

A SUBMISSION TO THE COMMISSION FOR ENERGY REGULATION AND THE UTILITY REGULATOR ON
THE SEM COMMITTEE'S CONSULTATION PAPER, *PROPOSALS FOR IMPLEMENTATION OF THE
EUROPEAN TARGET MODEL FOR THE SINGLE ELECTRICITY MARKET* (SEM-12-004).

BY

PAUL K GORECKI

ECONOMIC AND SOCIAL RESEARCH INSTITUTE

DEPARTMENT OF ECONOMICS, TRINITY COLLEGE DUBLIN

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I. Introduction

The model for trading electricity at the wholesale level on the island of Ireland – the Single Electricity Market (SEM) – has to comply with the European Union’s (EU) Third Package. While a deadline of 2014 has been set for Member States’ compliance, transitional arrangements, that “do not extend beyond 2016,” for meeting the Capacity Allocation and Congestion Management (CACM) Network Code apply to “island systems with central dispatch”(ACER, 2011, para. 1.12), of which the SEM is the only instance within the EU. These transitional arrangements reflect the fact that most EU wholesale electricity markets are self dispatch bilateral exchange models, in contrast to the mandatory pool central dispatch model of the SEM. The issue thus becomes how the SEM should be restructured to ensure compliance with the CACM Network Code.¹

The SEM Committee (2012) issued a consultation paper to address this issue, together with an accompanying paper by the Single Electricity Market Operator (SEMO) and the Transmission System Operators (TSOs) in the Republic of Ireland (EirGrid) and Northern Ireland (System Operator of Northern Ireland or SONI).² The SEM Committee has put forward for discussion some evolutionary proposals – four variants of the current SEM model – and one revolutionary proposal – a fundamental overhaul of the current SEM model. Each of these proposals is designed to secure compliance with the wholesale electricity model contained in the CACM Network Code – the European Target Model. This consultation is part of an ongoing process;³ it is not expected to result in a definitive answer to the question of the how compliance will be achieved, but rather mark a move towards resolving the issue.

In general, proposals such as those put forward by the SEM Committee are evaluated by considering whether or not the benefits exceed the costs.⁴ The proposal with the highest benefit/cost ratio is the preferred choice. However, it could be argued that such an approach is not merited in the current consultation exercise. A simpler methodology should be employed. Since the purpose of the exercise to ensure SEM compliance with the European Target Model, all that is required is to estimate the fixed and ongoing costs of implementing each proposal in terms of investments in new

¹ It should be noted that while Agency for the Cooperation of Energy Regulators (ACER) adopted the CACM Framework Guidelines (FG) in July 2011, the CACM NC has as yet to be finalised. See ACER (2011) and SEM Committee (2012, pp. 17-18) for a discussion of the relationship between the FG and the NC.

² EirGrid, *et al* (2012)

³ For details see: http://www.allislandproject.org/en/TS_Current_Consultations.aspx?article=41f5681a-ef37-41ca-ab7d-7a1bdd7db385. Accessed 6 March 2012. See also SEM Committee (2102, pp. 73-74).

⁴ This would, of course, apply equally to any additional models that were added to the choice set.

computer and trading systems for the market operator and market participants *etc*⁵ and then selecting the lowest cost proposal. However, such an approach is not appropriate. No attention would be paid to crucial factors such as curbing market power, ensuring adequate generation capacity and so on, that are likely to differ between the proposals and that, in turn, are vital to ensuring that the SEM works well for consumers, the ultimate objective of the electricity wholesale model.

Seen in this broader light, the issue of selecting the best alternative in the SEM Committee consultation paper becomes more difficult. The issue arises of what costs and what benefits need to be considered, apart from the fixed and ongoing implementation costs of switching from one model to another whether it is to a variant or a replacement of the SEM. Here we need to go back a little in order to be able to identify the critical costs and benefits. The current SEM model was designed to deliver electricity in an efficient and cost reflective manner.⁶ However, in order to do so successfully the SEM had to address particular concerns, including the market power of the incumbent vertically integrated Electricity Supply Board (ESB),⁷ facilitating entry and ensuring adequate capacity. These concerns can be used to evaluate the SEM Committee proposals. Does a particular proposal, for example, deal with the issue of market power or of ensuring adequate generation capacity? Of course, to some degree these issues are interrelated. Lack of adequate capacity is likely to exacerbate and reinforce any market power that generators may possess.

In considering whether or not a particular proposal adequately deals with the problems that the current SEM model was designed to address, however, attention needs to be paid to market developments since 1 November 2007, when the current SEM model was adopted. The market facts in 2016 and beyond, when the SEM has to comply with the European Target Model, may not be the same as those that obtained in 2007. If the Third Package is successful in creating an internal EU market for electricity issues such as market power are likely to be of lesser importance than for the small geographically isolated electricity market that existed on the island of Ireland in 2007.⁸ Thus attention needs to be paid to interconnection and the extent to which the SEM is part of the wider EU internal electricity market. Furthermore, the importance of renewable sources of electricity,

⁵ For example, when the SEM was introduced the implementation costs were estimated at €256.4 million in 2006 prices. The implementation costs were divided into four categories. For details see NERA (2006, p. ii).

⁶ The primary objective of the SEM, developed by the energy regulators in Northern Ireland and the Republic of Ireland, “in the light of their statutory duties and functions,” is that the “wholesale electricity trading arrangements should deliver an efficient level of sustainable prices to all customers, for a supply that is reliable and secure in both the short and long-run on an all-island basis” (SEM Committee, 2012, p. 28).

⁷ And the corresponding firm in Northern Ireland, Viridian.

⁸ While it is true that since 2002 the Moyle Interconnector (IC) linked the SEM with Scotland, its impact was limited due to its size relative to the SEM market and the high transaction costs involved in trading across the Moyle IC.

especially wind, is much greater to-day than it was in 2007 and its significance is likely to increase in the coming years. Hence the wholesale electricity model needs to provide flexible plant that is able to provide electricity at short notice, given the variability and difficulty of forecasting wind accurately.⁹

In the debate over restructuring the SEM to meet the European Target Model there is often a concern to preserve the essence of the current market.¹⁰ However, there is no generally agreed set of 'essential' or 'critical' characteristics of the SEM. What is essential/critical are those elements of the current SEM model that deliver electricity efficiently while successfully dealing with problems such as market power and ensuring adequate generation capacity. Whether these elements are relevant in the future depends on the degree to which the problems that the current SEM was designed to resolve are still pertinent in 2016 and beyond and, if so, the extent to which they are addressed by the European Target Model. Of course, if both the current SEM model and the European Target Model solve a particular problem then retaining the SEM is likely to make sense if it is consistent with the European Target Model and there are non-trivial implementation costs of moving from the current SEM model to this particular aspect of the European Target Model.¹¹

In addressing the way forward we divide the response into five sections, including the introduction. Section II sets out the problems and challenges that the SEM were designed to address, together with the extent to which participation in the internal EU electricity market and other recent and expected developments address these problems. Fresh challenges that have emerged since the creation of the SEM in 2007 or are likely to emerge are also discussed. Section III briefly outlines the SEM Committee proposals. It draws very heavily on EirGrid *et al* (2012) and SEM Committee (2012). Section IV evaluates the proposals, based on the conclusions to Section II. Section V concludes.

II. Challenges Facing the Wholesale Electricity Market: Past, Present & Future

The current SEM model was designed to provide wholesale electricity in an efficient and cost-reflective while at the same time addressing three major problems: neutralising the market power of incumbents; creating conditions to encourage and facilitate entry; and, ensuring adequate generation capacity.¹² These, as noted above, are related problems. Ensuring adequate generation

⁹ This issue would, of course, have to be addressed irrespective of whether the SEM had to comply with the European Target Model.

¹⁰ One of the consultation questions set out by the SEM Committee (2012, p. 31) falls into this category.

¹¹ This statement holds to the extent that the parts of the SEM model can be varied without effecting the functioning of the system as a whole.

¹² This reflects the objectives of the SEM as developed by the regulators in Northern Ireland and the Republic of Ireland (see footnote 6 above) and the great stress is laid by the State and the UK government on ensuring that the wholesale electricity market is competitive. (See Governments of the UK and Ireland, 2006, p. 6).

capacity, besides meeting security of supply concerns, also makes it harder for incumbents to exercise market power as does encouraging entry. We briefly describe each problem, how the current SEM addresses the problem and how future developments in the wholesale electricity market are likely to influence matters. Attention then turns to one new challenge facing the wholesale electricity market in Ireland for 2016 and beyond, the large volume of renewable electricity, primarily wind, that is expected to come on stream.

Mitigating Market Power

Prior to the creation of the SEM in 2007, ESB accounted for substantial share of the generation capacity on the island of Ireland as well as owning and partially managing the transmission network in the Republic of Ireland. In 2003, for example, ESB owned 73 per cent of generation capacity in the Republic of Ireland and 58 per cent on an all-island basis.¹³ When combined with the considerable uncertainty faced by entrants as well as the long lead times for an entrant to be a viable competitor, this suggests that ESB had the potential to raise prices above costs on a sustainable basis. In other words, ESB had market power. This inference is strengthened by the finding that for 2003 ESB plant had the ability to set the market price 91 per cent of the time on a Republic of Ireland basis and 67 per cent on an all-island basis.¹⁴ It could, however, be argued that since ESB is publicly owned it would not exercise its market power, but instead follow cost-reflective pricing. However, ESB costs may be artificially inflated through inefficiency (e.g. over manning) and/or paying high prices for factor inputs (e.g labour), in part due to lack of competition.¹⁵ In other words, the supernormal profits that would have been earned by the exercise of market power may have become dissipated in costs that are too high.¹⁶

Market power is addressed in the current SEM model by:

- A *mandatory pool* under which all generation units above 10MW have to bid into the pool;

¹³ These data are taken from FitzGerald *et al* (2005, Table 6.1, p. 89). Note that the market share reported in the text underestimates ESB's market share because it does not take into account ESB's joint venture participation in Synergen.

¹⁴ Fitz Gerald *et al*, (Table 6.1, p. 89). The index used to determine whether ESB has the ability to set prices is the Residual Supply Index (RSI) defined as (System capacity(including import capability) – Uncommitted capacity of investigated generator)/Demand. An RSI above 120 per cent is taken to be a competitive market. For discussion see also CEPA (2010, p.18).

¹⁵ It is possible, of course, that ESB cost of capital could be lower than it otherwise would be because, implicitly at least, the State is guaranteeing its debt. However, since the onset of the recession in 2008 this is not a tenable argument, given the state of Ireland's sovereign debt. Furthermore there is always a danger that the low financing costs might be used as leverage to finance other investments which might be risky. This issue is discussed further below.

¹⁶ This issue is discussed in Fitz Gerald *et al* (2005, pp. 81-2) and Diffney *et al* (2009).

- A generation unit has to *bid a price* into the mandatory pool that reflects *short run marginal cost* (SRMC), which is essentially the cost of fuel; and,
- All generation units are stacked from lowest to highest based on SRMC, the *merit order*. Where demand meets supply determines the System Marginal Price (SMP).¹⁷ All generators at or below the SMP are dispatched by the TSO's in Northern Ireland (SONI) and the Republic of Ireland (EirGrid) and paid the SMP. Since the SMRC of plants that are dispatched will be below the SMP, these plants earn infra-marginal rents.

Such a set of rules, which are set out in the Bidding Code of Practice, make it difficult for a firm to strategically withdraw a unit from the merit order or to bid a too high a price, both of which can raise SMP through the exercise of market power.¹⁸ The system is transparent, so that entrants as well as regulators can observe/monitor market behaviour. A Market Monitoring Unit (MMU) enforces the SEM rules and determines how well the market is performing.

The three characteristics set out above to deal with the problem of market power are supplemented by two additional mechanisms: Directed Contracts (DCs) and the ring - fencing the generation and supply operations of ESB and Viridian. DCs reduce the incentive for generators with market power – ESB and Viridian - to raise prices above costs on the SEM (i.e. the spot market), since CER & NIAUR, the regulatory authorities, *direct* these generators to offer a certain volume of Contract for Difference (CfD) based on expected SEM prices reflecting appropriate fuel/CO₂ scenarios. If the firm with market power causes the SMP to be above this expected price it will have to pay the difference to the buyer of the DC.¹⁹ The ring fencing of the generation and supply operations of ESB and Viridian is designed to prevent the generation arm of these firms from offering more favourable deals to their supply arms to the detriment of competitors in the supply business.²⁰

These mechanisms were enhanced by a detailed legally binding agreement between the CER and the ESB, dated 27 April 2007, under which ESB agreement to close and/or divest certain power generation assets by 2010 (the CER-ESB Asset Strategy).²¹ These assets included 208MW of peaking

¹⁷ The SMP mostly reflects the SRMC. However, there is also an uplift which “is paid if a generator’s start-up and no-load costs are not covered by any infra-marginal rent” (CER, 2011a, p. 4).

¹⁸ These strategies are described in CER & NIAUR (2010a, pp. 9-10). They are not just theoretical. A case was brought by the European Commission against E.ON AG for strategic withdrawal of capacity on the Germany electricity market with a view to raising prices. For details see: http://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_39388. Accessed 18 April 2012.

¹⁹ For a discussion see CER & NIAUR (2010a, pp. 18-22). A CfD is a mechanism for hedging for fluctuations around the expected SMP. It shares risk between the generator (seller) and the buyer. If the SMP is above the price agreed in the CfD – the strike price - then the difference is paid by the generator to the buyer; if the SMP is below the strike price then the buyer pays the difference to the generator.

²⁰ For a discussion see CER & NIAUR (2010a, pp. 23-24).

²¹ For details see CER (2007, 2009) and CER & ESB (2007).

capacity, 1,300MW of other capacity and several sites that could be used for power generation. The purpose of the agreement was to reduce the market share of the ESB to 40 per cent, which is generally considered to be the lower limit, under competition law, of the market share of a dominant firm (Whish, 2009, pp. 176-178).

The issue of market power in the SEM has been carefully considered in a review by the CER & NIAUR (2010a, 2010b, 2011, 2012) together with a commissioned research paper (CEPA, 2010). However, the review not only considered the current state of competition in the SEM, but also ways in which competition could be improved or enhanced to 2020. The review found that there “had been no significant market power exercised in the spot market to date due to the relevant market power mitigation measures in place” (CER & NIAUR, 2012, p. 3). Nevertheless, the review found that ESB was still the largest generator, with an all-island market share of 46 per cent in 2011.²² Despite new entry and increased interconnection, concerns were expressed over the exercise of market power in the period up to 2020 (*ibid*, p. 3). Although these concerns are less than when the SEM was created, they are nevertheless of sufficient gravity that the CER and NIAUR decided to retain the various measures outlined above designed to mitigate market power. Thus the evidence suggests that market power issues are likely to remain salient for the foreseeable future. However, this needs to be qualified in three ways.

First, subsequent to the CER & NIAUR (2012) decision on market power, the Government stated that it intends to sell off some of the non-strategic generation capacity of ESB and the energy business of Bord Gais, but ESB is to remain a vertically integrated utility.²³ In the case of the ESB the Minister responsible for the sale has stated that one of the reasons for selling some of the non-strategic generation assets of ESB is “in order to reduce ESB’s market dominance and provide for greater competition in the electricity market” (Department of Public Expenditure and Reform, 2012b). In the review, noted above, CER & NIAUR (2011, p. 10) remark that they “consider that the sale of certain [ESB] generation units would provide market power benefits,” but point out that it is not within their remit, but rather that of the State. With respect to Bord Gais, which has been a new entrant into the wholesale electricity market by building new generation capacity, it is not clear that the sale will have a significant impact on the competitive environment. It is likely to take some years for these asset disposals to occur, but nevertheless the disposals are likely to occur within the time horizon relevant in considering complying with the European Target Model. However, competition concerns although less than they otherwise would be are still likely to be an important

²² CER & NIAUR (2012, p 15).

²³ Department of Public Expenditure and Reform (2012a).

consideration. Instead of concerns over a dominant firm, competition concerns would revolve around a tight oligopoly.

Second, under the Third Directive there are provisions for the unbundling for distribution system operators (DSOs) where this is part of a vertically integrated firm.²⁴ The provisions, in Directive 2009/72,²⁵ have been summarised by the Commission as follows:

- (a) legal unbundling of the DSO from other activities of the vertically integrated undertaking not related to distribution;
- (b) functional unbundling of the DSO in order to ensure its independence from other activities of the vertically integrated undertaking;
- (c) accounting unbundling: requirement to keep separate accounts for DSO activities (EC, 2010, p. 23).

The purpose of unbundling the DSO from the vertically integrated undertaking is to ensure that the DSO operates independently of the vertically integrated undertaking for reasons set out above concerning ring fencing. The DSO can be part of the transmission operator, providing that the transmission arrangements comply with one of the three effective transmission unbundling options discussed above.²⁶

The Minister for Communications, Energy and Natural Resources announced March 2008 that regulations would be introduced as required under EU law “establishing the independent ESB Subsidiary to undertake the Distribution Operator role of ESB Networks, which will further strengthen the open and transparent use of the networks by all parties” (DCENR, 2008). The relevant Statutory Instrument, S. I. No., 280 of 2008, set out the requirements for the creation of the independent ESB Subsidiary, with the CER charged with carrying out periodic reviews of the operation of the subsidiary company. It thus appears that the ring fencing that the CER and NIAUR have introduced as a mitigating market power measure will remain in existence to comply with the provisions of the Third (and earlier) Package.

Third, absent the market power mitigation of the SEM, the market power of incumbent generators would dramatically decline if Ireland became an integral part of the EU internal electricity market.²⁷

²⁴ For further discussion see Commission guidance, EC (2010, pp. 23-29).

²⁵ Chapter VI, Articles 24-29 of Directive 2009/72/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market for electricity and repealing Directive 2003/54/EC.

²⁶ Article 29 of Directive 2009/72.

²⁷ For this to occur it is necessary to pass the hypothetical monopoly test. Under this test if a hypothetical monopolist of electricity on the island of Ireland can profitably impose a Small but Significant Non-Transitory

Generators in other parts of the EU, notably Great Britain, either directly or indirectly (through brokers or intermediaries) would be able to sell electricity into the SEM. However, for this to be effective several conditions have to be satisfied: the building of sufficient interconnection capacity between the SEM and other EU electricity markets; a set of trading rules that minimises transaction costs so that there is not a large wedge between the price in the rest of the EU and the SEM; and, a competitive electricity market in Great Britain and the wider EU. The trading rules in the various parts of the Third Directive are intended to deal with the issue of transaction costs.²⁸ In the simulations conducted by CEPA (2010) as part of the above review by the CER and NIAUR, that take into account the two existing interconnector with Great Britain, measures to mitigate market power are still recommended. This seems sensible as previous work suggests that interconnector capacity needs to be substantially enhanced before Ireland/Great Britain can be considered one market.²⁹ It is unlikely that such additional interconnection capacity will be in place before 2025-2027, based on historical timelines.^{30,31} However, even if sufficient interconnection capacity was built there are competition concerns with respect to the Great Britain wholesale electricity market while it is not clear that enough interconnection capacity has been built between Great Britain and continental Europe for price convergence with the rest of the EU to be reached.³²

In sum, while the market power of ESB is likely to diminish over time due to asset disposals, and increased interconnection, it nevertheless remains the case for the foreseeable future mitigating market power is an issue that any all-island wholesale market will have to address.

Facilitating Entry

An important competitive element in most markets is the entry of new competitors, particularly when it occurs via the building new generating plant. The threat of entry is likely to constrain incumbent generators not only in raising price above marginal cost, but also in providing an incentive for efficient production, given that an entrant may not incur many of the legacy costs of

Increase in Price (SSNIP) then the island of Ireland is a separate geographical market; if it cannot impose such a price increase, because suppliers from outside Ireland find it profitable to sell into Ireland, then Ireland is part of a wider EU market. For further discussion of the SSNIP test see Whish (2009, pp. 29-39).

²⁸ For further discussion see Gorecki (2011, pp. 63-67).

²⁹ For further discussion see Gorecki (2011, pp. 19-21).

³⁰ Government could, of course, accelerate the time required to complete an interconnector. For further discussion of the issue see Gorecki (2011, pp. 98-99).

³¹ In considering whether SEM is part of the EU internal market, the answer is not a simple yes or no, since the answer will depend on the time of day or night. Hence for some time periods the SEM might be part of the EU internal market while for others it is not. Even in these latter time periods the issue of how close the prices are would need to be considered in judging the degree of integration.

³² See SEM Committee (2012, pp. 68-69) and Gorecki (2011, pp. 78-81).

incumbents³³ and have access to the latest technology. However, for entry to be a credible threat it is important the structure and rules of the SEM facilitates entry.

Entry is addressed in the current SEM model by:

- *Regulatory Credibility.* Generators are long-lived assets – 20 years or more – with few alternative uses. Hence an investor requires certainty that the SEM rules will not change in unexpected or unanticipated ways. The SEM is enshrined in legislation in the UK and the Republic of Ireland and a Memorandum of Understanding between the two governments.³⁴ When changes are made to the SEM – as with the current consultation to ensure compliance with the European Target Model – this is done in an open, transparent and predictable manner. This creates regulatory credibility and certainty, which in turn leads to lower capital costs of financing building a new plant.³⁵
- *Market Access.* In order for a generator to be able to supply the market it needs access to the transmission system. A vertically integrated incumbent generator may decide to impede the new entrant by various delaying tactics as well as charging high connection fees. This issue is resolved through responsibility for the control and management of the transmission network being assigned to EirGrid, which is separate from the vertically integrated firm, ESB, which still retains ownership of the network. In addition the CER oversees the relationship between ESB and EirGrid to ensure that there is open, non-discriminatory access to the transmission network.
- *Finding Customers & Pricing Structure.* To be successful a new entrant not only requires access to the transmission network, but also customers. Under SEM the new entrant is not required to find customers or to sign long term agreements to match the life of the generator. This reflects the fact the pool nature of the SEM. If a new entrant is efficient – which would be the expectation since it would have access to the latest technology and be able to make investment decisions based on more up to date forecasts of fuel costs than incumbent generators – then it will be dispatched by the market operator and receive the SMP. Since the SMP will tend to be set by a less efficient plant, the new entrant will earn an infra-marginal rent which will contribute towards capital costs. It will also receive capacity payments, discussed below.

³³ Especially if the incumbents have been protected from competition.

³⁴ For details see: <http://www.dcenr.gov.ie/Energy/North-South+Co-operation+in+the+Energy+Sector/>. Accessed 20 March 2012.

³⁵ The same argument also applies to an incumbent considering building a new plant.

Hence the SEM has been designed to encourage entry, by lowering the risk of entry, providing a ready market for the output of the entrant and a pricing structure that contributes to capital costs.

The evidence suggests that the SEM has been successful in attracting new entrants (CER & NIAUR, 2010a, Figure 16, p. 35). Endesa, for example, entered in 2009 by buying three generators from ESB as part of the CER-ESB Asset Strategy to reduce ESB's market share.³⁶ Bord Gais built a gas fired 450 MW generation plant at Whitegate Co Cork that came on stream in 2010. SSE has built 500MW of wind generated electricity.³⁷ Given that market power is likely to be an issue in the wholesale electricity market in the foreseeable future, then a corollary is that the rules should continue to facilitate entry. There are, nevertheless a number of developments that bear on the issue of entry.

First, a major thrust of the Third Package is the unbundling of the transmission system from upstream generation and downstream supply. As the Directive 2009/72 states,

[W]ithout effective separation of networks from activities of generation and supply (effective unbundling), there is an inherent risk of discrimination not only in the operation of the network but also in the incentives for vertically integrated undertakings to invest adequately in their networks (*ibid*, Recital 9).

The discrimination reflects the incentive for the vertically integrated electricity undertaking to deny network access to domestic competitors and not to invest interconnection and the development of protocols for trade between the electricity systems of Member States, thus denying access to competitors located in other jurisdictions.³⁸ As noted above in Ireland the transmission system is controlled and managed independently by EirGrid, but ownership is retained by the ESB. However, it is proposed under the Third Package to increase the degree of separation.

Directive 2009/72 offers Member States three alternatives of securing unbundling, what is referred to as 'effective unbundling'.³⁹ Only two are relevant to Ireland:⁴⁰

- Ownership unbundling under which each undertaking which owns a transmission system and acts as a transmission system operator shall not have either direct or indirect control over generation or supply and persons are not allowed to appoint persons to a board of the

³⁶ Endesa's three plants accounted for 14 per cent of all-island installed capacity in 2009 and 9 per cent in 2010. For details see CER (2009; 2010a, Figure 16, p. 35).

³⁷ It accounted for 4 per cent of all-island installed capacity in 2010. (CER, 2010a, Figure 16, p.35).

³⁸ There have been a number of EU competition cases of concerning incumbents inhibiting flows of electricity between Member States. See, for example, the case of pricing in Sweden. For details see: http://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_39351. Accessed 18 April 2012.

³⁹ For an extensive discussion of these options see the Commission guidance on unbundling EC (2010).

⁴⁰ The third is Independent Transmission Operator (ITO). For details see Directive 2009/72/EC and EC (2010).

transmission system or transmission system operator if they also have either direct or indirect control over generation and supply. Hence the owner and operator of the transmission system are independent of generation and supply.

- Independent System Operator (“ISO”).⁴¹ Under this option the ISO, that does not own the transmission system, nevertheless acts as the transmission system operator. As with the ownership unbundling option, the ISO should be independent of upstream and downstream activities in electricity. The ISO is responsible for “granting and managing third-party access, including the collection of access charges, congestion charges and payments under inter-TSO compensation mechanism ... The ISO is also responsible for operating, maintaining and developing the transmission system” (EC, 2010, p. 12). The transmission owner has no responsibility in these matters. The National Regulatory Authority (NRA), which is the CER in the case of the Republic of Ireland, has a large number of responsibilities in relation to the ISO option.⁴²

Irrespective of which option is selected it has to be certified by the NRA – the CER in the Republic of Ireland and the NIAUR in Northern Ireland - as meeting the conditions set out in Directive 2009/72.

The cleanest method of achieving the goal of separating the transmission system from generation in a vertically integrated firm is through ownership unbundling,⁴³ because under the ISO option the vertically integrated electricity undertaking retains the incentive to engage in exclusionary conduct as well as links with the ISO. As a result it requires elaborate and costly regulatory measures to be put in place policed by the NRA to ensure that the vertically integrated electricity undertaking does not have the ability to engage in exclusionary conduct. Ownership separation also has the advantage, compared to the ISO option, that the transmission asset base cannot be used as leverage to engage in risky investments which may lead to a rise in the cost of capital for funding transmission investments (Diffney *et al* 2009).⁴⁴ In other words, electricity customers would be subsidizing these risky activities. Furthermore, in an Irish context it has been suggested that greater separation will lead to more cost-effective provision of building and maintaining the transmission system (*ibid*, p.

⁴¹ This option is open a Member State providing that on 3 September 2009 the transmission system belonged to a vertically integrated undertaking, a condition satisfied in Ireland.

⁴² These include: such as monitoring communications between the ISO and the transmission system owner and acting as a dispute settlement authority between the ISO and the transmission system owner.

⁴³ This is not to imply, of course, that the transfer of assets is not a complex task that requires careful thought.

⁴⁴ This assumes that under ownership unbundling that the transmission operator cannot invest in other activities. EirGrid’s responsibilities include being the TSO in the Republic of Ireland, the all-island market operator and responsibility for the East-West Interconnector. For EirGrid to extend its activities further would require Ministerial approval. For details see EirGrid (2011) and S.I. No. 445 of 2000 — European Communities (Internal Market in Electricity) Regulations, 2000. The latter established EirGrid.

482). It is for these reasons that in such situations structural solutions are considered better than behavioural ones. Thus at the EU level the Commission has argued for ownership unbundling (Regulation 2009/72, Recital 11), while in Ireland the Competition Authority (2004) and independent observers (e.g., Diffney *et al*, 2009) have also argued consistently for this option.⁴⁵

It appears that the ISO solution is the favoured option for Ireland. In announcing the sales of ESB generation assets, the Minister stated that “the Government reaffirms its commitment to the retention of ESB as a vertically integrated utility in State ownership as at present, notwithstanding the decision to dispose of some of its non-strategic power generation capacity” (Department of Public Expenditure and Reform, 2012a). If ESB’s ownership of the transmission system were reassigned to EirGrid, then ESB would no longer be a vertically integrated utility. The move to increase the separation between the transmission network owner, ESB, and EirGrid strengthens the existing arrangements thus provides reassurance to potential entrants.

Second, it could be argued that since there is currently excess generation capacity and there is less need to be concerned about encouraging entry. However, as we shall in the discussion below on ensuring adequate generation capacity, this is not the case when considering a medium to longer term time horizon.

In sum, the SEM has created conditions that encourage entry via acquisition of existing capacity and the building of new capacity. In the future entry will continue to be an important factor influencing incumbent behaviour, despite the presence of excess capacity in the short term.

Ensuring Adequate Generation Capacity

Electrical generation capacity consists of large lumpy investments that take a considerable time to plan and connect to the transmission system.⁴⁶ Hence mechanisms need to be in place in order to ensure that there is sufficient capacity available, especially at peak times. If sufficient capacity is not available then there are likely to be very pronounced price spikes at such times. When electricity supply was the responsibility of a publicly owned vertically integrated monopolist, planning took place within the firm to ensure sufficient generation capacity.⁴⁷ However, with the move to a decentralised market and a reduction in the market share of the former vertically integrated monopolist, that was no longer the case. Mistakes in forecasting and timing might be made by firms

⁴⁵ International evidence also supports ownership unbundling in terms of promoting competition. See Pollitt (2008).

⁴⁶ The discussion in this paragraph is based in Fitz Gerald et al (2005, pp. 57-58, pp 65-69).

⁴⁷ This did not mean, of course, that problems did not arise under such a system. For example, price changes were decided by the relevant Minister, which could result in too low prices increasing demand and making investment in new generation capacity problematic.

resulting in shortages of capacity. The provision of information by the regulatory authorities and the expectation of very high peaking prices might, to some degree, overcome this problem. However, there is always a danger that regulators will cap prices should they rise to high levels. Furthermore, in the all-island oligopolistic electricity market there is an incentive for generators to under invest so as to ensure high prices. In other words, the SEM price will be set by a quite inefficient plant resulting in substantial infra marginal rents. In order to ensure adequate generation capacity there are a number of mechanisms contained in the SEM. These include encouraging entry discussed above. However, here we will concentrate on the capacity payments mechanism within the SEM rules.

The Capacity Payment Mechanism (CPM) payments are made to generators for their availability, irrespective of whether or not they are dispatched. A fixed pot is set at the beginning of the year. Furthermore the CPM payments are higher the narrower the margin between supply and demand – in other words at the peak when prices are most likely to spike. The CPM is designed to contribute towards the fixed costs of a Best New Entrant, which is usually a peaking plant. Furthermore “at least a significant proportion of the generator’s fixed costs are covered by capacity payments. (CEPA, 2010, p. 51). Explicit capacity payment mechanisms are unusual in the EU wholesale electricity models (CER & NIAUR, 2010a, p. 30). Although most of the return to generators comes from SMP payments, CPM is substantial – around a sixth in 2007-08 and a fifth in 2009-10.⁴⁸ In terms of the way forward a couple of things need to be considered.

First, it could be argued that less attention should be paid to CPM given the substantial level of excess or spare capacity. In 2011 this varied, for example, from 28 per cent in January to 48 per cent in June, where excess capacity is measured at the peak (Table 2.1). However, this table needs to be interpreted with care. To a considerable extent this spare capacity is cyclical. As the economy recovers the spare capacity will be utilised. A substantial amount of capacity will be decommissioned between by 2025 – 2,961.5 MW according to Diffney *et al.* (2012, Table 3, p. 10).⁴⁹ In contrast, expected new planned capacity is only 438 MW by 2025, but in order to meet anticipated demand by 2025 a further 2,220 MW of capacity will be required, including the anticipated replacement of Moneypoint (*ibid*, Table 4, p. 10).

The availability of CPM is likely to be an important consideration in estimating whether and when a replacement should be made. Changing the CPM rules in response to short-term considerations neglects to take into account the fact that that investment in new and existing capacity in the SEM is

⁴⁸ See Gorecki (2011, p. 72, fn. 176). Proportions expressed in reference to total SMP and CPM payments.

⁴⁹ This, in turn, is consistent with EirGrid’s estimates of generation capacity (Diffney *et al.*, 2012, p. 10).

undertaken on the assumption that the rules of the game do not change once investments have been made, particularly in response to short-term fluctuations. It is therefore important that to ensure regulatory credibility that the CPM remain and if they are to be changed that such changes should only be applicable to future generators.

Table 2.1

Excess Capacity in the Electricity Generation System, Republic of Ireland^a, 2011

Month^b	Dispatchable Margin/ Dispatchable Capacity^c (%)	Peak Demand (MW)
January	27.9	4644
February	35.7	4427
March	40.7	4265
April	43.6	3683
May	42.7	3501
June	48.5	3479
July	44.4	3438
August	39.8	3385
September	45.9	3610
October	38.4	3824
November	34.7	4276
December	34.7	4538

a. The data source refers to the Republic of Ireland, rather than the SEM.

b. The data source presents weekly generation system information. For each month the first week is selected to estimate excess capacity.

c. Dispatchable margin is the difference between dispatchable plant and peak demand. Measured at peak demand.

Source: CER, *Generation System Performance Report*, various issues

Second, it could be argued that with interconnection and participation in the EU internal market, reliance can be placed on imports from other parts of the EU to alleviate peaks in demand in Ireland. However, as shown above, it is likely to be some time before interconnection with the rest of the EU will bring about price convergence. Even if there were price convergence there is still a risk that supply via the interconnection would be interrupted, thus necessitating sufficient all-island capacity to offset the shortfall. The risk would depend on the number and capacity of the interconnectors.

Finally, it should be noted that in markets which much more closely resemble the European Target Model, such as BETTA in Great Britain, there are concerns over shortfalls in capacity and moves to design a capacity payment mechanism.⁵⁰

In sum, the capacity payment mechanism has been an important mechanism for remuneration of the capital costs of new generators and encouraging capacity to meet peak demand. The substantial increase in excess capacity occasioned by the cyclical decline in demand does not change the case for the capacity payment mechanism when considering the longer term during which demand will increase and a number of generation plants will need replacing.

Renewable Electricity: Wind

Ireland like other EU Member States has to meet certain targets for renewable energy by 2020. These translate for the electricity sector for Ireland into having 40 per cent of electricity consumption from renewable sources, virtually all of which will be from wind, mostly onshore.⁵¹ Forty per cent is, of course, an average. At certain times, such as a summer valley of demand at night, renewable sources may be able to supply 100 per cent of the demand. At the present time that is not technically possible, due to various technological constraints such as reduced synchronous inertia (EirGrid & SONI, 2010, 2011). The maximum share of electricity supply that can be accounted for from renewable sources is currently 50 per cent, above which it is deemed that there is an unreasonable threat to the security of the system (EirGrid & SONI, 2011, p. 8) but this is expected to increase to 60-75 per cent (*ibid*, p. 8).

The presence of large scale wind generation poses two problems that any model of the wholesale market electricity will have to resolve. *First*, with so much wind there will be a need for conventional generation capacity that is flexible in that it can quickly supply electricity to the system (ramping). This reflects the fact that the wind does not always blow and can be suddenly come becalmed; with the result that power will be needed to offset the shortfall because of the decline in renewable electricity. Thus there will be a need to ensure that appropriate pricing systems are introduced in order to ensure sufficient ramping capacity, an issue discussed by EirGrid & SONI (2011). *Second*, under the pricing rules for SEM, prices are set ex post on an unconstrained basis. In other words, the SMP is set without regard to the technological and security constraints on the system. If, for example, there was sufficient wind available (although not dispatched for reasons set out above) to account for 100 per cent of demand then the SMP would be zero. If this were to happen on a consistent basis conventional power stations would receive only CPM, while wind generators would

⁵⁰ For a discussion see Gorecki (2011) and references cited therein.

⁵¹ For a discussion see Gorecki (2011, pp. 37-49).

also receive various renewable support payments. Thus any wholesale electricity market model will need to accommodate pricing mechanisms to ensure adequate conventional generation capacity to deal with the variability of renewable sources of electricity.

Conclusion

The SEM has been successful in meeting the challenges of mitigating market power, facilitating entry and ensuring adequate generation capacity. The magnitude of these challenges has been reduced subsequent to the creation of the SEM because of increased interconnection, the reduction in the market share of ESB, new entry and the cyclical decline in demand. However, although the magnitude of these challenges has been reduced and future developments suggest a continuation in this trend, it nevertheless remains the case that these challenges are likely to be present for the foreseeable future. It is only when the SEM is an integral part of the internal EU electricity market that market power and facilitating entry will be minor issues, providing that market is competitive. However, that is not likely to occur for 10 to 15 years at a minimum. This suggests any wholesale market model for the all-island market will have to continue to address these challenges for this period.

III. The Alternative Scenarios

The SEM Committee put forward four variants of the SEM and one proposal to replace the SEM as alternatives to meet the requirements of the European Target Model. The purpose of this section is not to provide a detailed description of these alternatives, but rather to highlight their major characteristics. The discussion of the four variants draws heavily on the SEM Committee (2012, pp. 32-47) and the EirGrid *et al* (2012, pp. 21-33; p. 62-118), while the issue of a replacement for the SEM is addressed in SEM Committee (2012, pp. 57-70).

We first deal with the four variants. Since there are a number of common characteristics across all four variants these are first set out before details of each variant are presented. The common characteristics are contrasted with the current SEM model. A summary comparison of the European Target Model and the current SEM model is presented in Table 3.1. Attention then turns to the replacement of the SEM by a new model. As we shall see, some aspects of these alternatives, especially the replacement of SEM, have as yet to be fully fleshed out in EirGrid *et al* (2012) and SEM Committee (2012). This is in keeping with the current consultation exercise not being the final word, but more part of an ongoing process.

Table 3.1
A Comparison of the SEM and the European Target Model

Characteristic	SEM Design	European Target Model
Market Design	Mandatory Pool	Voluntary Bilateral contracts
Trading Day	06AM for 24 hrs	23PM for 24 hrs
Trading Period	30 minutes	1 hr (for Day Ahead and Intra-day contracts).
Gate Closure	Trading Day – 20.5 hrs (EA1)	Trading Day – 12 hrs (Day – 1)
Offers/Bids	Generally Complex Offers (with Commercial & Technical Components).	Simple Offers & Bids Sophisticated Offers (Block Bids, Linked Bids, Minimum Revenue, Energy Ltd).
Intra-Day	2 Implicit Auctions	Continuous Implicit Trading
Form of Dispatch	Central Dispatch	Self Dispatch
Firm Pricing	Ex-post	Day Ahead & Intra Day
Financial Contracts	Limited contracts market	Forward financial & physical markets
Cross Border Settlement	Interconnector Units settle cross border trades	Shipping agent settles cross border trades
Capacity Payment	Explicit Capacity Payments	Not considered in the FG CACM

FG CACM = Framework Guideline Capacity Allocation and Congestion Management

Source: SEM Committee (2012, Table 2, p. 24).

Four Variants of the SEM Model: Some Common Characteristics

The four variants of the current SEM model share certain common characteristics.⁵² In each case we contrast the situation with the current operation of the SEM.

First, consistent with the European Target Model there are four different markets for which rules have to be designed: forward, which clears before the day-ahead stage; day-ahead, which is capable of being coupled through implicit auction with other EU day-ahead markets; intraday, which is also capable of being coupled implicitly with other EU markets; and balancing. These four markets are differentiated in relation to the time when electricity is sold by a generator for delivery on the trading day broken down into half or one hour periods. The furthest away from delivery is the forward market while the balancing market operates in real time. In contrast, under the SEM at present there is no forward or balancing market and limited intraday trading.

Second, under each variant a supplier must participate in at least one of the four markets. This allows a generator to select the most appropriate market to participate in given their technical characteristics. For example, the SEM Committee (2012, p. 21) cited the example of slow moving base load plant that is much more suited to the forward market than the day-ahead or intraday

⁵² This is based on EirGrid *et al* (2102, pp. 21-27).

market. However, the generator retains discretion in deciding the extent to which they participate in any particular market. Under the SEM at present all generators must submit bids for the day-ahead market and can rebid for the intraday market

Third, each generator is not required to offer all of its available capacity into the market(s) in which it decides to participate.⁵³ Indeed, it could submit bids that were infeasible and hence effectively withdraw from the market. Under the current SEM arrangements generators have a strong incentive to submit bids for all of their capacity for a particular trading day due to the CPM. Hence if an appropriately designed CPM forms part of all four variants then there will continue to be incentives to bid in capacity. However, this issue has, as yet, to be addressed.

Fourth, central dispatch, as opposed to self dispatch, is a feature of all variants.⁵⁴ In this respect there is no difference with the current SEM arrangements. It is partly for this reason that generators are required, as at present, to submit commercial and technical information including forecast availability. As the EirGrid *et al* (2012, p. 21) state, “[U]ltimately if the System Operator decides the generator is required a set of relevant data must be available to make this decision with.”

Fifth, prices in all of the markets are on any ex ante basis, except for the balancing market where they are usually but not always on an ex post basis. It is anticipated that there will be a single (but not necessarily the same) market price in the forward and day-ahead markets, but several prices in the intraday market.⁵⁵ This contrasts with the current situation in the SEM where there is a single SMP price paid to all generators calculated on an ex post unconstrained basis.

Sixth, the issue of how generators set prices is not discussed. It thus appears that generators are free to set prices based on their own best judgment as to what will maximise profits. This contrasts with the current SEM model under which offers are made based on a generator's short run marginal cost (SRMC), essentially its fuel costs. However, the possibility exists that SRMC could be retained under all the variants.

Seventh, there is no provision for capacity payments in any of the four variants. This contrasts with the current SEM model where there is a CPM, as noted in the previous section. However, it is intended to address this problem with a capacity payment mechanism of some kind.

⁵³ However, generators are required to provide technical information concerning their availability should the system operator need to dispatch them for system security reasons.

⁵⁴ The rationale for the retention of central as opposed to self dispatch is set out in SEM Committee (2012, p. 33).

⁵⁵ However, under Variants #1 #3 where there are bilateral contracts in the forward market there is unlikely to be a single price.

Eighth, a shipping agent is required, under all of the options, in order to ensure correct financial settlement of trades between different geographical markets. In the day-ahead and intraday markets all trades will be coordinated via local market operators such as SEMO and therefore there is a need for a single shipping agent between markets to settle imports and exports.⁵⁶ In the case of an export for example the shipping agent will purchase electricity from the SEM and will be settled by the market operator as a payment to a generator and a charge to the shipping agent.

Ninth, under all the variants interaction between the all-island market and the wider EU market occurs on the day-ahead and intraday markets.

- The *day-ahead* market sees participants submit bids and offers to the market operator, who will then submit feasible bids⁵⁷ to the single European price coupler for inclusion in its pricing algorithm.⁵⁸ Firm day-ahead prices and quantities would be issued back to the market operator. For each zone, such as the SEM, the market price would be set and, given this price, the trades that would take place. Such information would then be published, together with all the bids/offers made.
- The *intraday* market participants will make bids and offers to the market operator on a continuous basis. Feasible orders will be collected and submitted by the market operator and submitted to the Shared Order Book Function (SOBF) which is managed at the European level. In conjunction with the Capacity Management Model (CMM) that takes into account capacity constraints between different markets (e.g. limited interconnection relative to demand), the SOBF will make use of a single pan-European algorithm matching energy sales orders (generation bids) to energy purchase orders (supplier offers), possibly on a first-come-first-served basis. The algorithm has the best prices come first – highest buy price and lowest sell price (i.e. maximising consumer and producer surplus).⁵⁹ A shipping agent will be required to ensure appropriate settlement of trades across different markets.

In the day ahead market the pricing algorithm sets a single price per zone (e.g. the all-island market) by simultaneously solving for the equilibrium price and quantity based on supply and demand; the intraday market is more akin to matching a series of bilateral trades at particular points in time.

⁵⁶ The shipping agent in other EU markets is often the TSO.

⁵⁷ This means that the generator must be able to supply the electricity in the timeframe bid. For example, if it bids more than 100 per cent of its capacity, then that is not feasible or if it bids to supply electricity in the next trading hour but needs 12 hours to start up then that would not be feasible.

⁵⁸ According to Section 3.1 of the CACM FG the algorithm will be “based on the marginal pricing principle.” (ACER, 2011, p. 9).

⁵⁹ The same approach is used in the price coupling algorithm used in the day-ahead market.

Tenth, it is anticipated that most trade will take place in the forward and day-ahead markets. Use of the balancing market would be discouraged through penal prices which would incentivise generators to deliver the quantities contracted. Under the SEM all generators are required to bid into the day-ahead market.

Eleventh, there is a considerable degree of transparency in terms of information concerning bids and offers under all the variants, except where bilateral trading is allowed – in variants # 1 and 3. A high degree of transparency is consistent with the current SEM model.

Variant #1: Bilateral Trades, Couple on EA1⁶⁰

Variant #1, which is summarised in Table 3.2, sees the *forward* market organised through bilateral contracts. This variant allows the explicit use of IC capacity rights in advance of day-ahead implicit auctions. Under Variant #1 there may be limits placed on the extent which the forward market can be used, such as confining access to the holders of physical transmission rights (PTR) on interconnectors. Indeed, it might be decided that forward trades would be set to zero so that all trade would go through the day-ahead and intraday markets. The *day-ahead* market sees participants submit bids to the market operator who will then submit feasible bids together with offers to the single European price coupler for inclusion in its pricing algorithm. Firm day-ahead prices and quantities would be issued back to the market operator. Such information would then be published.

Table 3.2

Variants of the SEM Model: Option #1 Bilateral Trades, Couple on EA1

Timeframe	Market/Trading Rules
Forward	Bilateral trades
Day-Ahead	Couple on EA1 ^a
Intraday	Implicit continuous with no implicit auctions
Balancing	Imperfections, real-time market

a. EA1 = 9 am on D-1.

Source: EirGrid *et al* (2012, p. 28).

In terms of the *intraday* market, participants will make bids into the market operator on a continuous basis. Feasible orders will be collected and submitted by the market operator to the SOBF, where in conjunction with the Capacity Management Model (CMM), purchasers and sales will

⁶⁰ This discussion is based on SEM Committee (2012, pp. 34-39) & EirGrid *et al* (2012, pp. 28-29 and pp. 63-72).

be matched on a first-come-first-served basis. A shipping agent will be required to ensure appropriate settlement of trades across different markets. The *balancing market* considers contracted quantities from the three previous markets to be firm. To ensure the quality of information available for the system operators in terms of formulating economic dispatch of the system, generators are required to submit complex commercial offers to the balancing market. If a generator is unable to meet its contracted position these offers will be used to determine prices in the balancing market. The generator will be charged the difference between the contracted quantity and the actual quantity delivered.

Final settlement in the SEM will be based on the result of the four markets, with bilateral contracts settled outside the SEM. Depending on the volume trade settled in the bilateral market, this could see a marked decline in the collateral requirements of the SEM.

Variante #2: Forward Pool, Couple on EA2⁶¹

Variante #2, details of which are presented in Table 3.3, envisages a *forward* market that is a voluntary pool. Participants would submit complex commercial and technical offers for their generation as under the existing Trading & Settlement Code. Purchasers would submit single simple price/quantity pairs. The forward voluntary pool would function like the current SEM, with generators ranked in merit order with no modelling of system constraints. On completion of the EA1 run, prices and quantities would be firm and published by the market operator. The price would not include an uplift, which is necessary for generators to cover their running costs. The price would be calculated ex post for all participants irrespective in which timeframe they traded. The *day-ahead* market, which would couple on EA2, since the forward market couples on EA1, is also a voluntary market. Feasible bids would be transferred to the single European price coupler for inclusion in the price coupling algorithm. The results would be published by the market operator. The day-ahead market operates the same as in Variante #1.

In the *intraday* market, trading occurs through the submission of bids to the market operator. Feasible bids are collected and, together with offers, submitted to the SOBF where in conjunction with the CMM, purchases and sales are matched on a first-come-first-served-basis. On the *balancing* market as with the other options, a complex set of commercial and technical offer data is required by a specified gate closure. The TSOs make use of these incremental and decremental prices to balance the power in real time. Generators unable to meet their contracted positions would be required to pay, as under Variante #1, reflecting the difference between their contracted

⁶¹ This draws on EirGrid *et al* (2012, pp. 30-31 and pp. 73-83) and SEM Committee (2012, 39-43).

and actual deliveries. An alternative would be to determine the balancing price on an ex post basis, which would be estimated on the basis of perfect hindsight rather than in real time. However, there may not be a large difference between the two methods of pricing in the balancing market.

Table 3.3

Variants of the SEM Model: Option #2 Forward Pool, Couple on EA2.

Timeframe	Market/Trading Rules
Forward	Firm Forward Pool
Day-Ahead	Couple on EA2
Intraday	Implicit continuous with implicit auctions/implicit continuous with no implicit auctions
Balancing	Imperfections, ex-post market

a. EA2 = 11:00 on D-1.

Source: EirGrid *et al* (2012, p. 30).

All markets would be settled ex post as part of the SEM. This would mean that collateral requirements would continue to be on gross quantities of the combined markets that make up the SEM.

Variant #3: Bilateral & Forward Pool; Couple on EA2.⁶²

Under Variant #3, details of which are presented in Table 3.4, the *forward* market combines elements of Variant #1 and #2 with the result that there are two opportunities to trade in this market, sequentially not simultaneously. First, bilateral trading which would be completed in D-2. Second, a forward pool to which participants would submit complex commercial and technical offer data into the pool. Once the gate closed for the bilateral trading had taken place the contracted quantities would be imported into the forward pool. The forward pool assumes that all bilateral contracts are for the least cost quantities. Any supplier offers would be in addition to this already contracted in the bilateral trading. Participation in the two markets would be voluntary.

As soon as the forward pool is cleared and the results published, then submissions to the *day-ahead* market would be examined in terms of feasibility. Bids would be collected by the market operator, and if feasible, passed on the single European price coupler. Firm quantities and prices are returned and published to the participants, including the shipping agent and the system operators. The *intraday* market bids would also be assessed for their feasibility. The ability to integrate within day

⁶² This draws heavily on EirGrid *et al* (2011, pp. 31-32 and pp. 85-90) and SEM Committee (2012, pp. 43-45).

auctions into this variant is dependent on the liquidity of the earlier forward pool. If trade moves to the bilateral contracts market then there would be little benefit to additional within day auctions. Hence such auctions are not considered appropriate. Finally the *balancing* market incremental and decremental quantities would be calculated as set out in other options.

Table 3.4

Variants of the SEM Model: Option #3 Bilateral & Forward Pool, Couple on EA2.

Timeframe	Market/Trading Rules
Forward	Bilateral Trades & Forward Pool
Day-Ahead	Couple on EA2
Intraday	Implicit continuous with implicit auctions/implicit continuous with no implicit auctions
Balancing	Imperfections, real-time market, ex-post market

a. EA2 = 11:00 on D-1.

Source: EirGrid *et al* (2012, p. 30).

Final settlement in the SEM would be based on the results of the forward pool, day-ahead, intraday and balancing markets. Bilateral arrangements would be settled between the counterparties to the trade outside the SEM. As in Option #2, because this option retains a number of elements similar to a pool approach, so that ex post pricing can be used in the balancing market rather than real time pricing.

Variant #4: No Explicit Forward Market; Couple on CfD Auction.⁶³

The final variant of the SEM is #4, details of which are presented in Table 3.5. The intention here is to retain as much of the SEM as possible and insert an interface between the SEM and the European systems through arrangements that are similar to the current contracts for difference (CfDs). This would apply at both the day-ahead and intraday market.

There is no explicit *forward* market except those that exist already – explicit capacity auctions across the interconnectors and trading forward (CfD). As at present generators submit offers into EA1. As in current arrangements this would remain an indicative schedule with the exception of ICs trades that would remain fixed at this stage.

⁶³ This draws heavily on EirGrid *et al* (2012, pp. 32-33 and pp. 91-98) and SEM Committee (2012, 45-47).

Table 3.5

Variants of the SEM Model: Option #4 No Explicit Forward, Couple on CfD Auction.

Timeframe	Market/Trading Rules
Forward	No explicit forward arrangement
Day-Ahead	Couple on CfD auction
Intraday	Implicit continuous with implicit auctions
Balancing	Imperfections, ex-post market

a. EA2 = 11:00 on D-1.

Source: EirGrid *et al* (2012, p. 32).

In the *day-ahead* market generators and suppliers would submit offers and bids for the coupled implicit auction. Participation would be voluntary. Bids and offers would be sent to and matched by the European central coupler. The prices and quantities would be returned by the coupler as under other variants. However, the crucial difference with the other variants is that buyers and sellers would enter into CfD. The strike price would be the coupled price with the reference price the ex post SEM price (i.e. SMP). Thus if, for example, the SMP exceeded the strike price the seller would pay the buyer the difference between the two prices. Quantities would be firm and positions guaranteed via clearing.

In the *intraday* market, bids and offers would be submitted by generators and suppliers on a continuous basis and these would be submitted by the system operator to the pan-European SOBF. This continuously matches offers and bids and matched trades would be sent back to each zone (e.g. the all-island market) to settle accordingly. These prices and quantities would be the strike prices of CfDs in a similar manner to those traded at the day-ahead stage. Firm cross border flows from continuous trading would need to be included in the ex-post SEM schedules. Finally, in the *balancing* market, ex post pricing would take place as it currently does in the SEM and CfDs would be settled outside the SEM, as is currently the situation.

Replacing the SEM: a 'Clean Slate.'⁶⁴

An alternative to trying to adapt the current SEM to the European Target Model is to abstract from the current model and consider de novo what is the most appropriate all-island market for wholesale electricity. To a considerable degree, of course, this is a rerun of the debate over the creation of the SEM in 2007. As the SEM Committee (2012, pp. 61-62) point out “the basic choice for the day ahead and intraday wholesale electricity market is between a self-scheduled bilateral

⁶⁴ This discussion draws heavily on SEM Committee (2012, 57-70).

contracts market on the one hand and a centrally scheduled gross pool on the other.” Of course, the major difference between the debate prior to the creation of the SEM and today is the requirement to conform to the European Target Model. In comparing a centralised to a bilateral contracts system some of the same arguments are repeated by the SEM Committee as to why the current SEM model is the appropriate choice, including issues of market power and entry which were the subject of Section II. These arguments need not be rehearsed here. However, reference is made to the fact that the closer intraday continuous trading is to real time then “compliance with the Target Model would therefore argue decisively in favour of a self-commitment bilateral contracts market for the SEM” (*ibid*, p. 64). Consideration is also given to linking more closely in various ways with the British Electricity Trading and Transmission Arrangements (BETTA), through for example becoming incorporated as part of BETTA. However, a number of important difficulties are pointed out with respect to BETTA. Some estimates of the costs are presented based on the switch from a pool in England and Wales to the New Electricity Trading Arrangements (NETA), the forerunner of BETTA. The discussion by the SEM Committee of starting *de novo* does not come to any conclusion as to whether it is appropriate to switch to BETTA or a bilateral contracts wholesale electricity market or some other alternative. Instead it asks a series of questions concerning switching to alternative systems – BETTA, Nordpool and/or a MIBEL-style system.⁶⁵

IV Complying with the European Target Model: A Discussion of the Alternatives

The purposed of the consultation paper issued by the SEM Committee is not to reach a definitive view as to how the all-island wholesale electricity market should be reconfigured to comply with the European Target Model but rather act “as a first step in the process of reaching the goal of European integration by 2016” (SEM Committee, 2012, p. 73). Hence the consultation paper is designed “to stimulate debate and inform SEM Committee and government policy” (*ibid*, p. 73). However, while it is perhaps premature to reach a definitive view as to the appropriate way in which to comply with the European Target Model, it may nevertheless be possible to narrow the range of alternatives that should be considered. This should focus the debate and assist in meeting the deadline of complying with the European Target Model.

In this section we discuss the alternative models of the wholesale electricity market that were presented in the previous section. We start by addressing the issue of whether compliance with the European Target Model is best achieved through replacing SEM or selecting one of the four variants of the current SEM. Attention then turns to a discussion of the merits of the four variants. In this

⁶⁵ Details of these alternatives are set out in SEM Committee (2012, Annex 1, pp. 88-94).

discussion it is assumed that all of the alternatives comply with the European Target Model and concentrate on considering their merits.⁶⁶

Incremental or Radical Change?

The first issue to be considered is whether or not the SEM should be redesigned from scratch or whether change should be incremental through adapting the current wholesale market arrangements. There are a number of reasons for arguing that incremental change is the best option. *First*, it is generally agreed that the SEM has performed well in supplying electricity at a competitive cost reflective price, in part through successfully dealing with the problems of mitigating market power, facilitating entry and providing adequate capacity.⁶⁷ Furthermore these problems are likely to continue to be important for the all-island wholesale electricity market in at least the near and medium term.⁶⁸ *Second*, no clear alternative wholesale electricity market design has been presented by the SEM Committee (2012) that deals with these problems. Indeed, alternatives such as BETTA not only have some important shortcomings in relation to market power and encouraging entry, but themselves in a state of flux in part due to the requirement to meet the European Target Model and other aspects of the Third Package. *Third*, and to some extent an extension of the second point, EU wholesale electricity markets will need to address a number of issues in the near future. These issues include harmonising support schemes for renewable electricity, introducing capacity payment mechanisms and accommodating high levels of renewable generation. Since these issues are likely to affect wholesale market design it might be premature to undertake a radical review of the SEM ahead of resolution of these issues at the EU level.

Fourth, there was a debate over the most appropriate all-island wholesale model in designing the current SEM model. It is not at all clear that things have changed sufficiently since 2007 to reopen the question. As noted in Section II many of the same issues are important to-day and are not going to go away in the near to medium term. *Fifth*, it is not clear that there is enough time to debate whether or not a new all-island wholesale electricity model should be introduced and implement the outcome of any such exercise. Not only will the new model need to be agreed, a cost benefit

⁶⁶ This is not to deny that there might be problems of reconciling continuous implicit intraday trading with centralised dispatch (Gorecki, 2011, pp. 90-92; SEM Committee, 2012, p. 36). However, it is assumed that either the two can be reconciled and/or that trading will be less than continuous, but still more than the current three intraday gate closures. The latter is consistent with the CACM FG which states in Section 5 that intraday trading should enable “market participants to trade energy as close to real time as possible ...” (ACER, 2011, p. 11).

⁶⁷ See, for example, Gorecki (2011, pp. 75-76) and references cited therein and SEM Committee (2012, p. 10-11).

⁶⁸ This is discussed in Section II above. In some instances policy measures have not gone as perhaps they could to resolve some of the problems raised.

undertaken, but also legislation passed as well as, at the EU level, the Agency for the Cooperation of Energy Regulators (ACER) being satisfied that the CACM conditions are met. While compliance with the CACM has to be achieved 2016, the requirement that ACER is satisfied with the proposed new all-island wholesale model would mean that any proposal would have to be agreed well in advance of 2016.⁶⁹

Hence for the reasons set out above it is suggested that the debate over compliance with the European Target Model should focus on adapting the current SEM model, rather than reinventing the all-island wholesale market.

Incremental Change: Which Variant?

Before considering the merits of the four variants of the SEM some discussion of the common features of all four is merited that were set out in Section III. Although the term 'variant' is used in describing these models, implying perhaps not a great deal of change, this is not altogether the case. Each of the variants implies, although not to the same extent, considerable departure from the current SEM when measured against some of the key characteristics set out in Section II to resolve issues of mitigating market power, facilitating entry and assuring adequate capacity. However, some of the changes, such as an increase in the number of sub-markets which should increase the overall efficiency of the market, other things equal, since generators can bid in the sub-market which most closely matches their technical characteristics, does not necessarily detract from these key characteristics.

The variants of the current SEM may remove some of the key elements introduced to mitigate market power and facilitate entry. Depending on the nature of the CPM, generators may not have the incentive to bid all of their capacity and, while it has yet to be decided, it is not clear that generator bids will be required to be based on SRMC. There does not appear to be any discussion in either the SEM Committee consultation paper or the options set out by EirGrid for these choices. To some extent, of course, depending on the degree of transparency, the Market Monitoring Unit may be able to detect deviations from SRMC based on fuel cost and/or strategic withdrawal of generation capacity designed to raise prices.⁷⁰ However, this increases the market monitoring burden of the Market Monitoring Unit. It is not clear why this is necessary. It thus suggests to the

⁶⁹ The issue of legislative requirements is set out in SEM Committee (2012, pp. 71-72). It should be noted that even in the case of the variants of the SEM primary legislation may be required if the gross mandatory pool is not retained.

⁷⁰ Arguably this could be a breach of competition law and since the SEM is an all-island market and hence would affect trade between Member States would be brought to the attention of the European Commission. See footnote 18 above for reference to the E.ON AG case in this respect.

maximum extent possible that pricing based on SRMC of the current system be retained, combined with the capacity payment mechanism to incentivise capacity availability.⁷¹ While it is not proposed to dispatch the generators based on the merit order, the pricing algorithm is designed to have a similar outcome.

Turning to the variants themselves it is suggested that the use of the two variants with an element of bilateral contracts - #1 and #3 - should not be adopted. Transparency and liquidity are important aspects of the current SEM. They encourage entry and facilitate market monitoring to ensure that markets are working well for consumers. In markets such as BETTA even though they are substantially larger than SEM concerns have been expressed over the consequences of bilateral contracts that led to a lack of transparency which are reflected by the SEM Committee (2012, p.68-69). EirGrid (2012), in discussing the use of bilateral contracts, points out these problems and suggest various mechanisms, such as limiting their use, as a way of mitigating their impact. Furthermore, it is not clear with the extensive use of bilateral contracts what price would be used to estimate the Public Service Obligation for renewable support.⁷²

Variant #2 has the advantage in the having a forward pool that in many ways reflects the current SEM system. This could be strengthened by making participating in this market mandatory and leaving participation in the other markets voluntary. Variant #4 is an intriguing idea. Essentially it is trying to build an interface between the SEM and the EU day-ahead and intraday markets through the use of CfDs. While a number of issues still need to be resolved concerning this variant, such as “whether a CfD daily auction in the SEM can operate using the standard PCR algorithm but as a financial rather than physical product and produce outputs that are respected by and compatible with the SEM pool arrangements” (EirGrid *et al*, 2012, p. 45) it is nevertheless an option worth pursuing further. The suggestion by SEM Committee (2012, p. 56) of a pilot CfD project merits serious consideration.

V. Conclusion

Important decisions are need to be taken to ensure that the all-island wholesale electricity market complies with the European Target Model. It is important that the correct decision is made. Electricity is an important input into the traded sector of the economy and thus contributes to the success or failure of the Irish economy. Of course, as interconnection between the island of Ireland

⁷¹ However, as noted in Section II above, one of the issues yet to be addressed is incorporating a capacity payment mechanism in the wholesale electricity model that meets the requirements of the European Target Model.

⁷² See CER (2011b) for details.

and the rest of the EU increases and transaction costs of trading electricity fall, then electricity will be a fully traded with a single pan-EU price. However, that is not likely to occur for at least 10 to 20 years at the earliest. At the present time the debate over complying with the European Target Model is centred around the most appropriate choice as though this were a once and for all choice. Hence the debate is seen in part as radical vs. incremental change. To a considerable extent this is a false choice. The discussion of the challenges facing the all-island wholesale electricity market suggests a different way of framing the choice. In the immediate future to comply with the European Target Model adapting the current SEM model might be the best choice, when the internal EU market is working well and the Third Package and all the associated Network Codes are completed then consider whether a more radical alternative might be appropriate.

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