What Impact Would the Implementation of P212 have on the Costs Incurred by the System Operator in Managing the Transmission System?

It has been identified that one issue that needs to be considered in the assessment of P212, and its implications for the betterment or detriment of the applicable BSC objectives, is the impact this modification will have on the costs incurred by the System Operator in balancing the transmission system.

This assessment is a complex task and takes account of a number of differing price drivers such as the forward wholesale price of electricity, the forecast availability of generating capacity and the forecast level and distribution of a number of market behaviours, including system imbalance (NIV). From these and other associated price drivers we are able to provide a forecast of the cost of resolving the various components that encompass meeting our licence obligation to manage the transmission system economically and efficiently. Such components include the cost of meeting energy imbalance, the cost of meeting the system's reserve requirement, the cost of resolving transmission issues, frequency response and number of other issues.

In carrying out this assessment we have tried to understand which of the fundamental drivers, that affect the level of System Operator costs, would alter as a consequence of P212. Our first assumption is that in the short to medium term, the modification will not affect forecast plant availability or the forward curve wholesale price of electricity. These assumptions may not hold true in the longer term. For this analysis we have assumed that initially the biggest impact on costs will be derived from the change that P212 has on the average level and distribution of NIV.

The estimation of how NIV behaviour would change as a consequence of the introduction of proposal P212 is a particular challenge. A challenge recognised in its complexity, by the P212 modification group.

A considerable amount of analysis has been carried out by the modification group to consider how rational acting BSC parties would behave as a consequence of this modification. The results of the analysis reached were understandably inconclusive given the complexity with which different scenarios could drive behaviour. Our understanding is that the tentative conclusions reached by the majority of the modification were that this model would diminish the link between the imbalance price and the level of energy scarcity and that NIV would become more volatile.

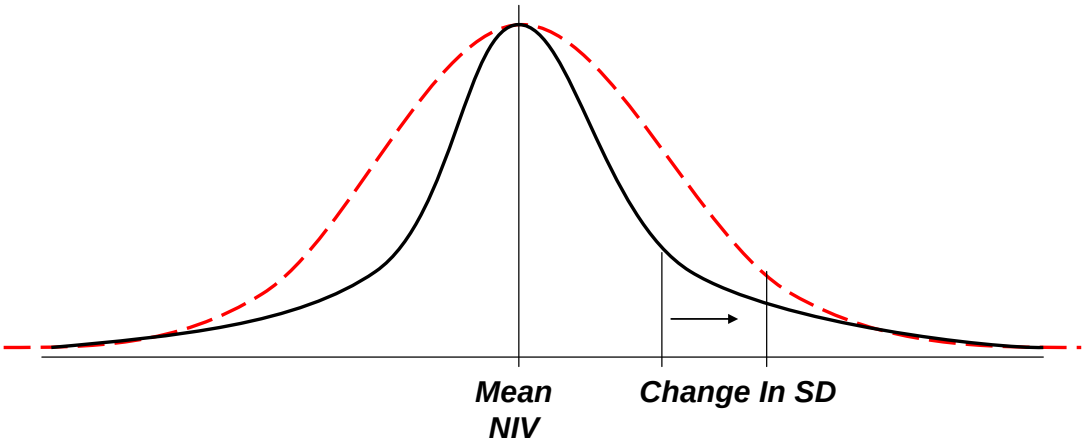
The historic volatility of NIV is a significant driver in deriving the current reserve requirement for the system operator. Therefore we have considered further the likely changes in behaviour this modification may drive.

What then will be the consequence for the level and distribution of market imbalance? The analysis initiated in the working group tended to identify a number of scenarios with the potential for the methodology to drive the market relatively longer and shorter with greater regularity. Depending on the degree of symmetry between this long and short swing, this may or may not impact the average of NIV. Given the inability to predict which of these scenarios will prevail and we have assumed that the average level of NIV will remain broadly in line with current figures.

This change in the behaviour of NIV volatility could lead it to exhibit one of a number of different distributions. However we believe that broadly it will exhibit one of the following two shapes.

The current behaviour of NIV tends towards a Normal distribution. One possible behavioural change would be to see it retain such characteristics but with a relatively wider distribution as demonstrated in diagram 1.

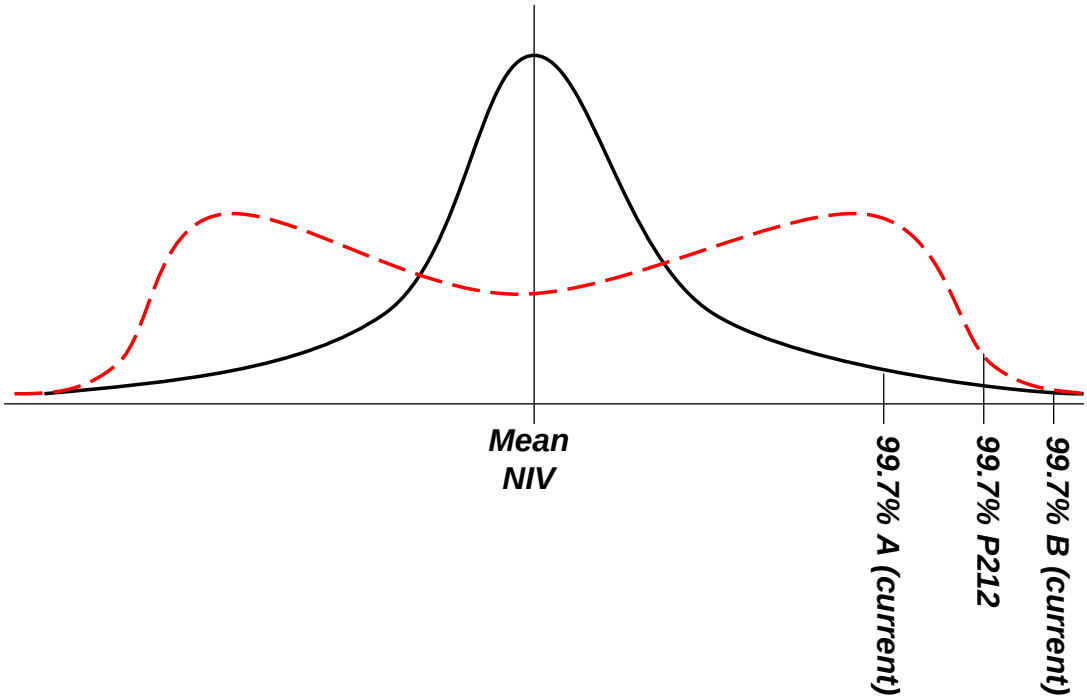
Diagram 1 : Normal Distribution



The System Operator requires sufficient reserve to secure the system against the level of plant loss and demand forecast error that is likely to occur 1 day in every 365. That equates to approximately 2.78 standard deviations of the distribution of system imbalance who distribution that exhibits Normal characteristics. If the distribution remains broadly Normal in shape with the introduction of P212 then the modification group expectation is that this will lead to an increase in the level of standard deviation.

The alternative theory is that the distribution of system imbalance will loose its normal shape and the commercial incentives on certain parties to drive the market as long or as short as is practicable, given the prevailing market price, will lead to a dual hump distribution. Diagram 2 is an extreme case of this but provides a sense of the distribution that could occur

Diagram 2 : Non Normal Distribution



As the alternative distribution in diagram 2 (identified by the red hatch mark) is not Normal the use of its standard deviation is no longer valid in determining the ability to cater for a 1 in 365 event. In this particular instance it is necessary to calculate the area under the curve that represents 99.7% of its volume and use this number as the reserve requirement value.

These two diagrams give an indication of the potential change in the behaviour of system Imbalance but is no closer in determining the probability that either of these distributions will manifest themselves or whether they will lead to a narrower or broader distribution of NIV.

Evidence presented by the models constructed in the modification group offer some evidence that the level of NIV volatility will increase. Without the benefit of any greater certainty on behaviour change we have not been able to translate this into a certain estimate on costs.

However, conscious of the need to provide some measure of use, we have made a decision to calculate the costs of an arbitrary change. The following assumptions have been made.

- The average of NIV will not change but the standard deviation will increase by 10%.
- The standard deviation of NIV will change uniformly for each settlement period of the day.
- NIV average is assumed to be -200MWh and Standard Deviation 400MWh (800 MW) based on analysis from 01-Apr-03 to 31-Mar-07
- The forward price of electricity is not materially impacted by this modification

Although this does not answer the question posed of us it does allow participants a cost benchmark with which to draw their own conclusions on costs.

This cost assessment has looked at two elements which we believe would be most affected by the change in NIV behaviour.

- The cost of meeting our reserve requirements
- The cost of resolving energy imbalance

Reserve costs

The Average cost of accepted Short Term Operating Reserve Contracts (SToR) procured for 07/08 was approximately £6.75/MWh.

SToR is procured for approximately 4100 hours per year

If the Standard Deviation of NIV increases by 10% the increase in reserve costs would approximate £6.75*4100*2.78*80 MW = £6,154,920

Energy balancing costs

If the standard deviation of NIV increases by 10% but the average of NIV is constant then we assume that there are a number of periods where the costs of resolving NIV in a short market are increased as there is a requirement to procure the more marginal priced plant more often. Conversely there will be a number of periods in which the system operator will see increased bid receipts as it has an increased long market length that it is able to sell back to the market albeight at a less attractive price. The net cost exposure of this is an increase in costs of approximately £10 million pounds based on 07/08 forward market prices.

Total costs

Therefore our initial estimate is that a 10% increase in the standard deviation of NIV would impose extra costs of approximately £16 million on market participants as these costs will feed directed through into the BSUoS charge.

It should be noted that this cost does not present the view of the system operator as to the likely cost implications of P212. The uncertainty of the likely market behavioural outcome, as informed by the difficulty encountered by the BSC modification group when assessing the impact of this modification, has not made it possible to provide a certain estimate of the impact on System Operator costs. Conscious of the need to provide some measure of comparison, we have calculated the impact of an arbitrary increase (10%) in the volatility of NIV. Consequentially this number should not be quoted as the System Operator cost impact of P212 but should be used as a starting point from which to estimate cost changes, based on the view point reached on the likely change in market behaviour it is felt P212 causes.