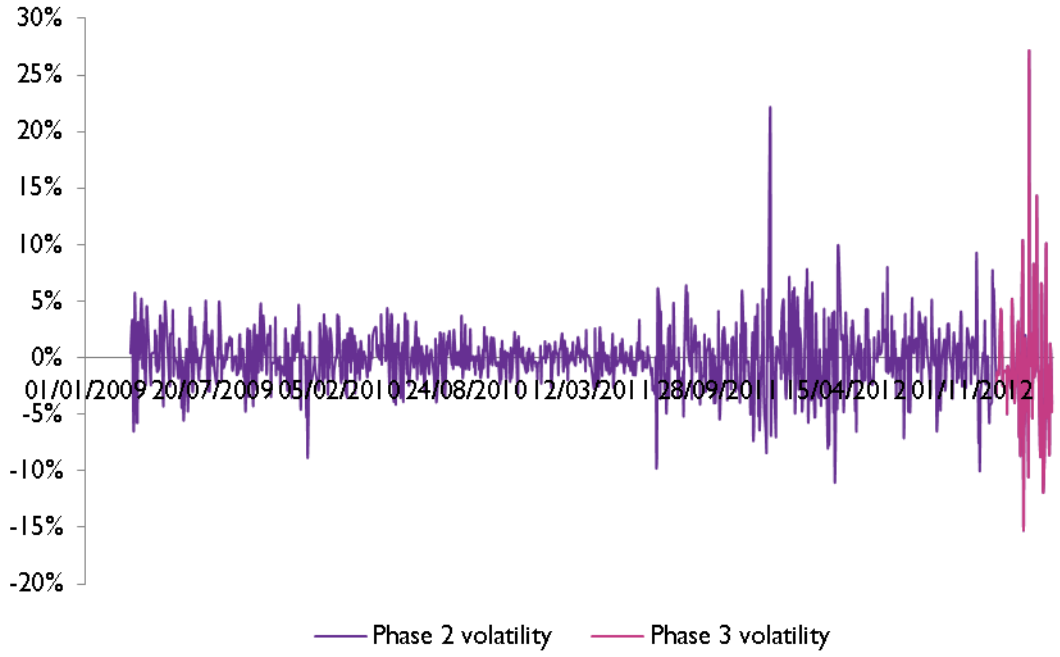
> "In order to avoid exposing the market to reporting that is not useful and to maintain cost-efficiency of the measure foreseen, it appears necessary to limit the regulatory impact of that requirement to only those EU ETS operators, which, by virtue of their size and activity, can reasonably be expected to be able to have a significant effect on the price of emission allowances, of auctioned products based thereon, or of derivative financial instruments relating thereto and for bidding in the auctions pursuant to Regulation (EU) No 1031/2010." (MAR Recital 51)

This context therefore warrants the consideration of a number of approaches to establish the appropriate level of the threshold referred to in Articles 7(4) and 17(2) MAR.

1.5.1 Price formation in the EU-ETS

In practical terms, it would be hard to exploit low-value inside information, i.e. which had a resultant price effect within intra-day volatility or less than the bid-ask spread. Information is of interest to investors if it has an effect on the price formation of a market, and in this case the price effects of the information would be 'swallowed' by the everyday movements in the carbon price. It is not unusual for the carbon price to vary between five and ten per cent day-to-day, as illustrated by the figure below. Relative bid-ask spreads are currently between three and four per cent.

Figure 1.4: Percentage change in inter-day daily futures price



Source: Europe Economics analysis of Bloomberg statistics, market included: ICE

1.5.2 Approaches to setting the threshold

We have explored the following approaches:

- Event analysis. Under this approach, we identify a number of "events" (such as the announcements of plant closures or the mothballing of a facility by EU ETS participants) which could have had an effect on aggregate emissions. We then reviewed price and price volatility at the time of the event to assess whether any change in these variables was detectable. The aim is to differentiate between volume changes which do not appear to be associated with a price effect from those that do.
- Applying a similar proportion of firms captured under ACER guidance for REMIT disclosures. Under this approach, the disclosure threshold would be set such that a similar proportion of companies in the EU ETS are captured as that captured by the ACER guidelines for the REMIT information disclosure requirements (i.e. the proportion of power firms with power generation units exceeding 100MW) which is around 30 per cent of firms.
- Directly linking the EU ETS threshold to the recommended REMIT threshold of 100 MW generation capacity.
- Analytical referencing, by identifying, from past papers by carbon market analysts concerning the drivers of carbon market prices, companies or installations judged important enough to have an impact on the carbon price.

We discuss each of these approaches in turn.

1.5.3 Event analysis

We make use of event analysis to estimate the change in CO_2 emissions that would result in a detectable change in the price level or price volatility of emissions. A suitable event would be a shock that measurably affects the EUA market. The aim is to differentiate between volume changes which do not appear to have a price effect from those that do. To illustrate this approach we examine one particular case in detail before turning to the statistical analysis of a set of relevant events.

Shutdown in German nuclear stations

The German policy reaction to the 2011 Japanese earthquake represents a very significant event. A shock such as the German announcement to close nuclear power plants is ideal as it enables us to isolate the effects of the volume and price change to the single event.[30]

On Friday 11th March 2011 a huge earthquake off the coast of Japan and the ensuing tsunami caused severe damage to many of the country's nuclear facilities. In response Germany announced the shutdown of seven of its nuclear power stations (which took effect between 15th and 18th March) with the remainder to be retired by 2022.

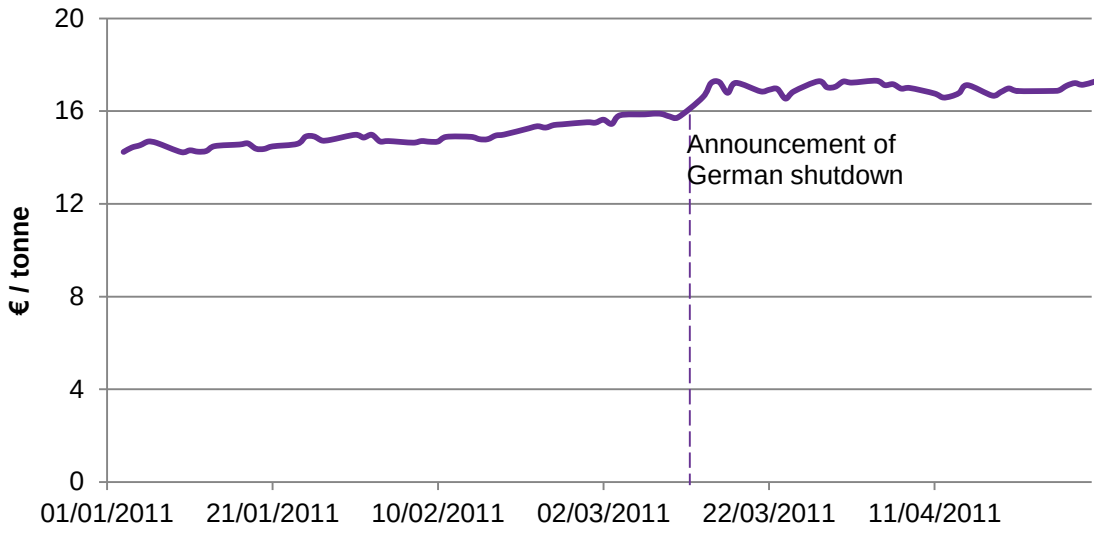
The plants that were shut down immediately had an aggregate capacity of about nine Giga watts (GW), with about six GW typically utilised (i.e. a total capacity of around nine GW and an average utilisation rate of around 70 per cent across the different plants).[31] In the short-run, it is likely that nearly all of the energy shortfall would have been sourced from fossil fuel (coal and lignite) power stations in Germany and from a mix (likely including nuclear) imported from across the border. Longer-term another 11GW of utilised capacity should be retired, with the intention that much of this should be from renewables.

The graphs below illustrate the impact on price of the announcement of shutdown of German nuclear power stations. We can see that the immediate effect is an increase in price of EUAs, which reflects the market reaction to the expected rise in future emissions. The impact on price level persisted until early May 2011, albeit weakened by other price drivers over that time.

[30] Looking at other changes which may affect emission volumes, such as legislative change, is less ideal because there will be expectations in the market before the passing of the legislation that may affect volumes and price, thus blurring the relationship between the legislative change (measured from the passing of a directive or the official announcement of the change) and the price and volume change (i.e. the price may start changing before the announcement is actually made, making it hard to estimate the true impacts of the legislation).

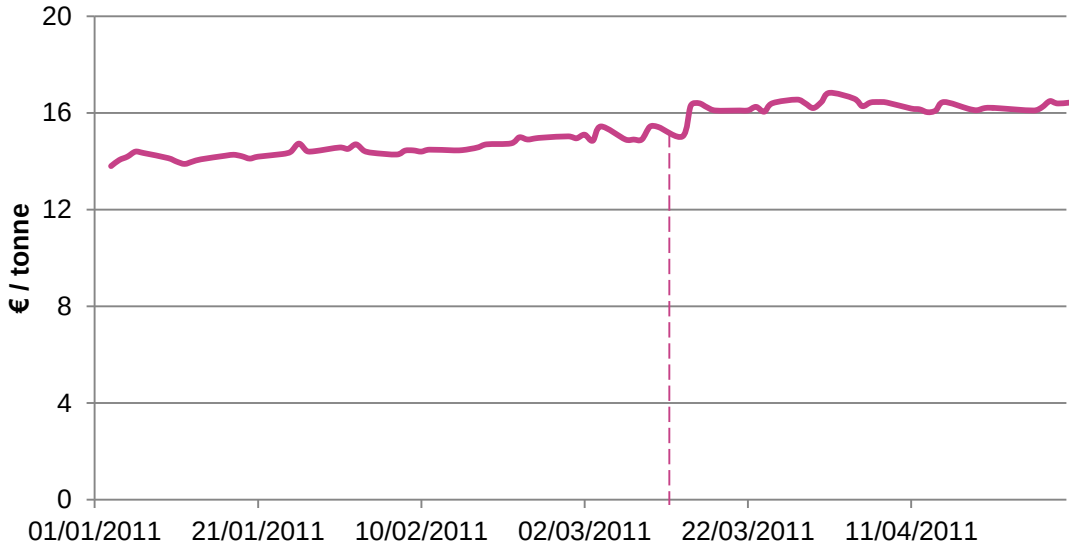
[31] Fabien Roques and Federico Ferrario, IHS CERA, "Implications of the Fukushima accident on the European Power sector", June 2011

Figure 1.5: Daily settlement price of EUA futures - Dec 2011



Source: Europe Economics analysis of ICE data, market included: ICE

Figure 1.6: Daily end-of-day price of EUA spot



Source: Europe Economics analysis of Bloomberg data, market included: EEX

Roques and Ferrario (IHS CERA, 2011) estimated that substitution in Germany of nuclear energy with fossil fuels could add two to five per cent to the 2010 level of EU power sector emissions. The authors associated this with a 10 per cent increase in the expected value of CO_2 allowances, calculated through to 2020. This is consistent with the order of magnitude of the observed immediate effect of the announcement on the carbon price.

The EU power sector accounted for about 60 per cent of verified emissions in 2010 (the benchmark year referenced by the authors).[32] This means that 2–5 per cent of power industry emissions are

[32] Analysis of CMD

equivalent to about 1.2–3 per cent of emissions across all sectors, or 23–58 million tonnes in one year (based on 2010 data).

To test the reasonableness of this estimate, we can use MIT estimates from 2007 that assign a rate of emissions of CO_2 between 0.65 kg/kWh and 1 kg/kWh for conventional coal-fired power stations. [33] (The average carbon footprint of oil-fired electricity generation plants is 0.65 kg/kWh, and thus the use of oil-fired electricity generation in the place of nuclear would have a similar effect on emissions.[34]) This implies that replacing the 8.6 GW (equivalent to 6GW at 70 per cent utilisation) of nuclear capacity in Germany with coal (adopting a direct translation from nuclear to fossil fuel by 18th March) would generate an additional 34–55 million tonnes of CO_2.[35] This is fairly well aligned with the IHS CERA volume estimates.

This indicates that an increase in emissions, and therefore demand for EUAs, or a decrease in supply of at least 23 million tonnes (being the lowest estimate of the volume change identified above) is associated with an evident price effect.[36] This suggests that a threshold for the disclosure of non-public information should be set somewhere below this range. However to examine this further we first need to identify events with lower volume effects.

Other events

As the purpose of the threshold is to set a company size (in terms of emissions) *below which* the companies' activities would have no impact on the carbon price or a reasonable investors' decisions, it is necessary to consider CO_2 volume shocks which have *no* significant impact on the carbon price. We have therefore searched Bloomberg News for the opening, closure, mothballing, downsizing and temporary stoppage in plants/ mills in sectors with significant emissions footprints: power and heat, iron and steel and cement.

This identified many events, of which we were able to estimate the emissions impact for over twenty (the news stories did not identify the emissions impact directly and did not always provide sufficient detail to estimate it).

We looked for impacts on price in the emissions market on the day of the announcement or in its immediate aftermath (i.e. the day of the announcement and up to two days subsequently).

Using data on the variation of the EUA spot price over time, we tested whether the various events described above had a statistically significant impact on EUA prices. We looked at these questions in two main ways. The first statistical test which we considered was a Chow break test which is a well-established way of assessing a change in the evolution of a time series. This compared the

[33] MIT (2007) 'The future of coal – options for a carbon-constrained world'

[34] Parliamentary Office of Science and Technology (2006) 'Carbon footprint of electricity generation' UK

[35] Our method of estimating this is as follows: 8.6 GW of nuclear capacity at an average utilisation capacity of around 70 per cent, as detailed in the Roques and Ferrario article, translates to around 52,560 GWh (multiplying 8.6GW x 365 x 24 x 70 per cent). With a range of 0.65kg and 1 kg/kWh of CO_2/kWh emitted by the average coal-fired station, this equates to between 34 and 55 million tonnes of carbon a year.

[36] In passing we note that the Prada report, a discussion of market abuse broadly indicates that the net position required to squeeze the market could be as much as several dozen million tonnes, approximately 60 million tonnes.

price movement at the time of the event with the scale of daily price movements in the previous three months before the event.

The second test (strictly a set of tests) compared price movements on the day of the event (or on the day of the event and one or two days subsequently). Again we looked for deviation from the price movements in the six weeks both before and after the event (but excluding the period around the event itself).

The table below shows the results.

Table 1.2: Statistical significance of the impact of different events on EUA prices

	Estimated volume effect (m tonnes)	Date	Test 1	Test 2
German nuclear shutdown	Between 23 and 58	Mar-11	**Yes**	**Yes**
Closure of three power plants	23.1	Nov-12	No	No
Closure of power plant	13.0	Aug-12	No	No
Closure of steel mill	7.0	May-09	No	No
Shutdown of coal-fired plant	6.9	May-09	No	No
Mothballing of steel mill	6.2	Dec-09	No	No
Closure of steel mill	5.9	May-11	No	No
Re-opening of power plant	5.8	Dec-11	**Yes***	**Yes***
Closure of coal-fired plants	5.0	Aug-09	No	No
Closure of coal-fired plant	4.8	Dec-12	No	No
Closure of power plant	4.0	Mar-09	No	**Yes**
Closure of oil refinery	4.0	Oct-13	**Yes***	No
Closure of power plant	3.4	Mar-12	**Yes***	No
Reduction in plant capacity by one third	2.3	Sep-12	No	No
Reduction in plant capacity by one half	2.0	Sep-11	No	No
Temporary halt at coal-fired power plants	1.9	Nov-12	No	No
Closure of steel mill	1.4	Jul-12	No	No
Plant halt	0.6	Nov-12	No	No
Closure of cement mill for one year	0.2	Apr-09	No	No
Closure of cement mill	0.1	Jan-12	No	No

Yes means the impact of the event is statistically significant at least 5 per cent level.
Yes* means that the impact of the event is statistically significant at 10 per cent level.
No indicates that the impact of the event is not found to be statistically significant in our analysis.

As can be seen the events do not cover all possibilities in terms of emissions volume. Equally there is not a sharp divide between events associated with price effects which are detectable in statistically significant terms, and those which are not — e.g. an event estimated to have a volume effect of 5.8 million tonnes has a detectable effect, but several larger ones do not. It follows that one interpretation — based on the stricter interpretation of statistical significance (i.e. at least a five per cent confidence level) — would be that the transition to information disclosure having a

statistically significant price effect could be as high 23 million tonnes (or more). This is about 1.2 per cent of the total volume of the emissions market.

The smallest volume impact to register as being associated with a statistically significant price effect in the above analysis is 3.4 million tonnes. We have adopted 3 million tonnes as a policy option. Alternatively the smallest volume impact to register as being associated with a statistically significant price effect on *both* measures is 5.8 million tonnes. We have adopted 6 million tonnes as a further policy option on this basis.

1.5.4 Weighting of emitters using REMIT threshold

Under REMIT, firms are prohibited from trading on "inside information" which is defined as information that is likely to have a significant price effect on the market if made publicly available. It covers information which a reasonable market participant would be likely to use as part of the basis of his investment decisions to enter a transaction and hence impact on the market price.[37]

Under this approach, the disclosure threshold would be set such that a similar proportion of companies in the EU ETS are captured as those captured by the ACER guidelines for the REMIT information disclosure requirements. The ACER guidelines recommend that information relating to generation units equal to or exceeding 100 MW should be publicly disclosed.

Estimating a CO_2 threshold based on this threshold of generation capacity is not straightforward as this depends on the fuel that is used to generate the power and the capacity utilisation (i.e. number of operating hours). A coal-fired power station is a reasonable benchmark against which to estimate emissions, although carbon dioxide emissions for conventional coal-fired power plants will also vary significantly because those emissions are a function of the coal's carbon content and the plant's thermal efficiency.

Using the average emission metrics reported in the MIT study of between 0.65kg and 1kg CO_2/kWh, and assuming an average load factor of 80 per cent for coal-fired stations, a 100 MW coal station would produce between 0.45 and 0.7 million tonnes of CO_2 a year. As a cross-check, the MIT study found that, on average, a 500 MW coal-fired power plant produces three million tonnes of carbon dioxide per year. An equally efficient 100 MW power station would produce 0.6 million tonnes, which is within the range estimated above.[38] For the purpose of our analysis we assume that a 100 MW coal-fired power station would have emissions of 0.5 million tonnes a year.

There are two available datasets on emissions that are relevant to this analysis. The first is the CMD company-based dataset, which records aggregate emissions per company and classifies companies according to their sector (e.g. 'power and heat'; 'iron and steel'). The second is the CMD installations-based dataset, which records emissions per installation and classifies installations by the nature of their activities (e.g. 'combustion of fuel').

[37] SGH monthly Bulletin, "REMIT: A new market abuse regime for energy companies", http://www.sghmartineau.com/publication_event/updates/remit-a-new-market-abuse-regime-for-energy-companies-February-2012.pdf

[38] MIT (2007) 'The future of coal – options for a carbon-constrained world'

We first estimate the proportion of energy-market companies captured under the ACER recommended threshold for disclosure under REMIT, and then apply this proportion to all EU ETS emitters:

- We use information on emissions by installation in the EU ETS to determine the number of installations that are engaged in energy-producing activity, and the proportion of this likely to be captured under the REMIT threshold (i.e. all those with a capacity of 100 MW or above). As noted above we approximate for this by using 0.5 million tonnes of verified emissions a year.[39] We then relate these installations to unique companies. We estimate that the recommended REMIT 'threshold' captures between 30-50 per cent of energy companies in the EU ETS.
- As energy companies have higher emissions than the average company in the EU ETS and therefore a larger proportion are likely to be important for price formation (see Figure 1.7 below, 'Utilities'), we consider it appropriate for the emissions-related threshold to capture the lower-bound proportion of all companies in the EU ETS, namely 30 per cent. Using the CMD-derived company data this would equate to around 280 companies.

This analysis indicates that the equivalent threshold would be around 0.96 million tonnes of emissions a year.

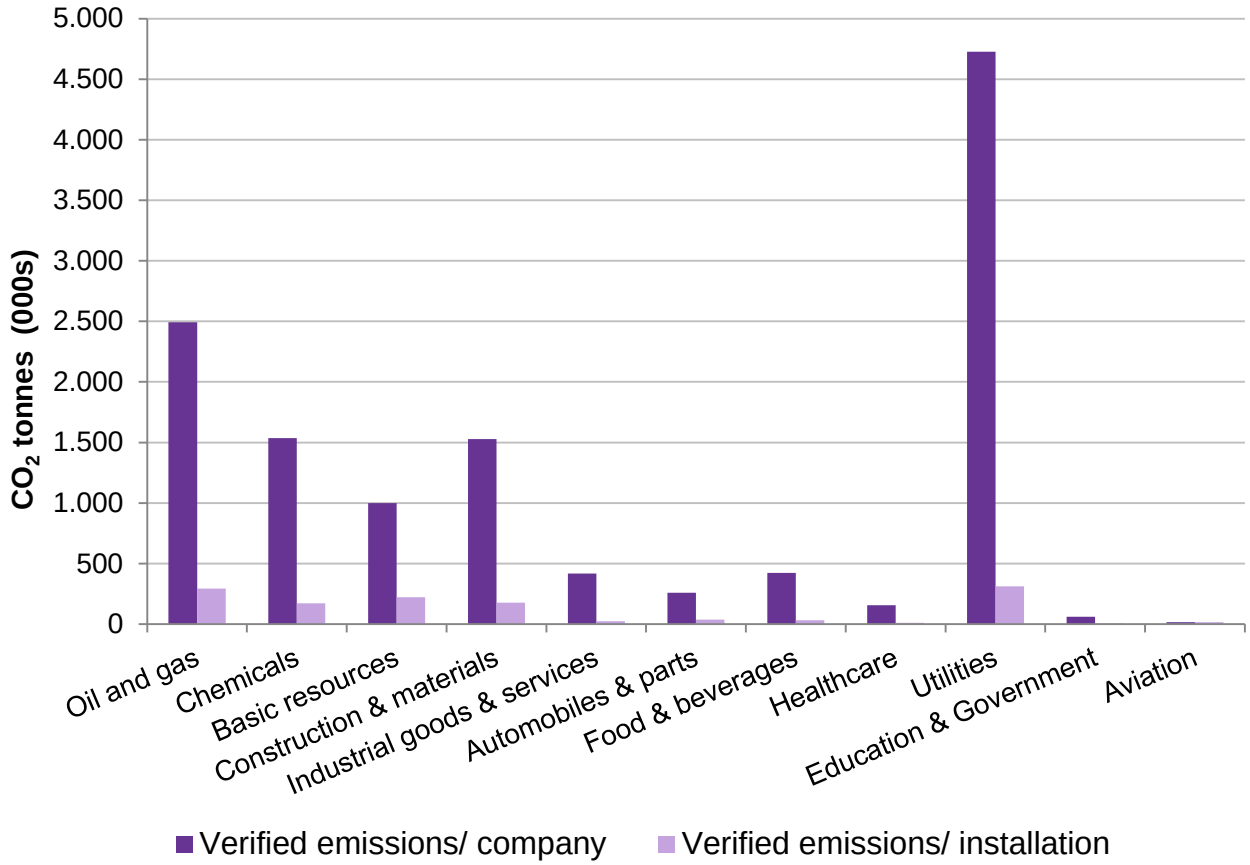
1.5.5 Direct REMIT benchmarking

This approach aligns directly the carbon threshold with the recommended threshold used in the REMIT disclosures. As described above, we estimated that a capacity of 100 MW per installation is equivalent to approximately 0.5 million tonnes of carbon a year. Under this approach we therefore set the threshold for aggregate emissions at 0.5 million tonnes per company. This creates a potential discrepancy between the scope of the REMIT threshold (which applies to installations) and the scope of the emissions threshold (which applies to companies). This is because there may be companies with aggregate emissions over 0.5 million tonnes a year but with many installations such that each one has emissions well below the level considered relevant under REMIT. Thus, direct application of the REMIT threshold leads to a significantly more rigorous outcome for emission allowance market participants in comparison to REMIT-covered entities.

The figure below illustrates this. In the utilities sector (i.e. energy-generating companies) the average emissions per installation are relatively small compared to the average emissions per company, as each company has a large number of installations and therefore large aggregate emissions.

[39] This is an approximation as the installation-level dataset classifies companies by the nature of their activities rather than their sector, and therefore it is not possible to accurately identify 'energy' installations, which are those affected by REMIT. We assume that all installations listed as 'combustion' or 'combustion of fuels' in the installation-based dataset are analogous to companies in the 'power and heat' sector in the company-based dataset and therefore are within the scope of REMIT.

Figure 1.7: Verified emissions by company and installation, 2011



Source: Carbon Market Data (2011) and Europe Economics analysis

Setting the threshold at 0.5 million tonnes of carbon a year would capture around 380 companies, accounting for approximately 97 per cent of all emissions in 2011. This is around 40 per cent of all EU ETS participants (roughly in the middle of the 30–50 per cent of energy sector players we estimated above).

Despite this discrepancy, an argument for setting the threshold at the most restrictive level would be to avoid a discrepancy whereby a company with high aggregate emissions but low average emissions per installation was not subject to the disclosure requirements.

1.5.6 Analytical referencing

For this approach we reviewed a range of carbon market analyst reports, such as Point Carbon, Tschach Solutions, Barclays Carbon Reports, World Bank and Bloomberg. The aim was to assess the extent to which individual ETS operators have been judged to influence the market, and then set a threshold that captured these operators and others of similar sizes. However, besides reference to general sectors of emitters (e.g. the heat and power sector is held to be the most influential in the carbon market), no mention is made of the impact of actions taken by individual emitters.

We therefore conclude that there is not sufficient information available to make this a viable approach to setting a threshold.

1.5.7 Options for the threshold

We have used different approaches to determine a range of thresholds. Our analysis indicates that the threshold could be set at the following levels of emissions:

- At 20+ million tonnes of CO_2 a year (based on event analysis, see discussion at 1.5.3).
- At either 3 or 6 million tonnes (again, based on the event analysis at 1.5.3).[40]
- 1 million tonnes CO_2 a year using a weighting of operators implied by REMIT.
- 0.5 million tonnes CO_2 a year using direct REMIT benchmarking.

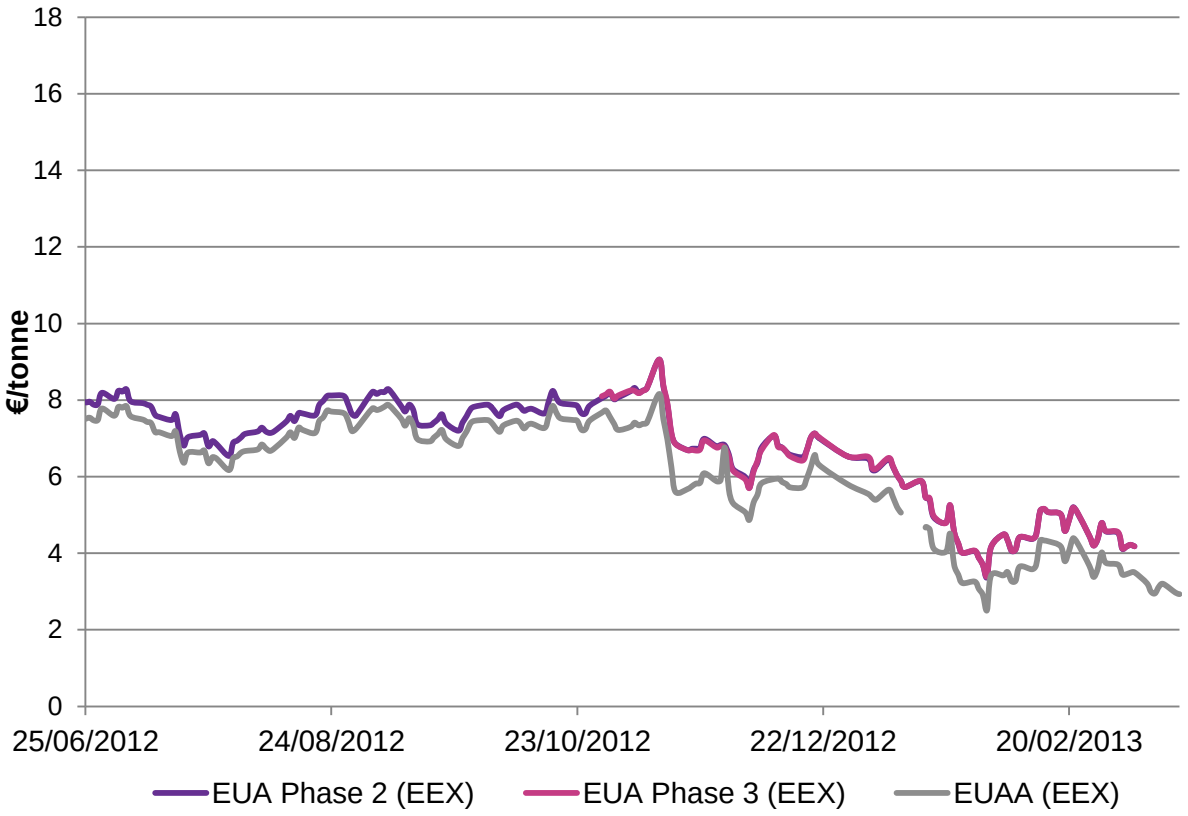
At the lower end, thresholds of 0.5 and 1 million tonnes of carbon would require information disclosure on the part of nearly all EU ETS market participants. The direct link to REMIT may not be suitable for a threshold applicable to the carbon market. Our fieldwork highlighted a valuable comparison between the sensitivity of carbon prices to outages, compared with energy prices. As allowances are a storable asset, their price should be less sensitive to production changes. Energy, on the other hand, is not a storable asset and thus a production outage immediately affects the supply of energy and thus the price. Smaller volume changes in power are therefore likely to have a far more significant impact on energy prices than equivalent changes in CO2 emissions will have on the carbon price.

Threshold for EUAAs

Data on verified emissions for aviation participants is relatively scarce given the recent inclusion of EUAAs in the Single Registry. The CMD dataset contains just two aviation participants with combined emissions of around 31,000 tonnes in 2011. Given the smaller market for EUAAs than EUAs there could be an argument for setting a different disclosure threshold for EU ETS participants with aviation activities. Although the relation between these two types of allowances may alter once there are regular auctions of EUAAs, as Figure 1.8 below shows, the price movements of EUAs and EUAAs are closely aligned, albeit at slightly different levels. The aviation participants can use the general EUAs. It is therefore likely that price formation in both markets is closely related. We therefore do not consider there to be a good reason for having a separate disclosure threshold for each market. On the basis of the CMD data this implies that no airline would be above the indicative threshold described above.

[40] The event analysis is of course based on *current* levels of price volatility in the EUA market. Prices *may* become more stable over the years as the EU ETS matures.

Figure 1.8: Price of EUAs and EUAAs



Source: Carbon Market Data (2011) and Europe Economics analysis

Rated thermal input

We have set the threshold for rated thermal input based on the threshold for emissions as it is important for the two to be equivalent, so as not to result in uncertainty among market participants as to whether they are required to disclose non-public information.

Using the same metrics as in the 'weighting of emitters using REMIT' approach in 1.5.4, we estimate that the equivalent rated thermal input for the possible thresholds is as follows:

- 20+ million tonnes of CO_2 a year is equivalent to around 3,500 MW rated thermal input.
- 6 million tonnes is equivalent to 1,050 MW rated thermal input.
- 3 million tonnes is equivalent to 530 MW rated thermal input.
- 1 million tonnes CO_2 a year is equivalent to 175 MW rated thermal input.
- 0.5 million tonnes CO2 a year is equivalent to 88 MW rated thermal input.[41]

[41] We note that the exact wording is different to the ACER guidance of 100MW as that refers to 100MW *capacity* which is de facto similar as *rated thermal input* (rated thermal input means the maximum, not yet taking into account the actual utilisation and efficiency).

1.6 Non-exhaustive List of Disclosures

As indicated above, the non-exempt emission allowances market participants would need to disclose those business decisions that affect their expected demand for emissions allowances in a way that could give rise to a significant price effect or otherwise be of interest to a reasonable investor. This simply means that a non-exempt market participant would not be required to make a disclosure with respect to all business decisions made — it would still need to assess the materiality of the decision in the context of the emissions market and to a reasonable investor. Clearly there is a need for judgment by a firm's management here — information of interest to an investor or that could induce a significant price change will vary over time. However since failure to disclose a relevant event would open up a firm to possible sanction, non-exempt firms may well err on the side of caution.

Greater control over the timing and flow of information (both internally and externally) would be necessary. A firm would need to maintain an insider's list for who has access to inside information. The relevant changes in the demand for emission allowances could either stem from individual events, or from ongoing changes.

A non-exhaustive list of the types of events and business decision that could cause a company to disclose would include:

- Outages or temporary plant closure due to unforeseen reasons. In the power and heat sector this would overlap with disclosure under REMIT, where the availability and output of power stations reporting under that initiative would already be known. (Whilst at present a calculation of emissions would be required there are, as we note above, approximate metrics for doing this.)

  In other sectors (i.e. industrial emitters) such unplanned plant closures could be already disclosed by a company with equity and/or bonds publicly listed — if the consequences were judged to be price-sensitive information in the context of at least one of these instruments. We do not have data on the overlap between publicly listed firms and EU-ETS market participants, although as firm-size increases so does the likelihood of having publicly listed financial instruments. However the materiality of any given temporary halt in the context of a firm's financial instruments need not match that relevant to the emissions market.

- Planned mothballing or extension of plants. It would be the net effect on emissions that would be the crucial factor for a non-exempt firm to consider. For example, if one plant was mothballed whereas an additional shift was implemented at another the net effect on the group's overall demand for emissions allowances could be low. This means that some coordination would be necessary in groups with several emitting installations. This may be a significant undertaking in some groups. Plant mothballing would be a relevant event for both power generating companies and industrial emitters.

- Closure or development of a new plant. Again it is what the net effect on the plant-owning firm's emission of CO_2 (probably) will be that would be material to the disclosure decision. For example a group might intend to close a steel mill and open a new — but otherwise identical — one elsewhere (e.g. to match more closely the location of its customers). If this all occurred

within the EU (e.g. closing a plant in Germany, opening one in Poland) the impact upon the EU ETS would be minimal (assuming that there is no significant time lag between the two events). On the other hand, if either the opening or closure was outside of the EU there would be an impact on aggregate emissions demand (and hence this could require disclosure to the emissions market).

By contrast, selling the steel mill might not need disclosure (at least in the context of the emissions market): although the allocation of emissions between firms would change, the overall level need not.

- Efficiency or operational changes at plants. This might apply for individual plants or more generally within a company. This could relate to fuel-switching at plants, in that different fuels are associated with different emissions rates, or technology change. For example, a group in the cement industry might introduce new technology reducing CO_2 emissions per tonne of cement produced at its various cement mills. If it was considered by the group that the overall impact would be material in terms of price discovery in the EU-ETS, or otherwise of interest to a reasonable investor in that market, then it would have a duty to disclose. The timing of the announcement would need to be as close as possible to the decision to implement the technology being considered. Efficiency or operational changes to power generating companies would be relevant in the same way.

Article 17(2) of the MAR states that an emission allowance market participant should publicly, effectively and in a timely manner disclose inside information concerning emissions allowances which it holds in respect of its business, including aviation activities or installations. With regard to installations, such disclosure shall include relevant information about the capacity and utilisation of installations, including planned or unplanned unavailability of such installations. One would expect the non-exempt market participant would also disclose enough information to identify the impact on the volume of emissions and the time period over which this effect is expected, as well as identifiers of the firm's installation and the cause of the change (so that an investor can ascertain whether the information is indeed new or not).

1.7 Impact Assessment

This section presents the impact assessment of the options for the minimum threshold. We have followed the European Commission's impact assessment guidelines, as instructed by the client DG Climate Action.

1.7.1 Defining the problem

The first step is to define the problem that requires intervention by the European Commission. As we have described in the above analysis, Article 17(2) of MAR states that an emission allowance market participant should disclose inside information concerning emissions allowances which it holds in respect of its business, including aviation activities or installations. The purpose of this information disclosure requirement is to promote the efficiency of the carbon market by aiding price discovery, and to prevent the possibility of insider trading.

However, in order to avoid exposing the market to reporting that is not useful (e.g. placing an unnecessary burden on market participants of processing information that is not material to price formation), the information disclosure requirements are to be limited to those EU ETS market participants that can reasonably be expected to have a material impact on the carbon market or on the price formation of emission allowances or would be of interest to a reasonable investor. As discussed in the background sections to this report, not all EU ETS market participants would hold non-public information that can be considered as inside information.

The problem therefore is establishing the threshold (in terms of emissions and rated thermal input at the company level) below which market participants should be exempt from the information disclosure requirement.

This problem is driven by the fact that the EU ETS is fragmented across a many companies, many of which would not have an impact on price discovery or investors' decisions through changes in their emissions. By way of contrast, in financial markets the actions and outcomes specific to the issuers of financial instruments are expected to have a direct impact on the value of those instruments. Hence, they are responsible for assessing what non-public information (i.e. price-sensitive information) could significantly affect the prices of those instruments — this makes the assessment of materiality more straight-forward as it is more closely linked to the relevant firm's own position.

1.7.2 Verifying the EU's right to Act

The principle of conferral states that the problem should be linked to at least one of the Treaties and the objectives they contain.

Recital 4 of the MAR notes that MAR

> "aims at contributing in a determining manner to the proper functioning of the internal market and should therefore be based on Article 114 of the Treaty on the Functioning of the European Union (TFEU)"

Recital 81 of the MAR states that

> "In order to specify the requirements set out in this Regulation, the power to adopt acts in accordance with Article 290 TFEU should be delegated to the Commission in respect of ... [inter alia] ... the thresholds for determining the application of the public disclosure obligation to emission allowance market participants"[42]

1.7.3 Policy Objective

The policy objective is to establish a threshold for the purpose of the exemption of some EU ETS operators from the requirement to disclose inside information. The threshold is effectively a materiality concept which recognises that not all non-public information is relevant to effective price formation.

[42] See also MAR Article 17(2)

1.7.4 Developing a baseline scenario

When assessing the solutions to a problem it is necessary to develop a baseline scenario — a view on how the problem would evolve in the absence of any solution — such that any impacts measured can be correctly attributed to the solutions.

The subject of this assessment are the delegated acts, which in accordance with Article 17(2) of MAR, the Commission shall be empowered to adopt, establishing a minimum threshold of CO_{2eq} and a rated thermal input for the purposes of the exemption. This means that the baseline scenario refers to how the problem would evolve if there is legal requirement for the disclosure of inside information but no such threshold concerning an exemption.

If there were no exemption from the disclosure requirement contained within MAR then all market participants operating in the EU ETS would incur the administrative burden of disclosing information. (The details of the baseline scenario are discussed further at 1.7.5 and 1.7.6 below). Further, the volume of information being reported might even impede, rather than improve, price discovery — by generating excessive noise — and, at the least, some market participants could incur costs interpreting and using the information.

An important element of the baseline scenario is current information disclosure requirements, namely REMIT. Power generating companies with installations with capacity over 100MW already are required to disclose information on production under REMIT. This information could contribute to price discovery to some extent in the carbon market, although production schedules would need to be converted from MW to carbon emissions, in itself not a straightforward exercise. The direct disclosure of information relating to emissions allowances by power generating companies may add benefits over and above the current REMIT requirements.

1.7.5 Policy Options

If the threshold is set too high, then important information that might be of interest to investors and affect the carbon price would not be exposed, thus limiting the value of the disclosure requirement in terms of improved price discovery.

If the threshold is set too low, then market participants whose emissions activities would not in fact have any impact on the market price or be of interest to investors may consider themselves required to disclose information and would — at the least — need to consider the applicability of the disclosure obligation to their operations. In addition, market participants may be faced with significantly increased information flow.

Section 1.5.7 above presents our analysis of possible thresholds. These are directly translated into our options below, with the addition of a baseline scenario (being MAR without a threshold). We do not include the threshold of 1 million tonnes as an option given its closeness to the REMIT-based threshold and due to the fact that our event analysis revealed no significant impacts of volumes changes around this level.

- Option 1 — Baseline scenario. As the disclosure of information is mandated under MAR, we have interpreted the 'do nothing' option as being equivalent to having no exemption, with all EU ETS operators required to disclose inside information, i.e. the threshold would be set below

the size of the level of the smallest emitter. Under this option, all operators would incur information disclosure costs, but price discovery would improve compared to a situation without any disclosure as investors and market participants would be able to consider relevant non-public information when operating in the carbon market. However, not all of the disclosed information would be useful.

- Option 2 — REMIT-based Threshold set at 0.5 million tonnes (i.e. broad equivalence to REMIT). This is about 0.03 per cent of total emissions.
- Option 3 — "Low" Threshold set at 3 million tonnes (about 0.15 per cent of total emissions).
- Option 4 — "Medium" Threshold set at 6 million tonnes (about 0.3 per cent of annual emissions within the EU ETS).
- Option 5 — "High" Threshold. Under this option the threshold would be 20 million tonnes of CO_2 emissions (i.e. about 1.2 per cent of aggregate annual emissions). Companies emitting more than this in a year would be required to fulfil the inside information disclosure requirements.

1.7.6 Impacts of the policy options

The impact of the various thresholds will be determined by the number of companies exempt from the disclosure obligation, the costs these will save from not having to meet these requirements, the impacts on price discovery and market efficiency, and the wider impacts such as changes to trading processes.

Information that would be of interest to investors is the *deviation* in emissions from expectations. The maximum downward deviation from expectations would occur if an emitter ceased operations completely. The analytical assumption for the maximum upward deviation used in this assessment is that an emitter doubled its emissions by increasing its operations and/or switching fuels etc. These are extreme cases and therefore thresholds set on the absolute emissions of companies can be considered conservative for determining the level of emissions of companies considered relevant to price formation and investment decisions.

Individual companies not exempt from the disclosure obligation would need to decide what changes in emissions counted as relevant inside information. These would be deviations that affect their expected demand for emissions allowances in a way that could give rise to a significant price effect or otherwise be of interest to a reasonable investor. These changes could either stem from individual events, or from ongoing changes.

Examples of the types of event that could cause companies to disclose are:

- Outages.
- Planned mothballing or extension of plants.
- Closure or development of new plant.
- Efficiency change of individual plants.
- Fuel-switching of plants.

It will be important for a company to consider the potential substitution effects between various business decisions, e.g. the closure of one plant may be associated with an increase in production capacity of another (with no consequent effect on emissions).

We assume that the actual disclosure would relate the change in emissions requirement and some identification of the reason for the change. Since the latter could be of interest in other markets (e.g. markets in that firm's equities and bonds) such a rationale would no doubt be carefully crafted.

For the set of policy options, we assess:

- The number of market participants exempt from the disclosure obligation.
- The direct costs savings of not having to meet this obligation.
- The impact on price discovery and on the market in emission allowances more broadly.
- The wider impacts, in terms of economic, social and environmental impacts.

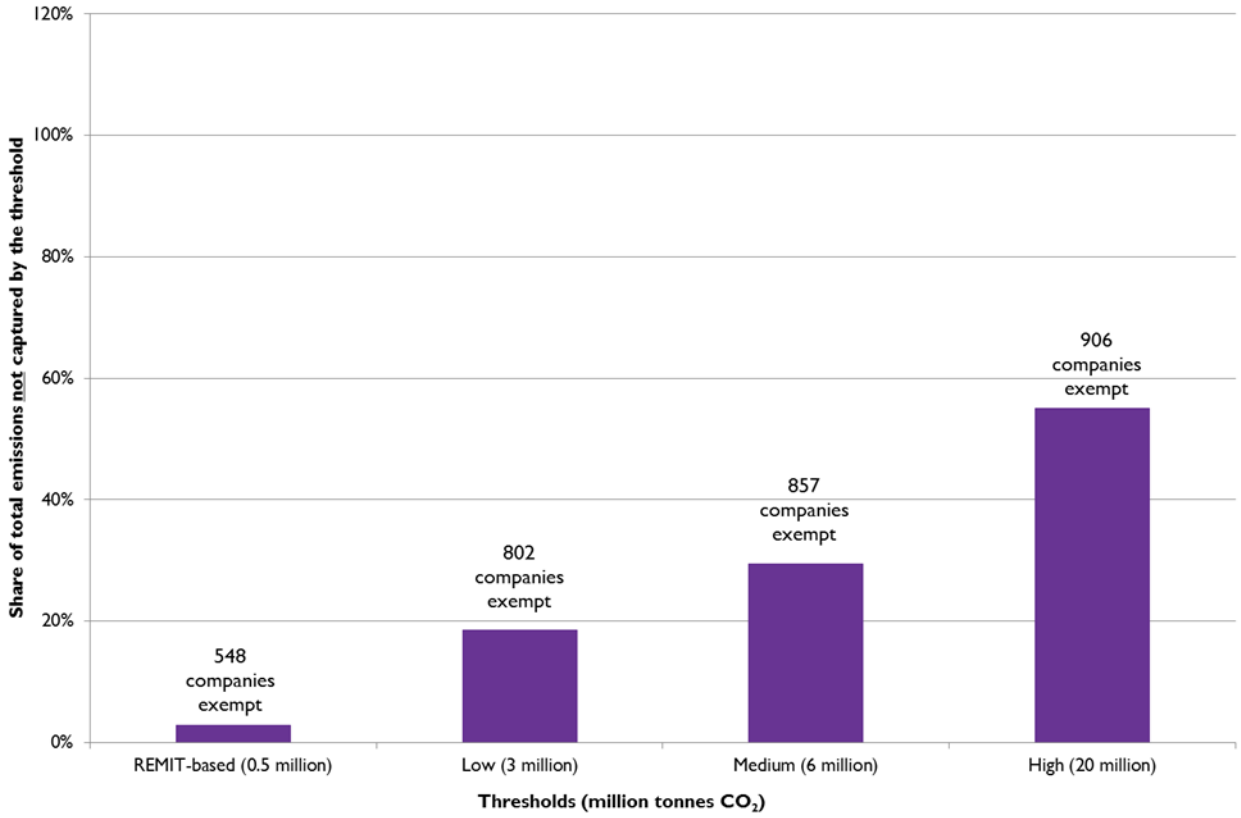
The number of market participants exempt

Using Carbon Market Data (2011, which aggregates information at a company rather than installation level) we estimate that the number of market participants captured and exempted by the various options is as follows:

- Option1 (no threshold, i.e. de facto the baseline or counterfactual) — no EU ETS companies would be exempt and all (around 930) would be subject to the disclosure obligation.
- Option 2 (0.5 million tonnes) — around 548 companies would be exempt (i.e. around 379 companies would be captured by the threshold).
- Option 3 (3 million tonnes) — around 802 companies would be exempt (around 125 companies captured by the threshold).
- Option 4 (6 million tonnes) — around 857 companies would be exempt (around 70 companies captured).
- Option 5 (20 million tonnes) — around 906 EU ETS would be exempt from the disclosure obligation (i.e. around 21 would be captured by this threshold).

The figure below illustrates the proportion of emissions and the number of companies exempted by the thresholds. Without a threshold 100 per cent of emissions would, of course, be captured by the disclosure threshold. As can be seen, the higher the threshold the greater the number of firms exempted from the disclosure requirement and the greater the share of emissions these exempt firms represent.

Figure 1.9: Share of total emissions of companies exempted by different thresholds



Source: Carbon Market Data (2011) and Europe Economics analysis

The direct costs of complying with the disclosure requirements

In order to understand the impact of the threshold we need first to understand the impact of the disclosure obligation. Non-exempt market participants required to disclose information would need to develop appropriate systems to link business decisions with the impact on the volume of emissions. This would be somewhat analogous to understanding the earnings impact of business decisions. (A point to note is that the expected earnings impact is the *driver* of much business decision-making (e.g. the closure of an inefficient plant to boost earnings). Whilst expected emissions and the associated carbon cost are intended to drive certain decisions (e.g. fuel-switching) at current carbon prices this effect is likely to be considerably weaker relative to earnings as a driver. Corporates may embody these internal control processes in documented management guidelines.

They would also incur compliance costs associated with gathering and publishing information. This would entail information on the implications of emissions changes being sent from installations to a central part of the business, or else calculated centrally, such that the emissions impact of business decisions could be understood and monitored and important changes (actual or forecast) identified. Where material the business decision (e.g. to mothball a plant) would then give rise to an appropriate disclosure. We assume that in order for disclosures to be timely, the ongoing assessment of business decisions which would have large expected emission changes would be necessary. In addition, non-exempt firms would be required to review at regular intervals what a

material volume impact would be — since this can vary dependent upon the prevailing conditions in the emissions market.

Our fieldwork revealed that there are differing opinions as to what the disclosure requirement would entail. For example, at one extreme, some respondents to our fieldwork thought they would require an individual at each site to monitor decisions and data and make choices about what information should be published, rather than have this as a centralised function. However, the latter might build upon existing EU ETS compliance obligations (e.g. understanding the emissions associated with a particular installation). A decentralised approach would typically imply a higher cost. On the other hand, other respondents to the fieldwork thought that the current REMIT requirements would fully map onto the emissions disclosure requirements and thus there would be little additional burden. We describe below *our* analysis of the expected one-off and ongoing costs.

Disclosure is intended to be public, effective and timely. The technical means of public disclosure of inside information under MAR is to be determined by implementing technical standards to be developed by the European Securities and Markets Authority (ESMA), although the ultimate decision-making powers on such standards are with the European Commission (MAR, Article 17(10)(a)). —This work is ongoing and as at the date of this report the technical means of disclosure therefore remains undefined. Therefore we have made our best estimates here.

We have assumed that publishing this information exclusively on company websites would be insufficient, and that firms would need to notify trading venues (which have regulatory newsfeeds) and/or recognised news outlets (e.g. Bloomberg, Reuters).

These processes would entail both one-off and ongoing costs.[43] We distinguish costs across companies on the basis of the number of installations held: up to five installations in the EU); between 6 and 10 EU installations; and over 10 installations in the EU. We also distinguish between energy-producing companies assumed to already be reporting under REMIT, and industrial emitters.

One-off cost impacts of the baseline:

- Understanding the rules. With the introduction of the new policy, companies would need to allocate resources to understand the rules and compliance requirements and train the relevant individuals. It might also include the training of senior decision-makers so that the compliance is suitably internalised. We envisage the process would take around 2–10 full time equivalent (FTE) days depending on the number of installations in the company.
- Designing a compliance strategy. A compliance strategy would define the parameters for identifying what information should be considered inside information and thus relevant for reporting. This might include a range of deviations from expectations of required emission

[43] We reference the recent impact assessment conducted by DECC for the UK's Carbon Reduction Commitment regulations, which estimated the one-off and ongoing costs for the reporting of emissions. The primary activities include understanding the scheme rules, developing a compliance strategy and collection and submission of data.

allowances, and the process for information disclosure. The resources required to design a compliance strategy are estimated between two FTE and five FTE days.

- Developing processes for data collection and reporting. A degree of automation may be necessary. The collection of data on emissions from all installations should overlap substantially with existing compliance responsibilities under the EU ETS. Reporting systems would be required to communicate the information to the regulatory news feeds of trading venues or to financial news vendors (e.g. Bloomberg, Reuters). This should be suitable for some automation. We envisage the resources required would be around five to 20 FTE days depending on the complexity of the business (which we associate here with the number of installations in the company).

Ongoing cost impacts of the baseline:

- Monitoring of business decisions by an emissions coordinator. Each firm would require a responsible person to ensure that compliance with MAR was achieved, i.e. ensuring that the emissions impact of material business decisions was understood. We assume this process would be partly automated, but still require between 2.5 and 15 FTE days per year, depending on the frequency of data collection and the number of installations in the company.
- Monitoring of the emissions market. Again a non-exempt firm would need to consider at regular intervals what constituted material in the context of the emissions market and so make well-informed decisions as to whether changes in the data, or future events, warrant disclosure. This decision making process would be guided by the compliance strategy. We assume that this activity will entail between 2.5 and five FTE days per year.
- Reporting to the public. The costs of reporting would relate to notification of identified news outlets and trading platforms (i.e. publication on a firm's website only would not be adequate disclosure). We estimate that between one and two FTE days per year would be required depending on the number of installations in the company.

As discussed, companies required to disclose information under REMIT are likely to already have many of the above systems in place. Power generating companies with capacity over 100 MW already are required to disclose information on production under REMIT, and therefore similar requirements for carbon emissions should not involve a significant additional burden. This is of course true under all options considered, because such disclosure under REMIT is part of the baseline/ counterfactual, i.e. as such it does not differentiate the various options for the threshold. Converting planned energy production schedules from MW to carbon emissions should be a straightforward conversion exercise. Information about events (e.g. the closure of plants) would be published in the same format. There is likely to be an element of adjustment required to tailor current systems to the disclosure requirements, so we therefore reduce by 75 per cent the following cost elements:

- Developing process for data collection and reporting.
- Monitoring of business decisions by an emission coordinator.
- Reporting to public.

Companies involved with trading in the carbon market will also need to ensure that information publication is timely and does not interfere with their ability to trade. It is likely that the trading divisions will be sufficiently separate from the divisions responsible for publishing information, and that trading will take place on the assumption that all relevant information is being properly disclosed. The disclosure requirement is therefore unlikely to have much impact on trading processes.

Using the CMD data we summarise the number and type of firms affected under each option.

Table 1.3: Number of non-exempt firms affected by different threshold options

	Total firms	Energy producer	Industrial emitter
REMIT-based			
< 5 installations	170	83	87
6 to 10 installations	78	35	43
> 10 installations	131	43	88
Total	**379**	**161**	**218**
3 million tonnes			
< 5 installations	29	19	10
6 to 10 installations	16	8	8
> 10 installations	80	36	44
Total	**125**	**63**	**62**
6 million tonnes			
< 5 installations	7	6	1
6 to 10 installations	6	5	1
> 10 installations	57	28	29
Total	**70**	**39**	**31**
20 million tonnes			
< 5 installations	1	1	0
6 to 10 installations	1	1	0
> 10 installations	19	13	6
Total	**21**	**15**	**6**

The table below summarises the FTE days required for each cost element across different firm sizes. We note that these estimates apply to those companies not already required to disclose information under REMIT.

Table 1.4: Estimated FTE days to comply with disclosure requirements

	< 5 installations	***6 to 10 installations***	***> 10 installations***
One-off costs			
Understanding the rules, including training	2	5	10
Designing a compliance strategy	2	3	5

Developing processes	5	10	20
Ongoing costs (annual)			
Monitoring business decisions	2.5	5	15
Monitoring the emissions market	2.5	3.75	5
Reporting to public	1	1.5	2

We use an indicative cost of €500 per day to estimate the costs to companies of the information disclosure requirements. (This is based upon one Full Time Equivalent, FTE, carrying out this activity). The cost of Option 1 (i.e. no threshold) is presented in the table below.

Table 1.5: Option 1, i.e. baseline – no threshold

	< 5	**6 to 10**	**> 10**	**Total**
One-off costs (€000s)				
Understanding the rules, including training	583	420	880	1,883
Designing a compliance strategy	583	252	440	1,275
Developing processes*	1,165	596.25	1,348	3,109
Total	***2,331***	***1,268***	***2,668***	***6,267***
Average cost per company (€000)	***3***	***8***	***15***	***7***
Annual ongoing costs (€000s)				
Monitoring business decisions*	583	298.125	1,011	1,891
Monitoring the emissions market	729	315	440	1,484
Reporting to public*	233	89.4375	134.75	457.1875
Total	***1,544***	***703***	***1,585***	***3,832***
Average cost per company (€000)	***3***	***4***	***9***	***4***

* For **the** energy producers required to disclose information under REMIT, these cost elements are reduced by 75 per cent. **This is why the average cost may differ across options.**

The other policy options represent a **saving** in direct costs relative to this (i.e. this represents the benefit of setting a non-negligible threshold).

Table 1.6: REMIT-based option, i.e. 0.5 million tonnes

	< 5	6 to 10	> 10	Total
One-off cost savings (€000s)				
Understanding the rules, including training	413	225	225	863
Designing a compliance strategy	413	135	112.5	661
Developing processes*	896	337.5	360	1,593
Total	***1,722***	***698***	***698***	***3,117***
Average cost per exempt company (€000)	***4***	***10***	***2***	***6***
Annual ongoing cost savings (€000s)				
Monitoring business decisions*	448	169	270	887
Monitoring the emissions market	516	168.75	112.5	798
Reporting to public*	179.125	50.625	36	265.75
Total	***1,143***	***388***	***419***	***1,950***
Average cost per exempt company (€000)	***3***	***5***	***1***	***4***

* For the energy producers required to disclose information under REMIT, these cost elements are reduced by 75 per cent. This is why the average cost may differ across options.

Table 1.7: Threshold set at 3 million tonnes

	< 5	6 to 10	> 10	Total
One-off cost savings (€000s)				
Understanding the rules, including training	554	380	480	1,414
Designing a compliance strategy	554	228	240	1,022
Developing processes*	1,128	546.25	818	2,492
Total	***2,236***	***1,154***	***1,538***	***4,928***
Average cost per exempt company (€000)	***4***	***8***	***16***	***6***
Annual ongoing cost savings (€000s)				
Monitoring business decisions*	564	273	613	1,450
Monitoring the emissions market	693	285	240	1,218
Reporting to public*	225.625	81.9375	81.75	389.3125
Total	***1,482***	***640***	***935***	***3,057***
Average cost per exempt company (€000)	***3***	***4***	***10***	***4***

*** For the energy producers required to disclose information under REMIT, these cost elements are reduced by 75 per cent. This is why the average cost may differ across options.**

Table 1.8: Threshold set at 6 million tonnes

	< 5	6 to 10	> 10	Total
One-off cost savings (€000s)				
Understanding the rules, including training	576	405	595	1,576
Designing a compliance strategy	576	243	297.5	1,117
Developing processes*	1,159	585	988	2,731
Total	***2,311***	***1,233***	***1,880***	***5,424***
Average cost per exempt company (€000)	***4***	***8***	***16***	***6***
Annual ongoing cost savings (€000s)				
Monitoring business decisions*	579	293	741	1,613
Monitoring the emissions market	720	303.75	297.5	1,321
Reporting to public*	231.75	87.75	98.75	418.25
Total	***1,531***	***684***	***1,137***	***3,352***
Average cost per exempt company (€000)	***3***	***4***	***10***	***4***

*** For the energy producers required to disclose information under REMIT, these cost elements are reduced by 75 per cent. This is why the average cost may differ across options.**

Table 1.9: Threshold set at 20 million tonnes

	< 5	6 to 10	> 10	Total
One-off cost savings (€000s)				
Understanding the rules, including training	582	417.5	785	1,785
Designing a compliance strategy	582	250.5	392.5	1,225
Developing processes*	1,164	595	1,255	3,014
Total	***2,328***	***1,263***	***2,433***	***6,024***
Average cost per exempt company (€000)	***4***	***8***	***15***	***7***

Annual ongoing cost savings (€000s)				
Monitoring business decisions*	582	298	941	1,821
Monitoring the emissions market	728	313.125	392.5	1,433
Reporting to public*	232.875	89.25	125.5	447.625
Total	***1,543***	***700***	***1,459***	***3,702***
Average cost per exempt company (€000)	***3***	***4***	***9***	***4***

* For the energy producers required to disclose information under REMIT, these cost elements are reduced by 75 per cent. This is why the average cost may differ across options.

Table 1.10: Summary of Cost Savings for Exempt Market Participants

	Threshold set at:			
	0.5m	**3m**	**6m**	**20m**
One-off cost savings (€000s)	3,117	4,928	5,424	6,024
Ongoing cost savings (€000s)	1,950	3,057	3,352	3,702

Competent Authorities

A further category of stakeholder affected by the threshold would be the relevant Competent Authorities supervising compliance with MAR and the costs that these would incur. The imposition of a threshold means that — relative to a counterfactual of *all* firms have the disclosure obligation — the population of firms to be supervised would reduce.

The 2011 impact assessment of the MAR assessed the impact on competent authorities due to increased market surveillance at three FTEs for larger markets and one FTE for smaller markets, as well as €20k per annum in data costs. These are based on the then preferred options across all of MAR.

MAR (Article 16) defines the competent authority as being determined by the location of the trading venue. The main (albeit not exclusive) trading venues are in Germany and the UK. However the disclosure duty falls on emission allowances market participants (rather than to issuers) — this could be seen to mean that the relevant competent authority is determined as the one where the emission allowance market participant/company is registered. With this as context we assess both of these scenarios:

- In the former case, our view is that a conservative estimate of the introduction of the disclosure obligation without a threshold would not require more than one FTE in each of the UK and Germany, where the main trading venues are located. At €500 per day this would equate to €225k per annum. We do not foresee substantive additional data requirements. The introduction of a threshold would reduce the number of firms and — to some extent — could reduce the time spent on monitoring. Against this, it is not clear that the presence of the threshold would materially alter the number of events or price movements worthy of supervisory consideration. We estimate the maximum saving would be approximately one FTE (achieved at a threshold of 20 million tonnes). There would be little or no saving with the REMIT-based option. The other two options lie between these two estimates.

- In the second case (where the competent authority is determined by the country of registration) is more complex. With a low threshold it would be likely that all (or nearly all) Member States would be affected. Even at the higher thresholds analysed here many or all Member States could be affected. For example, considering the firms above 6 million tonnes, these are registered in at least 15 different Member States). The wider distribution of tasks could result in a less efficient outcome, although it would also ensure enforcement of the disclosure requirement in the case of entities that do not use trading venues. In this case, the resource impact would be more widely distributed. This is notwithstanding that again, it is not clear that the presence of the threshold would materially alter the number of events or price movements worthy of supervisory consideration. In this case we would expect incremental resources ranging from 3–4 FTEs across the EU28 without a threshold. The maximum saving would be 1–2 FTEs for the 20m tonne threshold. Again there would be little or no saving with the REMIT-based option, and the other two options lie between these two estimates

This means that there is no *qualitative* difference between these two scenarios in terms of the final result – they both result in lower cost at higher thresholds, and they both lead to disclosure by the participants in the emission allowance market.

Trading venues

The trading venues are unlikely to incur significant extra costs as a result of the policy options. News feeds are typically in place already, and the marginal cost difference between the various options should be slight. To the extent that any differences exist, these would again be associated with the population of the firms above whatever threshold is set.

Impact on price discovery

Given that the counterfactual (the baseline scenario) is the implementation of MAR with no threshold (or equivalently a threshold set below the size of the smallest emissions market participant) the main benefits are the cost savings compared to this baseline, as set out above, and avoiding exposing the market to reporting that is not useful.

The primary benefit of increased information disclosure is better price discovery due to greater information transparency, which leads to improved market efficiency and integrity. Currently emissions data are already published annually and therefore any additional disclosures should at most only affect prices between year ends. This would contribute to quicker price discovery but the scale of any improvement here is difficult to estimate. Our interest is the impact of different thresholds exempting different numbers of firms from this: up to the point at which companies exempted from disclosure do not hold *any* information relevant to price formation or investors' decision-making, the threshold should have no impact on price discovery.

Our analysis of the events described above indicates that firms emitting less than three million tonnes should not hold any information relevant to price discovery,. Therefore the impact on price discovery of the first option (no threshold) would be more or less equal to the impact on price discovery of setting the threshold at three million tonnes. The position with respect to firms with emissions below six million tonnes is less clear, since the analysis has some indications of price effects below this level, but also of no price effect immediately above this level.

Our analysis indicates that it is likely there are firms with emissions below 20 million tonnes that could hold information relevant to price discovery. This means that having the threshold at 20 million tonnes would likely result in worse price discovery than having the threshold at lower levels, as this option would most likely exclude some significant firms from the disclosure requirement.

The above discussion focuses on the relative impact on price discovery between the various threshold options. As discussed in detail in section 1.3, those market participants who contributed to our survey held the view that the role of entity-specific information is of limited interest , and even more so for information that is not publicly available (i.e. much important entity-specific information such as production levels is correlated with publicly available variables such as GDP).

Number of disclosures

In the absence of such disclosure at present, the scale of this is difficult to assess quantitatively. As a reference point, we note that EEX discloses occasions when power stations (above 100MW) were not in operation or capable of operation. These disclosures started in late 2009 with respect to Germany and Austria — since that date around 10,000 announcements have been listed, at the rate of about 25 per day. Extrapolating to the EU28 energy sector this implies perhaps as many as 100 announcements per day. Even with the threshold set at the lowest level, emissions allowance market participants might not disclose at this rate (i.e. there may be fewer such events and in turn disclosures), but they would however still need to monitor information flows (or pre-define what type of information could be of interest) and decide whether events need to be disclosed or not — they would need to decide *what* to disclose. As described above, such decision-making can be costly for participants. It may be that participants, when in doubt, tend towards disclosing rather than not.

Similarly, whatever information is published needs to be absorbed by the market. The lower the threshold for exemption is set, the greater the number of disclosing firms will be and, in all likelihood, the greater the amount of information in the market. Again, an analogy is helpful. An analyst tracking all of the constituents of the FTSE100 (a widely tracked equity index), for example, would need to consider on average five unanticipated announcements per trading day.[44] The tracking of macroeconomic variables in the EU ETS (i.e. current practice, at least as described by those trading firms participating in our fieldwork) would imply, at most, tracking the out-turn in four–five variables on an average trading day (and since Eurozone data are released at both national and at the Eurozone level, the number of the variables necessary to track would likely be less than this). In this context, the additional analytical effort associated with, in the extreme case, dozens of extra news items per day could be very considerable. This could raise the cost of following the emissions market, potentially lowering participation amongst financial actors.

Even if firms under the reporting disclosure requirement (based on any threshold) only occasionally disclose information, having a large number of small firms (i.e. a very low threshold) would still

[44] This is based on the following: between 1st October 2013 and 31st December 2013 there were 257 announcements on Bloomberg relating to FTSE100 constituents. This excludes scheduled financial reporting announcements — rather the focus is on unexpected good and bad news which the relevant issuers considered salient to trading in their financial instruments.

require costly processing by market participants whilst essentially only contributing to market noise.

Other market efficiency impacts

There are other aspects of market efficiency beyond price discovery. There was significant uncertainty among respondents to the survey as to the impact of increased disclosure requirements on other aspects of market efficiency. Around a quarter had the following views on the impacts of increased information disclosure:

- Price volatility — possibly a small positive impact. If the information that is disclosed would reach the market anyway, then earlier disclosure may have a small reduction in volatility as participants would have more time to absorb the information in advance. Long-run price should not be affected.
- Volumes traded — a more transparent market might attract more participants and thus increase volumes traded. However, transparency requires information on other variables such as volumes traded and pre- and post-trade prices; the incremental impact of entity-specific information is unlikely to be large.
- Transactions costs — any increase in volumes may lead to a reduction in transactions costs. This is likely to be small: one respondent stated that bid-offer spreads are already tight.
- Number of market participants — small, positive increase in the number of market participants. The carbon market is largely a compliance market and an increase in entity-specific information is unlikely to attract additional investors.

Table 1.12 summarises the likely scale of the benefits and costs of the five threshold options.

The wider impacts

We consider the wider social and environmental impacts of the five threshold options. Short-term environmental impacts would arise if the disclosure of information led to a change in the carbon price. A sustained increase in the price of carbon beyond what is consistent with the actual demand for emission allowances may expedite the goal of emissions reductions that the EU ETS was set up to achieve. A sustained fall in the carbon price below what is consistent with the actual demand for emission allowances would do the opposite. However, as it is unlikely that the disclosure requirement would have a significant sustained impact on the price level we consider the environmental impacts to be limited.

Social impacts in terms of public health and safety would arise under the longer-term impacts of changes in the carbon price on general emissions and the presence of greenhouse gas in the environment. These are likely to be limited.

Employment impacts may arise if the costs of complying with the disclosure requirements form a significant proportion of companies' revenues or if new people need to be employed in order to comply with the information disclosure requirement. Given the scale of our estimates, significant impacts look highly unlikely.

1.7.7 Comparisons of the options

In this section we compare the effectiveness of the threshold options in meeting the objectives of the policy, and their efficiency in doing so. As set out in section 1.7.3 the policy objective is to establish a threshold for the purpose of exempting EU ETS operators who are not deemed to hold inside information from the obligation to disclose inside information. The threshold represents the size (in terms of CO_{2eq} emissions) below which companies are not deemed to hold inside information. The threshold is therefore effectively a materiality concept which recognises that not all non-public information is relevant to effective price formation.

As the objective of the threshold is to exempt those firms that are not considered to hold information relevant to price formation, in assessing the effectiveness of the options in meeting this objective we consider whether the exemptions implied by the options would have an effect on price formation and carbon market functioning compared to a scenario of no exemption (i.e. no threshold).

This assessment is based on the assumption (implicit in the adoption of the information disclosure requirement under MAR) that the disclosure of inside information will improve price formation and market functioning.[45] Option 1 reflects the baseline scenario of no exemption where all carbon market participants are required to disclose inside information. We therefore assess Options 2-5 (which each represent increasingly higher CO_{2eq} thresholds and greater numbers of exempt market participants) in terms of whether these imply any changes in price discovery and formation in relation to the baseline scenario of no threshold.

Options that do not negatively affect price formation or market functioning compared to the baseline but rather avoid exposing the market to the reporting that is not useful are considered in effect to meet the objective, as exempting the associated number of firms from the information disclosure obligation would not be detrimental to price discovery (which in turn implies that these firms do not hold relevant non-public information).

To compare the effectiveness of the options we apply a multi-criteria analysis of the options across a set of criteria that embodies the relevant aspects of price formation and market functioning:

- Price discovery
- Market liquidity
- Price volatility

Although the options specify different numbers of firms to be exempt from the disclosure requirement, their performance against most of the above criteria does not reflect a 'spectrum' (i.e. each option is not necessarily progressively better (or worse) than the next). This is because the key factor influencing the effectiveness of the options in meeting the objective is whether the exempted firms are deemed to hold inside information or not. Therefore, if firms below the 0.5 million tonne threshold, the 3 million tonne threshold and the 6 million tonne threshold are all

[45] An analysis of the impacts of the information disclosure under MAR is not included in the scope of this report; our remit is to assess the implications of an exemption from this obligation.

considered not to hold inside information then these three options would be equally effective in meeting the policy objective in relation to the criteria for price formation.

However, their performance against the criterion of market liquidity is somewhat ambiguous, because it reflects conflicting underlying effects. As discussed in section 1.7.6, a greater number of market participants disclosing information could raise the cost of following the carbon market, potentially lowering participation in particular of financial actors, which are important providers of market liquidity. On the other hand, increased disclosure of relevant information should promote market confidence, which should in turn promote market participation. The latter effect should generally be at least as strong as the other — indeed, the fieldwork indicated that market participant numbers and volumes traded were expected to increase and transaction costs to decrease. These are all consistent with increased market liquidity. We then assess the efficiency of the options by considering the resource implications in meeting the objective and any wider consequences that might be associated with the options. Again we analyse the options compared with the baseline scenario across a set of relevant criteria:

- Direct cost savings
- Market noise
- Wider impacts
- Completeness of the exemption of non-relevant firms

We now compare the options against each criterion in turn. The results of this comparison are summarised in Table 1.12 below.

Price discovery

The increased information disclosure due to MAR would lead to better price discovery by increasing the flow of relevant information to market participants. Our interest is the impact of different thresholds exempting different numbers of firms from this: up to the point at which companies exempted from disclosure do not hold *any* information relevant to price formation or investors' decision-making, the threshold should have no impact on price discovery.

Our analysis of the impacts of the options shows that firms emitting less than three million tonnes (Option 3) are very unlikely to contribute significantly to price discovery due to factors mentioned above such as the existing levels of information disclosure (annually by all EU ETS participants, and more regulatory by energy producers), and the limited importance of currently unpublished entity-specific information in price discovery. This is underpinned by our statistical event analysis which shows no price effects of disclosures relating to emissions of three million tonnes or less. The impact of Option 4 on price discovery is less clear. Our event analysis reflects some ambivalence here as there are events between three and six million tonnes that are linked to price effects, but also cases of no price effects above six million tonnes.

Given this uncertainty and the factors referred to above limiting the relevance of additional information that would be disclosed compared to the baseline, we judge that exempting the firms specified under Option 4 would result in either no noticeable impact or a small noticeable impact on price discovery compared to the baseline scenario. Options 2 and 3 are therefore considered to

effectively meet the objective of the policy as they specify a size threshold below which firms are not deemed to hold inside information as information disclosed by these firms would not affect price discovery. By definition, Option 1 which exempts no firms would also not negatively affect the price discovery facilitated by the information disclosure. These options score a "+" in Table 1.12 below to indicate that they effectively meet the objective of the policy by exempting firms from the disclosure obligation who would not be deemed to hold inside information. Given the small uncertainty about whether that Option 4 may exempt some firms that are deemed to hold inside information, this option is given a score of "o/+" to reflect that it is largely effective in meeting the policy objective.

Option 5 entails the exemption of firms emitting up to 20 million tonnes CO_{2eq}. Given our event analysis it is clear that volume changes at this level do have a price effect. Firms emitting 20 million tonnes therefore cannot be considered not to hold inside information. Exempting these firms from the information disclosure obligation would clearly have a negative impact on price discovery compared to the baseline scenario as important firm information would not be made publicly available. Option 5 is therefore deemed to be very ineffective in meeting the objective of the policy, and scores a "– –" in Table 1.12 below.

Market liquidity

One way of considering the liquidity of a market is the number of market participants willing to enter into trades, and by the transaction costs of making such trades. Transactions costs might fall if the volume of trades increases (spurred in turn by an increase in market confidence resulting from improved information disclosure), and more participants may be attracted to the market if they perceive lower costs and greater ease of trading. More participants may also enter the market if they perceived it to function well and have efficient price discovery. Against this a greater number of market participants disclosing information could raise the cost of following the carbon market, potentially lowering participation in particular of financial actors, which are important providers of market liquidity. It must be noted that market liquidity is influenced by many variables, including trading transparency (i.e. information about order flow, volumes traded and pre- and post-trade prices): we do not expect very significant effects here.

In considering the market confidence driver, where exempted firms are not deemed likely to hold material inside information, the exemption is likely to have no impact on market confidence. Options 1 to 4 therefore effectively meet the objective of the policy by exempting firms that would not have an impact on price formation or market functioning (i.e. they would all exhibit a weakly positive effect on market confidence, and hence market liquidity). However, the other influencing factor — due to the increased costs of following the market — is also relevant. This is a negative factor, indeed more negative for Options 1 and 2, less negative for Option 3 and 4. It is likely to be at best equal and likely weaker in effect than the market confidence effect. Overall, then, Options 1 and 2 are ambiguous in their overall effect on market liquidity (i.e. "+/-"). Options 3 and 4 are weakly positive overall.

As Option 5 includes the exemption of firms that our analysis indicates could hold material inside information, this option does not effectively meet the policy objective and would not promote market confidence. It would, of course, result in the least change in the cost of following the

emissions market. This option scores a single "–" in Table 1.12 below to reflect that it is ineffective in meeting the objective in relation to the criterion of improved market liquidity (as the effect on market confidence is more important than that of increasing the costs of following the market).

Price volatility

Information disclosure can affect price volatility in two different ways. On the one hand, if the non-public information that is disclosed would reach the market anyway some time later, then earlier disclosure may reduce the 'lumpiness' around the time at which information reaches the market compared to a flow of information from many participants coincident with the end of the year. If firms with relevant inside information are exempt from disclosing this information in a timely way, then this would reduce the improvements intended by the disclosure obligation under MAR.

On the other hand, price volatility in part reflects the market processing information (company-specific information and information around trading activity) as part of the price discovery process. If the market is required to process a large amount of non-relevant information then short-term (i.e. intraday) volatility might increase as the market takes longer to settle on the "correct" price path. Therefore the more firms that do not hold material inside information but are nevertheless required to consider disclosing information to the market, the greater this driver of price volatility is likely to be.

In terms of intraday volatility relating to non-relevant information, then, Options 1 and 2 score the lowest, as these do not exempt firms with no relevant inside information from the disclosure requirement and therefore do not meet the policy objective of exempting firms that would not have an impact on price formation (as some of the firms included in these options would have a negative impact on price formation). Option 3 scores less poorly as it exempts a greater number of non-relevant firms.

Options 4 and 5 score well against this criterion of intraday volatility as these exempt a greater number of firms not holding relevant information. However, in relation to the impact of disclosures on the 'lumpiness' of information flows, Option 5 is likely to exempt some firms from the disclosure obligation that *do* hold relevant information and therefore this could increase volatility compared to a situation of no exemption.

Given the ambiguity in the mechanisms of effect of information disclosure on price volatility, Options 5 receives a -/o score. Option 4, because it scores well on the first criterion but is also subject to some ambiguity, scores a +/o score in the table below. The above assessment considers the effectiveness of the options in meeting the policy objective of exempting firms deemed not to hold inside information from the information disclosure obligation. We now turn to our assessment of the efficiency of the options in meeting the objective.

Direct cost savings

The direct cost savings are the main quantifiable benefit deriving from the threshold. With the exception on Option 1 all options are associated with a cost saving, as exempt firms would not incur the costs of disclosing information. As no firms are exempt under Option 1 there is no associated saving. The table below summarises the cost savings for each option. The baseline scenario of no threshold for exemption would result in all EU ETS market participants being obliged

to undertake information disclosures, at an estimated impact of around €6.3 million one-off costs and €3.8 million annual ongoing costs. As can be seen in the table below (repeated from Table 1.10), Options 2 to 5 result in progressively larger cost savings, as fewer and fewer firms would be included in the information disclosure obligation and incur the related compliance costs. Fewer emission allowances market participants to supervise should also reduce the costs to supervisors.

Table 1.11: Summary of Cost Savings for Exempt Market Participants

	Option 2 Threshold of 0.5 million tonnes	Option 3 Threshold of 3 million tonnes	Option 4 Threshold of 6 million tonnes	Option 5 Threshold of 20 million tonnes
One-off cost savings (€000s)	3,117	4,928	5,424	6,024
Ongoing annual cost savings (€000s)	1,950	3,057	3,352	3,702

Although Option 5 results in the greatest cost saving (around 96 per cent of the original costs in the baseline scenario) our analysis above shows that it does not in fact effectively meet the objective of the policy as it results in some firms being exempt which cannot be deemed not to hold inside information.

Of the options that effectively meet the objective of the policy, Option 4 does so most efficiently, i.e. with the greatest cost saving (i.e. lowest associated cost).

Market noise

All firms incur a cost in processing information, for example reviewing all available information, deciding whether it is relevant to investment or trading decisions, and deciding how to use the information that is relevant. The more information available in the market, the more costly this exercise would be. Non-relevant information would be considered 'noise' and would have an associated processing cost with no related benefits.

The more firms that do not hold inside information but are nevertheless required to disclose information to the market, the greater the market noise. Market noise will reduce the efficiency with which the policy objective is met. Option 1 scores lowest in these terms, as the greatest amount of market noise would be associated with this option as it does not exempt any firms that are not deemed to hold inside information from the disclosure obligation. Market noise is also associated with Options 2 and 3 and therefore these options also do not score highly in terms of efficiency. Option 4 scores the best on efficiency in relation to market noise, as it exempts a greater number of firms not deemed to hold inside information from the disclosure requirement. However, given the uncertainty in the event data analysed it is possible that some firms above this threshold would not hold inside information and thus could contribute to market noise if they are required to disclose information to the market. For this reason Option 4 scores a "+/–" for efficiency in meeting the objective in relation to market noise.

As Option 5 is not considered to effectively meet the policy objective at all, we do not include it in the assessment of efficiency.

Wider impacts

We consider that wider (socio-economic and environmental) impacts of the thresholds are likely to be very limited, with no discernible differences between the various options. We do not envisage that wider impacts would affect the efficiency with which any of the options would meet the objective, and therefore all options score a "o" against this criterion.

Completeness of exemption of non-relevant firms

The policy objective is to define a threshold such that firms that are not deemed to hold inside information are exempt from the disclosure obligation under MAR. The full objective of the policy would be to exempt *all* firms deemed not to hold inside information (or near enough to this level). An option would not be fully effective in meeting the objective if it only exempted a sub-set of firms that do not hold inside information.

Against this criterion Option 1 scores very poorly as it does not, in fact, exempt any firms from the disclosure requirement. Options 2 and 3 exempt progressively more firms which our analysis shows would not hold inside information (see Figure 1.9 above). Option 4 most effectively meets the objective of the policy as it exempts the greatest number of firms deemed not to hold inside information. Any threshold above 6 million tonnes would not be certain to only exclude firms not deemed to hold inside information — e.g. the threshold of 20 million tonnes (Option 5) would almost certainly exempt firms holding inside information from the information disclosure obligation. Option 4 therefore scores most highly against this criterion, with a "+" in the table below. The table below summarises the results of the multi-criteria analysis of the effectiveness and efficiency with of the options in meeting the policy objective.

Table 1.12: Effectiveness and efficiency of the options in meeting the policy objective

	Option 1: no threshold	Option 2: 0.5 million tonnes	Option 3: 3 million tonnes	Option 4: 6 million tonnes	Option 5: 20 million tonnes
Effectiveness of the options					
Price discovery	+	+	+	o/+	– –
Market liquidity	+/–	+/–	+	+	–
Price volatility	– –	– –	–	o/+	o/–
Efficiency of the options					
Direct cost savings	– –	– –	–	+	N/A
Market noise	– –	– –	–	+/–	N/A
Wider impacts	o	o	o	o	o
Completeness of exemption	– –	–	–/+	+	– –

Key: + = effective/efficient; ++ = very effective/efficient; – = ineffective/inefficient; – – = very ineffective/inefficient; neither (in)effective or (in)efficient

On the basis of our multi-criteria analysis of the options in terms of how effective and efficient they are in meeting the policy objective, Option 4 scores the best overall, both in terms of effectiveness and efficiency. Our preferred option is therefore a threshold of 6 million tonnes, which offers the best trade-off between costs and benefits.

Appendix: Stakeholder Engagement

Europe Economics

2 Appendix: Stakeholder Engagement

2.1.1 Workshop

On 20th November 2013 we held a workshop at which nine organisations and one trade association participated. Setting a threshold for information disclosure was one of the topics discussed.

2.1.2 Survey

In addition to the workshop, fieldwork was conducted to gather input from a wider range of stakeholders. In particular, a total of 51 companies and organisations across different groups were invited to contribute to a survey. The stakeholder groups were:

- Power generators
- Industrial emitters
- Industry associations of emission traders; and
- Financial institutions including banks, clearing houses and trading exchanges.

A total of 13 responses were received. Of these, three were submitted by industry associations on behalf of a wider population of interested firms.

2.1.3 Summary of Responses

The survey responses received and the workshop attendees across all relevant stakeholder groups are shown in the table below. There was a small degree of overlap between the workshop participants and survey respondents. The total number of responses is from individual firms, i.e. after eliminating such double-counting. The table does not (and is not intended) to sum across the rows.

Substantial input was received from associations representing power companies and industrial emitters. Whilst these have been counted as single contributions, the input reflects the views of a wide range of market participants.

Table 1.13: Summary of respondents

Stakeholder group	Workshop attendees	Survey responses	Total participating
Power generators	3	4*	6*
Industrial Emitters	-	3	3
Associations of emission traders**	1	2	2
Financial institutions	6	4	9

* One respondent is a leading trade association for the European electrical power industry

** These cover the views of a range of industrial emitters and power generators

2.1.4 Identity of respondents

The survey was conducted on the basis of confidentiality of the responses, including the identity of the respondents. The workshop was conducted on the basis of the Chatham House Rule, modified to the extent that the attending firms could be publicly identified.

Table 1.14: Identity of firms represented at the workshop

Organisation
BNP Paribas
E.ON
Citigroup
EcoWay
Thomson Reuters Point Carbon
Statkraft
EEX
Vertis Environmental Finance
GDF SUEZ
IETA