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Electricity cash-out issues paper

Consultation

Reference:	143/11	**Contact:**	Jamie Black
Publication date:	1 November 2011	**Team:**	GB Markets
Response deadline:	24 January 2012	**Tel:**	020 7901 7096
		Email:	GB.Markets@ofgem.gov.uk

Overview:

Under the electricity market arrangements in Great Britain, if a market participant generates or consumes more or less electricity than they have contracted for, they are exposed to the imbalance price, or 'cash-out', for the difference. The cash-out arrangements are central to the delivery of a secure and competitive electricity market.

Ofgem has repeatedly expressed concerns about problems with cash-out prices. These problems could lead to future electricity security of supply being undervalued, and could unnecessarily increase the costs of balancing the system, to the detriment of consumers. While the Government aims to address security of supply through the introduction of a capacity mechanism, the Department of Energy and Climate Change has also confirmed the importance of an effective electricity cash-out regime.

We are seeking views on whether we should conduct a Significant Code Review (SCR) addressing electricity cash-out. We are inviting interested parties to comment on the appropriate approach to improving electricity cash-out and the scope of a potential SCR.

Context

Electricity cannot easily be stored. The System Operator (SO), National Grid Electricity Transmission, is responsible for maintaining a balance between supply and demand at all times. Electricity generators and suppliers have incentives to balance their own positions through bilateral contracting and trading, leaving the SO to resolve the remaining imbalance. The arrangements for payments relating to imbalances, often referred to as cash-out, are central to the delivery of a competitive wholesale electricity market in Great Britain. Cash-out directly affects the price that consumers pay for their energy and the incentives on the electricity market participants to invest in secure supplies.

In Project Discovery we assessed the risks to GB electricity security of supply, and conducted an appraisal of the current market arrangements. In our February 2010 consultation document we expressed concerns that electricity cash-out prices may not be correctly signalling the value of flexibility and peaking generation, increasing the risks to future security of supply. We believe that changes to the balancing arrangements could not only improve security of supply; they could also improve balancing efficiency, incentives for demand side response, and competition. All these changes should in turn reduce costs to consumers. There are close links with Ofgem's work to promote liquidity and to align with European policy objectives to move towards an integrated market for electricity.

This document is seeking feedback from stakeholders on whether to launch an electricity cash-out Significant Code Review to investigate reforms to address these issues.

Associated documents

Project Discovery - Options for delivering secure and sustainable energy supplies, February 2010, Reference: 16/10
http://www.ofgem.gov.uk/Markets/WhlMkts/Discovery/Documents1/Project_Discovery_FebConDoc_FINAL.pdf

Code Governance Review – Final Proposals, March 2010, Reference: 43/10
http://www.ofgem.gov.uk/Pages/MoreInformation.aspx?docid=297&refer=Licensing/IndCodes/CGR

Open letter - next steps: Potential Significant Code Reviews (SCRs), December 2010
http://www.ofgem.gov.uk/Licensing/IndCodes/CGR/Documents1/SCR%20open%20letter%20consultation_Aug10_final.pdf

Modification Proposal P217 – final decision letter, November 2009, Reference: 145/08
http://www.ofgem.gov.uk/Licensing/ElecCodes/BSCode/BSC/Documents1/P217D.pdf

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Executive Summary

Ofgem has repeatedly expressed concerns about problems with electricity cash-out prices. These problems could harm future electricity security of supply and unnecessarily increase the costs of balancing the system, to the detriment of consumers. As we suggested in our February 2010 Project Discovery consultation document, electricity may be undervalued at peak times, meaning that electricity supplies could be interrupted when consumers would have been willing to pay more to maintain them. The Government has expressed these same concerns in its 2011 Electricity Market Reform (EMR) White Paper. While the Government aims to address security of supply through the introduction of a capacity mechanism, it has also expressed the importance of an effective electricity cash-out regime. This issues paper consults on whether we should launch a Significant Code Review (SCR) to address our concerns with the electricity cash-out arrangements.

Reasons for considering a SCR now

There have been two major reviews of the electricity cash-out arrangements in the past five years. These have led to modifications to industry codes which have made incremental improvements to the arrangements. However, wider reforms to the arrangements, which we now believe may be required, are not easily achieved through the traditional piecemeal modification approach. The SCR process allows us to take a leading role and a holistic approach to electricity cash-out reform. The reasons we believe that wider reform of the cash-out arrangements may be required in the near future are threefold:

1. We need to ensure that the existing cash-out arrangements remain fit for purpose in light of some large challenges. We need to replace ageing fossil fuel plant with a new generating fleet and integrate an increasing proportion of intermittent renewables into the system

2. The roll-out of smart and advanced meters and other new technologies creates new opportunities for demand side participation in balancing arrangements. This could help manage intermittency and keep costs down

3. A key component of the EMR proposals is the implementation of a capacity mechanism to reward capacity (both generation and non-generation technologies) for its availability. Even with a capacity mechanism in place, cash-out will remain a critical mechanism for delivering security of supply. We believe it is appropriate to consider the two issues side-by-side.

Proposed principles of the review

If we launch an electricity cash-out SCR, we propose that it be based on the following principles:

- Cash-out arrangements should, as far as possible, allow and provide incentives for market participants to balance their positions without the need for unilateral actions to be taken by the System Operator (SO)

- The incentives for balancing should reflect the value of peak energy, ensuring that customers receive the level of security of supply that they would be willing to pay for

- SO actions should be adequately reflected and participants should be incentivised to reduce the cost of system actions

- More generally, the wider balancing arrangements (including balancing mechanisms and cash-out) should promote the most efficient operation of the system, including the active engagement of the demand side.

Approaches

We set out two alternative approaches to a potential SCR. The first approach (narrower scope) would consider further development in accordance with the current direction of travel. It would seek to improve the current mechanisms for deriving cash-out prices, but leave the wider balancing arrangements largely unchanged. The second approach (wider scope) would consider more fundamental changes to the electricity balancing arrangements. This could include the introduction of a new pre gate closure balancing market which would clear energy imbalances (without unilateral actions by the SO), from which cash-out prices could be derived.

We are consulting on whether these are the correct principles to consider in undertaking an electricity cash-out SCR, and the approach to best achieve them.

Process

In the 2011 EMR White Paper, the Government stated that it supports Ofgem's intention to launch an electricity cash-out SCR. If we launch a SCR in early 2012 we expect this would allow us to align the implementation of any cash-out reforms with the Government's implementation of a capacity mechanism as part of the EMR. The SCR process is intended to last no more than 12 months. However, taking into account the scope and complexity of the project, and the industry's ability to resource and support the process, any SCR launched on electricity cash-out arrangements may take longer than this.

The deadline for responses to this consultation is 24 January 2012.

1. Background

Summary

This chapter provides background to the current cash-out arrangements, the drivers for reform, and the wider context.

Questions

Question 1: Should a Significant Code Review (SCR) be conducted on electricity cash-out?
Question 2: What considerations should be taken into account when thinking about the appropriate timing for an electricity cash-out SCR? Should a SCR be timed to align with and take account of the Electricity Market Reform (EMR) capacity mechanism implementation?
Question 3: To what extent do you believe that future EU framework guidelines on cross border allocations and congestion management, and cross border balancing, should shape the scope and timing of a SCR?

Development of electricity cash-out

1.1. The electricity market in Great Britain (GB) operates on the basis of energy-only price signals. Unlike some other electricity markets, there is no separate mechanism for rewarding the provision of capacity, although as discussed below this is now being considered as part of the Government's Electricity Market Reform (EMR)[1].

The New Electricity Trading Arrangements (NETA)

1.2. Upon privatisation of the electricity industry in 1990 all electricity generation in England and Wales was offered into a gross pool and dispatched centrally by the System Operator (SO). The current arrangements came about as a result of the 2001 reforms which created the New Electricity Trading Arrangements (NETA)[2]. One of the aims of NETA was to encourage generators and suppliers to trade bilaterally to meet the demands of GB consumers. Where any difference remains between demand and supply, the SO, National Grid Electricity Transmission (NGET), is required to manage these imbalances in its role as residual balancer. The cash-out regime

[1] http://www.decc.gov.uk/en/content/cms/legislation/white_papers/emr_wp_2011/emr_wp_2011.aspx

[2] These arrangements were expanded from England and Wales to include Scotland under the British Electricity Trading and Transmission Arrangements (BETTA) arrangements from 2005, when the Scottish market was merged with the England and Wales market. Since then, the GB electricity market has operated as a single pricing region.

charges individual participants for imbalances between their contracted and physical positions based on the costs incurred by the SO in balancing the system[3].

Modifications

1.3. There have been two reviews of the electricity cash-out arrangements in the past five years[4]. A number of modifications have been made to the cash-out arrangements under the existing code governance arrangements, some as a consequence of these reviews. These have made incremental improvements to the mechanisms for calculating the electricity cash-out price, making them more reflective of the cost of resolving energy imbalances on the system[5].

Market developments

1.4. The electricity market in GB has changed significantly in the decade since NETA was introduced. It may be that the drivers behind the initial design of the balancing arrangements are no longer as pertinent as other factors which will shape GB's market structure and electricity system going forward. There are a number of factors that may mean the original principles and form of the balancing arrangements should be reconsidered, including:

- The need to replace a large proportion of the existing generating fleet and integrate an increasing proportion of intermittent renewables into the system
- An increasing need for peak and balancing power
- The roll-out of smart and advanced meters and other new technologies which will create new opportunities for demand side participation in the balancing arrangements.

Project Discovery

1.5. Project Discovery was our assessment of the risks to GB electricity and gas security of supply, and our appraisal of whether the market arrangements remained fit for purpose[6]. In it we raised concerns that the price signals provided by cash-out may not be leading to the most economically efficient outcome. For example, we set out that cash-out prices can be dampened in periods of generation scarcity and noted that the cost of any involuntary demand side actions is not taken into account when calculating the price. In other words, customers that would have been willing to pay more to maintain their supplies could face interruptions. Furthermore, we identified key challenges in integrating large volumes of renewable generation on the

[3] The cash-out arrangements are contained in the Balancing and Settlement Code (BSC).
[4] http://www.ofgem.gov.uk/Markets/WhlMkts/CompandEff/CashoutRev
[5] Appendix 3 summarises relevant modifications and reviews.
[6] http://www.ofgem.gov.uk/Markets/WhlMkts/Discovery/Pages/ProjectDiscovery.aspx

system under the current balancing arrangements. We provided a range of possible policy responses for consideration by Government.

Electricity Market Reform (EMR)

1.6. The Government's 2011 EMR White Paper outlines a policy framework for delivering secure and sustainable electricity supplies, which includes the introduction of a capacity mechanism. In its White Paper, the Department of Energy and Climate Change acknowledges the link between its proposed capacity mechanism, and possible future reforms to the cash-out arrangements.

1.7. Both cash-out and capacity mechanisms provide signals on the value of additional capacity. Depending on the design, cash-out prices may have a direct role in the capacity mechanism (eg cash-out prices could be used as a reference price for some forms of market-wide capacity mechanism). Under a targeted capacity mechanism (eg strategic reserve), the cash-out price will need to rise at times of scarcity in order to maintain incentives on participants to cover their peak positions (thus minimising the volume of strategic reserve needed). We therefore consider that it is important that reform of cash-out and the introduction of a capacity mechanism are considered alongside one another as far as possible.

Significant Code Review

1.8. In August 2010, Ofgem consulted on whether to conduct a SCR on electricity cash-out. We announced in December 2010 that we intended to wait until the outcome of EMR before proceeding any further[7]. The Government has stated that, around the turn of the year, it will publish more detail on the type of the capacity mechanism to be implemented. This consultation will leave us well placed to launch a SCR (if we believe it appropriate) that fully takes into account the interactions between the EMR capacity mechanism and electricity cash-out reforms.

Wider Context

1.9. The cash-out mechanism is fundamental to the functioning of the GB electricity market. It is impacted by and has implications for other areas of work already under way.

European context

1.10. The Agency for the Cooperation of Energy Regulators (ACER) has completed a framework guideline on cross border capacity allocation and congestion management. The framework guideline establishes the European target model on

[7] Respondents to our August 2010 consultation broadly favoured waiting for DECC's review of the electricity market before addressing cash out reform through further code changes. http://www.ofgem.gov.uk/Licensing/IndCodes/CGR/Pages/GCR.aspx

cross border trade[8]. Implementation of the target model may require changes to GB market arrangements. For example the target model states a preference for defining price zones according to structural transmission congestion rather than member state borders. If zonal pricing were introduced in GB this would have significant implications for the design of the cash-out mechanism.

1.11. Any cash-out reform carried out as part of a SCR would also need to take account of other European developments including framework guidelines for cross-border electricity balancing, and the European Directive on renewable energy (which contains provisions for priority dispatch).

1.12. More generally, we appreciate that imbalance pricing, the introduction of a capacity mechanism, and the concepts of market coupling and market splitting are closely linked. Some of the issues raised in this document could be addressed through reforms in one or more of these areas. The decisions made in each of these areas will need to complement each other in order to provide an outcome that is compliant with the relevant European legislation.

System operation

1.13. If an electricity cash-out SCR were to result in significant changes to the balancing arrangements, this could change the way in which the SO procures reserve and other ancillary services. It would be necessary to review the incentives that are placed on the SO to promote the efficient operation of the system.

Settlement with smart metering

1.14. Ofgem is considering how settlement reform, enabled by smart and advanced metering, could create greater opportunities for Demand Side Response (DSR) by facilitating the introduction of time-of-use or dynamic price tariffs. This could allow the system to be balanced more cost efficiently, and hence we need to ensure that the cash-out arrangements do not present a significant barrier to this potential being realised.

Sustainable development

1.15. It is important that the cash-out mechanism accurately reflects the costs that renewable generators' variability may impose on the system but does not unduly penalise these parties. The wider balancing arrangements should enable the efficient management of these variable resources.

[8] The European Network of Transmission System Operators for Electricity has started work on the related network code translating the framework guideline into binding EU legislation and has until September 2012 to complete it. The network code will then be submitted to the commitology process and is expected to become legally binding in 2013.

Liquidity

1.16. Ofgem has been monitoring and assessing liquidity in the electricity market as part of an ongoing review since 2009[9]. Throughout this process some respondents have highlighted the relationship between the cash-out arrangements, trading and market entry. We intend to publish a decision on measures to improve liquidity by the end of 2011, and we will take into account the potential impacts on liquidity as part of any electricity cash-out SCR.

Gas market interactions

1.17. Around 40% of GB electricity is generated using gas-fired power stations. The reliance on gas to provide flexible electricity supplies is likely to remain and may increase given the need to manage the increasing share of variable wind generation on the system. Conversely, increasing variability in output from gas-fired plant is likely to create new challenges for operating the gas networks.

1.18. It is important that both the electricity and gas cash-out mechanisms provide incentives for energy to flow to those who value it most highly, should the supply situation become tight. Our ongoing work on the Gas Security of Supply Significant Code Review (Gas SCR) is examining the case for including the Value of Lost Load (VoLL) in the calculation of cash-out where firm load interruption occurs due to a gas deficit emergency[10]. If this is implemented it may increase the need for reform of the electricity cash-out arrangements, to ensure that there is efficient allocation of gas between the two markets under emergency situations[11].

[9] In March 2011 we published proposals to improve liquidity in our Retail Market Review.
[10] http://www.ofgem.gov.uk/Markets/WhlMkts/CompandEff/GasSCR/Pages/GasSCR.aspx
[11] Taking into account any actions required for public safety reasons, to the extent possible, if firm interruption is required, it should occur in the most efficient manner.

2. Issues with the current arrangements

Summary

This chapter sets out our view on the range of issues with the current electricity cash-out arrangements.

Questions

Question 4: Do you agree that the issues we have identified could be material?
Question 5: Are there any other areas of concern that should be considered by an electricity cash-out Significant Code Review (SCR)?
Question 6: Do you consider that the principles set out form the appropriate basis for an electricity cash-out SCR? If not, what would be more appropriate principles for considering reform?

2.1. Ofgem has repeatedly expressed concerns about problems with electricity cash-out prices. These problems could harm future electricity security of supply and unnecessarily increase the costs of balancing the system, to the detriment of consumers. We discuss what we see as the major issues in more detail below.

2.2. See appendix 2 for an overview of how cash-out prices are derived.

Cash-out prices may not fully reflect scarcity at times of system stress

2.3. We believe it is important in principle for prices to reflect accurately the marginal value of energy in each half-hourly period. This encourages suppliers to contract forward to make the necessary provisions to cover the peak demand of customers, thus encouraging generators to invest in peaking capacity. Cash-out prices may not currently reflect scarcity on the system at times of system stress for a number of reasons, discussed below[12].

Actions in balancing mechanism are taken for system and energy balancing reasons

2.4. The SO uses the balancing mechanism to maintain system integrity (for example in terms of resolving transmission constraints) and to address overall energy imbalances. Under the British Electricity Trading and Transmission

[12] We note that the system is typically short at gate closure in the highest demand periods, but long at other times. This may be evidence of insufficiently strong prices signals at peak. Alternatively, participants with flexible capacity may be electing to make it available via the balancing mechanism rather than selling it in the within-day market. Of the 30 highest demand half hours since the introduction of P217A, the system has been short at gate closure on 80% of these occasions.

Arrangements (BETTA), the cost of system actions on the GB transmission network have as far as possible been shared equally by all users of the system, whereas the costs of actions to address energy imbalances at gate closure have as far as possible been targeted at those who caused the imbalance. However, it has not been possible to do this fully and therefore there has been 'system pollution' of the energy price. This system pollution was one of the reasons why cash-out prices were originally calculated based on the average price of actions taken by the SO rather than the marginal price. Cash-out prices are currently being calculated based on a Price Average Reference (PAR) value of 500 MWh[13]. Whilst this protects against price spikes resulting from non-energy imbalances, it may be dampening price signals when there is true scarcity on the system.

2.5. Since the introduction of the New Electricity Trading Arrangements (NETA), attempts have been made to reflect only the costs of energy balancing in the cash-out price. This has been done by trying to remove these 'polluting' system actions (ie actions taken to resolve locational or sub-quarter-hourly issues) to avoid them being reflected in the energy imbalance or cash-out price. The most recent modification to introduce new rules to remove system actions was BSC Modification P217A. In our decision letter we committed to undertake a post-implementation review to assess the effectiveness of the changes. We consider that this review should take place as part of an electricity cash-out SCR if one is launched.

2.6. There is a further question as to whether this whole approach – of separating energy and system costs and sharing the full costs of the latter – is the most economically efficient approach, particularly in a system with an increasing penetration of variable generation. The SO is already taking more actions to resolve transmission constraints related to wind generation. Encouraging market participants to self balance while ignoring network constraints could increase system costs. For example, suppose a supplier has generation behind a constraint boundary, and demand on the other side of that boundary. If its demand increases on a windy, constrained day, incentives delivered by cash-out will encourage the market participant to balance its energy position. However, this could necessitate more system actions.

Cash-out prices may be distorted by misallocation of costs

2.7. Concerns have been raised that the costs of some energy balancing actions are not being correctly allocated to the half-hour in which they occur.

2.8. First, the SO contracts forward for some forms of reserve (eg short term operating reserve, or STOR), paying providers an availability fee regardless of when the reserve is used, and a utilisation fee when the contract is exercised. The utilisation fee is captured within the cash-out price calculation when the reserve is used. However, it is difficult to accurately allocate the cost of availability fees to the

[13] The current methodology uses an average of the top 500MWh of the stack actions accepted by the SO setting the price. Ofgem rejected proposals to reduce the PAR value further due to concerns about system pollution.

correct periods, except in hindsight when the use of reserve across the whole year can be assessed.

2.9. Second, the SO takes some 'reserve creation' actions in balancing periods prior to the occurrence of the imbalance they are intended to resolve. For example, the SO may turn down a flexible plant from 4-5pm so that it is in a position to ramp up rapidly to meet the 5pm peak. Actions taken in the BM in one period to resolve an expected imbalance in a later period can distort cash-out in both periods.

2.10. Inaccuracy in these prices may mean that price signals can be depressed when reserve is used and inflated when it is not.

Some actions taken by the SO are uncosted

2.11. Some actions that the SO can take at times of system stress, including temporary voltage reductions or disconnections of firm load, are uncosted. Therefore, cash-out prices may be set below the value that customers would place on avoiding a supply interruption (their value of lost load, or VoLL). This reduces the incentives on participants to contract forward to avoid such circumstances occurring.

Cash-out prices may not provide the right incentives for demand side response

2.12. Among other factors, accurate balancing incentives are necessary for efficient investment in and utilisation of DSR for balancing purposes. Distortions to cash out-prices could deter customers from DSR, or could deter the SO from using DSR for balancing purposes. This could increase overall balancing costs.

2.13. The use of load profiles in settlement dampens cash-out incentives because imbalance charges paid by suppliers do not reflect the actual amount of electricity that their customers use across time. Thus there are important interactions between cash-out reform, and the rollout of smart meters.

Cash-out prices suffer from a lack of transparency and predictability

2.14. A number of commentators have argued that it is difficult for participants to predict the level of the cash-out price that they will be exposed to. This is due to the lack of information from the SO regarding forecast levels of Net Imbalance Volume (NIV) and the complexity of the calculation.

2.15. A potential symptom of the lack of transparency of the NIV and cash-out prices is the tendency for the system to go long away from peak times. Participants face asymmetric risks, with the risk of very high System Buy Prices (SBPs) being much greater than the risk of very low System Sell Prices (SSPs). A reasonable risk mitigation strategy is to go long where possible. Whilst this provides the SO with

some reserve that is effectively free, this may not represent the most efficient solution for the system as whole.

2.16. The unpredictable nature of cash-out prices makes it harder for participants to manage their risks. This may be an advantage for larger players who can absorb this risk through self-supply and more diversified portfolios. Opaque or uncertain cash-out prices may harm within-day market liquidity and the availability of risk management products. The complexity and opaqueness of the BM may also be one of the issues discouraging new participants, such as DSR providers, from entering the market.

2.17. Prices in the BM may also be unpredictable. Bids and offers accepted in the BM are currently paid-as-bid. The lack of a uniform price may hamper transparency and competition. However, because of the continuous nature of actions taken by the SO and the variation in the products that it is buying, it may not be possible to pay a single cleared price to all accepted bids or offers in a certain period.

2.18. The recent examples of the SO accepting very highly negatively priced bids from wind plant in order to manage transmission constraints raises some concerns[14]. Whilst the flagging rules prevent these actions polluting the cash-out price, they may lead to additional costs feeding into Balancing Services Use of System (BSUoS) charges[15]. As the proportion of renewable generation on the system grows, the risk of such incidences becoming more frequent increases, and the impact on constraint costs could become material.

Dual cash-out prices have a large spread

2.19. The dual cash-out regime is a key feature of NETA. This approach aims to incentivise parties to balance their own positions ahead of gate closure, reducing the volume of balancing actions taken by the SO to a minimum.

2.20. Dual cash-out creates two different prices for the same product in the same period. Standard economic theory suggests that this could lead to sub-economic outcomes. Participants should be able to trade out their positions such that the spread between the buy and sell prices should only reflect transaction costs and risk

[14] NGET is currently conducting a consultation on 'Managing intermittent and flexible generation in the Balancing Mechanism' http://www.nationalgrid.com/NR/rdonlyres/FD02238E-6168-4BAA-8F15-F3147CED1EE0/49115/ManagingIntermittentandInflexibleGenerationintheBMConsultationfinal.pdf

[15] Parties are charged BSUoS to cover the SO's energy and system balancing costs. The bidding behaviour of plant operating under low carbon support could have a very significant impact on the costs of managing transmission constraints. DECC is considering how the design of Feed in Tariffs with Contracts for Difference (FiTs with CfDs) under EMR might influence behaviour, and is considering solutions that would minimise the risk of dispatch distortions.

premia. However, in practice the spread between the average SBP and SSP is very large, especially when compared to the spreads in other commodity markets[16].

2.21. The nature of the current balancing arrangements makes a significant spread in cash-out prices unavoidable. The main price reflects the SO's costs of balancing the system at short notice. Hence this price can deviate significantly from the closing within-day market price. The reverse price is itself based on the market price. This causes the large spreads. However it is important to note that such spreads can remove incentives to 'spill' into the BM rather than trade in the forward or within-day market. If spilling into the BM were to increase, it could cause the SO greater uncertainty and make it very difficult to fulfil its role as residual system balancer.

2.22. The SBP-SSP spread should provide a signal for participants who can control their positions to do so. For participants that have difficulties in balancing, large spreads may place a significant cost on their businesses. For example, independent wind generators or small suppliers without the benefits of a diversified portfolio will have a greater proportion of their volumes exposed to cash-out. The dual nature of cash-out prices also prevents them from being used as a reliable reference price, further hampering liquidity.

2.23. If we were to conclude that the dual cash-out regime leads to the most efficient way of balancing the system overall, we would be concerned to ensure that the spread in cash-out prices fairly reflects the costs imposed by participants from their imbalances. This would mean ensuring that the main price is not polluted and that the reverse price is a true reflection of the within-day market price.

Participants are not incentivised to provide accurate Physical Notifications

2.24. By the time of gate closure, participants must submit their final physical notifications (FPNs) from their generating plant and large consumption units. These notifications are used by the SO to help establish the actions necessary to balance the system. As signatories to the Grid Code, participants are required to provide accurate FPNs. FPNs act as a baseline for participants submitting bids and offers to deviate from their FPN into the BM. It is therefore in BM participants' interest to provide accurate FPNs. However, there are currently no specific financial penalties if FPNs are inaccurate for other participants, and FPNs are not used to calculate participants' imbalance position[17]. Inaccuracy in FPNs could cause the SO to take inefficient balancing decisions[18].

[16] On average the spread between SSP and SBP in 2010 (expressed as % of the midpoint between SSP and SBP) was 27%. The spread exceeded 50% for 11% of settlement periods.
[17] An Information Imbalance charge is included in the BSC but has always been set to zero.
[18] Participants metered output deviated from their FPNs (adjusted to take BOAs into account) by an average of 6.9% in 2010. For intermittent generation this figure is around 28%. As the volume of intermittent generation on the system increases, increasing average deviation of

Reconciliation cashflows are large and opaque

2.25. The total SO balancing costs (energy and system) are charged to parties via BSUoS charges based on their energy volumes. Cashflow received by Elexon through energy imbalance charges is reallocated through the residual cashflow reallocation cashflow (RCRC), on a per MWh basis. In theory a participant who is perfectly balanced should receive a rebate through RCRC equivalent to what it pays for energy balancing via BSUoS. Due to the separation of RCRC and BSUoS, as well as the fact that BSUoS is not broken down into energy and system balancing costs, it is not readily apparent whether or not this is occurring. We are concerned that if it is not, there may be a less than efficient allocation of costs.

2.26. If the sums recovered and redistributed under RCRC are greater than the costs incurred by the SO in energy balancing, this suggests that those less able to balance (eg wind generators) are being over-charged for their imbalances. Conversely if RCRC is less than the costs of the SO's energy balancing actions, this would suggest that these parties are being subsidised by those with a greater ability to balance (eg fossil-fuel generators).

output from FPNs is likely to necessitate additional actions by the SO.

3. Potential approaches to reform

Summary

This chapter proposes principles for a review of electricity cash-out, and identifies potential approaches to address concerns with the current electricity cash-out arrangements outlined in chapter 2. We consider reforms under two approaches: further development in accordance with the current direction of travel; and a new approach to balancing.

Questions

Question 7: Do you agree with how we have characterised the two approaches to reform? Do you have views on which approach you would prefer, and if so, why?
Question 8: Do you consider the range of potential areas for reform captured by the two approaches to be sufficiently broad?
Question 9: Should any of the potential areas for reform identified be placed out of scope?

Principles

3.1. In order to address the issues outlined in chapter 2, if we launch a SCR we propose that it be based on the following principles:

- Cash-out arrangements should, as far as possible, allow and provide incentives for market participants to balance their positions without the need for unilateral actions to be taken by the System Operator (SO)
- The incentives for balancing should reflect the value of peak energy ensuring that customers receive the level of security of supply that they would be willing to pay for
- SO actions should be adequately reflected and participants should be incentivised to reduce the cost of system actions
- More generally, the wider balancing arrangements (including balancing mechanisms and cash-out) should promote the most efficient operation of the system, including the active engagement of the demand side.

Approaches

3.2. An electricity cash-out SCR could take two approaches to meeting the above principles: further development in accordance with the current direction of travel; or a new approach with more extensive changes to the balancing regime.

Further development in accordance with the current direction of travel

Separating energy and system actions

3.3. As discussed above, we propose to review the effectiveness of the processes for separating system and energy actions as part of a SCR. This would allow us to establish whether improvements to this method should be considered. We may consider reducing the (Price Average Reference) PAR value, or even moving to a fully marginal price. We note that a more marginal price may disproportionately affect small and intermittent parties.

3.4. We may consider whether moving the point at which the SO takes on its residual balancing role (gate closure) closer to or further from real time would improve overall balancing efficiency. The length of the gate closure period (currently one hour) should strike the most efficient balance between allowing participants to resolve their own imbalances and allowing the SO to efficiently balance.

3.5. Contract notification could be delayed to allow for contract notifications to be submitted after gate closure. Because of the time it takes for the contract notification process to be completed by central systems, and the risks posed by failing to notify contracts in time, participants effectively have a one and a half hour gate closure.

Improved allocation of costs

3.6. In Chapter 2 we outlined several areas in which the cost of energy balancing actions may be misallocated. We may investigate further whether the costs of short term operating reserve (STOR), reserve creation and warming contracts could be allocated more accurately into cash-out prices.

Attributing reasonable costs to all SO actions

3.7. We may also consider attaching a price to SO actions that are currently uncosted, such as voltage control and involuntary demand side interruptions resulting from a system-wide supply shortage. It may be appropriate to attribute a price to these actions, for example in the case of involuntary demand side reductions equivalent to the value of lost load (VoLL) of the relevant customers, to ensure that cash-out prices rise to reflect the approximate cost to the affected customers of having their supply interrupted[19].

Improving spreads

[19] Establishing the appropriate VoLL is a significant task in itself, especially as the cost of reduced voltage and outages will be different and will differ between consumers. Whilst voltages are in constant flux noticeably without impacting consumers, it may also be appropriate to reflect the cost to consumers of voltage reductions outside of certain parameters in the cash-out price.

3.8. Within the constraints of a dual cash-out regime we could review whether the spreads are appropriate. We have discussed above how the calculation of the main imbalance price (main price) could be improved. A SCR could also consider changes to the reverse price, ranging from the specifics of the calculation of the market index price to the purpose and underlying principles of the reverse price (eg moving to a single price). We discuss below how more extensive reforms to the balancing arrangements might facilitate a transition to a single price.

3.9. An alternative approach could be to calculate the reverse price as a fixed or percentage differential to the main price. This could reduce the volatility and unpredictability of the cash-out price spread, whilst retaining incentives to self-balance. It may be possible to only apply the spread to participants whose imbalance exceeds an acceptable tolerance[20]. A further alternative could be to set both cash-out prices based on a fixed spread around a market price[21].

Enabling DSR

3.10. The rollout of smart and advanced meters capable of recording detailed consumption data can improve the accuracy of the imbalance volumes to which cash-out prices are applied. Settlement and cash-out reform are therefore complementary. Ofgem is considering how smart and advanced meter rollout can enable the accuracy of settlement to be improved.

Transparency

3.11. In order to help participants better forecast cash-out prices and hence their exposures, the SO could be required to publish an ex-ante forecast of the net imbalance volume (NIV) for each period or even indicative cash-out prices.

3.12. Greater transparency and reporting of bidding behaviour in the BM may also be beneficial in promoting competition and reducing incidences such as those witnessed recently when very large negatively priced 'sleeper bids' were taken by the SO to resolve transmission constraints[22].

Information incentives

3.13. We may seek to review the potential benefits of improving the accuracy of final physical notifications (FPNs) and to assess the case for introducing information imbalance charges.

[20] Such an approach was proposed under Modifications P201 and P202 but rejected.
[21] Such an approach was proposed under Modification P212. This Modification was rejected, but in its decision letter Ofgem said that there could be merits in deriving the cash-out price from market prices.
[22] 'Sleeper bids' are highly negatively priced bids that are placed in the balancing mechanism and automatically rollover into all subsequent periods.

Cost recovery

3.14. To improve the transparency of the cost recovery of energy imbalances, the SO could be required to break down the Balancing Services Use of System (BSUoS) costs into energy and system balancing costs.

3.15. If a divergence between residual cashflow reallocation cashflow (RCRC) and energy balancing costs was exposed this would reveal other areas where the balancing arrangements might need to be reformed, for example reviewing the PAR value or level of spreads. Mechanisms that directly targeted the costs incurred by the SO in energy balancing to participants with imbalances might also be considered. This may mean that Residual Cashflow Allocation Cashflow (RCRC) could be eliminated with residual BSUoS costs only reflecting the costs of system balancing.

Potential new approaches to balancing

3.16. New approaches could be taken to balancing that address the issues that we have identified. Below we discuss some of the potential options for addressing these issues that would represent a departure from the current balancing approach. The discussion below is included to prompt debate and is not intended to limit the scope of a potential SCR. We are interested in the views of interested parties on alternative models.

Balancing Market

3.17. The ability to derive a pure marginal cost for energy balancing may be limited by the fact that we are trying to derive a price for one product (half-hour energy imbalances) from a different set of products (multiple balancing actions taken by the SO in real-time).

3.18. An alternative approach could be to create two distinct mechanisms for resolving energy and system imbalances. One potential model would be to introduce an energy balancing market and retain the BM only for residual system balancing.

3.19. A balancing market could be an auction held at each gate closure. Participants would submit their offers (to increase generation or decrease demand) and bids (to decrease generation or increase demand) for half-hourly blocks of energy. The SO would also bid or offer its expectation of the NIV. Cleared bids and offers would receive the marginal clearing price and this could also set a single cash-out price for each period. Participants would pay or receive the cash-out price based on the difference between their notified contract and metered position as currently.

3.20. Any uncleared bids or offers could be automatically transferred to the BM. The SO would then use the BM to resolve remaining system imbalances. The costs of BM actions would no longer feed into cash-out[23].

3.21. A balancing market may provide the opportunity for greater transparency in the setting of cash-out prices and provide smaller participants with greater opportunities to balance their positions without needing to pay potentially large premia to larger players to manage their imbalance risk.

Reserve Market

3.22. A further addition to this solution could be the introduction of a reserve market. This could take the form of a day-ahead auction where participants offer flexibility to turn up or down the next day[24].

3.23. Through this mechanism the SO could procure its daily requirement for upward 'regulating' power and downward 'regulating' power. The requirements to create reserve through actions in the BM and to enter BM start-up contracts may be reduced. The requirement to contract ahead for STOR may still exist but contracted STOR could be placed into the reserve market rather than exercised through the BM.

3.24. A summary of how balancing and reserve markets could help address concerns with the current arrangements can be found in Appendix 4.

Possible variants or alternative approaches

3.25. As we signalled in Project Discovery, we believe that there may be some benefits in considering further the creation of a centralised market for intermittent renewables, as has been deployed in other markets such as Spain[25]. As the proportion of intermittent renewables, particularly wind, on the system increases it may become increasingly difficult for the SO to manage its output through the BM.

3.26. We are seeking respondents' views on whether the concept of a centralised renewables market should be included within the scope of an electricity cash-out SCR.

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[23] A similar approach was considered as part of the 2007 cash-out review http://www.eprg.group.cam.ac.uk/wp-content/uploads/2008/11/littlechildbalancingmarket.pdf

[24] Day ahead reserve markets exist in the New England, ERCOT and the Netherlands.

[25] In response to the high penetration level of renewable energy (especially wind) and problems with its integration, the Spanish SO set up a unique Control Centre of Renewable Energies (CECRE). The CECRE monitors and controls renewable energy in the Iberian market. The CECRE is the sole interlocutor in real time between the SO and each one of the regional generation control centres, to which the wind farms (and other renewable facilities) are connected

Out of scope

3.27. A more radical alternative approach could be to re-introduce a gross pool by which a majority of energy is transacted via a centralised mechanism for scheduling plant and setting prices[26]. Some commentators are calling for a return to a pool-type arrangement to deal with the challenges of transitioning to a low carbon power system. We do not propose to include this within the scope of an electricity cash-out SCR. We consider that such an approach should be out of scope given the level of disruption it would imply for the market.

Framework for assessing future change

3.28. In this document we have outlined the possible scope for an electricity cash-out SCR with proposals to consider changes ranging from relatively minor improvements to existing arrangements to quite significant reforms.

3.29. The expected benefits of any changes progressed under an electricity cash-out SCR would need to be considered in the context of the implementation costs and short term disruptive effect on the market. We would undertake full impact assessments for any changes that would likely have material impacts. If we were to launch an electricity cash-out SCR we would consult on the criteria we should use to conduct these impact assessments.

[26] This is the approach that was adopted for the England and Wales Pool between 1990 and 2001. These trading arrangements were replaced by the New Electricity Trading Arrangements (NETA).

Appendices

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Appendix 1: Consultation response and questions

1.1. Ofgem would like to hear the views of interested parties in relation to any of the issues set out in this document. In particular, we would like to hear from generators, suppliers, customers and the System Operator. We would especially welcome responses to the specific questions which we have set out at the beginning of each chapter heading and which are replicated below.

1.2. Responses should be received by 24 January 2012 and should be sent to:

Jamie Black
GB Markets
Ofgem
9 Millbank
London
SW1P 3GE
020 7901 7096
GB.Markets@ofgem.gov.uk

1.3. Unless marked confidential, all responses will be published by placing them in Ofgem's library and on its website www.ofgem.gov.uk. Respondents may request that their response is kept confidential. Ofgem shall respect this request, subject to any obligations to disclose information, for example, under the Freedom of Information Act 2000 or the Environmental Information Regulations 2004.

1.4. Respondents who wish to have their responses remain confidential should clearly mark the document/s to that effect and include the reasons for confidentiality. It would be helpful if responses could be submitted both electronically and in writing. Respondents are asked to put any confidential material in the appendices to their responses.

Next steps

1.5. Having considered the responses to this consultation, Ofgem intends to consider whether to launch a Significant Code Review (SCR) of electricity cash-out. The SCR process is designed to last no more than 12 months. However, taking into account the scope and complexity of the project, and the industry's ability to resource and support the process, any SCR launched on electricity cash-out arrangements may take longer than this. We would also expect to draw upon our experience of the Gas SCR as part of this process.

1.6. As part of a SCR we would expect to publish an initial consultation, a draft decision and a final decision following engagement with stakeholders through an open and transparent process to be specified upon launch. Both the draft decision and the final decision would be supported by an impact assessment. Should we

decide that changes are needed to industry codes as a result of the SCR, directions would be given to the relevant licensee (in this case National Grid Electricity Transmission (NGET)) to raise appropriate code modifications in line with these directions through the industry code modification procedures.

1.7. If we decide that it is appropriate to launch a SCR we would set out the scope and process in a launch statement. Any questions on this document should, in the first instance, be directed to Jamie Black, whose contact details are given above.

Consultation questions

CHAPTER 1: Background

Question 1: Should a Significant Code Review be conducted on electricity cash-out?

Question 2: What considerations should be taken into account when thinking about the appropriate timing for an electricity cash-out SCR? Should a SCR be timed to align with and take account of the Electricity Market Reform (EMR) capacity mechanism implementation?

Question 3: To what extent do you believe that future EU framework guidelines on cross border allocations and congestion management, and cross border balancing, should shape the scope and timing of a SCR?

CHAPTER 2: Issues with the current arrangements

Question 4: Do you agree that the issues we have identified could be material?

Question 5: Are there any other areas of concern that should be considered by an electricity cash-out Significant Code Review?

Question 6: Do you consider that the principles set out form the appropriate basis for an electricity cash-out SCR? If not, what would be more appropriate principles for considering reform?

CHAPTER 3: Potential approaches to reform

Question 7: Do you agree with how we have characterised the two approaches to reform? Do you have views on which approach you would prefer, and if so, why?

Question 8: Do you consider the range of potential areas for reform captured by the two approaches to be sufficiently broad?

Question 9: Should any of the potential areas for reform identified be placed out of scope?

Appendix 2: Derivation of cash-out prices

1.1. The electricity market in Great Britain (GB) operates on the basis of half-hourly settlement. Participants are expected to balance their own positions by contracting to buy or sell electricity prior to gate closure. At gate closure market participants submit their contracted and expected generation or demand up to one hour before each settlement period. The System Operator (SO), National Grid Electricity Transmission (NGET), is ultimately responsible for achieving physical balance on the system nationwide and minute by minute. To do this it uses a range of balancing tools, the balancing mechanism (BM) being the principal one.

1.2. Participants whose metered output or demand deviates from their contracted positions are exposed to imbalance settlement or cash-out. The cash-out prices are derived from the costs of actions taken by the SO in the BM. In its role as residual balancer, the SO takes numerous actions in the BM to maintain the frequency and voltage on the whole network within safe limits. These actions are taken to address system wide imbalances (energy imbalances) and system integrity, eg imbalances in certain areas caused by locational constraints (system imbalances). Such imbalances are the inevitable consequence of the need to operate a market based on finite settlement periods, finite zones and in advance of physical delivery.

1.3. The SO needs to take a holistic view of the most efficient way to balance the system through the day. It does not necessarily base its actions on trying to resolve the individual half-hour market-wide energy imbalances (net imbalance volumes or NIVs). A key challenge with setting cash-out prices is deriving an energy price that can be used to settle participants' half-hourly imbalances from the wide range of real-time continuous actions taken by the SO.

1.4. There are two energy imbalance prices: 'Main' and 'Reverse'. Participants pay or receive a different price depending on the direction of their imbalance in relation the overall system imbalance. Participants who are out of balance in the same direction as the system are seen to be contributing to the system imbalance. They are exposed to a price that reflects the cost of correcting that imbalance, the main imbalance price (main price). Participants that are out of balance in the opposite direction to the system do not contribute to the overall imbalance. They are exposed to the reverse price.

1.5. The system buy price (SBP) is paid by participants with a negative imbalance position. The system sell price (SSP) is paid by participants with a positive imbalance position. If the system is short, the main price is the SBP, and is calculated from the offers to turn up generation (or turn down demand) that the SO has accepted in the BM to bring the system back into balance. If the system is long, the main price is the SSP, and is calculated from the bids to turn down generation (or turn up demand) that the SO has accepted in the BM.

1.6. The table below provides a summary of how cash-out prices are calculated.

	System position	
	Long	**Short**
SBP	Reverse	Main
SSP	Main	Reverse

1.7. The main price is currently calculated using a price average reference (PAR) of the 500MWh of most expensive energy-related actions needed to balance the system. The calculation excludes those system-related actions taken to resolve sub half-hourly or constraint related imbalances. The reverse price is a market index price which is based on short-term energy trades on the within-day spot markets.

Appendix 3: Relevant modifications and reviews

1.1. There have been a range of industry-led modifications and two Ofgem-led reviews (one in 2004, and one in 2007) to develop the cash-out arrangements. The majority of the changes made have focused on two issues: reducing system pollution (by improving the effectiveness of removing transmission-related costs from the cash-out calculation), and making the cash-out price more marginal.

Modification Proposals P10 and P18A

1.2. Modification P10 was implemented in May 2001 and introduced the De Minimis Tagging rules, removing bids and offers of less than 1MWh from determination of the System Buy Price (SBP) and the System Sell Price (SSP). This was accepted in order that price spikes caused by limitations in the settlement systems could be reduced and therefore cash-out prices could be more cost reflective. The Continuous Acceptance Duration Limit (CADL) Tagging rules were introduced under Modification P18A in September 2001, whereby all bids and offers of less than 15 minute duration would be unpriced for the purposes of calculating cash-out prices.

Modification Proposal P78

1.3. Prior to Modification P78, SBP and SSP in each settlement period were both derived using accepted offers and bids respectively, together with balancing services actions. In March 2003, Modification P78 introduced Net Imbalance Volume (NIV) Tagging and the current Main/Reverse price methodology, whereby parties who are out of balance pay the "Main" price if their imbalance is in the same direction as the system, and the "Reverse" price if their imbalance is in the opposite direction to the system (as determined by NIV). The market index price (MIP) was introduced to set the Reverse Price. This mechanism was intended to ensure that parties would continue to be exposed to the SO's energy balancing costs where they were exacerbating the system imbalance, but not be unduly penalised where their imbalance was helping to alleviate the system imbalance.

Modification Proposals P136 and P137

1.4. Modification Proposals P136 and P137 sought to introduce a fully marginal methodology for the calculation of the main cash-out price. The Authority rejected P136 and P137 based on concerns that a very small volume of energy accepted by the SO, or a 'system' balancing action, could set the cash-out price. Ofgem was also concerned that a fully marginal cash-out regime could increase the risk that companies could manipulate cash-out prices. This would lead to cash-out prices that did not reflect the costs of energy balancing.

Modification Proposals P194 and P205

1.5. Modification P194, raised by NGET in August 2005, proposed an alternative calculation for a 'chunky' marginal price based on a volume weighted average of a pre-defined maximum volume of the most expensive balancing actions. This eligible volume, known as PAR, was originally set at 100MWh. This modification was approved by the Authority on the grounds that more marginal price signals were required to ensure that parties were taking the necessary actions to balance their positions, particularly at times of system stress. Before P194 was implemented, Modification P205 was raised and subsequently approved by the Authority, revising the level of PAR to 500 MWh. P205 was accepted since accompanying analysis demonstrated that a PAR value of 500 MWh could lead to pricing signals similar to a PAR value of 100 MWh during periods of system stress, and yet would be less susceptible to distortions associated with 'system pollution', the incomplete tagging of system actions from the price stack.

Modification Proposals P217 and P217A

1.6. The most recent Modification to be approved was Modification P217A, the alternative version of P217. Modification proposal P217 was raised by RWE nPower in November 2007 and sought to improve the Main Energy Imbalance Price calculation by introducing a methodology for 'flagging' Bid Offer acceptances (BOAs) and disaggregating Balancing Services Adjustment Data (BSAD) volumes that are taken to balance the system to resolve transmission constraints, and replacing the price of these where they would otherwise 'pollute' cash-out prices. P217 also proposed a reduction in the PAR to 100MWh. Alternative Modification Proposal 217 (P217A) retained the 500MWh PAR value, but was otherwise identical to P217.

1.7. P217A was approved instead of P217 because we felt that there was no case for reducing the PAR value at that time. In our decision letter we stated that we believed that the PAR value should be kept under review. We also committed to carrying out a post-implementation review of P217A.

Appendix 4: How a new approach could address concerns

Balancing and reserve markets

1.1. The strawman of a balancing market and reserve market described in Chapter 3 demonstrates one possible new approach to balancing. This is included to prompt debate and is not intended to limit the scope of a potential SCR. We are interested in the views of interested parties on alternative models.

1.2. In the table below we summarise how a combined balancing and reserve market could help address the issues identified in Chapter 2.

Issue	**Potential benefit**
Separating energy and system actions	Addresses the issue of system pollution directly by creating a market in half-hourly energy from which the cash-out price is derived.
Improved allocation of costs	Removes distortions resulting from reserve creation and provides a daily value for reserve, improving the cost targeting of reserve.
Reflecting true marginal value of energy	Since cash-out prices set in a balancing market would be free from pollution (by definition) it should be possible to set the cash-out price based on the marginal cleared price thus providing a reliable signal of the value of peak energy and encourage participants to make sufficient provisions to cover their positions.
Improving spreads	Could produce a single cash-out price. Since it would be based on the marginal value of energy this should provide appropriate incentives for participants to contract forward to minimise their exposure to the price.
Transparency	Would provide a transparent mechanism for discovering the cost of energy imbalances based on a cleared auction with timely information on the likely cost of imbalances.

Information incentives	Accurate forecasting of NIV would be an important component of this solution, possibly requiring information incentives to be placed on participants.
Cost recovery	By paying all bids and offers the same cleared price, and applying the same price to cash-out, the amount of RCRC would be dramatically reduced.

1.3. The success of such an approach in defining a reliable price for energy imbalances will depend to a large extent on the SO's ability to forecast the NIV accurately. It would also be necessary to consider the cost of losing the 'synergistic' benefits of the SO being able to combine energy and system balancing actions. For example, an offer accepted to address the forecast NIV in the balancing market may need to be reversed in the BM due to a transmission constraint, leading to unnecessary costs. Such an approach may also weaken incentives to invest in plant reliability. An unexpected outage after gate closure would no longer result in exposure to a cash-out price that reflects the impact of that outage on the system. This last point could be addressed with information imbalance charges.

A centralised renewables market

1.4. If renewable generation output could be scheduled via the outcome of regular day-ahead or within-day auctions this could significantly simplify the SO's task. The market could also provide an opportunity for independent generators to sell their output, and create greater within-day liquidity and price transparency. Participants would pay a more predictable balancing fee to manage their variability after the market closes, rather than being exposed to volatile and unpredictable cash-out prices. This type of arrangement may provide a more suitable mechanism for balancing intermittent renewables than the current BM and cash-out arrangements, which were designed predominantly with flexible plant in mind.

1.5. However, the benefits of a centralised renewables market would need to be weighed against the incremental administration costs, and the potential loss of dynamic efficiency in wind output forecasting brought about by a centralised approach. We would also need to assess the likelihood of private aggregators emerging to fulfil this function.

Appendix 5: Glossary

A

Agency for Cooperation of Energy Regulators (ACER)

ACER is a European Union body which cooperates with EU institutions and stakeholders, notably national regulatory authorities (NRAs) and European Network of Transmission System Operators (ENTSOs), to deliver a series of instruments for the completion of a single energy market.

B

Balancing and Settlement Code (BSC)

The Balancing and Settlement Code (BSC) contains the governance arrangements for electricity balancing and settlement in Great Britain. The energy balancing aspect relates to parties' submissions to NGET to either buy or sell electricity from/to the market at close to real time in order to keep the system from moving too far out of balance. The settlement aspect relates to monitoring and metering the actual positions of generators and suppliers (and interconnectors) against their contracted positions and settling imbalances when actual delivery or offtake does not match contractual positions.

Balancing Mechanism (BM)

The Balancing Mechanism is the principal tool used by the SO to balance the electricity system on a second-by-second basis. Generators and consumers with spare flexibility in their portfolios submit offers (to increase generation or decrease demand) and bids (to decrease generation or increase demand) to the SO via the Balancing Mechanism. The SO uses the Balancing Mechanism for energy balancing and for system balancing actions.

Balancing Mechanism Unit (BMU)

The basic unit of participation in the Balancing Mechanism, describing one or more generation or demand units which import or export electricity from or to the electricity system.

Balancing Services

The SO supplements the Balancing Mechanism with forward contracts for a range of Balancing Services. The SO will enter into these agreements where it believes that it cannot source the service through the Balancing Mechanism, or it wishes to reduce the costs of Balancing Mechanism actions by guaranteeing the availability of certain units.

Balancing Services Adjustment Data (BSAD)

Balancing Services Adjustment Data (BSAD) is used to incorporate the costs of the SO's Balancing Services contracts into the calculation of Energy Imbalance Prices.

This is laid out in the BSAD Methodology statement which the SO is required to produce under Standard Condition C16 of the Transmission Licence.

Balancing Services Use of System charges (BSUoS)

Balancing Services Use of System charges (BSUoS) recover the costs that the SO incurs in the Balancing Mechanism and in procuring Balancing Services from parties using the system. They are charged on a half-hourly basis based on energy volumes.

Bid/Offer Acceptances (BOAs)

Acceptances by the SO of Balancing Mechanism offers to increase electricity on the system, or bids to reduce electricity on the system. The prices of BOAs form the basis for the calculation of the Energy Imbalance or cash-out prices.

BM Start-up

A Balancing Service giving the SO access to additional generation BMUs that would not otherwise have run and which could not be made available in Balancing Mechanism timescales due to their technical characteristics and associated lead times.

C

Capacity Mechanism

A capacity mechanism explicitly rewards the provision of capacity. Proposals for a capacity mechanism were part of the Government's Electricity Market Reform (EMR) consultation document, and the July 2011 publication of the EMR White Paper confirmed that a capacity mechanism would be implemented. DECC has consulted on the form of the capacity mechanism to be implemented, and has stated that it will publish more detail on the type of mechanism around the turn of the year.

Contracted position

Parties must notify their contracted position to the SO for each settlement period through the process of Contract Notification. A long contracted position indicates that a party has contracted more supply than demand and a short contracted position vice versa. Any difference between a participants contracted position and its metered position will result in that party being out of balance.

Contract Notification

A contract notification details the volume of any energy bought and sold between participants. A single agent acts on behalf of both trading parties, and submits a single contract notification prior to gate closure.

Constraints

There are various parts of the transmission network where import or export capacity is limited. Constraints can become active when this capacity limit is reached. This may require the SO to take balancing actions to reduce generation behind the

constraint, and increase generation or reduce demand elsewhere on the network to maintain the energy balance. These actions may be more expensive than energy balancing actions the SO would otherwise have taken.

D

De Minimis tagging

Individual BOAs with volumes below 1 MWh are excluded from the price calculation. This is intended to remove any 'false' actions which are created because of the finite accuracy of the systems used to calculate bid and offer volumes.

Demand side response (DSR)

Demand side response involves electricity users varying demand due to changes in the balance between supply and demand, usually in response to price.

The Department of Energy and Climate Change (DECC)

The British Government department responsible for energy and climate change policy.

E

Electricity Market Reform (EMR)

The Government-led Electricity Market Reform Project which aims to develop and deliver a new market framework that will ensure secure, low carbon and affordable electricity supplies.

Elexon

Elexon is the Balancing and Settlement Code company which manages the BSC on NGET's behalf.

Energy Imbalance Prices (or cash-out prices)

Energy Imbalance Prices are applied to parties for their imbalances in each half-hour period. System Buy Price (SBP) is charged for short contracted positions. System Sell Price (SSP) is paid for long contracted positions.

Energy Imbalance

Energy imbalances are differences between the total level of demand and the total level of generation on the system within the half hour balancing period. The cash-out price aims to reflect the price of actions taken to solve energy imbalances, rather than those taken to solve system imbalances.

Energy stack

The energy stack comprises of Bid Offer Acceptances in price order and is used to calculate the main energy imbalance price, once relevant tagging has been applied.

F

Feed-in Tariffs with a Contract for Difference (FiT CfDs)

Long term contracts to be introduced by Government as part of the EMR to encourage investment in low-carbon generation. FiT CfDs are intended to provide greater long-term revenue certainty to low carbon investors.

Final Physical Notification (FPN)

The Final Physical Notification (FPN) is the level of generation or demand that the BMU expects to produce or consume.

Flagging

SO identification of balancing actions deemed as potentially being impacted by a transmission constraint.

G

Gate closure

The point in time by which all Contract Notifications and Final Physical Notifications must be submitted for each settlement period. Parties should not change their positions other than through instruction by the SO after gate closure. It is currently set at one hour before the start of the relevant settlement period.

I

Imbalance

The difference between a party's contracted position and metered position measured on a half-hourly basis.

Information Imbalance Change

This is a provision in the market rules to levy a charge on participants who deviate from their Final Physical Notification. It is currently set to zero.

Involuntary Demand Side Actions

Actions such as voltage reduction and involuntary demand reduction. These are currently unpriced and are therefore not reflected in the cash-out price.

M

Main Price

There are two Energy Imbalance Prices, 'Main' and 'Reverse'. The Main Price is charged to parties out of balance in the same direction as the system. When the

system is long, long parties receive the Main Price (SSP), whilst when it is short, short parties pay the Main Price (SBP).

Market Index Price (MIP)

The Market Index Price (MIP) is used to set the reverse Energy Imbalance Price. It is calculated based on short term trading activity on exchanges. Currently the MIP is set based on selected trades undertaken on the APX and N2EX exchanges over a period of 20 hours before gate closure.

Market Splitting

Market Splitting defines the boundaries between price areas according to physical constraints, rather than by national borders.

Metered Position

The actual volume of electricity generated or consumed by a participant. It is the sum of the actual volume of electricity imported or exported at each BMU.

Modification Proposal

In this context, a proposal to modify the Balancing and Settlement Code (BSC). Modifications can be raised by any Party to the BSC. Modifications are then defined and assessed by a Modification Group formed of BSC Parties in conjunction with Elexon. The BSC Panel will recommend whether a modification should be approved or rejected. The final decision is made by the Gas and Electricity Markets Authority.

N

Net Imbalance Volume (NIV)

The overall energy imbalance on the system as determined by the net volume of actions taken by the SO in the Balancing Mechanism and under Balancing Services contracts.

New Electricity Trading Arrangements (NETA)

The electricity market arrangements introduced in 2001.

NGET

National Grid Electricity Transmission plc (NGET) is the system operator (SO) for the electricity transmission system in Great Britain (GB), with responsibility for making sure that electricity supply and demand stay in balance and the system remains within safe technical and operating limits.

P

Price Average Reference (PAR)

The volume of electricity from the energy stack (taken in descending price order) included in the calculation of the Main Price. PAR is currently set to 500 MWh. The PAR volume is always the most expensive 500 MWh of available electricity in the main stack.

Project Discovery

Project Discovery was Ofgem's year-long study of whether the current arrangements in GB are adequate for delivering secure and sustainable electricity and gas supplies over the next 10-15 years. Its findings were published in February 2010.

R

Reserve

Additional capacity available to the SO in order to manage uncertainty in the supply/demand balance.

Reserve creation

The use of BOAs in order to create sufficient flexibility and responsiveness to meet variations in the supply/demand balance.

Residual Cashflow Reallocation Cashflow (RCRC)

The net cashflow received by Elexon through energy imbalance charges and which is reallocated amongst participants based on their credited energy volumes on a half-hourly basis.

Reverse price

There are two Energy Imbalance Prices, 'Main' and 'Reverse'. The Reverse Price is charged to parties out of balance in the opposite direction to the system. When the system is long, short parties pay the Reverse Price and vice versa. The Reverse Price is currently set to the Market Index Price.

S

Short Term Operating Reserve (STOR)

A contracted Balancing Service, whereby the service provider delivers a contracted level of power when instructed by the SO, within pre-agreed parameters. The SO makes two kinds of payments for use of STOR, availability payments and utilisation payments.

Spread

The difference between the Main Price and the Reverse Price. This is a consequence of a dual cash-out price.

System Operator (SO)

The entity charged with operating the GB high voltage electricity transmission system, currently NGET.

System Buy Price (SBP)

The price that parties pay for a negative energy imbalance.

System pollution

A number of mechanisms are in place to exclude the cost of solving system imbalances when calculating the cash-out price as participants cannot be expected to avoid these costs. However, separating system imbalances from energy imbalances is complex, and sometimes system balancing costs remain in the calculation. This is called system pollution. System pollution can distort cash-out prices.

System Sell Price (SSP)

The price that parties receive for a positive imbalance.

T

Tagging

The process by which bids and offers are removed from the energy stack, either completely or leaving only volume, so that remaining actions determine energy imbalance prices.

Transmission system

The national high voltage electricity network, operated by the SO.

Uncosted SO actions

There are a number of actions affecting consumers that the SO can take that currently do not have a price associated with them (eg voltage reductions and disconnections). In Project Discovery we argued that a cost should be attributed to these actions and this should be reflected in the Balancing Mechanism.

V

Value of Lost Load (VoLL)

The price at which a consumer is theoretically indifferent between paying for their energy, and being disconnected.

Appendix 6: Feedback Questionnaire

1.1. Ofgem considers that consultation is at the heart of good policy development. We are keen to consider any comments or complaints about the manner in which this consultation has been conducted. In any case we would be keen to get your answers to the following questions:

1. Do you have any comments about the overall process, which was adopted for this consultation?
2. Do you have any comments about the overall tone and content of the report?
3. Was the report easy to read and understand, could it have been better written?
4. To what extent did the report's conclusions provide a balanced view?
5. To what extent did the report make reasoned recommendations for improvement?
6. Please add any further comments?

1.2. Please send your comments to:

Andrew MacFaul
Consultation Co-ordinator
Ofgem
9 Millbank
London
SW1P 3GE
andrew.macfaul@ofgem.gov.uk