



Market Power Mitigation in the SEM

Directed Contract Quantification Methodology Decision Paper

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1 Introduction

As part of the Single Electricity Market (SEM) development there has been a recognised necessity to prevent the abuse of market power by participants with a large market share. The market power mitigation strategy commenced in February 2006, with the publication of the consultation paper, *Market Power Mitigation in the SEM* [SEM/AIP/03/06]. Following the consultation period, the Regulatory Authorities published *Market Power Mitigation in the SEM Decision Paper* [AIP/SEM/31/06] on April 7th 2006. These papers set out the strategy to be implemented by the Regulatory Authorities to mitigate market power.

An important market power mitigation tool to be used by the Regulatory Authorities is the implementation of Directed Contracts. This essentially involves directing generators with potential market power to offer a portion of their output to all suppliers who wish to avail of it. The Regulatory Authorities decided that these contracts will be Contracts for Difference (CfDs).

The price form and allocation methodology for these contracts has been comprehensively consulted upon culminating in the supplemental decision paper published on November 3rd entitled *Market Power Mitigation in the SEM Directed Contracts: Price, Form and Allocation: Supplemental Decision Paper* [SEM/AIP165/06].

The quantification methodology of these directed contracts was open for consultation after the publication of the consultation paper *Market Power Mitigation in the SEM: Directed contract Quantification Methodology Consultation Paper* [AIP/SEM/144/06]. This consultation period closed on October 20th. This decision paper addresses the comments received from participants and sets out a decision on a suitable quantification method for directed contracts that will be used by the Regulatory Authorities.

2 Executive Summary

Regarding the overall approach for the directed contract quantification methodology, there is sufficient acceptance of an HHI approach to proceed with implementation.

Regarding the granularity of contracts (monthly vs. quarterly in particular) there is a tendency from respondents to support monthly, however, ESB PG has strong reservations on the basis of the ability (or lack thereof) of forward fuel markets to provide monthly granularity. ESB PG prefers quarterly contracts because there is more liquidity in quarterly forward fuel markets than in monthly fuel markets. On a related issue, ESB PG is concerned that the directed contract quantification methodology should not place directed contract sellers in an over-contracted situation in a material number of hours. These two objectives offset each other however. For a given level of required aggregate directed contract coverage, moving to quarterly averaging of volumes would increase the risk that coverage in any individual hour would exceed actual production. The Regulatory Authorities have decided that the directed contract quantity determination will be quarterly to accommodate hedging issues.

Regarding an appropriate HHI threshold, the Regulatory Authorities will refrain at this time from making a final decision. A key reason for this is that the Regulatory Authorities recognise and accept the need to validate the PLEXOS model against the specific rules of the SEM. The Regulatory Authorities accept that the HHI index is impacted by technical aspects of the market simulation model. It would be premature to set an exact HHI threshold before these technical aspects are validated. As respondents realise, the selection of a threshold is as much art as science. While there was general consensus that a threshold of 1800 could not be too low and that a threshold of 1000 could not be too high, there were advocates at both extremes. The Regulatory Authorities are seeking the level of Directed Contracts that is the minimum needed to ensure a competitive market. This does not mean, however, that the Regulatory Authorities are inclined to elect a high HHI threshold that tolerates more concentration. As much as the Regulatory Authorities want to limit the level the Directed Contracts to no more than needed, they do not want to do this at the risk of enabling the exercise of market power. As will be explained later, the Regulatory Authorities have ruled out HHIs that exceed 1500 and are leaning toward a lower HHI level as a result of several factors including the low elasticity of spot electric markets, the disproportionate contribution of a single player to the HHI, computational

assumptions and limitations on the ability to develop perfect data, the ringfencing decision and the fact that the SEM will be a new and untested market.

Several respondents objected that the illustrative directed contract quantities contained in the Consultation Paper, which resulted from the concentration methodology, did not apportion any directed contracts to NIE PPB. This result stems from NIE PPB's smaller size relative to ESB PG. In any HHI-based method that sets out to minimise the total number of directed contracts necessary to meet a target HHI threshold, it will be necessary to take capacity uniformly from the largest competitor until the point where it is no larger than the next-largest competitor. This is simply a mathematical result as well as a logical one. The Regulatory Authorities do not concur that there are any relevant considerations of "equity" in this context. Directed contracts will be priced at an expectation of market price (unaffected by market power) and are designed to be competitively neutral. Being assigned to sell a Directed Contract is not punitive.

Regarding NERA's independent wholesale generation ringfencing report and its impact on the directed contract quantification methodology, the Regulatory Authorities accept NERA's recommendations. The Regulatory Authorities base this decision on the experience to date with ringfencing measures, the addition of the market monitor unit to ensure compliance, and the benefits that effective competition can bring to the consumer. This results in the Regulatory Authorities measuring concentration by treating the unregulated generation affiliates of ESB PG and NIE PPB as separate entities from those regulated entities.

Regarding an apparent misunderstanding by at least one respondent on the exclusion (or non-exclusion as the case may be) of individual units from the HHI calculation, the Regulatory Authorities reaffirm that no unit will be excluded from the HHI calculation on the basis that it cannot bid a price. The Regulatory Authorities also reaffirm the definition of load period types (subject to the possibility of adjusting the peak period definition upon receiving data from NIE) and the generators that are considered in the HHI calculation in each.

Regarding the NIE PSO, the inclusion of NIE PPB generation in the HHI calculations leading to the illustrative directed contract quantities contained in the Consultation Paper is based on the assumption that NIE PPB has an economic incentive to maximise profitability from energy market sales. The working assumption has been that this economic incentive would exist

because NIE PPB would operate in the competitive market, and would offer contracts to all-comers or would face regulation that enabled it to profit from reducing the required PSO. If it transpired for any reason that NIE PPB did not have such an economic incentive for any reason, then the assumption that they be included in the HHI calculation will be reviewed.

Regarding the market price that is used in the HHI calculation, the Regulatory Authorities are inclined to use the SMP, which includes uplift. The Regulatory Authorities do however recognise as legitimate, concerns about consistency between the market indicator used to evaluate what plants are within the competitive range and the cost indicator for such plants. Perfect consistency may not be achievable, but it is the target and the Regulatory Authorities will evaluate the degree of consistency that is possible and any identified bias in setting the HHI threshold. If perfect consistency proves elusive and the bias is to overstate the shares of dominant players, the threshold will be more permissive. If perfect consistency proves elusive and the bias is to understate the shares of dominant players, the threshold will be more restrictive. The views of entities on both sides of the spectrum have again been very useful and the Regulatory Authorities, after considering these views, recognise that it would be premature at this time to specify a precise threshold for HHI and the precise calculation that will be used to determine market share by period. This will require more experience with validating the dispatch simulation model¹. As the Regulatory Authorities understand better any biases that may exist in that model, they will carefully consider the HHI threshold issue and the calculation used to determine market share.

¹ The RAs have indicated their intent to validate that model in the paper Market Power Mitigation in the SEM Directed Contracts: Price, Form And Allocation: Supplemental Decision Paper AIP/SEM/165/06.

3 Discussion of Comments Received

3.1 Favoured Model for DC Quantification

The following table summarises each respondent's comments on the favoured model for directed contract quantification. Most respondents favoured a concentration model, albeit with caveats. Airtricity, Bord Gáis and Synergen expressed stronger objections.

	Cournot	Bertrand	SFE	Simple Behavioural	Concentration
Airtricity	No index threshold should be used; rather "The Regulatory Authorities should select an index level which results in reasonable outcomes that have some level of credibility within the industry".				
Bord Gáis	Unsatisfied with concentration model, but do not offer an alternative.				
ESB CS					✓
ESB International					✓
ESB PG					✓
NIE					✓
Synergen	Additional analysis of HHI, simple behavioural and Bertrand models, and then set the DC level based on average from the various methods				
Viridian Power & Energy					✓

Synergen offered an approach in which additional analyses be performed on the concentration method, and then this (revised) method be run in parallel with others, with an average directed contract quantification being computed across the various methods. The Regulatory Authorities are not inclined towards this approach because it is believed the approach would be unnecessarily complex.

Airtricity commented that it believes the Residual Supply Index (RSI) is more appropriate than the HHI metric. The Regulatory Authorities considered the RSI methodology, particularly in light of the SEM interactions described in the Consultation Paper. The RSI methodology is a measure of the extent to which a generator (or generators) are near-pivotal – i.e. required to produce some non-zero level of output in order to ensure that total system load is served. In an energy-only market there is a high correlation between the hours in which a generator is pivotal, and the hours in which one would expect a scarcity component in the SMP (i.e. the SMP to be above SRMC). The extent of such hours is a proxy measure for market power. The SEM, however, is not an energy-only market and has specific features designed to transfer scarcity rents from the energy market to an alternative mechanism, specifically: the SRMC bidding principles with market monitoring, the TSC requirement of a single set of offer prices per day, and the Capacity Payments Mechanism. The main residual concern in the SEM, which directed contracts address, is therefore not price spikes at times of scarcity, but instead high market concentration throughout the price duration curve. RSI focuses only on the peak period, and is incapable of detecting potential for the exercise of market power in shoulder and off-peak periods.

The Regulatory Authorities have considered all the comments received and have concluded there is sufficient acceptance of an HHI approach to proceed with implementation.

3.2 Granularity of Contract Volumes

There is a tendency from respondents to support a monthly granularity of contracts. ESB CS and NIE expressed a preference for monthly. Viridian Power & Energy stated that the contract volumes may be of greater value to suppliers if they vary monthly rather than yearly.

ESB PG however stated that the granularity should reflect the availability of relevant forwards/futures that are available in the fuel market. ESB PG has strong reservations on the basis of the ability (or lack thereof) of forward fuel markets to provide monthly granularity. ESB PG claims monthly fuel contracts would be necessary because it would be necessary to perfectly, or near-perfectly, backup monthly directed contract volumes with monthly fuel arrangements. ESB

PG therefore prefers quarterly contracts because there is more liquidity in quarterly forward fuel markets.

On a related issue, ESB PG is concerned that the directed contract quantification methodology should not place directed contract sellers in an over-contracted situation in a material number of hours.² These two objectives offset each other however. For a given level of required aggregate directed contract coverage, moving to quarterly averaging of volumes would increase the risk that coverage in any individual hour would exceed actual production.

Directed Contracts will be offered in quarterly segments. Further, at least in the first year of the SEM, it is envisaged that some months of the year would inevitably be monthly, since the SEM starts on November 1, 2007 – which is not the beginning of a calendar quarter.

Having noted ESB PG's concern regarding over-contracting in individual trading periods, the Regulatory Authorities conducted an analysis to compare the indicative (monthly) contract volumes from the Appendix of Consultation Paper to the ESB PG expected 2007 non PSO-related output from the Loop 2 PLEXOS results. This analysis yielded less than 1% of hours in which the directed contract volume exceeded forecast production levels. The Regulatory Authorities do not consider this to be a material number of hours in this context. This was not an unexpected result since the very purpose of the directed contract methodology is to apply directed contracts in the load period types in which a generating company has high concentration of the economically available capacity in the SEM. It was noted that in some of the hours, the PLEXOS Loop 2 results predicted a very low level of output from the ESB PG

² ESB PG is concerned there may be a material risk that directed contract volumes exceed ESB PG generation levels. The Regulatory Authorities are sympathetic to this concern, since if such situations occurred on a frequent basis, it could indicate that more directed contracts had been applied than was necessary to mitigate market power. It is largely for this reason that the Regulatory Authorities suggested a level of granularity (monthly and by peak/ mid-merit/ baseload) such that the directed contract "shape" be tuned to system load, and in particular to the market concentration in each segment of this shape. Shaping the directed contracts to expected system conditions should be more likely to avoid an over-contracting situation than quarterly averaging.

units concerned – for example due to coincidence of random forced outages – and in these cases virtually any level of directed contracts could exceed production levels.³

It is anticipated that the Regulatory Authorities will calculate the quarterly directed contract quantities based on the highest level of directed contracts in any one month in the quarter. However, the Regulatory Authorities recognise this has the potential to conflict with the requirement to limit the level of directed contracts to the minimum to mitigate market power or to over contract ESB PG (and potentially PPB) in certain periods. The Regulatory Authorities propose to validate the PLEXOS model early in the New Year, and review this element of the methodology once validated modelling results are available.

3.3 Preferred HHI Level

Considerable feedback was provided on the HHI level. In general, generation owners favoured higher HHIs while suppliers favoured lower HHIs. As generators would benefit from more concentration and suppliers would benefit from less concentration, this is not surprising. The respondents did however, provide rationale for their positions, with suppliers citing factors such as low demand elasticity.

Upon reviewing the comments, the Regulatory Authorities have further analysed this issue and have identified several factors that they will influence their decision. These factors are:

1. The Regulatory Authorities concur that there is low elasticity in spot electricity markets. For this reason, the Regulatory Authorities would hesitate to use an HHI index above 1500.
2. The Regulatory Authorities recognise, as respondents point out, that HHI values are subject to interpretation and do not have a unique meaning. In that regard, the Regulatory Authorities will recognise that the HHI for the SEM is skewed by the presence of one very large share participant, ESB PG. The same HHI value could result in a variety of ways. For

³ The Regulatory Authorities believe that conducting the HHI capacity share calculation without regard to random outages is a reasonable and pragmatic approach in the context of the overall method and do not accept that the application of directed contracts need be contingent on modelled unit availability in each hour.

example, the same HHI resulting from a large ESB PG and a variety of smaller players could also be obtained by a reduction in ESB PG's share and an increase in other's shares. In selecting the index the Regulatory Authorities are inclined to consider that the way in which the HHI is achieved, with a very large contribution from one entity, is a factor that would lead the Regulatory Authorities, all else equal, to lean toward a lower HHI. This means that from the 1500 maximum value that the Regulatory Authorities will lean toward a lower value.

3. The Regulatory Authorities are concerned with the lack of market experience and recognise the need to instil confidence in the SEM. In the Decision Paper to be issued on the MMU and in prior Consultation and Decision Papers regarding market power, the Regulatory Authorities have been clear that they regard the spot market as the market that provides discipline to the voluntary contract market. The Regulatory Authorities have rejected calls for market power mechanisms aimed directly at the contract market, in large part because of a commitment to having in place, a viable spot market not affected by market power. Especially at the outset, the Regulatory Authorities believe it essential to ensure that market power will not affect the SEM spot market so a contract market can develop. This is another factor that inclines the Regulatory Authorities towards a lower as opposed to higher HHI threshold at SEM commencement.
4. The Regulatory Authorities accept the NERA ringfencing recommendations and will treat the unregulated generation affiliates of ESB PG and NIE PPB as separate from ESB PG and NIE PPB for purposes of the HHI calculation. This significantly reduces measured concentration. A lower HHI is appropriate in light of this treatment.
5. Valid points have been raised concerning the metrics used to develop the market shares for HHIs. The HHIs have been developed by viewing hourly SMPs from a PLEXOS analysis and then examining each generating unit's marginal cost to determine if it is economic given the SMP. The SMPs include start-up and no load costs (through a PLEXOS reflection of uplift) and the unit marginal costs do not. This could possibly overstate the market share of a generator and lead to an HHI higher than it should be. The extent to which this is a real as opposed to academic problem can be determined from analyses of the PLEXOS results. However, the model version now available has not been validated and does not contain the uplift formulae that will apply in the SEM. Once such validation is conducted, an analysis

will be done to examine the extent to which there is a possible distortion. If market shares are overstated, the HHI threshold may be raised to account for a bias that could raise HHIs.

In light of factors 1 through 3 above, the Regulatory Authorities would be inclined to select an HHI in the lower portion of the range between 1200 and 1500 for the first year of the SEM. However factor 4, the liberal treatment of ringfencing, causes the Regulatory Authorities to consider an HHI as low as 1000. However, it is because of factor 5 – the need to validate PLEXOS – that the Regulatory Authorities will not select a final HHI threshold at this time. While the Regulatory Authorities will keep open a range of 1000 to 1500, they anticipate selecting an HHI threshold between 1000 and 1250. After the PLEXOS validation effort, which is expected to be completed by April 2007, the Regulatory Authorities will also examine any possible bias in the definition of market shares and use that analysis to assist in selecting the final threshold.

3.4 Directed Contracts for PPB

ESB CS believe “equity of treatment” should be included as an evaluation criterion, although they do not set out a detailed definition of this criterion, nor do they provide a description of the public policy objective it would serve.

ESB CS believes the result of the Regulatory Authorities’ preliminary analysis of directed contract volumes (in the June paper AIP/SEM/66/06), of 40% to 60% of ESB PG’s expected output and 0% to 30% of NIE PPB’s expected output, to still be appropriate. Similarly, Bord Gáis complains that “at no point have the Regulatory Authorities attempted to explain the substantial difference between the levels of envisaged contracts – from both incumbents – in June to the level identified in the September paper”. The Regulatory Authorities remind Bord Gáis in particular that it was made clear in the June paper that the ranges provided then were indicative, and that the final directed contract quantities applied will be determined by the quantification methodology for which the current consultation was their opportunity to provide constructive input on specific methodologies.⁴ Each of the methods described in the

4 The Regulatory Authorities stated the following in the June paper: “It is expected that, due to the high level of concentration in the market, ESB Power Generation (ESB PG) will offer the bulk of the energy under DCs; while NIE

Consultation Paper would produce a different result, and many of the reasons for these differences were discussed. The Regulatory Authorities also note that the revised illustrative directed contract quantities (at the 1500 HHI/5% level) in the Consultation Paper are more-or-less in line with the bottom end of the ranges estimated in June prior to the quantification consultation: approximately 37% of ESB PG's estimated output as reported in AIP/SEM/02/06, and 0% of NIE PPB's.

With respect to the allocation of directed contracts to NIE PPB, ESB PG believes that "equality of treatment" should be included as an evaluation criterion. ESB PG argues that such a criterion would be consistent with the Regulatory Authorities' objective of "not unfairly discriminating towards either new or existing players". The Regulatory Authorities disagree and do not accept that the discrimination, or lack thereof, of new entrants versus existing players would materially change as a result of the modified directed contract quantification methodology proposed by ESB PG. ESB PG proposes that directed contracts are pro-rated with generation levels for ESB PG and NIE PPB. ESB CS proposes a similar approach. The Regulatory Authorities agree that all market participants – even the smallest – contribute to the HHI calculation. But that doesn't logically lead to the conclusion that directed contracts should be pro-rated (or pro-rated across the largest two participants). To minimise the directed contract quantity required to meet a specific HHI threshold level, the marginal directed contract should be allocated to the entity with the largest residual market share because doing so will reduce the HHI by the most.

ESB PG give five reasons why the proposed HHI rules should be changed as they propose (with the effect of allocating directed contracts to NIE PPB):

1. Equitable treatment. Discussed above.

Power Procurement Business (PPB) may offer significantly lower quantities. It is important to note at this stage that the Regulatory Authorities have not completed a detailed analysis of the volume of contracts to be offered to the market. However, having conducted a preliminary analysis it is expected that ESB PG will be required to offer something in the range of 40% to 60% of its typical generation output levels as DCs, and it is expected that PPB will be required to offer somewhere between 0% and 30%. It is intended that the determination of the quantity setting methodology will form a separate consultation due to take place in late August/ early September."

2. Potential of DCs to remove PSO distortionary effects and promote market confidence. The Regulatory Authorities are not convinced that the relationship between the directed contract pricing method and the NI PSO as described by ESB PG leads logically to the conclusion regarding the recommended specific form of HHI rules.
3. Volume risk. The Regulatory Authorities address volume risk in Section 3.2 of this decision and are not convinced that the allocation of directed contracts to an additional party would make a great deal of difference in this respect, particularly since the methodology is designed to apply directed contracts only when the entity concerned has a high concentration of economically available generating capacity.
4. FX issue. The Regulatory Authorities believe that FX risks for NI suppliers are manageable in international FX markets and will be supported by the availability of NI non-directed contracts.
5. Legal drafting balances. ESB PG is concerned that “if ESB PG is the only market participant selling DCs, no other parties will have an interest in achieving a balanced pricing methodology and a balanced set of Terms and Conditions during the drafting of the detail of the DCs”. The Regulatory Authorities are committed to a balanced and objective approach and assure ESB PG that data and analyses will be considered when determining prices and that the Regulatory Authorities will remain aware that in the debate on pricing that both buyers and the seller may be less than fully objective as they seek a particular outcome. Further, the Regulatory Authorities expect that NIE PPB will take a strong interest in the contracts as it may be allocated directed contracts in the first year and/or in subsequent years. Work on the model is ongoing and the Regulatory Authorities’ results to date are illustrative and subject to change. There is no conclusion that the ultimate allocation will not have directed contract volumes for NIE PPB.

On each of these points the Regulatory Authorities see no compelling argument with respect to the evaluation criteria that were laid out in the Consultation Paper.

Regarding the NI PSO, the Consultation Paper stated that the PSO methodology in Northern Ireland is currently under review, however it is generally the preference of the Regulatory Authorities to allow market price signals to give incentives to PPB to operate as efficiently as

possible and in this context a continuing PSO could have a role to play as well as offsetting incentives for NIE PPB to exert any potential market power. For the avoidance of doubt, the inclusion of NIE PPB generation in the HHI calculations leading to the illustrative directed contract quantities contained in the Consultation Paper is based on the assumption that NIE PPB has an economic incentive to maximise profitability from energy market sales. The working assumption has been that this economic incentive would exist because NIE PPB would operate in the competitive market, and would offer contracts to all-comers. There may be other mechanisms by which this economic incentive could come about, such as incentive regulation. If it transpires that NIE PPB does not have such an economic incentive, then the assumption that they be included in the HHI calculation will be reviewed.

3.5 Ringfencing

Bord Gáis expressed their opinion that the ringfencing report and the Consultation Paper failed to adequately investigate the total market power potential of incumbent businesses, including their vertical affiliates and horizontal generating affiliates. They note that “The NERA [ringfencing] report concluded that a ‘significant portion of the generation will be owned by the incumbent utilities and their affiliates’; yet nevertheless recommended that both ESB PG and NIE PPB should be treated separately from the rest of their respective group for the purposes for determining the level of directed contracts? BGES notes the Regulatory Authorities have not made a final decision in relation to this area and we urge them to consider the issue further before doing so.”

The NERA report examines the issue of horizontal integration in the spot market. It recommends a range of measures to mitigate the potential for the abuse of market power. It highlights that the ringfencing measures already in place and the additional measures recommended will not provide 100 percent certainty that affiliated generators will bid independently of each other.

The issues due to horizontal integration are currently faced in the markets that SEM will replace and the Regulatory Authorities have experience with imposing and monitoring effective ringfencing licence conditions. The Market Monitoring Unit will have measures in place to monitor all generators, to ensure that all bids are submitted independently, and the Regulatory

Authorities will monitor compliance with specific ringfencing conditions. In addition the Regulatory Authorities will undertake a formal review of the ringfencing measures one year after market go-live.

Based on the NERA report and the discussion above, the Regulatory Authorities believe the ringfencing measures currently in place supplemented by the additional measures recommended by NERA are sufficient to treat ESB PG and NIE PPB as independent from their affiliated generation companies. At this point in the development of the market, the Regulatory Authorities believe that this position is merited. Taken together, the benefits that competition can bring and the specific measures taken to monitor compliance out weight the risk to the consumer.

It should be noted than in accepting the NERA recommendation, the Regulatory Authorities are in several important ways pursuing a middle ground. First they will take the NERA recommendation literally and will treat ESB PG and NIE PPB as independent from their affiliated generation companies. NERA was not asked to examine ringfencing between affiliates not involving ESB PG or NIE PPB. However, Synergen is ringfenced from all affiliates and it could be logically argued that the unique conditions in the Synergen license would justify treating it as a separate entity. In light of the comments received with respect to ringfencing and in order to be cautious, the Regulatory Authorities will not consider Synergen separate from its unregulated affiliates. Second, as discussed above, the ringfencing decision will be considered in setting the HHI threshold and will militate to a lower threshold. Hence, the NERA ringfencing recommendations are being tempered by these factors.

It is also recognised that a number of other measures will contribute to the creation of a competitive electricity market, namely the level/type of regulation of the incumbent parties, i.e. ESB PES, NIE PES, ESB PG and NIE PPB and the necessary changes to the PSO mechanisms. The Regulatory Authorities are currently considering these issues and are mindful that decisions here will have a direct impact on the effectiveness of the competitive market.

3.6 Choice of Units to Include in the HHI Calculation

ESB PG is of the view that plant that does not have an associated bid price should not be included in the HHI calculation. Further, ESB PG stated “We understand that it is the

Regulatory Authorities intention to exclude wind power and certain other non-price setting plant from the HHI calculation.” To be clear, the Regulatory Authorities do not plan to make any distinction, for HHI calculation purposes, on the basis of whether a unit has an associated bid price or not. Whether a unit has a bid price or not isn’t the main driver of market power. Rather, it is whether that unit’s revenues are based on market prices (thus it benefits from any exertion of market power) or, alternatively, are based on regulated prices unaffected by any exertion of market power. The Regulatory Authorities note that in a portfolio of units within a company, market power strategies need not necessarily be exerted by all units within the portfolio; it is price-setting units, or units that are nearly price-setting that will typically be strategically bid in a market power scenario – either by bidding a higher price, or by strategic withdrawal. Nevertheless, plants with a lower dispatch cost (or no dispatch cost) owned by the same company will be the prime beneficiaries of any such market power strategy, so long as they receive market prices, and these units could be a large part of the reason why the market power strategy is profitable for the company concerned. Non-bidding units in this category would receive the full benefit of the impact on the market price, so long as the unit concerned is not under a regulatory contract limiting its revenue. For this reason, the distinction the Regulatory Authorities will make regarding inclusion in the HHI calculation is not whether a unit can bid a price, but rather whether the revenues of the unit concerned are regulated so as to not pass through the benefit of any market power being exerted.

Arguably this logic could suggest that Tynagh and Aughinish could be excluded from the HHI calculation as the operators will bid the plants in to the SEM but by contract will not profit from high SEM prices. However, those contracts provide that the owners may reduce the quantity of MW applicable to the contract and use the capacity for other purposes. This provides an incentive for the Tynagh and Aughinish owners to increase market prices and these plants will be included in the HHI calculation.

NIE believes that treating the baseload, mid-merit and peak markets as being separated by time, rather than the type of plant that is on the margin in those periods, does not reflect the markets accurately. NIE believes it is wrong to assume that the peaking market, for example, will be contested by baseload plant that will not set the SMP at peak times. NIE further believes that HHIs (and directed contract quantities) in peak hours should be calculated excluding generation previously assigned to baseload and mid-merit hours. The Regulatory Authorities do

not agree that this approach would lead to a better determination of directed contracts for the purpose of mitigating market power. Again, the Regulatory Authorities emphasise that price-setting ability is not the same as market power. All generators, including inframarginal generators, have price-setting ability, whether by physical or economic withdrawal of capacity. In order to be market power, this ability to change the market price must be profitable. Market power is primarily a function of market concentration, and the profitability that results from market power is a function of the quantity of generation output that receives the benefit of an increased price. In peak hours, the ownership of baseload plant is a key driver of market power and ignoring it in the HHI calculation could considerably understate market power. For this reason the Regulatory Authorities will not adopt NIE's proposal regarding the exclusion in the peak HHI calculation of generation previously assigned to baseload (or mid-merit) hours.

The Regulatory Authorities accept that the methodology described in Section 8 of the Consultation Paper could be clearer regarding the definition of hours over which each HHI is calculated, and the paper *Market Power Mitigation in the SEM Directed Contracts: Price, Form and Allocation: Supplemental Decision Paper* of November 3rd should help clarify this point.

For the avoidance of doubt:

- For the calculation of baseload HHIs and the calculation of the baseload directed contracts quantities, baseload hours are defined as those (late night and early morning) hours which are not mid-merit or peak hours.
- However, baseload directed contracts will be in effect in all hours (i.e. including mid-merit and peak hours).
- For the calculation of mid-merit HHIs and for the calculation of the total quantity of directed contracts that will exist in mid-merit hours, mid-merit hours are those hours defined as mid-merit in the Section 8 of the Consultation Paper (between 0800 and 2300)⁵ that are not peak hours. The quantity of mid-merit contracts will be the total quantity of directed contracts in

5 Mid merit hours in non business days are defined in page 15 of the paper *Market Power Mitigation in the SEM Directed Contracts: Price, Form And Allocation: Supplemental Decision Paper AIP/SEM/165/06*.

mid-merit hours just calculated, minus the quantity of baseload contracts that are already in effect in mid-merit hours. (If this calculation yields a negative number, the quantity of mid-merit contracts will be zero.)

- Mid-merit contracts will be in effect in all mid-merit hours.
- For the calculation of the peak HHIs and for the calculation of the total quantity of directed contracts that will exist in peak hours, peak hours are those hours defined as peak in the Section 8 of the Consultation Paper (between 1700 and 2000⁶ from September to March inclusive). The quantity of peak contracts will be the total quantity of directed contracts in peak hours just calculated, minus the quantity of baseload contracts and mid-merit contracts that are already in effect in peak hours. (If this calculation yields a negative number, the quantity of peak contracts will be zero.)
- Peak contracts will be in effect in all peak hours.

The Regulatory Authorities will also take this opportunity to comment in general on the issue of what units should be included in the HHI calculation and how they should be included. In general any unit that could benefit from a higher market price will be included, whether it bids or not. Units owned by a common owner will be included as a single entity, excepting the ringfencing exclusion separating ESB PG and NIE PPB from their generation affiliates. Units operating under a PSO, with no incentive or benefit from a higher market price will be excluded. To clarify, this condition does not apply to Tynagh, Aughinish or the PPB. Regarding Moyle, ideally every producer or potential generator ought to be represented in the HHI calculation by their actual relevant capacity. Imports over Moyle cannot be carried out that way since there is no firm representation of which generators lie behind the aggregated quantities being sent over the interconnector. Traditionally, there are two solutions to this problem. The first is to 'atomise' Moyle, i.e. to treat it as contributing to total capacity in the denominator of the market share equation but to give it zero weight in the numerator. While this will clearly somewhat understate

⁶ This definition is subject to adjustment when data is provided by NIE, as described in the paper Market Power Mitigation in the SEM Directed Contracts: Price, Form And Allocation: Supplemental Decision Paper AIP/SEM/165/06.

the contribution of these companies, it is unlikely for imports into Ireland to form a part of a market power exploitation strategy by any of the current participants in the market. Alternatively, Moyle could be regarded as consisting of some hypothetical number of 'equivalent generators,' say four. Indeed, 'atomising' Moyle is equivalent to assuming it consists of many small generators, and that has been the chosen approach.

Finally energy limited resources such as hydro, pumped hydro and wind will be recognised considering their energy limits and maximum production.

3.7 The Use of SMP in the HHI Calculation

ESB PG does not have a problem with the inclusion in the HHI calculation of a plant not in merit, but close to being in-merit, but doesn't think the evaluation of what "in-merit" means should involve an SMP inclusive of uplift for start-up and no-load. Synergen believes the 5% parameter should be 0% because 5% implies a spurious level of accuracy, and that "in-merit" must be accounted for on the basis of rolling average historic availability.

The Regulatory Authorities have considered these arguments and believe that SMP with uplift is the price that should be used to determine what units are in merit. Conceptually the Regulatory Authorities recognise that in a complex non-linear unit commitment process some units run at times when their per MWh costs exceeds the system shadow price, and some units never get started when their per MWh cost is less than the system shadow price. The relationship between unit SRMC and system shadow price, or between unit SRMC and SMP, is complex – and simple comparisons do not reflect operational realities in either case. The Regulatory Authorities believe that this issue must be examined empirically. Once a validated version of the PLEXOS model with the SEM uplift formulae is available, the Regulatory Authorities intend to examine those results against a series of measures including market share based on SMP with uplift and generating unit marginal costs, market share based on SMP with uplift and generating unit average variable costs and market share based on model dispatch. The Regulatory Authorities will not examine market shares using system marginal costs (SMP without uplift) as they do not believe that it is a meaningful value as it will not be the market price. Based on the comparative market shares, the Regulatory Authorities will select a measure. If the measure selected has a bias to overstate HHI, the Regulatory Authorities will

correspondingly raise the HHI target. If the method selected has a bias to understate the HHI, the target will be lowered. At this point the Regulatory Authorities are aware of this issue and will account for it during implementation. The Regulatory Authorities do generally agree with ESB PG that comparing SMP with uplift to unit costs without no load costs is inconsistent and has the potential to result in significant distortion. They intend not to use this method unless it can be empirically demonstrated that any such distortion is minor and that other methods are also imperfect.

The Regulatory Authorities further note that PLEXOS analyses done to date do not reflect the SEM uplift formulae. It appears likely that the uplift in SMP in current PLEXOS runs is significantly overstated relative to that which will result from the actual SEM uplift formulae. As such it is not possible to conduct empirical analyses at this time.

3.8 Local Market Power

Synergen raises valid local market power issues. The Regulatory Authorities reiterate that the directed contract quantification methodology is conducted on an all-island basis and considers only SMP effects. Directed contracts would not reduce the incentive to drive up constraint payments that would result from the exertion of local market power. The Regulatory Authorities continue to conduct local and regional⁷ market power analyses. The Regulatory Authorities have determined that these analyses will be provided to the MMU upon its inception, and will be used by the MMU to guide its monitoring of the possible presence of local market power. It is not anticipated at this time that the Regulatory Authorities will publish these analyses, however the MMU may choose to do so in the future. In accordance with the market power mitigation strategy that has been set out throughout this workstream, a range of remedies are available if local or regional market power is observed in the SEM. Specifically, if bidding principles and market monitoring are deemed insufficient remedies to sufficiently mitigate any local or regional market power, potential remedies of increasing severity include the imposition of bidding rules, and in the extreme, the imposition of Reliability Must Run contracts.

⁷ By “regional” in this context the Regulatory Authorities refer to a portfolio of units in a transmission-constrained region, owned by the same owner.

3.9 Pricing Model Validation

Viridian Power & Energy and Synergen request that PLEXOS, if used as part of the overall directed contract methodology, be benchmarked against the Market Clearing Engine. The Regulatory Authorities reaffirm the need for a PLEXOS validation effort. As described in the recent supplemental decision paper on directed contract price, form and allocation,⁸ the Regulatory Authorities believe that the timeline may not allow for a direct validation against the SEM pricing engine because access to the pricing engine with sufficient lead time to validate is not likely. However, the need for a serious validation is noted and accepted. The Regulatory Authorities will undertake a validation effort and will keep the MPG informed of and involved in the validation. It is necessary to realise that such a validation effort will use available information and not necessarily the ABB pricing engine.

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4 Conclusion

The Regulatory Authorities have found the comments very useful. After considering the comments the Regulatory Authorities affirm the following:

- The method used to develop the quantity of directed contracts will be the HHI method.
- Quantities will be set by quarter based on the month in the quarter with the highest quantity.
- The HHI threshold will be between 1000 and 1500 and will be selected considering a variety of factors discussed above and after examining the results from a common sense perspective.
- All units that could potentially profit from higher market prices will be included in the HHI calculation. All units with common ownership will be included as a single entity. Energy limited units will be included in a way that affects their energy limitations.
- The NERA ringfencing recommendations will be adopted, but will be tempered by using an HHI threshold lower than might otherwise have been applied, and by taking these recommendations literally and not recognising for HHI computation purposes Synergen's unique ringfencing from other affiliates of PG.
- To determine market shares the Regulatory Authorities will view three methods once the PLEXOS model has been validated. These are SMP compared to unit SRMC, SMP compared to unit average variable cost, and forecast unconstrained generation. The Regulatory Authorities will only select the first approach if it can empirically be shown to not result in a material distortion.
- Local market power is acknowledged to be outside the ability of directed contracts to remedy and there are other controls on local market power.

The Regulatory Authorities will be implementing the directed quantification methodology following the validation of the PLEXOS model and anticipate informing the industry of quantities in April. Prior to doing so, the Regulatory Authorities will provide as much data as feasible to participants and will provide for informal comments on the data and calculations by participants.