



SEM Contracting Report 2007-2013

Market Modelling Group (MMG)

SEM/14/073

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1. Introduction to Report

Since 1st November 2007 there has been an all-island wholesale electricity market in operation, covering Ireland and Northern Ireland, known as the Single Electricity Market (SEM). The SEM is a centralised mandatory pool market in which all key electricity generators and suppliers must participate, with the detailed rules set out in the Trading and Settlement Code¹. It is worth noting that the SEM is expected to operate in its current design until the end of 2016 and, following this, a new market design, currently referred to as I-SEM¹, will replace it.

The SEM is regulated jointly by the CER in Dublin and Utility Regulator in Belfast, known as the Regulatory Authorities or RAs. The decision-making body which governs the market is the SEM Committee, consisting of the CER, the Utility Regulator as well as an independent member (who also has a deputy), with each entity having one vote.

The purpose of this report is to provide information on volume and price trends in relation to publically-traded Contracts for Differences (CfDs) in the SEM. This is in order to assist transparency for both existing and potential new market participants..

The structure of this report is such that a background to the different type of publically-traded CfDs is provided in section 2, followed by information on CfD volume trends on section 3 and information on price trends in section 4. Information is presented in this report by calendar year for the delivery period of the contracts covered. An overview of this report is provided in section 1.1 below.

There may be other hedge contracts between suppliers and generators that are not captured in this report, for example in-house agreements made within a vertically integrated utility or private bilateral contracts between two parties.

1.1 Key Points from this Report

A summary of the key points or trends highlighted in the report are the following:

1. Overall public contract volumes in SEM were around 50% of the spot market volume up to 2009, i.e. were circa 17 TWhs per year, but have since declined to around 37%, i.e. to circa 13 TWhs per year. This has been driven by a number of factors:
 - a. A reduction in the volume of Directed Contracts (DCs) as ESB PG's market power declined over the years, until the horizontal integration of ESB's all-island generation which increased DC volumes in 2013; and,
 - b. A reduction in the volume of PSO related-CfDs in Ireland and Northern Ireland, related to reduced spot market output from some of the underlined power stations and the cancellation of some plant contracts.
2. The majority of public contracts offered in SEM to end 2013 have been regulated, the most popular contract product offered is baseload, the most popular contract duration is quarterly and ESB is by a large margin the biggest provider of the public contracts.
3. Contract prices saw significant changes in the first few years, with baseload prices peaking in 2009 at €93 or £79/MWh and then falling dramatically in 2010 to €57 or £52/MWh². From 2011 onwards baseload prices stabilised at around €67-68 or £56-67/MWh. These trends all reflect the forward fuel prices prevailing at the time these CfDs were sold.
4. The overall trend in CfD clean spark spreads - one proxy for gross profits³ - has been downward since the start of the market. A significant divergence between NDC and DC spreads can be seen in 2009 and 2010. This gap subsequently declined. The overall similarity of DC and SEM pool spreads is notable.

¹ Please see <http://www.allislandproject.org> for further information.

² CfDs sold in pounds had their lowest average prices in 2011 at £49/MWh.

³ This does not measure the volume of generation, which also needs to be taken into account when estimating gross profits.

5. Difference payments between suppliers and generators are the outcome of agreeing a CfD and impact on the cost of electricity. 2009 was the year when the greatest levels of payments were made from suppliers to generators, at around €800/£700 million in total. After this the annual volume of payments was smaller, at no greater than around €60/£50 million in total, reflecting greater stability in CfD prices relative to spot market prices.

2. Overview of Contract Types

There are a number of different types of public contracts in use in the SEM which are explained in this section of the report. Section 3 then details of the quantities of these contracts made available in SEM, while Section 4 details the prices of the contracts.

2.1 Introduction to Public Contracts

In wholesale electricity markets such as the SEM, the spot price of electricity can be volatile, influenced by changing electricity demand, changing fuel/carbon prices and changing generator availability. To manage the risk associated with the volatile System Marginal Price (SMP) in the SEM's pool market, generators and suppliers can contract publicly via CfDs for a certain amount of volume, thereby providing more wholesale price certainty. These CfDs products are out-side of the SEM pool market and are a financial product rather than a physical product. These CfDs are separate from other in-house contracts/agreements made within a vertically-integrated utility and/or a private bilateral contract between two parties.

CfDs allow the two parties to the contract - the generator as the seller and the supplier as the buyer - to reduce their exposure to volatile System Marginal Price (SMP) movements in the SEM pool market, as explained in the illustration below. If the average SMP in the market is lower than the agreed price then the supplier compensates (pays) the generator the difference. If the average SMP in the market is higher, then the generator pays the supplier the difference. So through CfDs both parties transfer risk and achieve price certainty for the volume agreed. However both have lost the opportunity to make additional profits/losses when prices move contrary to market expectations.

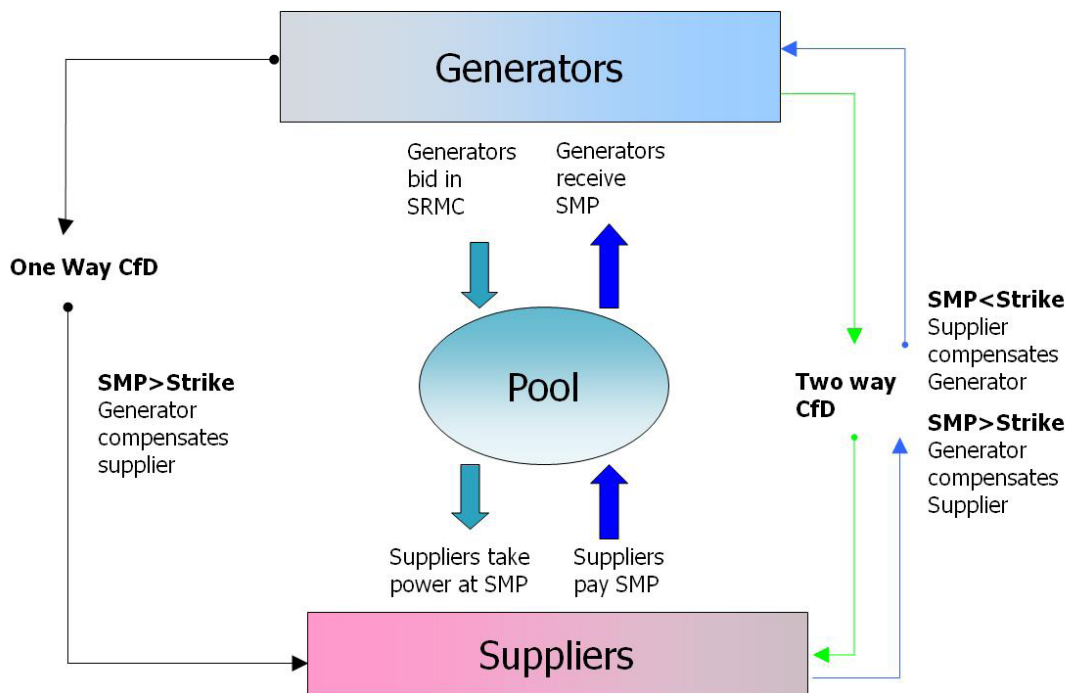


Figure 1: Illustration of two-way CfD's operating in the SEM.

There are a number of different CfD types currently in use as discussed below.

2.2 Directed Contracts

Directed Contract (DCs) are CfDs which are imposed on the incumbent generators with market power in the SEM by the RAs as part of the RAs' Market Power Mitigation Strategy.

DCs are a mandated set of CfDs implemented at the direction of the RAs on entities with large shares of control over generation which are deemed to have market power. These generators have to date been ESB and the Power NI Energy Power Procurement Business (PPB)⁴, given their forecast spot market share. As they are “directed”, it is the RAs who decide upon the methodology, pricing and quantity of the DCs to be offered by generators, as well as supplier eligibility rules for the purchase of DCs. The intent of these contracts is effectively to reduce the amount of generation that such entities will be receiving spot-based prices (SMP) for through the SEM. The quantity of generation that the entities will offer to the market and receive spot-based prices for will therefore be the difference between the generation that they control and the directed contract quantities - i.e., the “uncontracted generation position”.

The DCs mitigate market power by reducing the incentive for the generators deemed to have spot market power (ESB and PPB) to submit bids into the market above competitive Short Run Marginal Cost (SRMC) levels for the purpose of influencing either pool prices (SMP) or future contract prices. This is because the RAs set the DC price, quantity and eligibility and so if they do this, they will then lose money on the CfDs which are attached to these bids so are no better off setting the price higher than SRMC.

Further details on DCs are available on the *allislandproject* website⁵.

Until 2011 (covering contracts up to Q3 2012) all DCs in the SEM were offered in a “one shot process” for the following year during subscription windows held over a number of weeks in the summer. However, in 2012 the SEM Committee made the decision⁶ to adopt a new “rolling quarterly approach” to the offering of DCs from June 2012. Under this system the DC subscription windows are held every quarter, with DCs being allocated on a rolling basis up to 5 quarters ahead. This approach allows the DC prices/quantities on offer and supplier eligibilities to be more up-to-date to market share and pricing forecasts and to supplier Maximum Import Consumption (MIC) data. Thus this approach is beneficial for the core market mitigation objective of DCs and provides suppliers with more commercially flexibility as they can better match regular DC purchases with their (changing) customer number/consumption levels.

2.3 Non-Directed Contracts (NDCs)

Generators can offer forward Non-Directed Contracts for Difference (NDCs) in the SEM which suppliers are free to bid for. The RAs have no direct role in setting the price or volume of these forward contracts, although they do monitor liquidity levels. Although it is possible for any generator to offer NDCs, to date, three parties have offered them to all participants in the market, ESB, PPB⁷ and AES.

NDCs are sold via the Ireland Power Auction platform, which is a multi-lateral trading facility (MTF) hosted by the organised market place “Tullett Prebon”. Contracts are sold via one of two methods, as set out below:

1. Through the first method, an auction process is held on the platform. Through this auction a generator can offer a product, set the volume, contract period and reserve price. Suppliers have a set window (2 hours) in which to bid on the product. They bid in 5MW bands at any price at or above the reserve. If the product being auctioned is oversubscribed then the bids are taken in descending order by price and the product is sold at the price where the full volume is taken up. If a product is not oversubscribed then it sells at the reserve price.

⁴ PPB were only required to offer DCs for 2009.

⁵ http://www.allislandproject.org/en/market_decision_documents.aspx

⁶ [Directed Contracts Implementation for 2012/13 and Beyond - SEM/12/026](#)

⁷ PPB contracts are reported as PSO-related CfDs in this report.

The table below shows an example of an auction in which Generator A is offering 20MW of Peak product in Q4 2014 and has set the reserve price at €100. As the auction has been oversubscribed the sale price is set at €103.50 – the clearing point for the 20MW (10MW each for Supplier 1 & 2). If the full volume is not subscribed then the product is sold at the reserve price. So for example if Supplier 3 was the only counterparty, they would pay the reserve price of €100, not the €101 they had bid in.

Instrument	Peak - 2012 Q4 - Eur	
	Offer	Quantity
Generator A	€100.00	20MW

Trader	Bid	Quantity
Supplier 1	€106.00	5MW
Supplier 1	€105.00	5MW
Supplier 2	€104.50	5MW
Supplier 2	€103.50	5MW
Supplier 2	€102.00	5MW
Supplier 3	€101.00	5MW

Clearing Volume/Price →

Table 1

- The second method is Over the Counter (OTC) sales in which the generator offers a product, setting the volume, contract period and price. With an OTC sale the suppliers also have a set window (2 hours) in which to purchase the product. The difference is that if a supplier makes a bid at the price set by the generator, then they are able to purchase it instantly and the product is removed from the shelf. In this sense the product is sold on a “first-come, first-served” basis. In addition a supplier can bid below the offer price and the generator can then choose to accept this lower bid or not. It is possible that several suppliers can make bids below the offer price. As a result the OTC sales are more interactive/flexible than the auctioning process and assist in CfD price discovery.

The volumes of NDCs sold as OTC has increased since its start in 2011. This has been accelerated by ESB, the largest seller of CfDs, moving all its NDC sales from auctions to OTC from the beginning of 2013. The other seller of OTC CfDs that the RAs are aware of is AES.

2.4 PSO-related CfDs

PPB has a number of generating unit agreements (GUAs) with different power stations in Northern Ireland and acts as an intermediary, bidding these generating units into the SEM⁸. PPB also offers NDCs to market participants and at the same time enters into fuel hedges to back up such CfDs. It should be noted that PPB is a regulated business and any net costs or benefits are recovered from or rebated to customers through the Public Service Obligation (PSO) in Northern Ireland.

ESB also offer CfDs associated with the PSO levy in Ireland, which are similar to PPB’s NDCs. One difference is that ESB do not include any hedging, such as fuel hedging - therefore any contract difference payments paid or received are incorporated into the Irish PSO levy. Overall this flow of contract money into and out of the PSO levy is mitigated by the following two factors:

- These CfDs are based on a conservative view of the forecast generation of the dispatchable power stations covered by the PSO (3 peat stations, Aughinish Alumina and Tynagh).
- Between 2010 and 2011 these CfDs moved from being offered in annual to quarterly auctions and from quarterly to monthly products with the reserve price for these contracts set by the CER.

⁸ Due to the cancellation/expiry of a number of these GUAs, there are now only two remaining. These are between PPB and AES in respect of units at the Ballylumford Power Station.

2.5 Types of Contract

Between DCs, NDCs and PSO-related CfDs, there are four types of contract product offered by generators: Baseload, Mid Merit, Mid Merit 2 & Peak. The details of the period to which these CfDs apply are as follows:

- Baseload - 24 hours, 00:00 to 24:00.
- Mid Merit - 07:00 to 23:00 on Business days and 80% of the contract quantity on non-business days.
- Mid-Merit 2 - 07:00 to 19:00 on weekdays.
- Peak - 17:00 to 21:00, available from October to March.

These can be offered as monthly, quarterly, seasonal or annual products by generators with the contract typically agreed from a few weeks up to 18 months in advance of the contract period.

By offering and having access to a wide a range of products over a varying time period and for different lengths of time, generators and suppliers now have a good mix of CfDs in the SEM. This allows generators to hedge for their individual generation portfolio against movements in underlying fuel prices, though they can perhaps achieve this with fuel hedges too, at least to a certain extent, while it also allows suppliers to build a portfolio of hedges that match the (changing) demand profile of their unique customer base.

For illustrative purposes Figure 2 below shows a supplier's demand profile for a single day, as well as the volume of hedges they have entered into. As can be seen the supplier has built a hedge portfolio the broadly matches its demand profile. Although there is still some exposure to the volatility of the SMP, the supplier has significantly reduced their exposure through hedging.

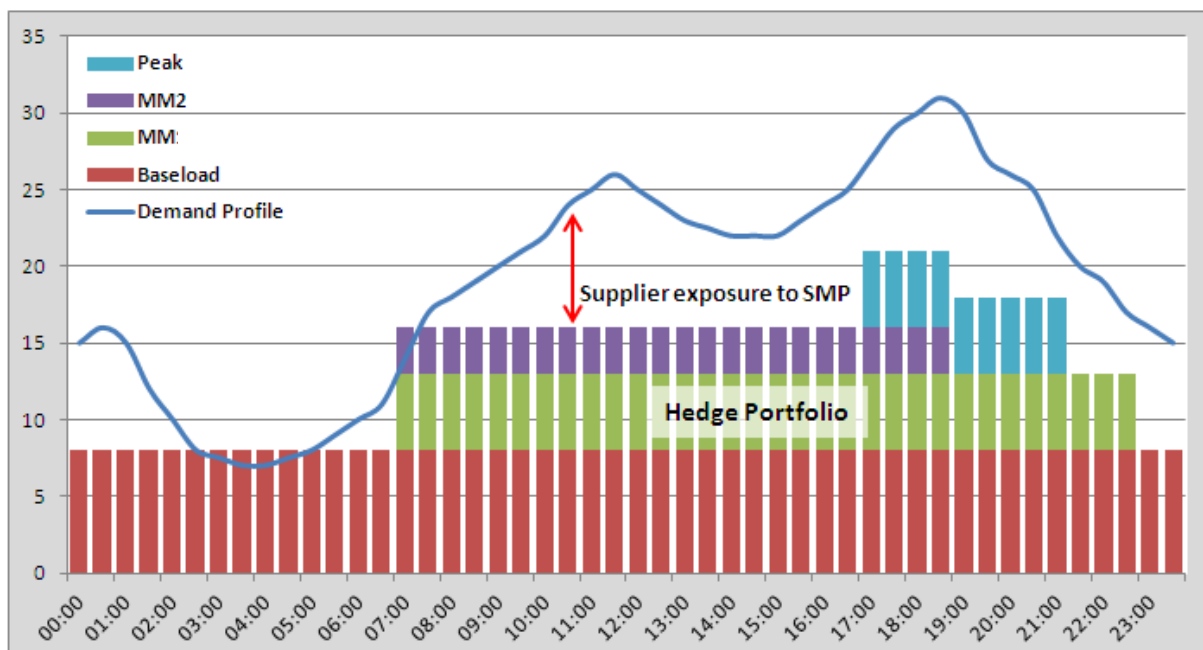


Figure 2: Illustration of supplier hedge portfolio.

3. Contract Quantities

This section provides an overview of public contract volumes made available in the SEM, followed by more detailed tables/graphs showing the volumes for DCs, NDCs and PSO-related CfDs, covering all four contract types (Baseload, Mid Merit, Mid Merit 2 and Peak). It is important to note that the volumes shown represent the volume of contracts offered in each year since the start of the SEM and not the volume of contracts actually taken-up by suppliers.

3.1 Overall Volumes

Table 2 and Figure 2 below show the changes in the source of CfDs being sold in the market. As can be seen, traded contract volumes were greatest in the first full year of the SEM, 2008, at 17.5 TWhs and dropped to the lowest levels in 2011 at under 12 TWhs, before rising again to just under 13TWhs in 2013. This means that in recent years, as shown in the table/graph, slightly over 1/3 of the total SEM spot pool market has been financially hedged against via publically-traded CfDs. As noted previously this does not include internal contracts among vertically integrated market participants or private bilateral contracts between generators and suppliers.

The contract volume changes have been driven by two main factors: changing market power and reduced forecast generation of the sellers. The former factor influences the volume of DCs, which are mostly imposed on ESB Power Generation (PG), and led to an overall fall in DC volumes from 2009 to 2011 as ESB PG's spot market share/power fell. DC volumes then increased significantly in 2013 due to ESB PG and ESBI generation horizontally integrating. This horizontal integration of ESB was allowed for by the SEM Committee, following public consultation, in its decision of SEM/12/002⁹, given the low market power risks involved. The latter factor has influenced the volume of PSO-related CfDs offered to the market, as the forecast generation from power stations covered by the PSO has fallen over time in both jurisdictions.

Year	DCs	PSO-ROI	PSO-NI	NDC Auctions	NDC OTC	Total CFDs	MSQ	% of SEM Pool
2007	564	870	758	1,049	-	3,241	6,437	50%
2008	3,284	5,233	4,582	4,424	-	17,523	34,622	51%
2009	3,491	5,256	3,898	4,078	-	16,723	34,906	48%
2010	2,919	4,521	2,574	3,243	-	13,257	33,624	39%
2011	1,614	3,793	1,650	4,358	121	11,536	33,119	35%
2012	1,648	3,302	965	4,909	808	11,633	32,944	35%
2013	3,460	2,887	871	4,290	1,394	12,902	34,622	37%

Table 2: Total Contract Volumes by offering (GWh)

⁹ http://www.allislandproject.org/en/market_decision_documents.aspx?page=4&article=682a98fe-9c18-4c73-8fa3-57e75d24d85e

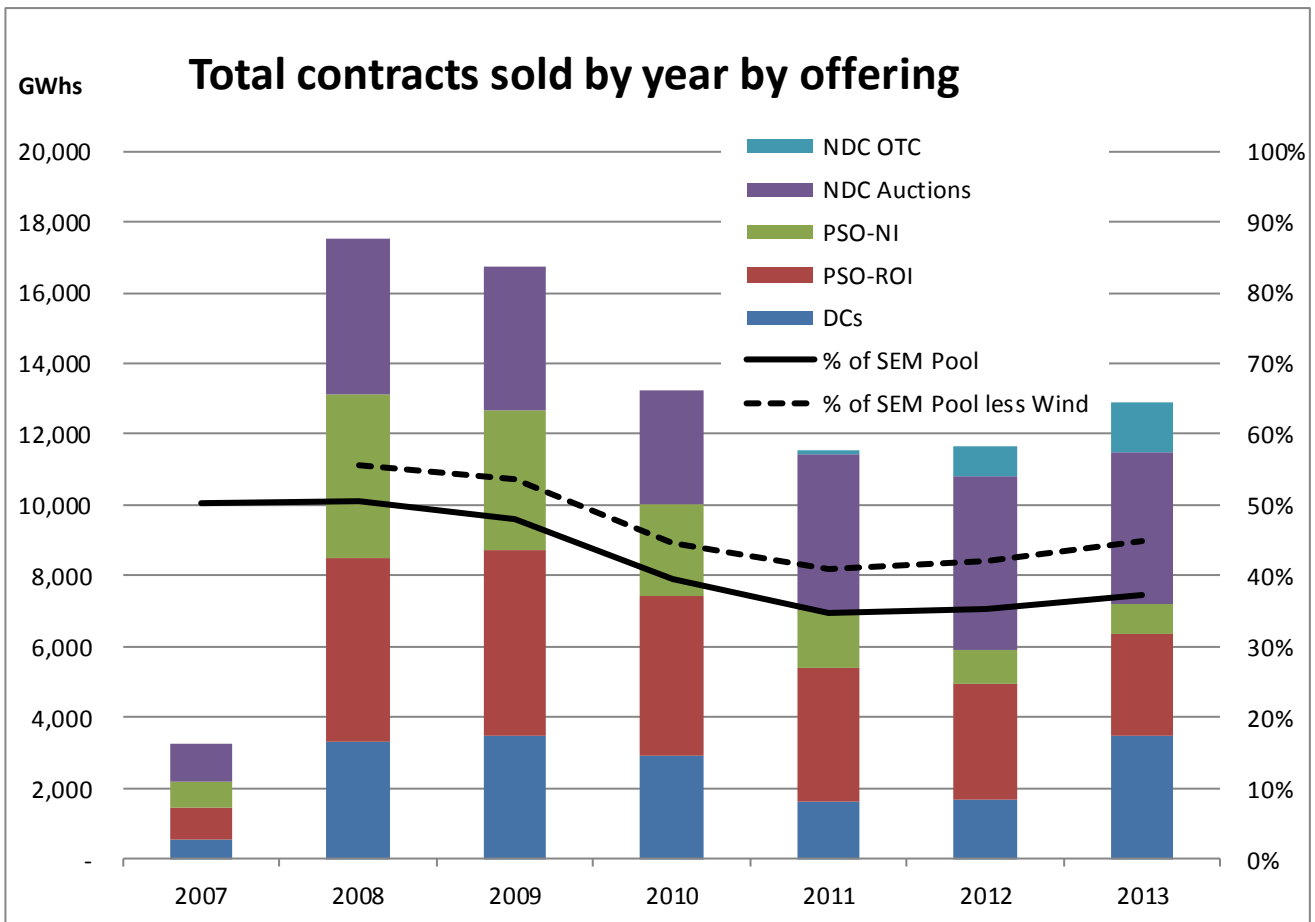


Figure 2: Total Contract Volumes by offering

3.2 Regulated v. Unregulated Contracts

As can be seen from Table 3 below, a majority of the volume of contracts on offer in every year have been regulated (DC and PSO-related CfDs) rather than unregulated from an RA perspective (NDCs)¹⁰. However, the percentage of regulated contracts decreased from circa 75% in 2008/09/10 to just over 50% in 2012, and then increased slightly with the horizontal integration of ESB which has resulted in an increase in DCs.

	2007	2008	2009	2010	2011	2012	2013
Regulated Contracts	68%	75%	76%	76%	61%	51%	56%
Unregulated Contracts	32%	25%	24%	24%	39%	49%	44%

Table 3: Percentage of contracts regulated

3.3 Product Types

Looking at product types, shown in table 4 and figure 3, the bulk of contracts on offer in the SEM have been baseload. Baseload volumes fell up to 2011 driven by two factors, referred to above, reduced market power and the generation output of PSO-related generation. This was reversed somewhat in 2013 with the horizontal integration of ESB and the associated increase in DCs.

The volume of Mid Merit product has been relatively stable over the years. Mid Merit 2 increased after the first few years of the SEM, largely by the introduction of this product as part of the ROI-related

¹⁰ While such contracts are unregulated by the RAs, they are subject to appropriate EU/national financial regulation within their respective jurisdictions.

PSO auctions. In 2013 Mid Merit 2 volumes sold dropped considerably driven by a fall in ESB NDCs on offer.

Peak products have declined steadily over the years, which have primarily been due to the level of DC peak products offered, and the volumes offered through the NI PSO.

Year	Baseload	Mid Merit	Mid Merit 2	Peak	Total
2007	2,381	569	157	133	3,241
2008	12,362	3,930	895	336	17,523
2009	11,694	3,648	1,077	303	16,723
2010	8,521	3,368	1,080	289	13,257
2011	6,288	3,715	1,298	236	11,536
2012	7,116	3,032	1,300	186	11,633
2013	8,719	3,350	712	121	12,902

Table 4: Total Contract Volumes by Product Type (GWh)

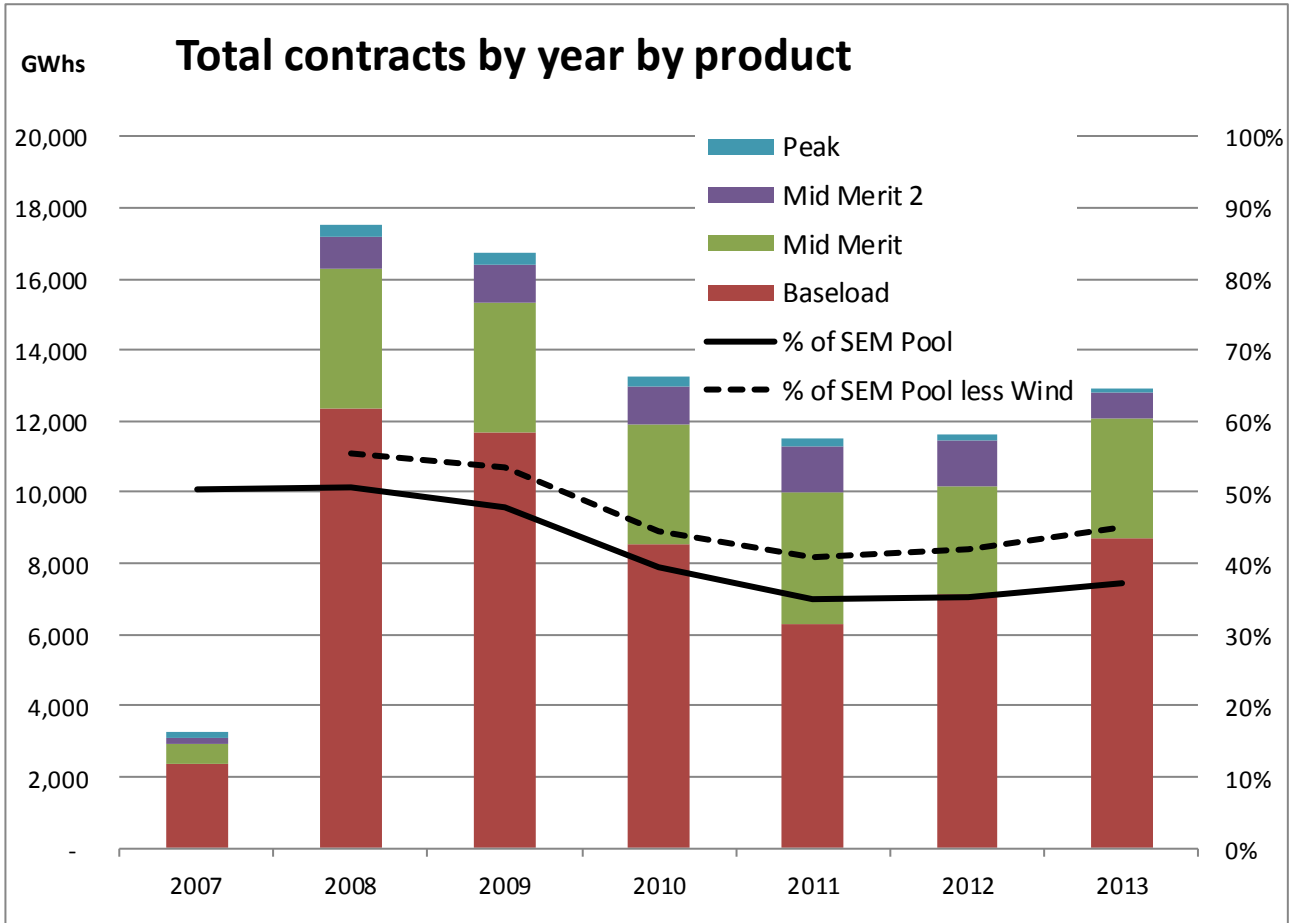


Figure 3: Total Contract Volumes by Product Type

3.4 Contract Duration

The duration that CfDs are offered for is an important aspect of buyers and sellers hedging. Shorter term products offer greater commercial flexibility and longer term products offer potentially greater commercial stability. To date there have been four duration types, annual, seasonal, quarterly and monthly.

As can be seen in the table/graph below, the majority of contracts in the SEM have been offered as quarterly products, driven by the DCs for which this is the sole duration. Monthly products were first introduced for 2010 and have increased over the years, helped by the change in ROI PSO-related CfDs from quarterly to monthly products, offered quarterly.

Annual products were offered in the first few years of the SEM, making up nearly 23% of the volume sold in 2008, but have not been traded in recent years. Relatively small volumes of seasonal products, winter (October to March) and summer (April to September), have only been offered through the NI PSO-related CfDs.

Year	Annual	Seasonal	Quarterly	Monthly	Total
2007	662	5	2,573	-	3,241
2008	4,003	379	13,141	-	17,523
2009	3,717	661	12,345	-	16,723
2010	2,322	-	9,596	1,339	13,257
2011	911	-	7,488	3,138	11,536
2012	-	154	7,350	4,129	11,633
2013	-	226	8,443	4,234	12,902

Table 5: Total Contract Volumes by Duration (GWhs)

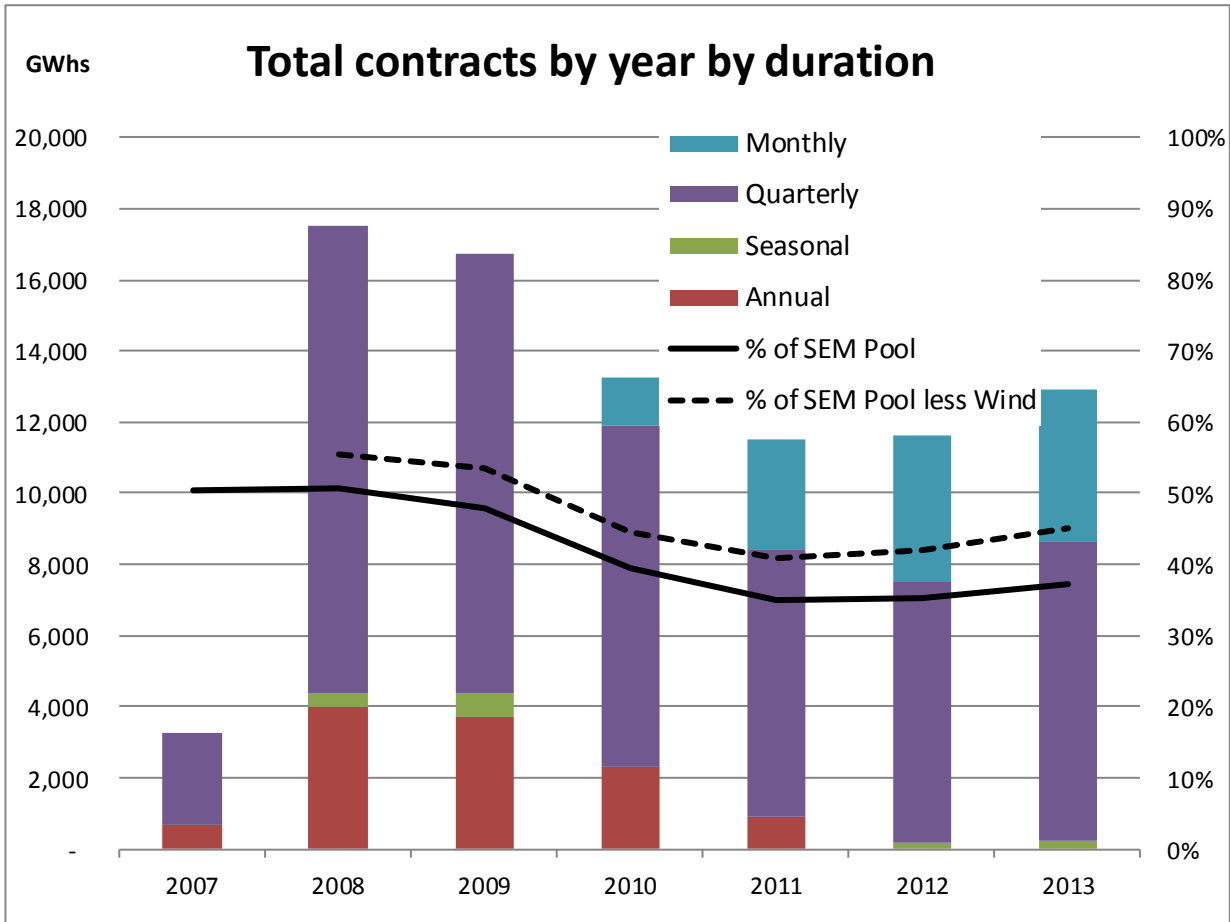


Figure 4: Total Contract Volumes by Duration (GWhs)

3.5 Contract Sellers

There are three main sellers, all with generation, of CfDs in the SEM, ESB, PPB and AES. ESB is by a big margin the largest seller of CfDs and sells them in euros, while PPB and AES sell CfDs in pounds, as shown below in the table/graph.

The volume of CfDs sold by ESB dropped by over 1.6 TWhs in 2010, and this reduction came across in all contract types, DC, NDC and PSO-relate CfDs. The overall volumes since 2010 have remained relatively constant. Similarly the volume of PPB CfDs sold in 2010 fell by about 1.8 TWhs and by another 1.5 TWhs over the next 2 years. The number of powers stations and their generation under contract with PPB has declined over the years and explains the diminishing volumes offered and sold. AES has more recently offered CfDs to the market which reflects the generation that used to be sold under PPB's CfDs that is no longer under contract with them.

Year	ESB	PPB	AES	Total
2007	2,483	758	-	3,241
2008	12,940	4,582	-	17,523
2009	12,331	4,392	-	16,723
2010	10,683	2,574	-	13,257
2011	9,887	1,650	-	11,536
2012	10,667	965	-	11,633
2013	10,920	871	1,111	12,902

Table 6: Total Contract Volumes by Seller (GWhs)

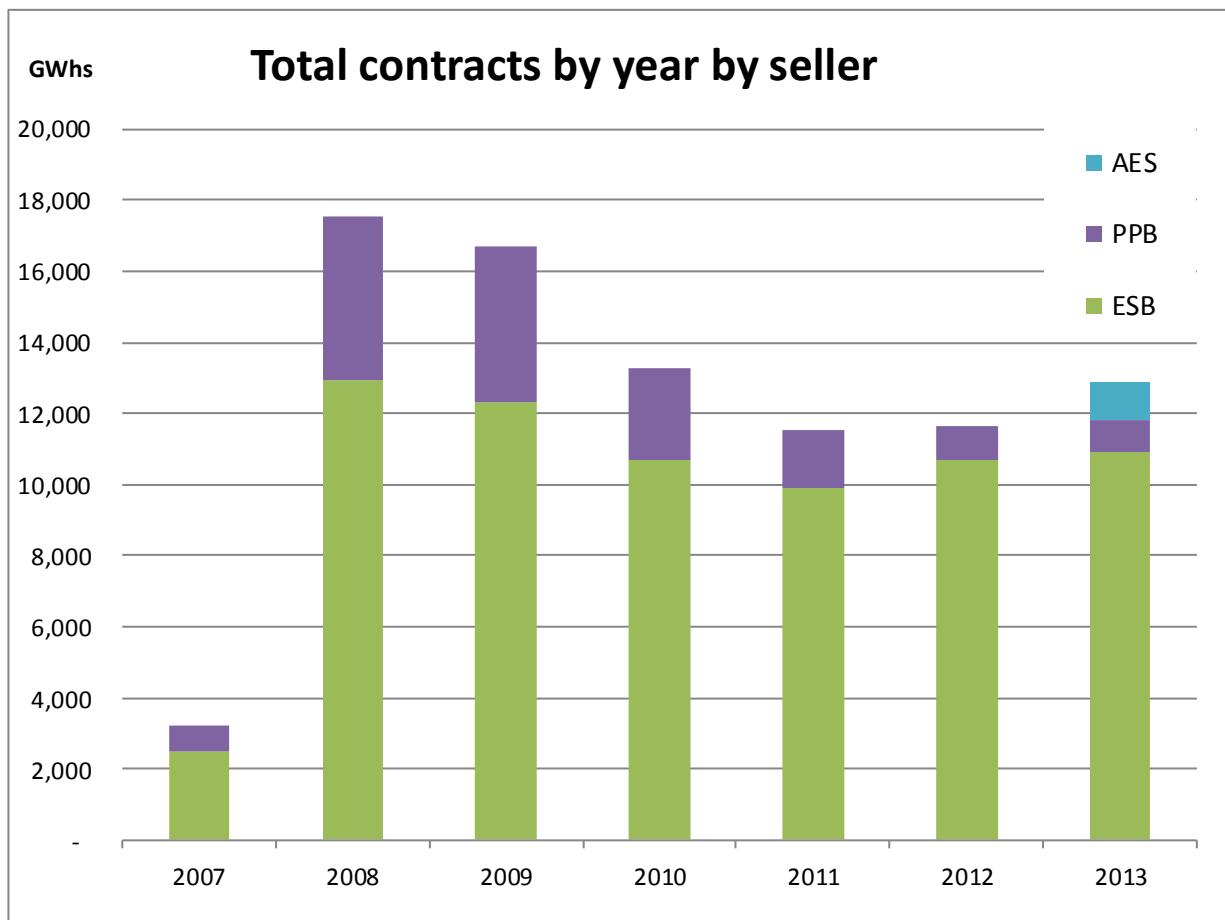


Figure 5: Total Contract Volumes by seller (GWhs)

4. Contract Prices

This section provides an overview of public contract prices in the SEM. This includes a background to the drivers of CfD prices, a summary of CfD prices up until 2013, difference payments between buyers and sellers and finally an examination of the clean spark spread in CfDs.

4.1 Overview

Changes in fuel prices and in particular gas prices tend to be the primary driver of SMP - and therefore CfD - movements in the SEM.

The figure below shows the daily average time-weighted SMP from the beginning of the market up to the end of 2013. This highlights the volatility at a daily level, which is even greater when examined on a half hourly level, and the natural desire for suppliers to find a way to hedge their exposure to this price volatility, given that they have to date typically offered their customers fixed price contracts. It can be seen that the SMP peaked in mid-2008, before falling dramatically in the 2nd half of 2008 and 2009, rising in 2010/11 and being more stable since then (aside from a March 2013 spike). This closely follows the movement in spot gas prices over the period, as one would expect given that gas is the most important fuel type among electricity generators in the SEM and is the fuel type typically used by generators setting the SMP. It is worth noting that gas prices typically have a seasonal premium between the summer and winter prices, as gas demand is typically higher in the winter.

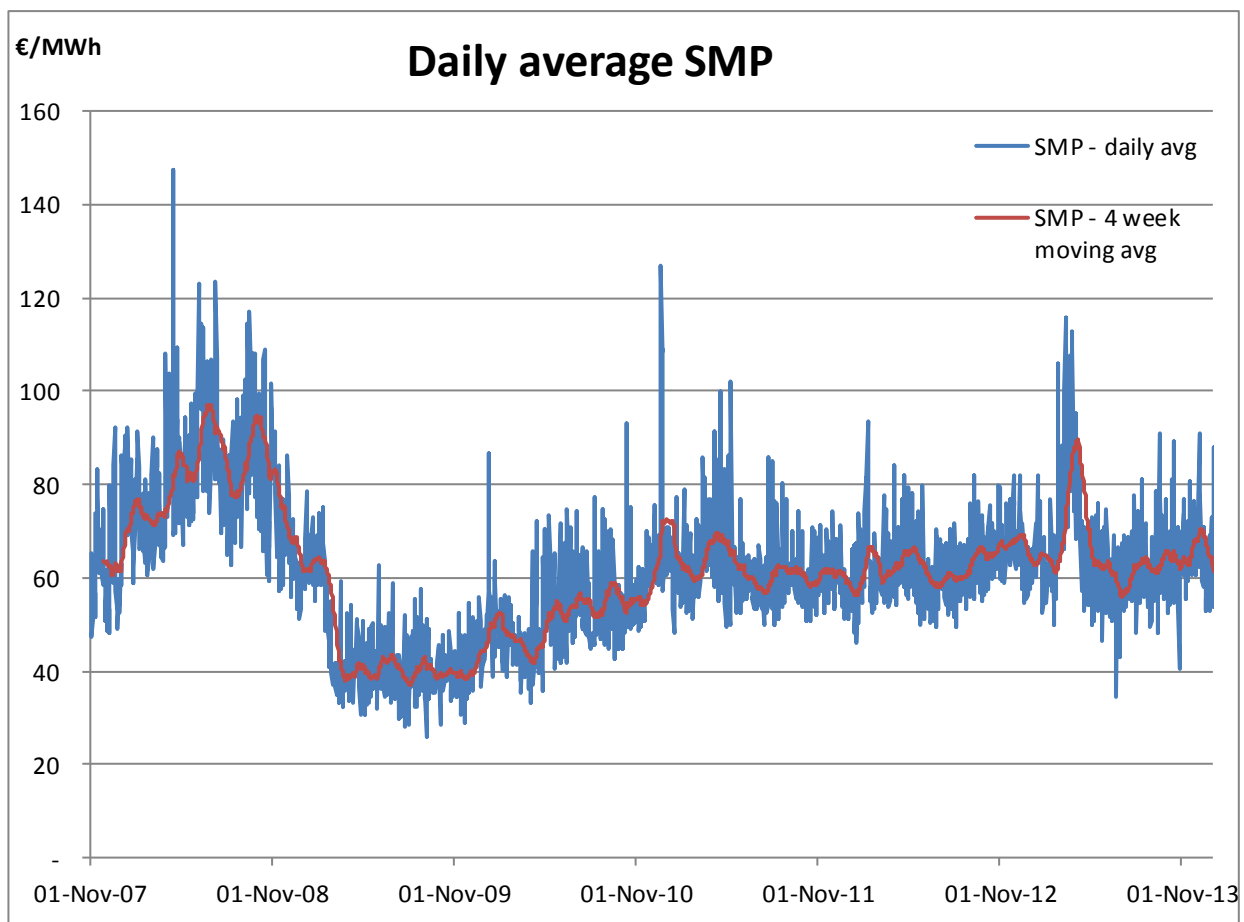


Figure 6: SEM daily average SMP

The following graphs show the forward fuel prices for different fuels that are used by generators in the SEM.

While it is the day-ahead fuel prices that influence the SMP, it is the forward or future fuel prices that influence the CfD prices. The different fuels show a broadly similar trend since the start of SEM. Gas prices peaked in mid-2008, followed by a dramatic fall in the second half of 2008 and 2009, and increases in 2010/11 with relatively stable prices since then. Coal showed a similar trend though its prices have fallen since 2011. These forward price trends, especially gas, have influenced the CfD prices, which results in them essentially lagging the SMP trends. This can be seen especially with the 2008 peak in forward fuel prices influencing the CfDs sold during this period and the associated high strike prices for CfDs going out to Q3 2009. This is discussed in more detail in the next section.

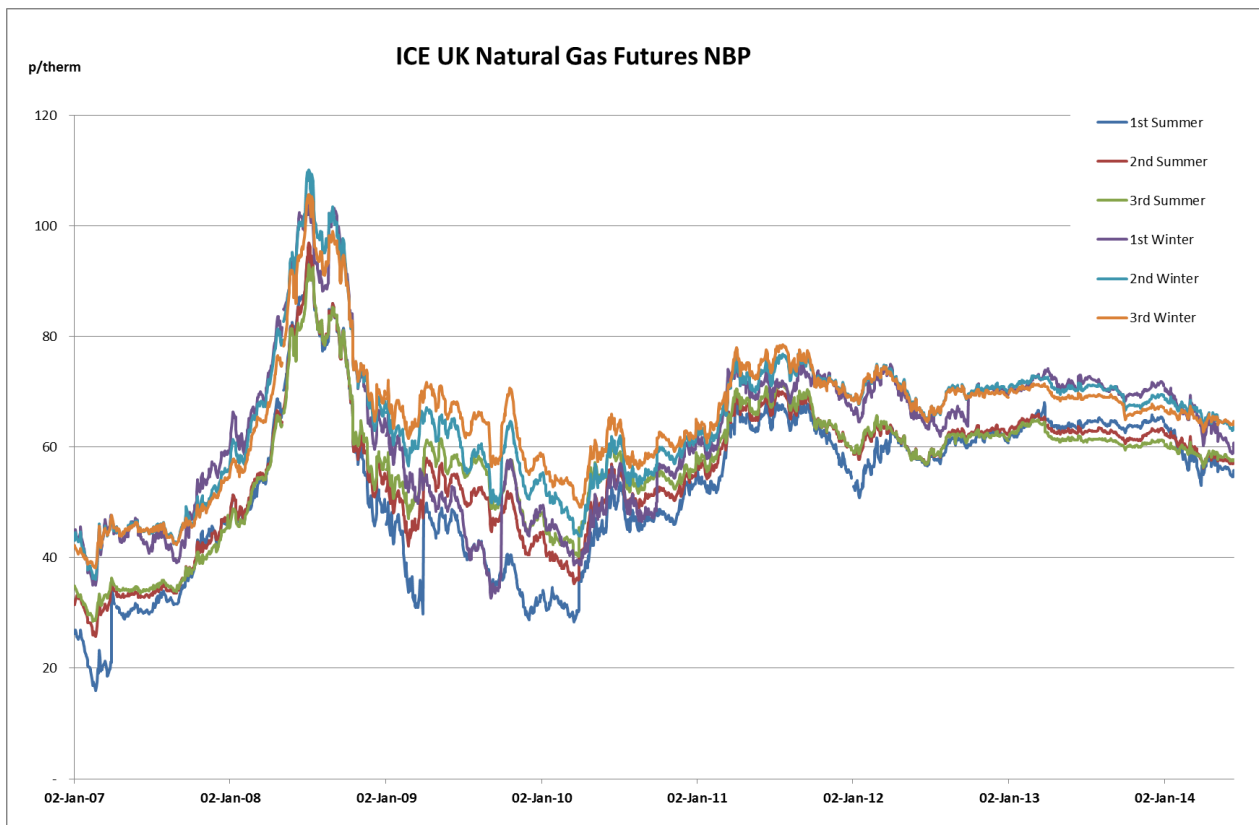


Figure 7: ICE UK Natural Gas Futures NBP

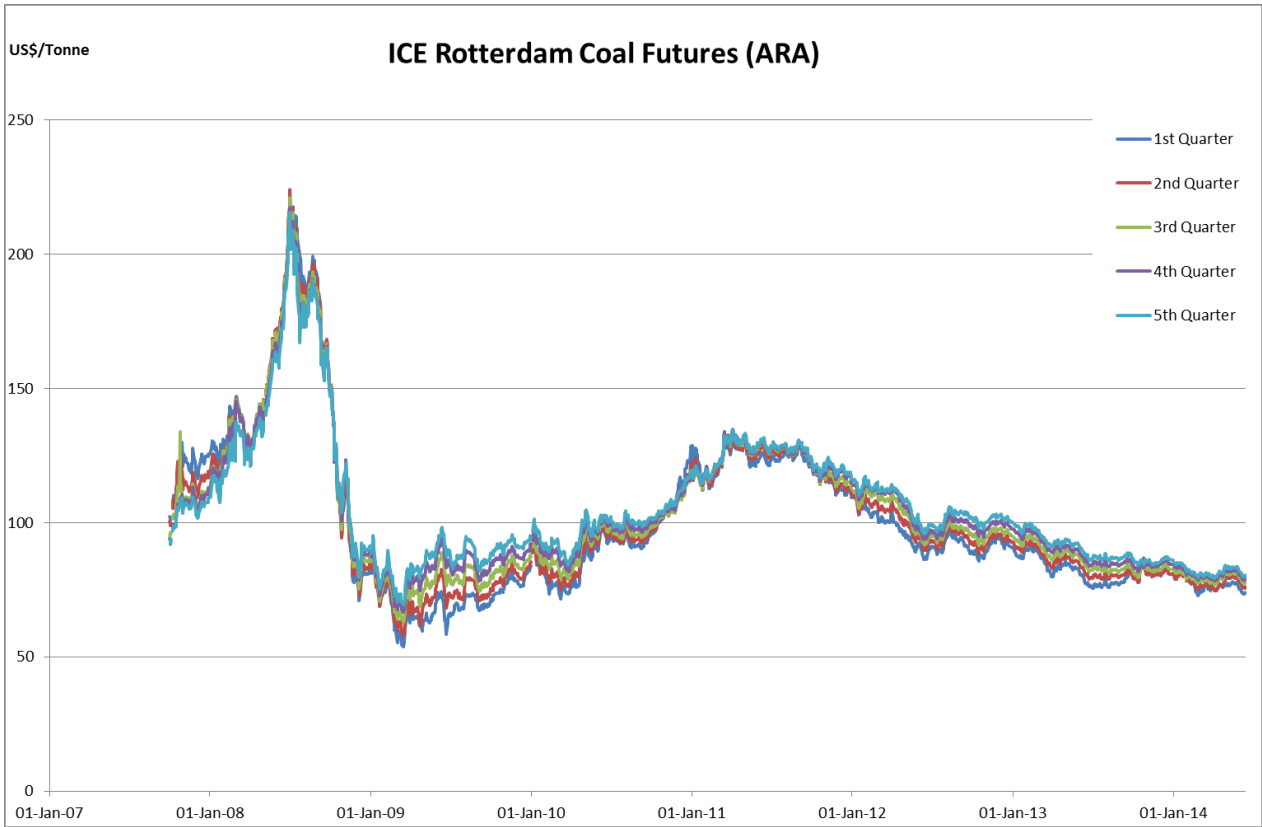


Figure 8: ICE Rotterdam Coal Futures

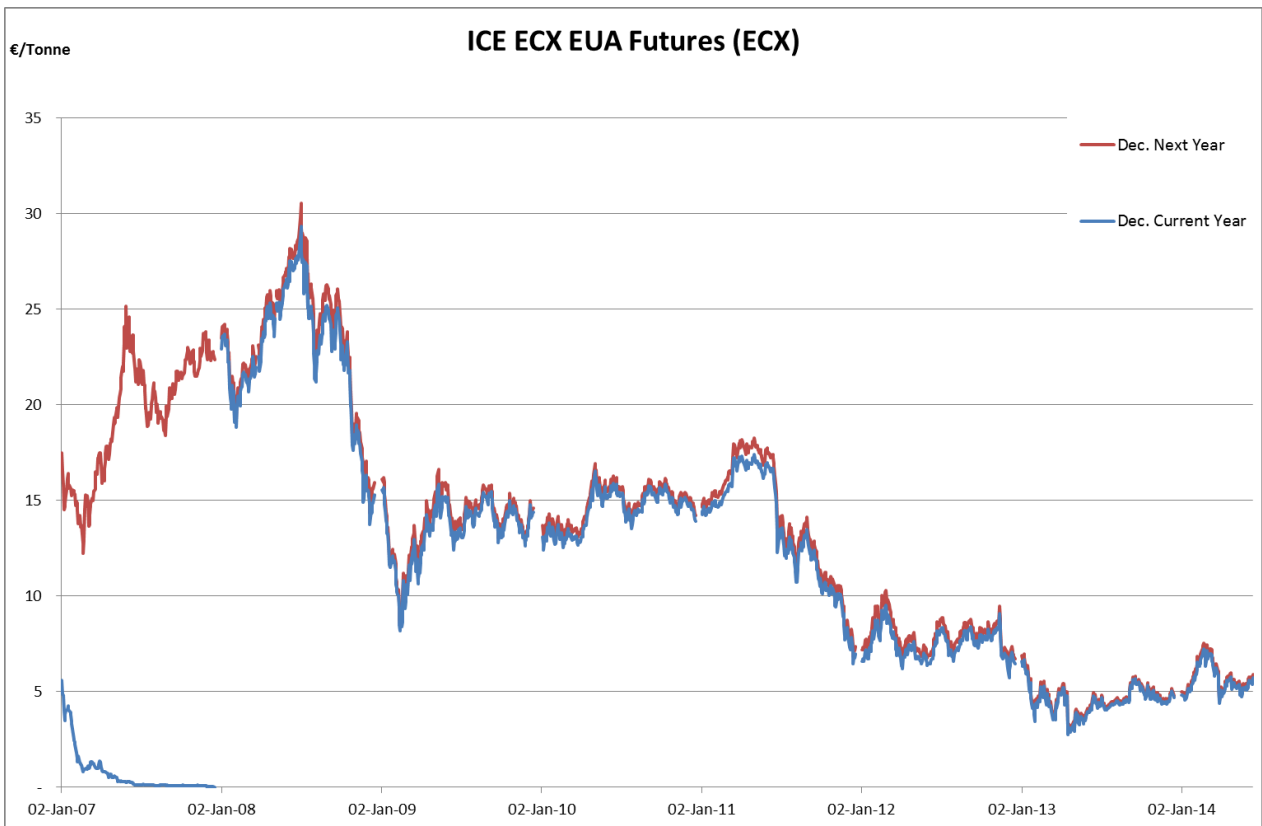


Figure 9: ICE ECX EUA Futures¹¹

¹¹ These are CO₂ prices.

4.2 Detailed Prices

This section contains a number of graphs showing in detail the contract prices since the start of the SEM. There are graphs showing the price movements for DCs, NDCs and PSO-related CfDs sold in euros (ESB CfDs) and pounds (PPB & AES), covering all four contract types (Baseload, Mid Merit, Mid Merit 2 and Peak). It is important to note that the prices shown are demand-weighted average clearing prices for the actual volume of contracts sold.

In tables 7 & 8 and figures 10 & 11 below we can see the changes in average prices year-on-year for each of the four contract products that were sold in euros and pounds respectively, which essentially lag changes to the SMP. Overall contract prices peaked for 2009, which were driven by high forward fuel prices - especially gas- in the spring and summer of 2008 when the contracts were offered. The 2010 contract prices, which were the lowest in the years covered, were based on the floor in forward fuel/gas prices when the contracts were offered in 2009. Since then, contract prices increased for 2011 in line with increased forward gas prices in 2010, and there has been relative price stability for CfDs thereafter (except for peak product which has become more expensive), with all prices still considerably below the 2009 peak.

Year	Baseload	Mid Merit	Mid Merit 2	Peak
2007	€ 65	€ 74	€ 82	€ 105
2008	€ 79	€ 83	€ 101	€ 145
2009	€ 93	€ 101	€ 106	€ 139
2010	€ 57	€ 63	€ 65	€ 87
2011	€ 67	€ 72	€ 76	€ 95
2012	€ 69	€ 76	€ 78	€ 103
2013	€ 67	€ 75	€ 76	€ 118

Table 7: Annual Average Strike Prices in Euro denominated CfDs

Year	Baseload	Mid Merit	Mid Merit 2	Peak
2007	£ 46	£ 54	£ 58	£ 77
2008	£ 56	£ 66	£ 69	£ 106
2009	£ 79	£ 81	£ 93	£ 128
2010	£ 52	£ 60	£ 60	£ 85
2011	£ 49	£ 57	£ 58	£ 98
2012	£ 57	£ 68	£ 70	£ 102
2013	£ 56	£ 63	£ 64	£ 104

Table 8: Annual Average Strike Prices in Pound denominated CfDs

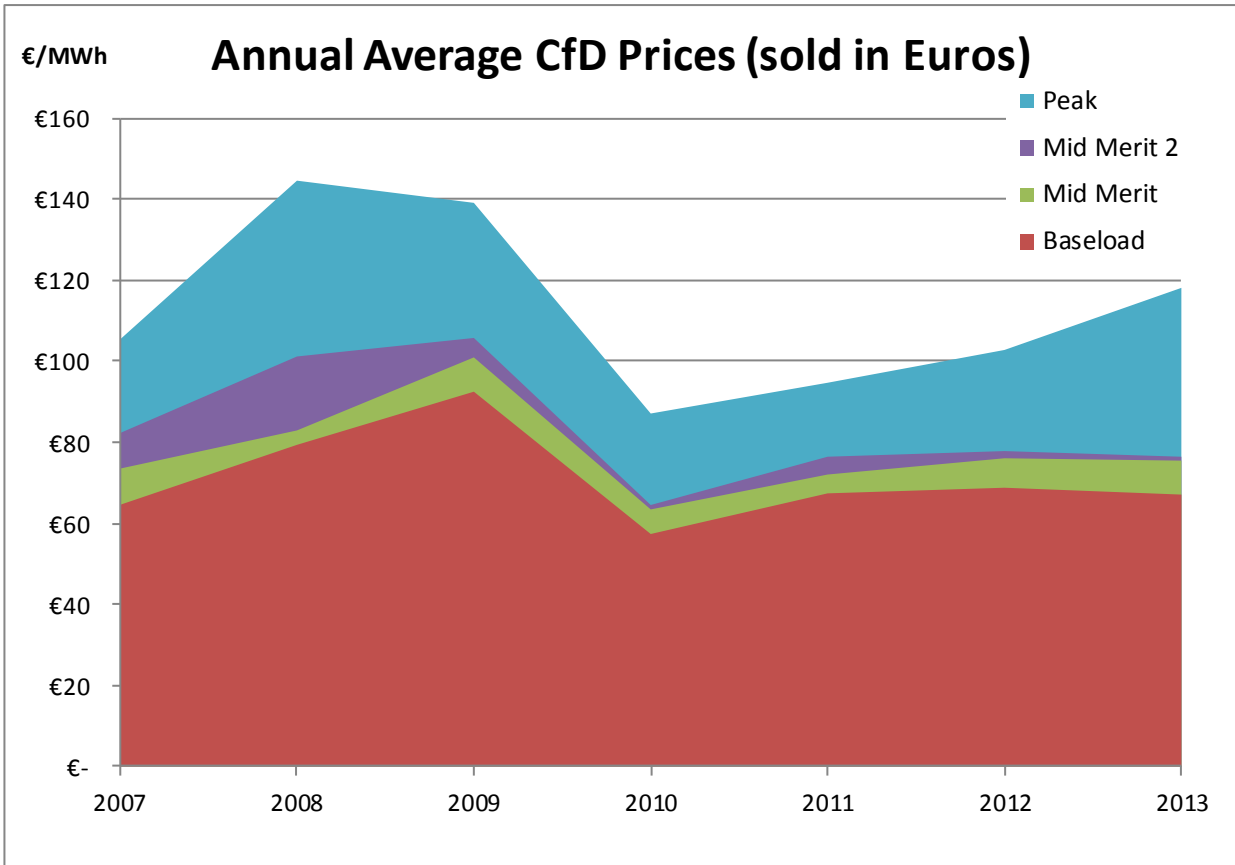


Figure 10: Annual Average Strike Prices in Euro denominated CfDs

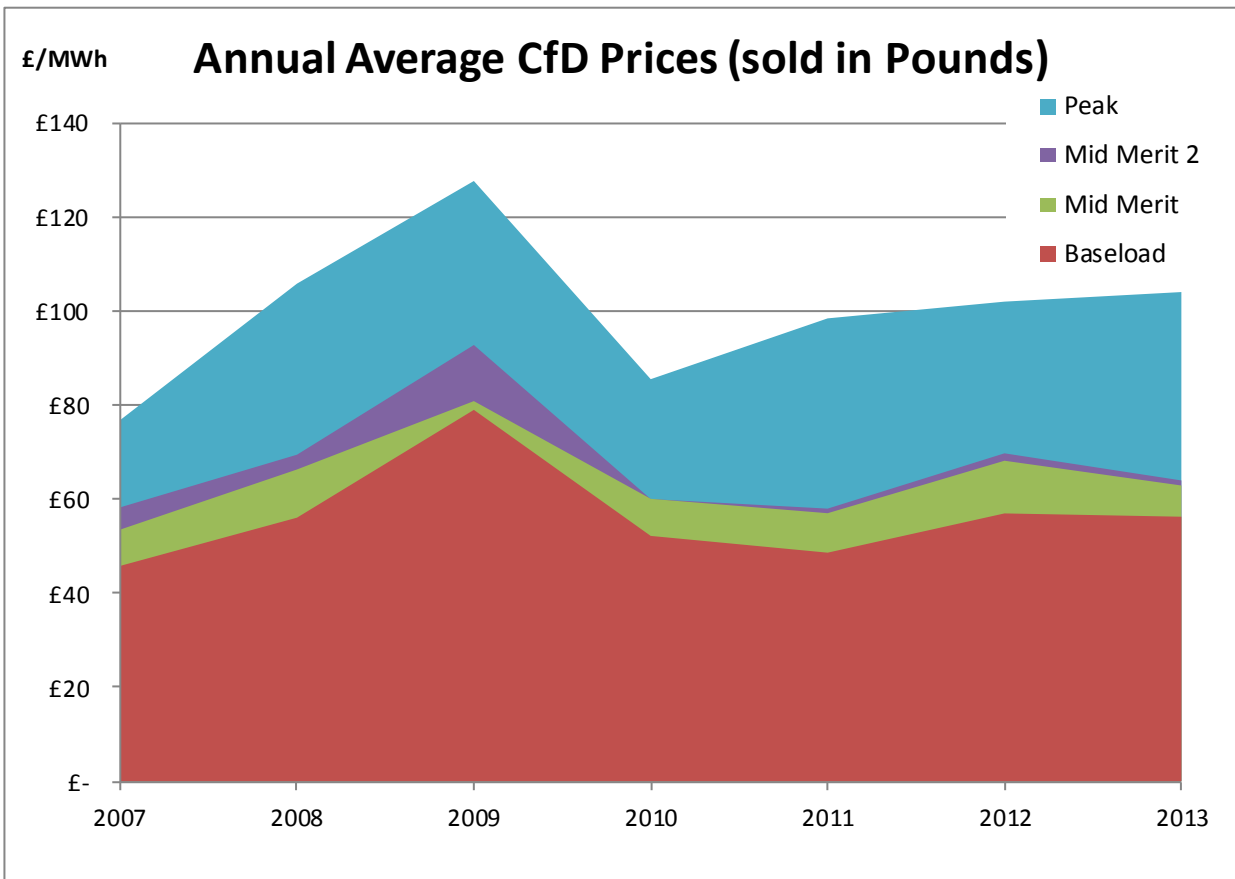


Figure 11: Annual Average Strike Prices in Pound denominated CfDs

The above contract price trends are shown in more detail in the remainder of this section. Figures 12-15 show the average prices of CfDs sold in euros by product type and by contract type (DC, NDC & PSO-related CfD). DCs are typically the lowest priced CfDs as they are sold on a subscription basis, with prices set through an RA pricing formulae, removing the possibility of an added premium that is usually seen in the sale of NDC and PSO-related CfDs. Figures 16-19 show the equivalent average prices for CfDs sold in pounds.

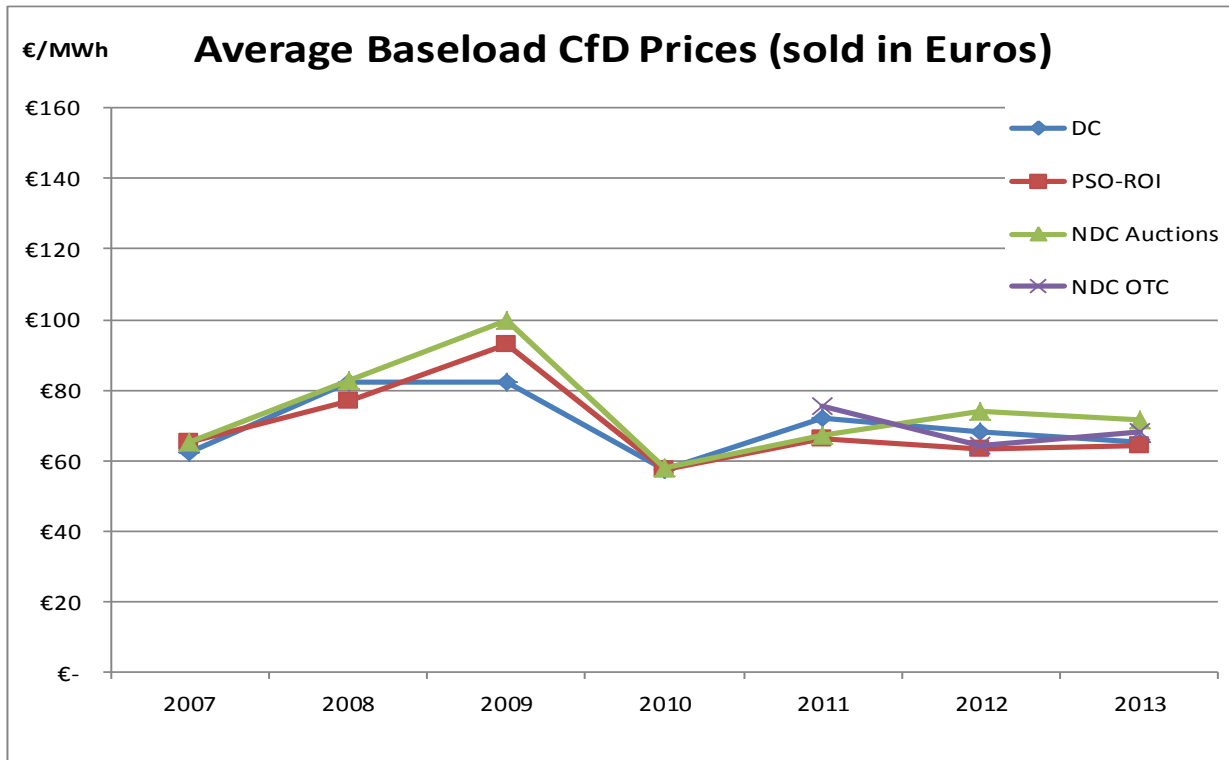


Figure 12: Average Baseload CfD Prices (sold in Euros)

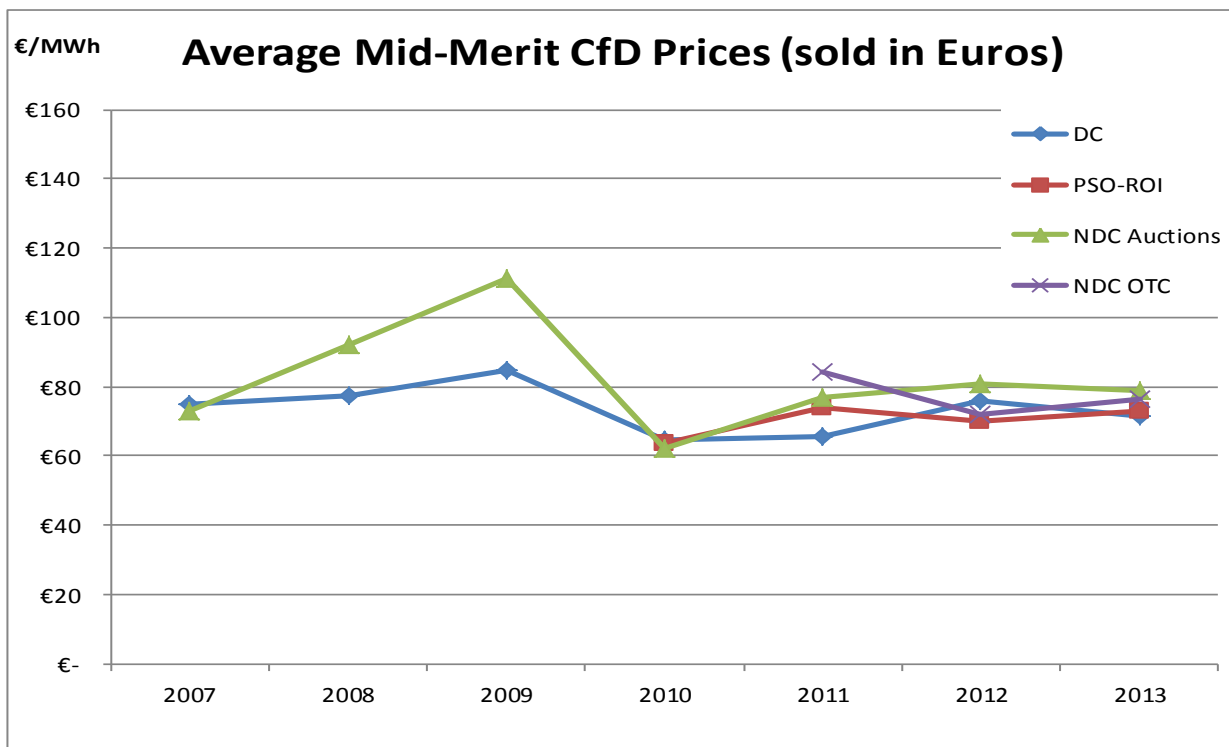


Figure 13: Average Mid Merit CfD Prices (sold in Euros)

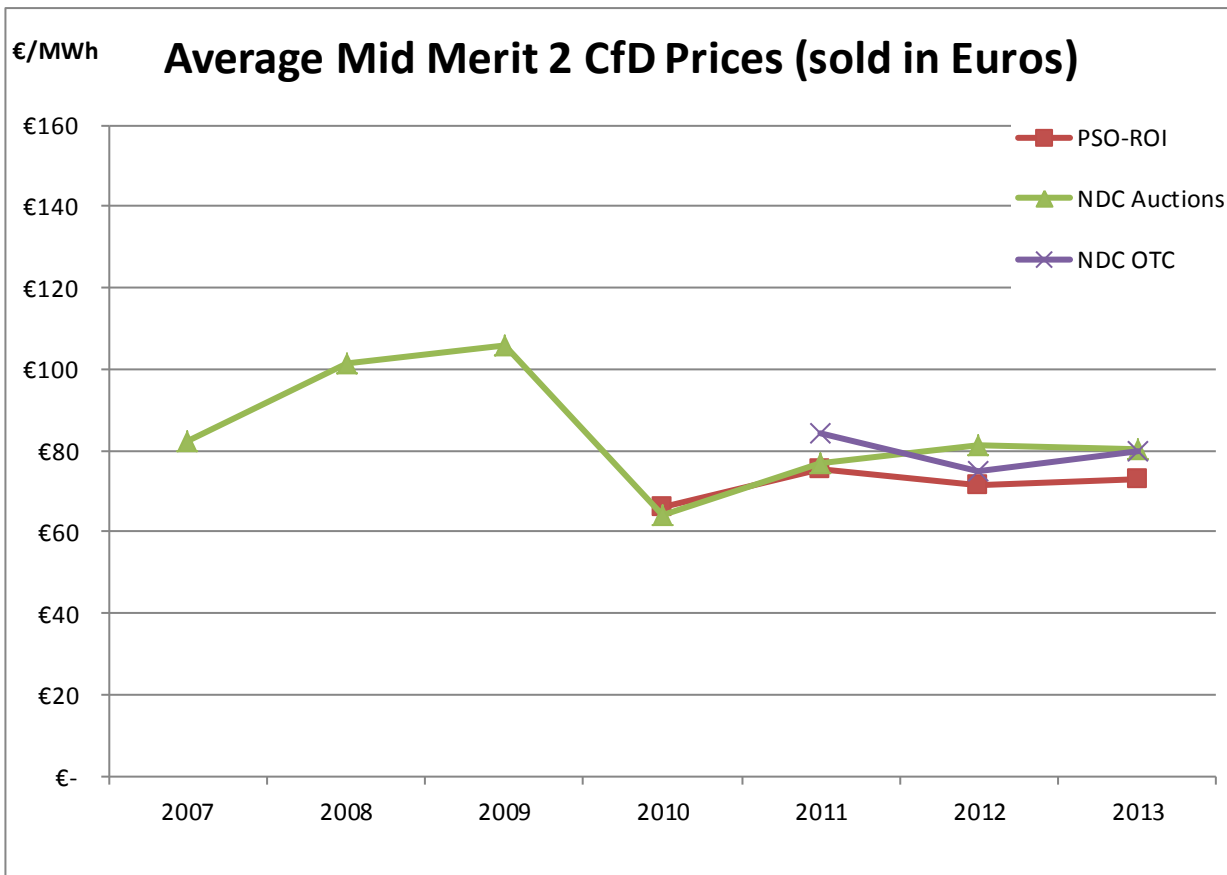


Figure 14: Average Mid Merit 2 CfD Prices (sold in Euros)

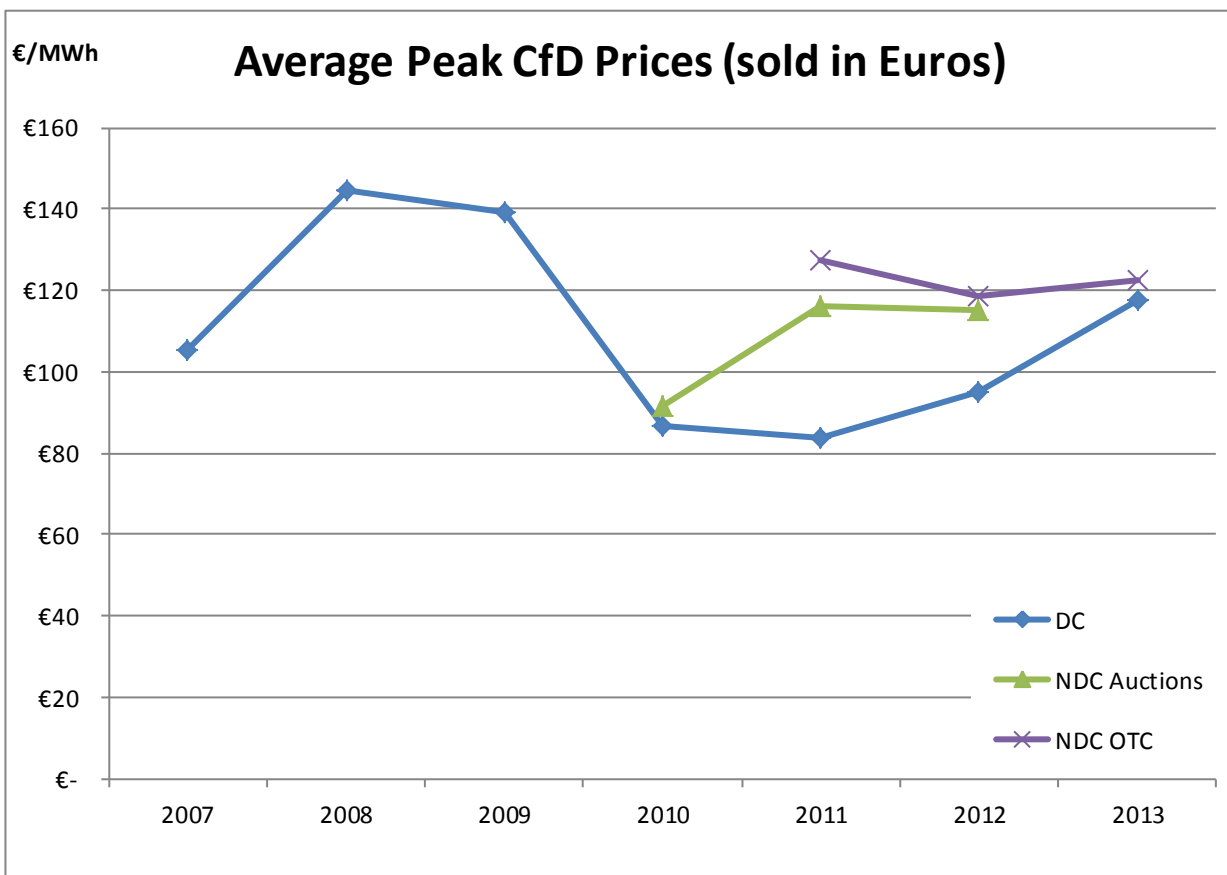


Figure 15: Average Peak CfD Prices (sold in Euros)

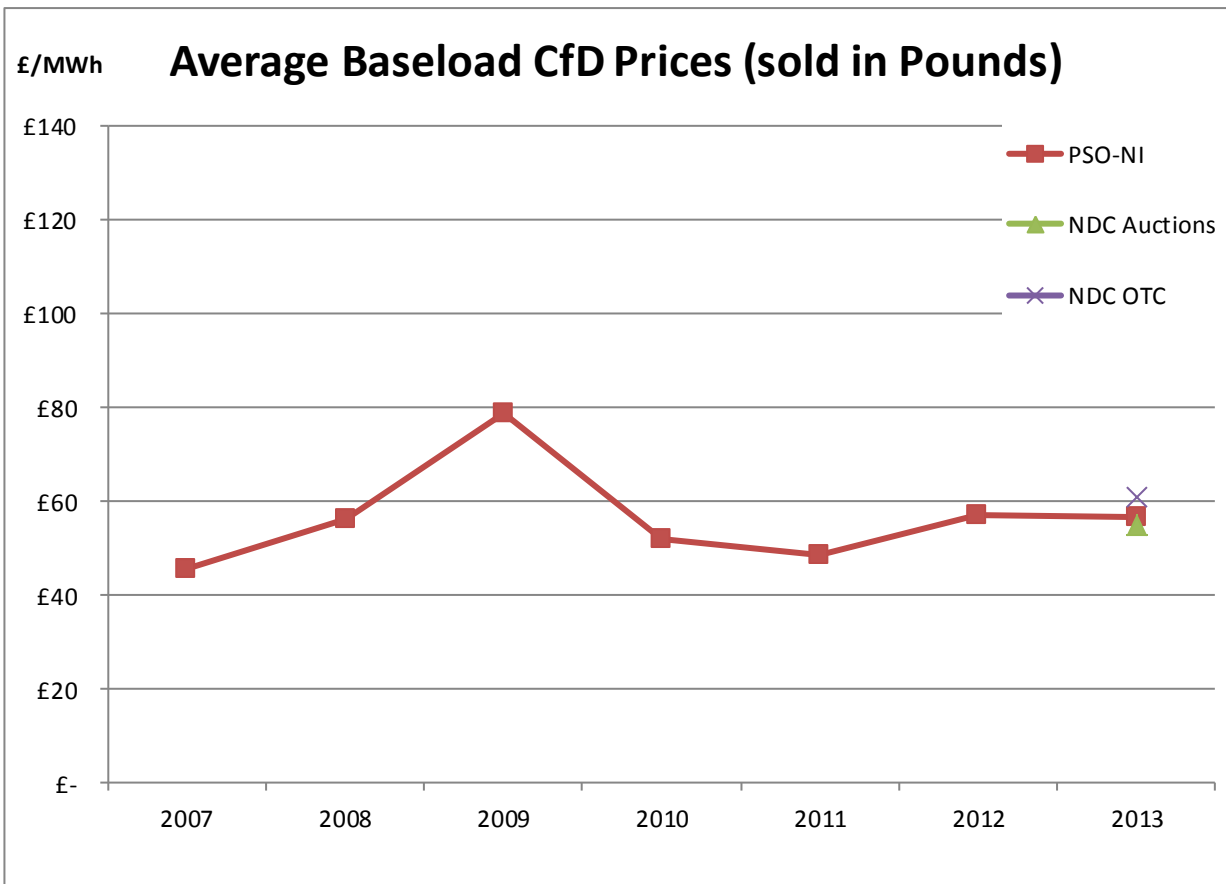


Figure 16: Average Baseload CfD Prices (sold in Pounds)

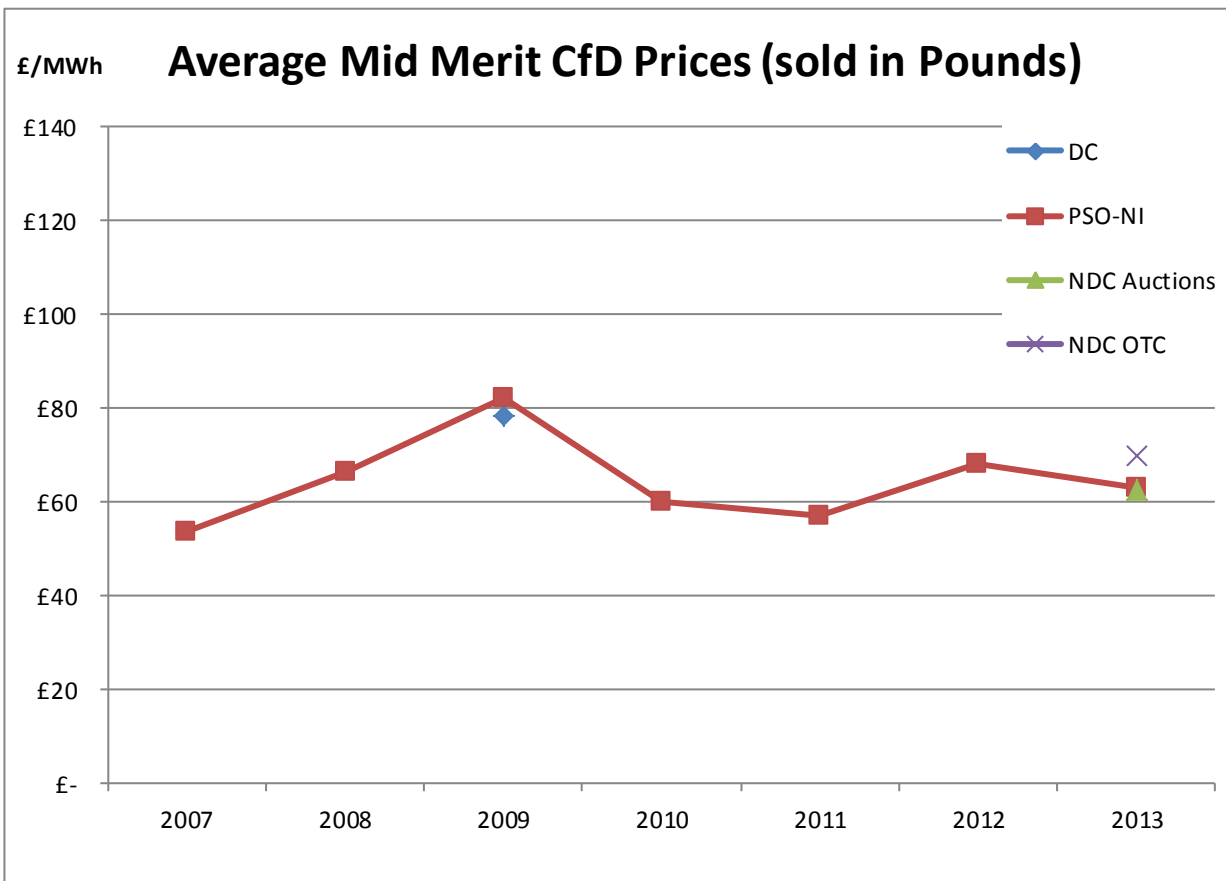


Figure 17: Average Mid Merit CfD Prices (sold in Pounds)

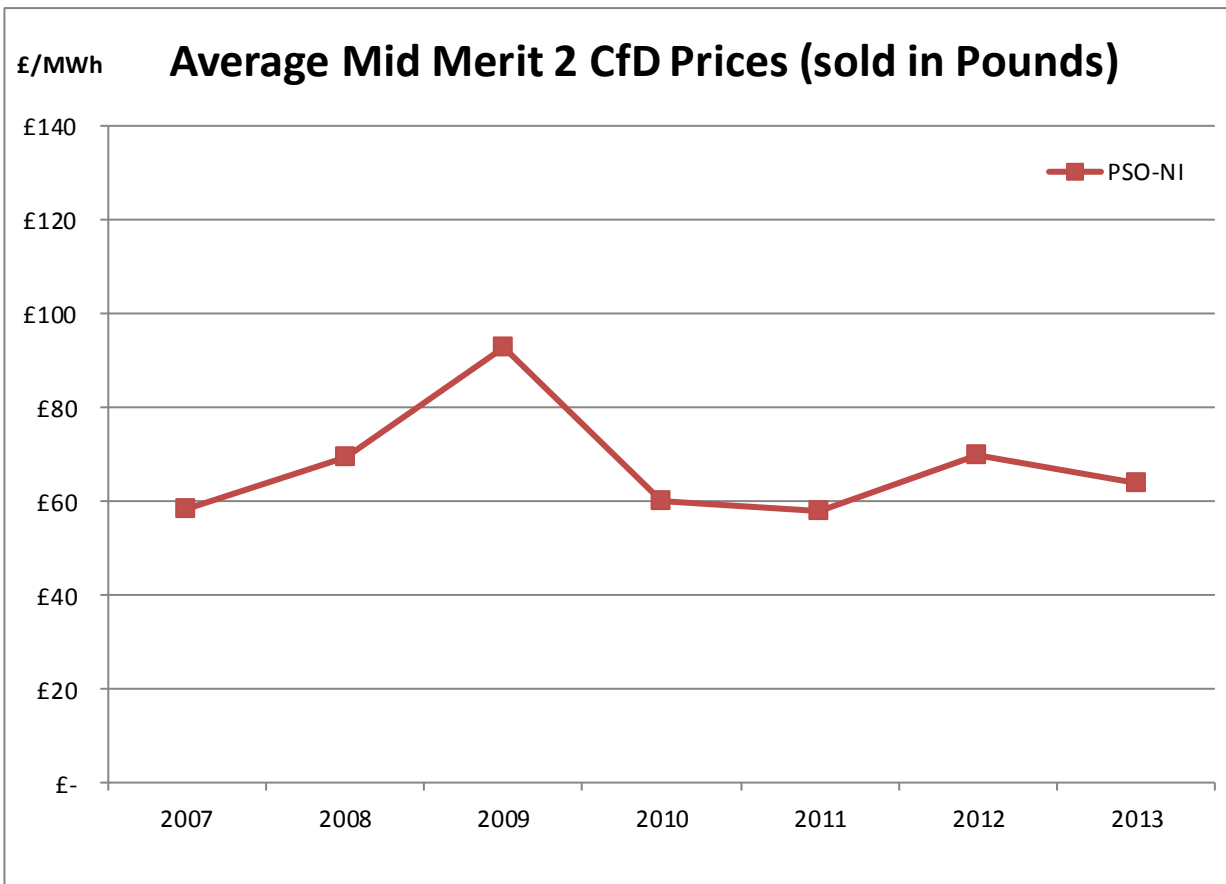


Figure 18: Average Mid Merit 2 CfD Prices (sold in Pounds)

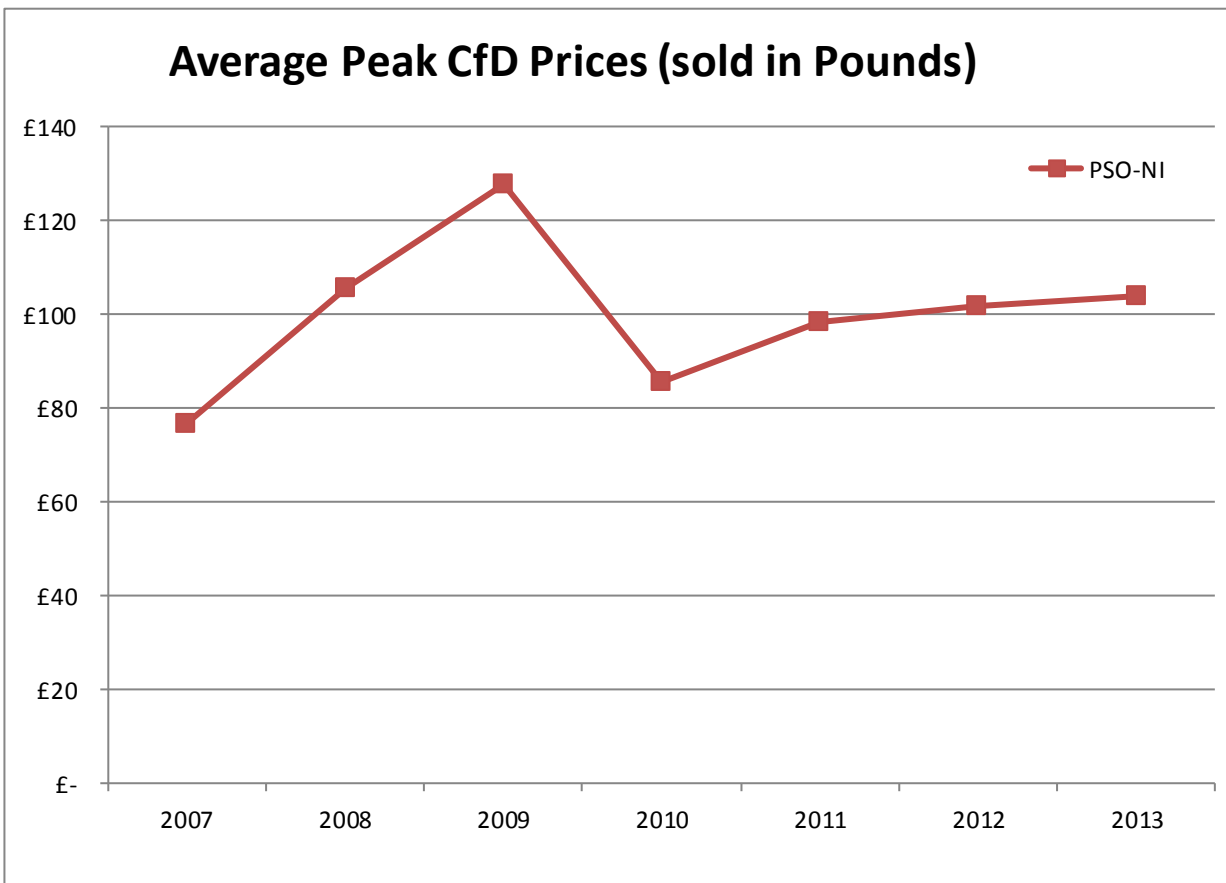


Figure 19: Average Peak CfD Prices (sold in Pounds)

4.3 CfD Clean Spark Spreads

In order to compare CfDs prices which are sold at different times and are based on different forward fuel prices, a CfD clean spark spread can be used. The clean spark spread is measured as the wholesale price of electricity minus the price of natural gas, and the cost of carbon credits, taking into account the fuel efficiency of natural gas in producing electricity. The clean spark spread is essentially the theoretical gross income of a gas-fired power plant from selling a unit of electricity (measured in MWh), having bought the fuel and carbon credits required to produce this unit of electricity. All other costs (operation and maintenance, capital and other financial costs) must be covered from the spark spread. Figure 20, below, provides an illustration of the clean spark spread.

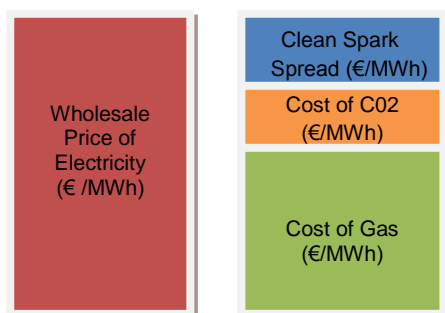


Figure 20: Wholesale Electricity Price & Clean Spark Spread

The following calculations for CfD clean spark spreads uses the future NBP gas price on the day the CfD was sold, to calculate the cost of operating a CCGT with an efficiency of 49.13% as well as the cost of CO₂. The clean spark-spread for the SEM was also calculated for reference¹².

Tables 9 and 10 show the average CfD clean spark spread for contracts sold in euros and pounds respectively. Overall there has been a general decrease in the spread over time, which would be influenced by low future fuel prices and a possible reduction in the price premium for NDC and PSO-related CfDs.

Year	Baseload	Mid Merit	Mid Merit 2	Peak
2007	€ 25	€ 33	€ 35	€ 67
2008	€ 19	€ 31	€ 37	€ 70
2009	€ 14	€ 32	€ 45	€ 65
2010	€ 14	€ 22	€ 26	€ 41
2011	€ 14	€ 21	€ 22	€ 43
2012	€ 11	€ 19	€ 20	€ 44
2013	€ 9	€ 18	€ 18	€ 59

Table 9: Average CfD Clean Spark Spread (in Euros)

¹² This excludes revenue from capacity payments and also the extra cost of transporting gas from Britain to Ireland, to be consistent with the calculations used for the CfDs.

Year	Baseload	Mid Merit	Mid Merit 2	Peak
2007	£ 18	£ 25	£ 31	£ 49
2008	£ 16	£ 27	£ 30	£ 71
2009	£ 20	£ 30	£ 39	£ 90
2010	£ 14	£ 23	£ 23	£ 44
2011	£ 10	£ 16	£ 18	£ 48
2012	£ 13	£ 18	£ 20	£ 54
2013	£ 10	£ 15	£ 18	£ 63

Table 10: Average CfD Clean Spark Spread (in Pounds)

Figures 21-24 show the clean spark spread for CfDs sold in euros and figures 25-28 show the equivalent CFDs in pounds. The NDC spreads were almost double those of the DCs in 2009 and 2010 and then the difference almost disappeared in 2011, widening in 2012 and closing again in 2013 when examining the NDC OTCs.

Figures 21-24 below show the clean spark-spread for CfDs sold in euros and figures 25-28 show the equivalent CfDs in pounds, in all cases compared with the spark-spread in the spot market (i.e. using SMP). Overall the NDC (auction) baseload spreads were almost double those of the DCs in 2009 and 2010, at circa €11/MWh, the difference then fell to only circa €2/MWh in 2011, widening to over €4/MWh in 2012 & 2013. The gap between DC and NDC OTC spreads started higher than those sold in auction in 2011 but fell below them in 2013, to just under €2/MWh.

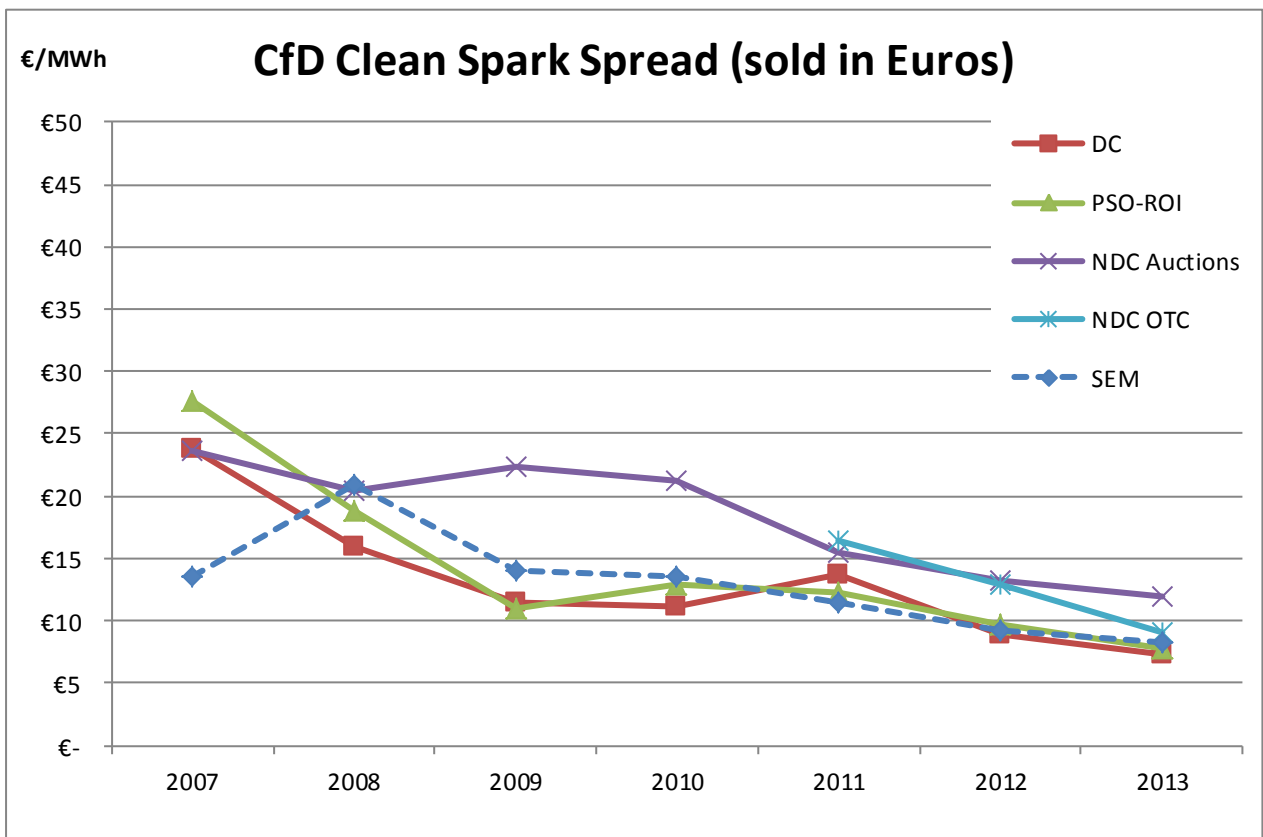


Figure 21: Baseload CfD Spark Spread (Euros)

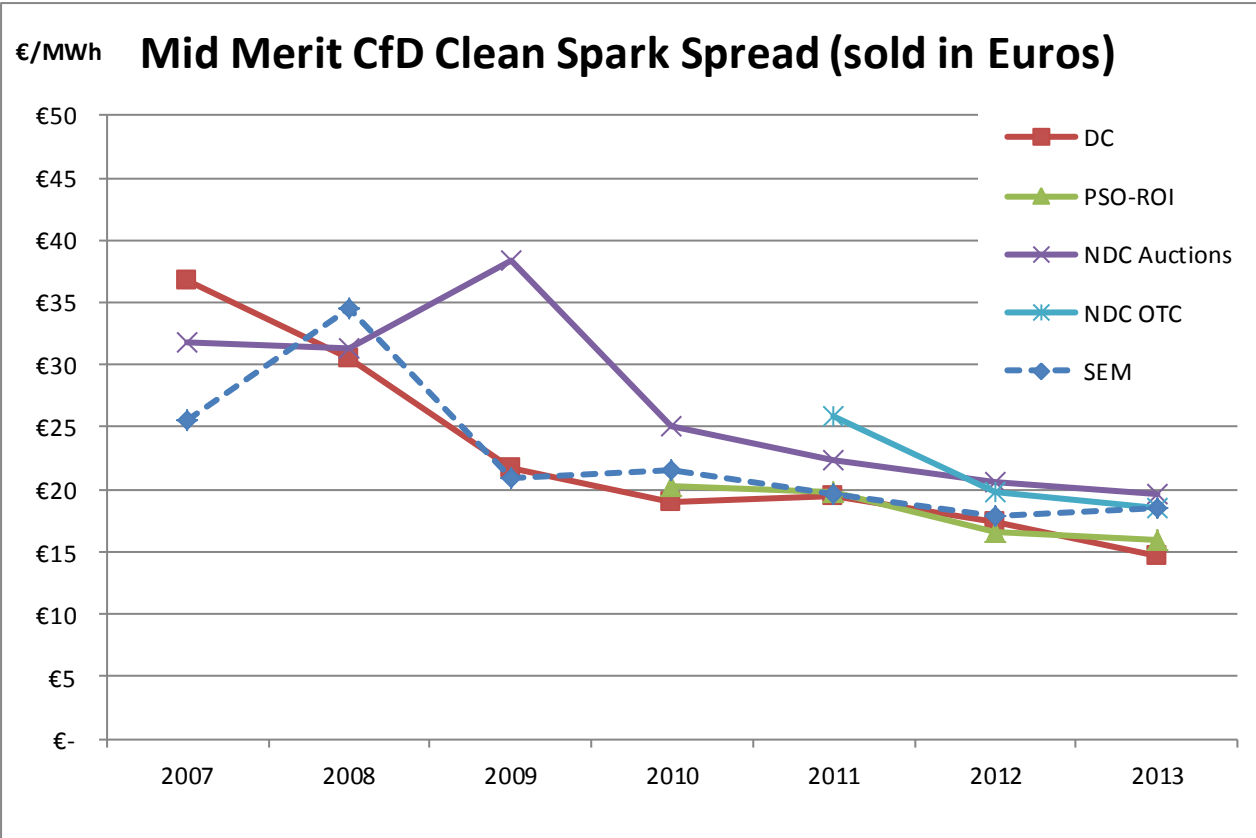


Figure 22: Mid Merit CfD Spark Spread (Euros)

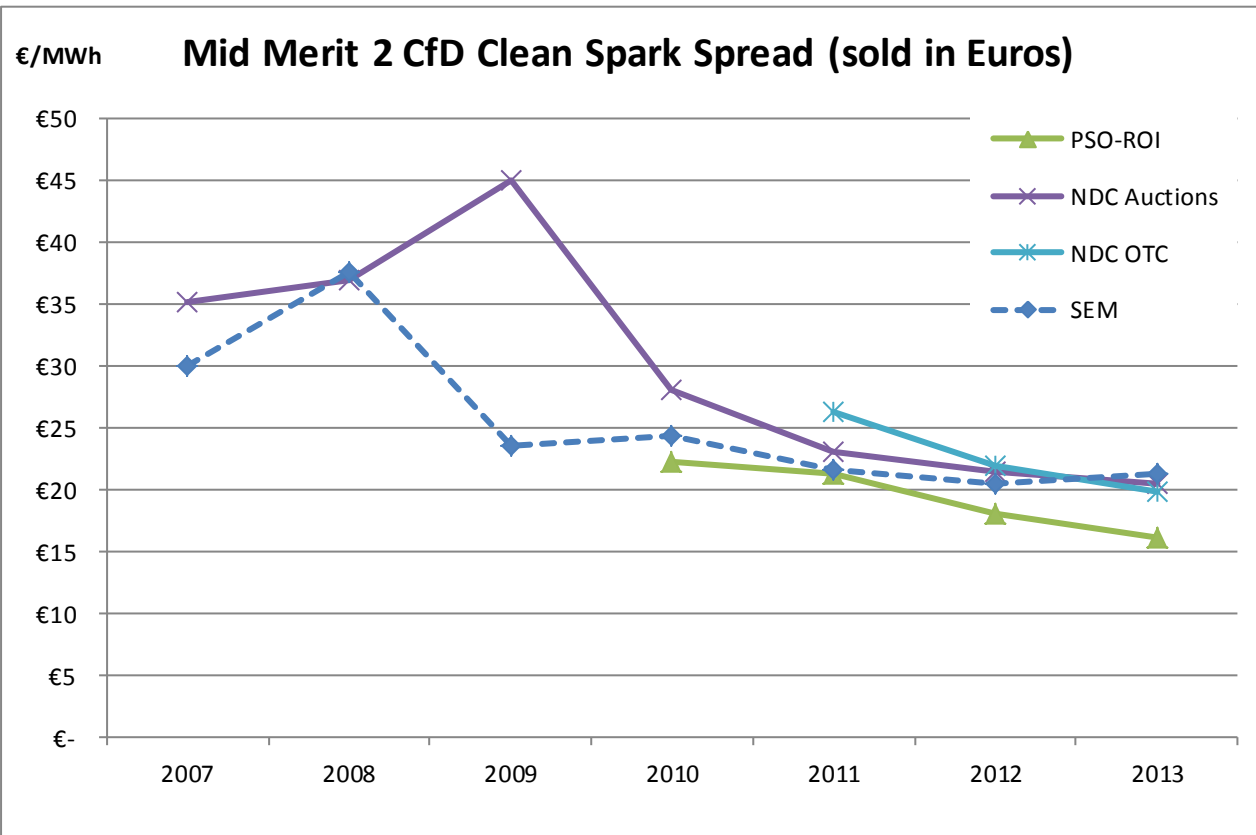


Figure 23: Mid Merit 2 CfD Spark Spread (Euros)

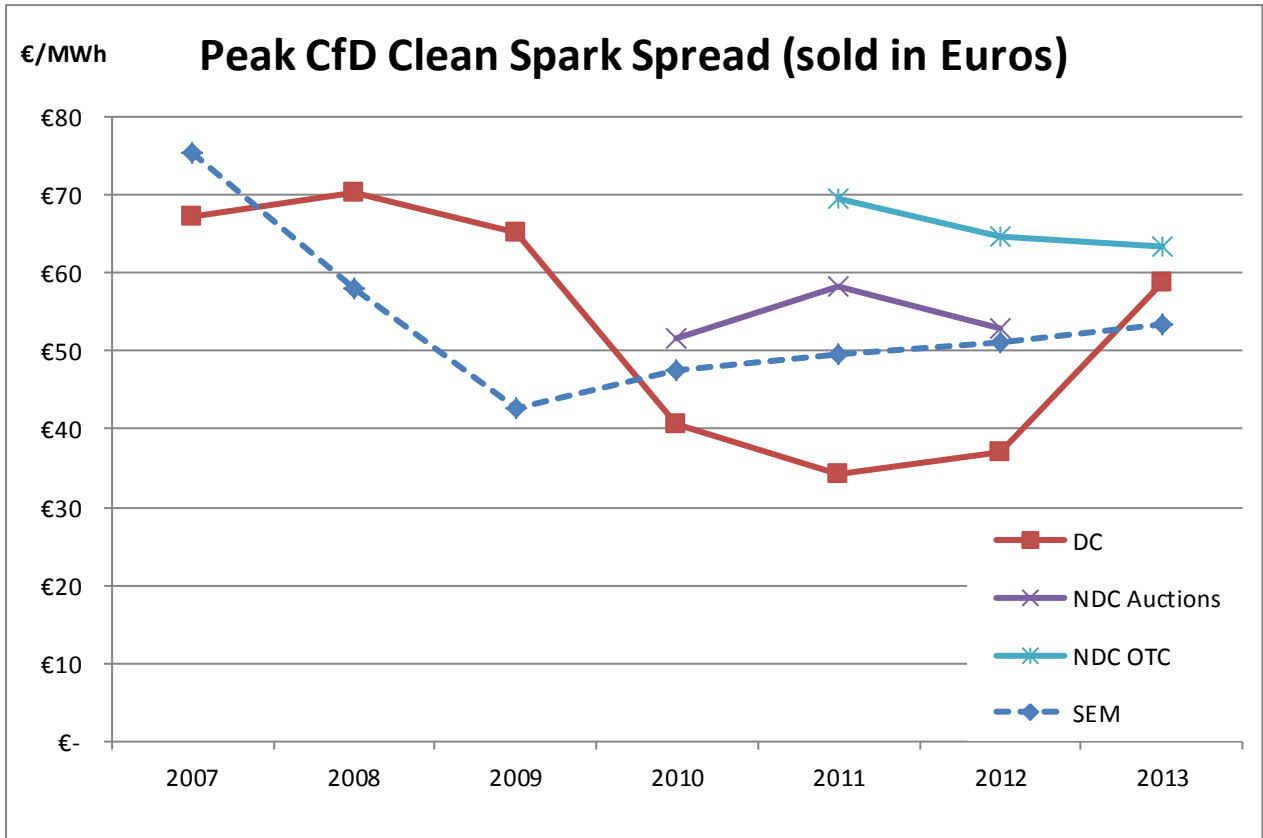


Figure 24: Peak CfD Spark Spread (Euros)

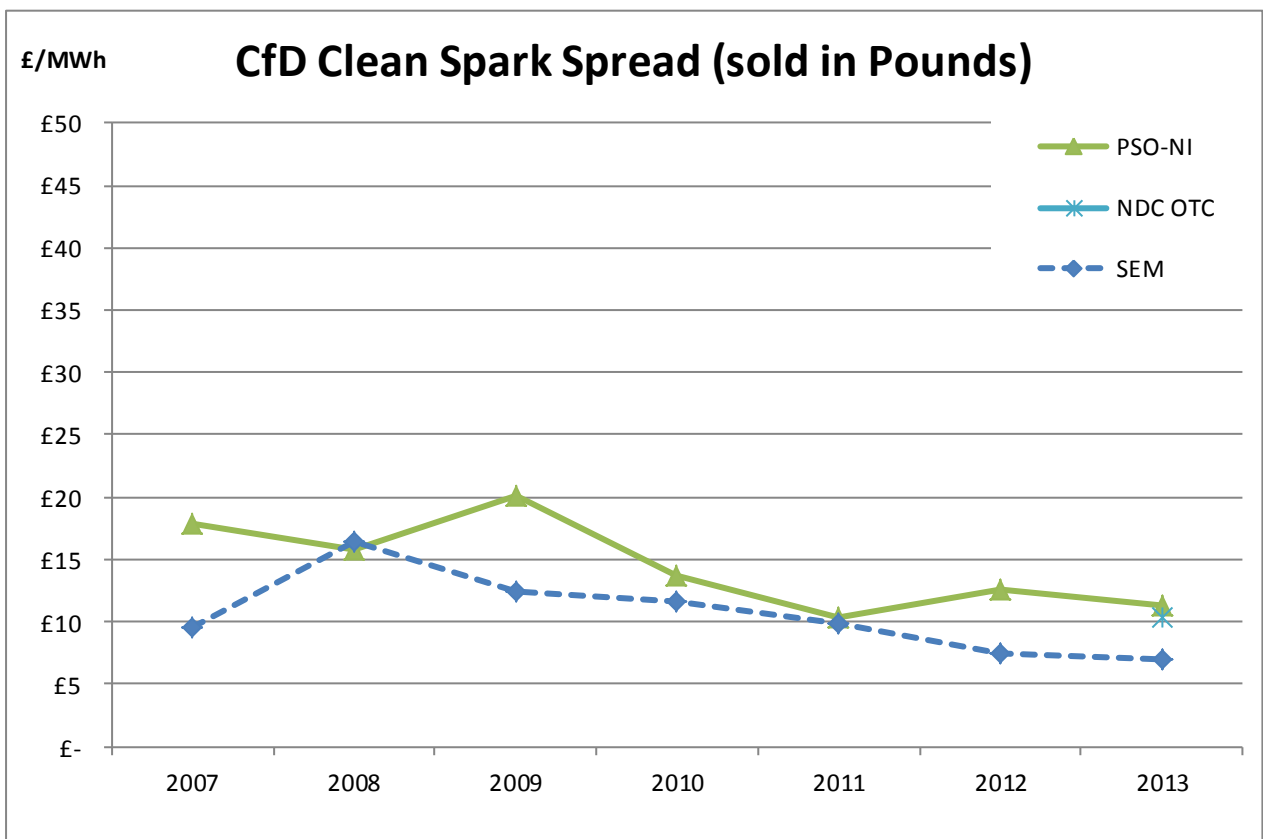


Figure 25: Baseload CfD Spark Spread (Pounds)

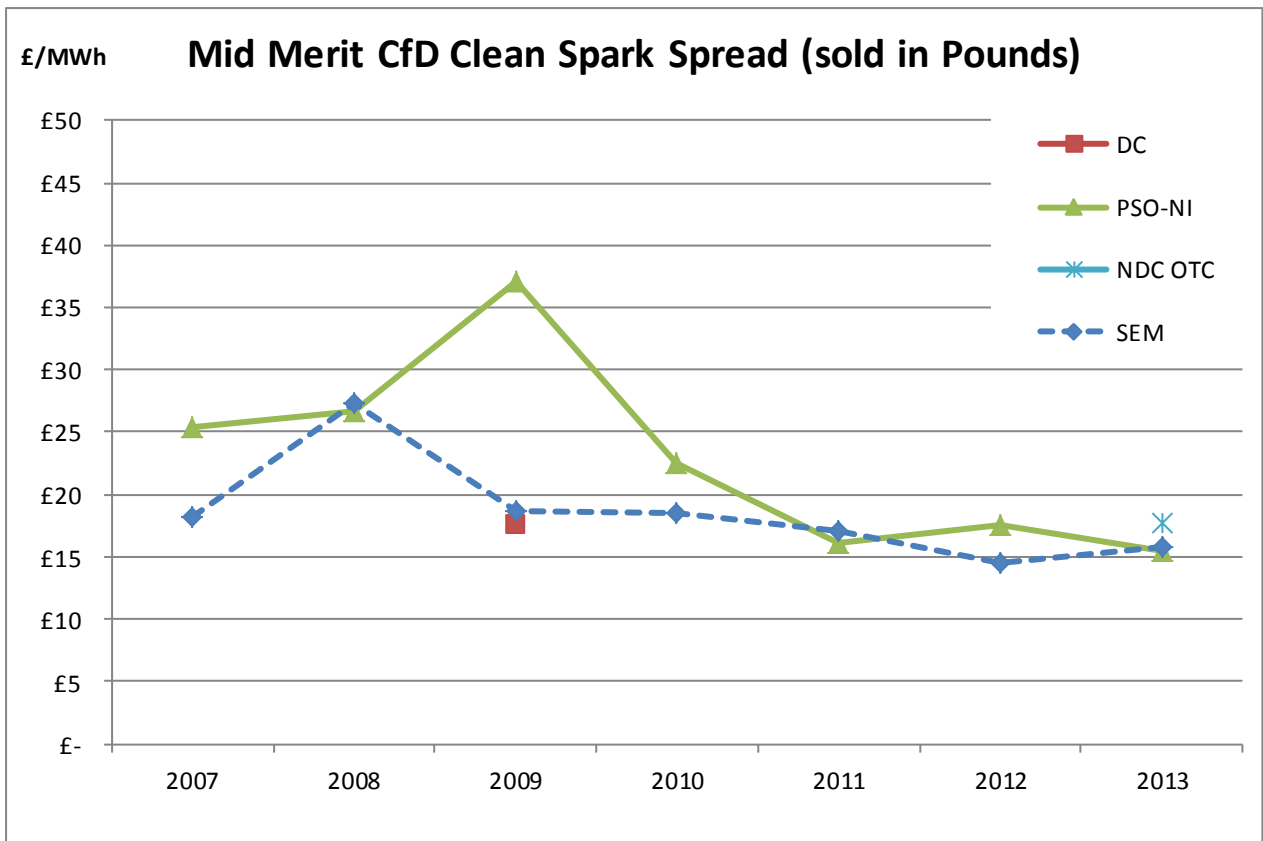


Figure 26: Mid Merit CfD Spark Spread (Pounds)

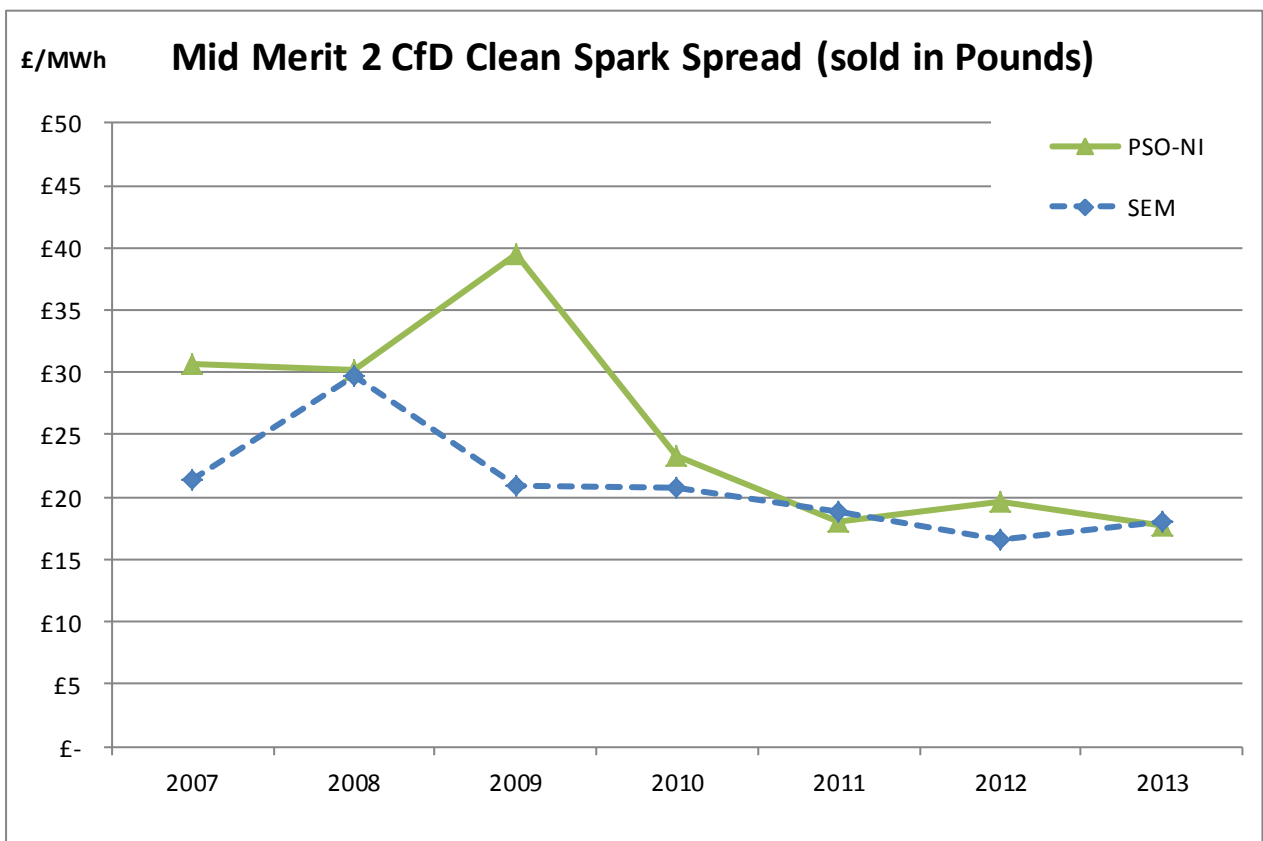


Figure 27: Mid Merit 2 CfD Spark Spread (Pounds)

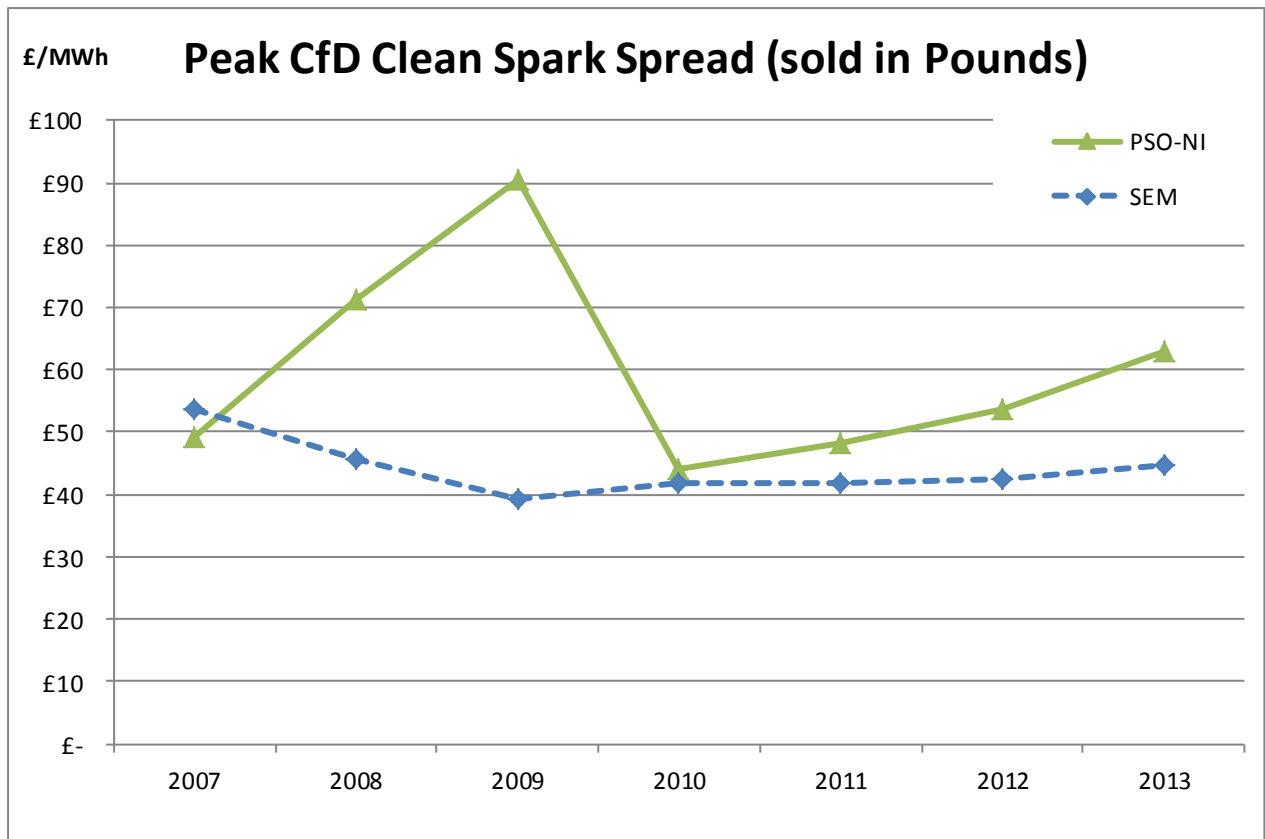


Figure 28: Peak CfD Spark Spread (Pounds)

4.4 Difference Payments

Difference payments are the outcome of entering a CfD, made by either the buyer or the seller. The following graphs show the overall direction of these payments. Figures 29 & 30 show the average difference payment in €/MWh and £/MWh for each product type. In most cases the payments have been from the buyer to the seller (typically from suppliers to generators).

Figures 31 & 32 show the total difference payments in millions of euros made to the seller of CfDs in euros and pounds respectively. In euro CfDs the net payments were to suppliers in 2007 and 2008 and to generators in the years after that. The trend is similar for CfDs in pounds, with the exception that 2011 there were payments to suppliers. The greatest impact that CfDs have had on SEM generators' and suppliers' financial position was in 2009, totalling around €800/£700 million, following the large correction made by fuel markets beginning in the latter half of 2008. After this the annual volume of payments was smaller, at no greater than around €60/£50 million in total, reflecting greater stability in CfD prices relative to spot market prices.

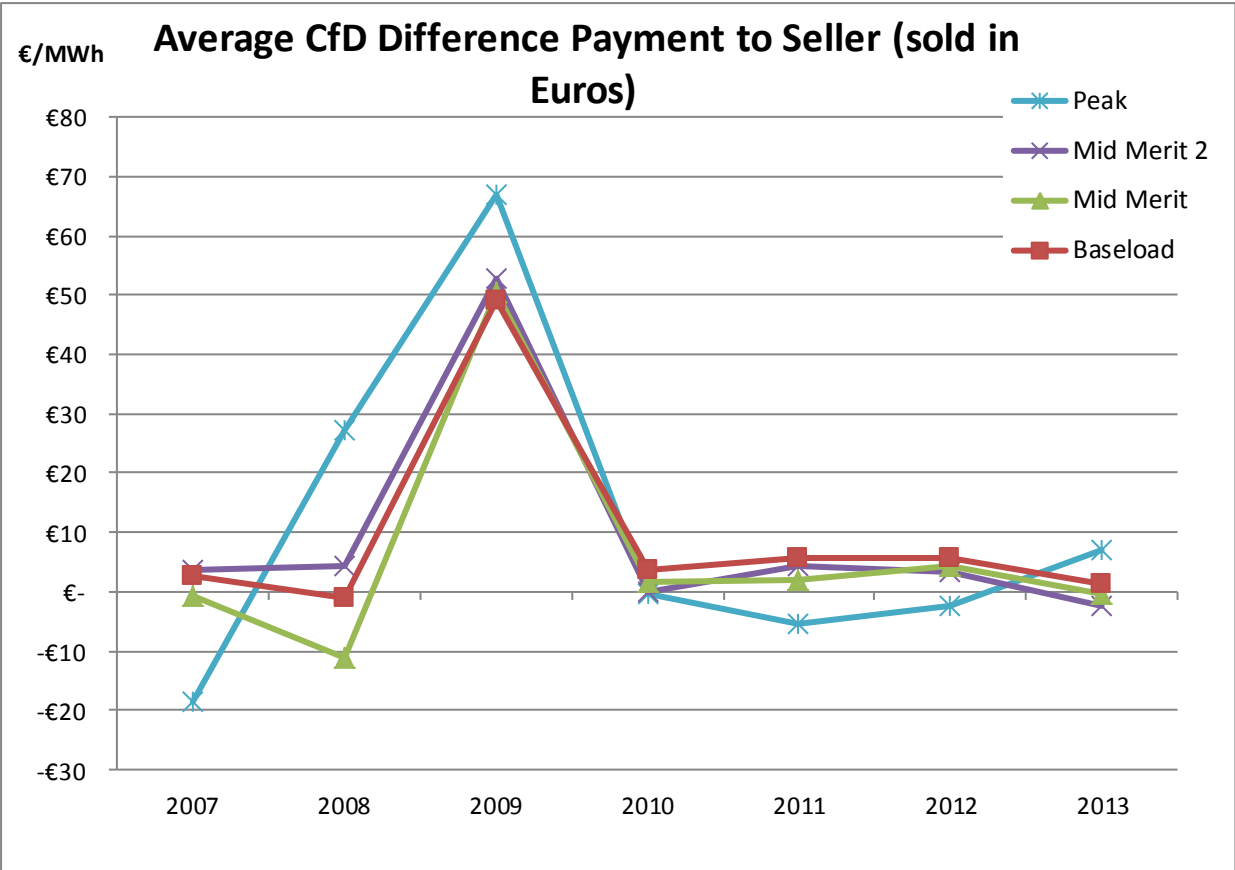


Figure 29: Average CfD Difference Payment to Seller (sold in Euros)

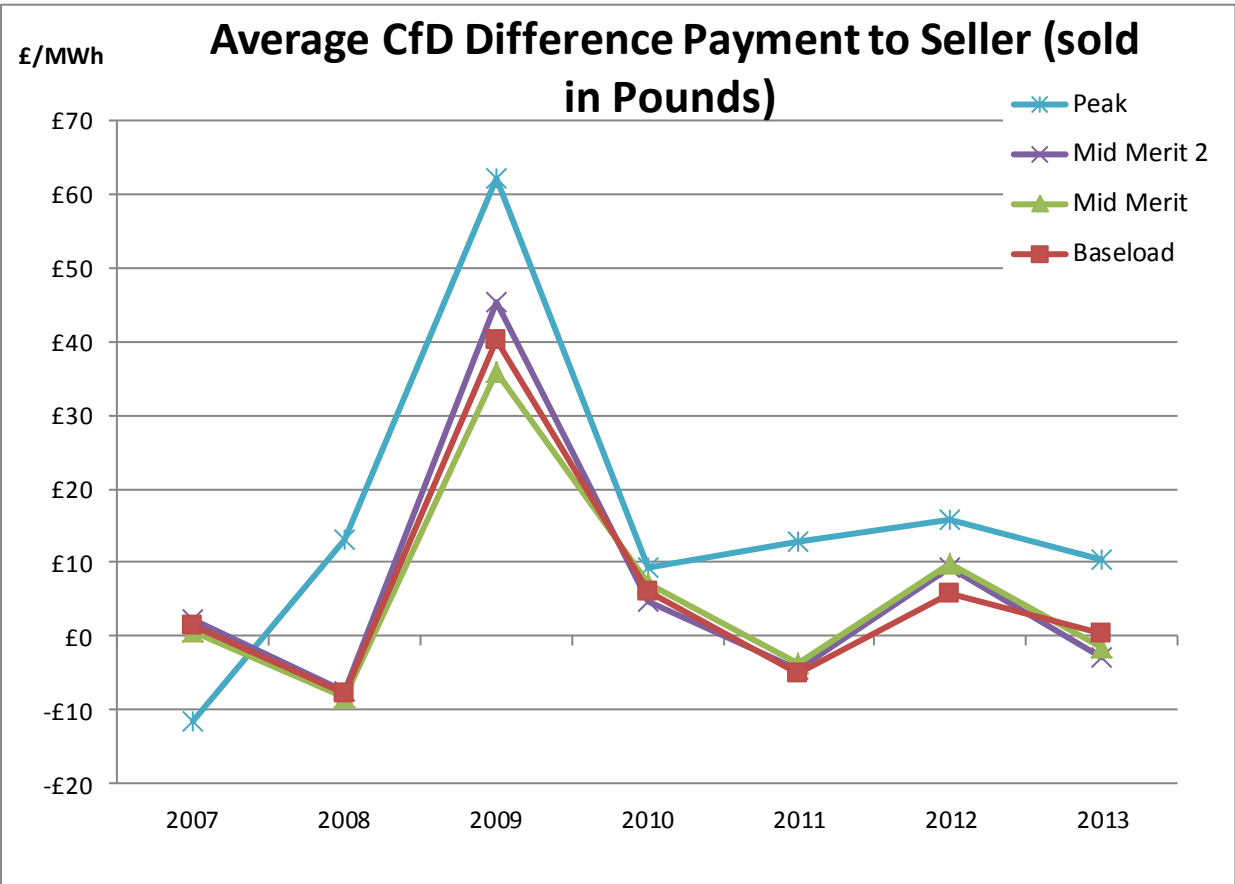


Figure 30: Average CfD Difference Payment to Seller (sold in Pounds)

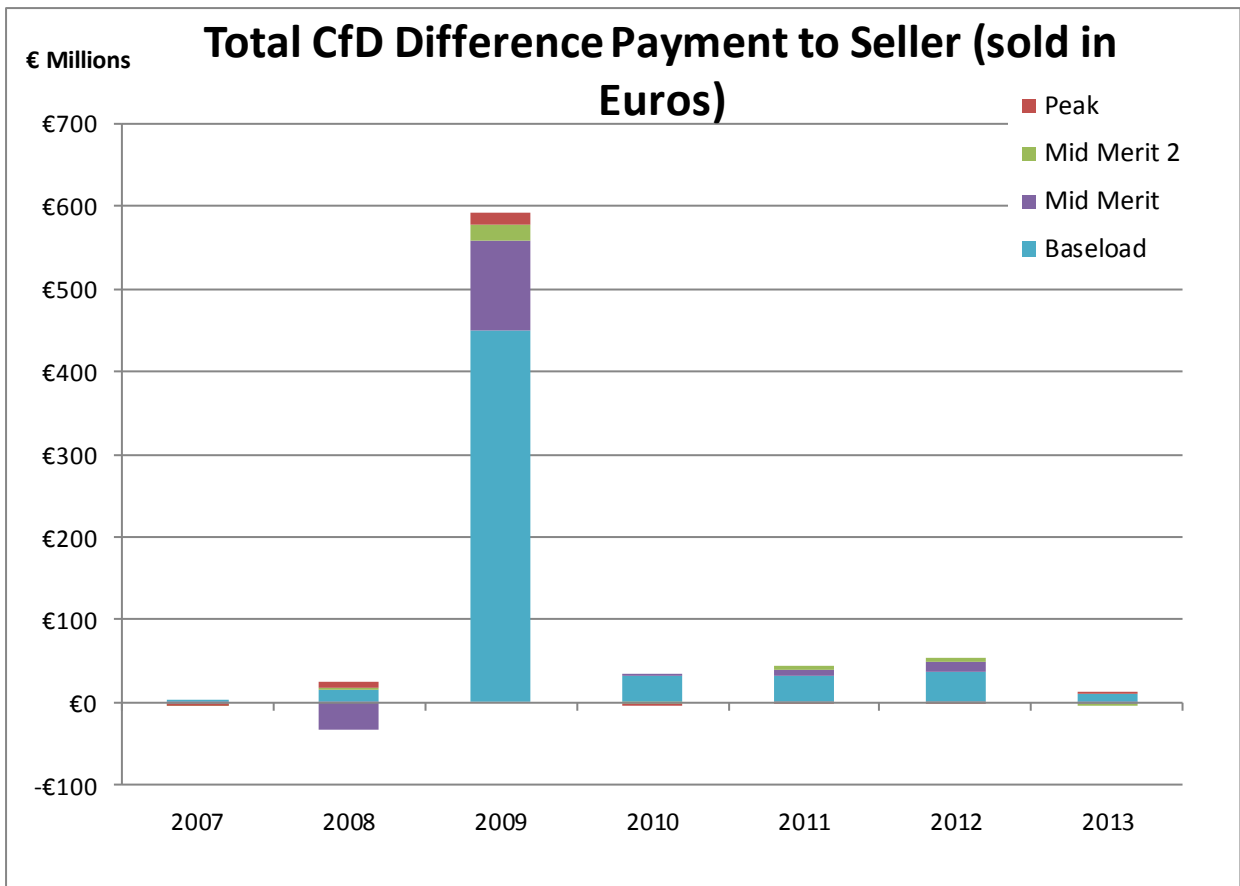


Figure 31: Total CfD difference payments to seller (sold in euros)

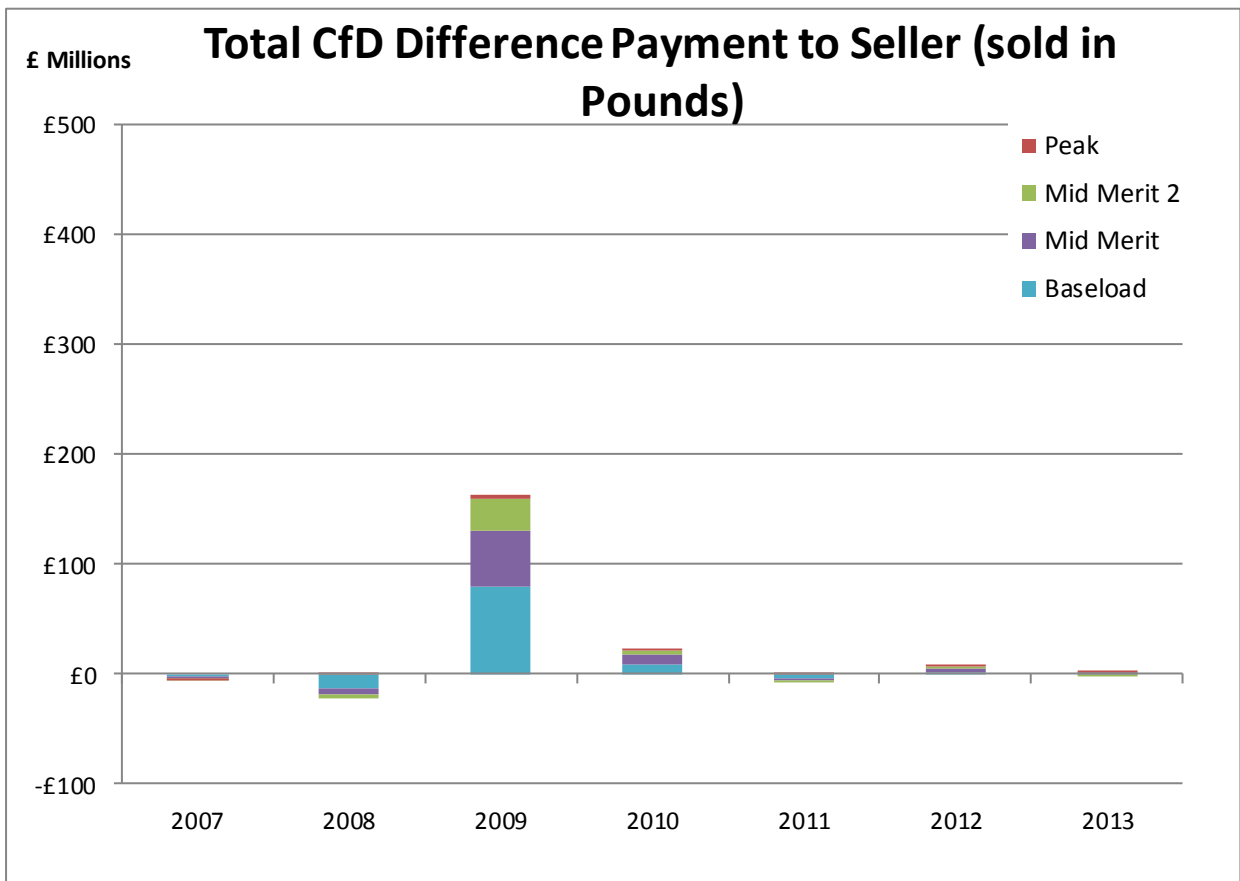


Figure 32: Total CfD difference payments to seller (sold in pounds)