



EirGrid Group Response to the SEM Committee Consultation

**Principles of Dispatch and the Design of the
Market Schedule in the Trading and Settlement
Code**

September 2009

Executive Summary	i
The principles of the market design	ii
Construction of the market schedule	ii
Dispatch Principles	iii
Access Arrangements	iii
Deemed Firm Access.....	iv
Priority dispatch	v
1.Principles of the Single Electricity Market (SEM) Design	1
2.Construction of Market Schedule	3
2.1 Curtailment	5
3.Dispatch Principles	6
4.Priority Dispatch	8
5.Allocation of Access Rights	11
5.1. Models that ignore financial firm rights	14
5.2. Models that absolutely respect financial firm access rights	14
5.3. Models that respect a degree of firmness	14
5.4. Discussion of Options.....	15
5.4.1. Summary of Option 1	15
5.4.2. Summary of Option 2	15
5.4.3. Summary of Option 3	16
5.5.Option 4 - Possible Alternative Proposal	16
5.6.Considerations on Transmission, Distribution Design Standards and Reasonable Maintenance	18
6.Deemed Firm Access	19
7.Technical Constraints	20
7.1. Other Technical Constraints	20
8.Hybrid Plant	21
9.Treatment of Variable Price-Takers	21
10.Determination of SMP when demand is met by Price Takers	22
11.Quantity of Generation Paid PFLOOR	22
12.Tie Breaks	23

Executive Summary

The EirGrid Group, representing EirGrid, System Operator Northern Ireland (SONI) and the Single Electricity Market Operator (SEMO), welcomes the opportunity to respond to the proposals detailed in the SEM Committee's (SEMC) consultation paper entitled "*Principles of Dispatch and the Design of the Market Schedule in the Trading & Settlement Code.*" The paper covers a range of topics and has 12 proposals for consideration. These proposals have an impact on issues ranging from the efficiency of dispatch and the design of the market schedule in the short run to long term investment signals associated with access rights. In light of the stated policy objectives for secure, efficient and economic electricity for consumers, combined with the substantial renewable energy targets from both governments in Ireland and Northern Ireland, the successful resolution of these issues is of paramount importance for the operation of the power system.

It is clear that the ultimate solution of many of the issues raised by the SEMC is related to the timely and appropriate construction of transmission network assets. Developing adequate grid infrastructure is a pre-requisite both for the connection of sufficient plant to maintain security of supply and for the delivery of renewable targets of both governments. EirGrid reiterates its call for the support of all stakeholders in the development of the transmission grid.

There is broad recognition that the power system is going through a period of considerable transition at the moment, and that the advent of significant volumes of conventional and renewable generation connecting in advance of the deep reinforcements in order to meet the broad government policies and targets is raising some important questions. EirGrid believes it is imperative that the best decisions possible are made based on a consideration of the principles and practical issues involved, as well as an assessment of the impact on the operational and investment climate in both the short and long term. EirGrid as an independent system and market operator in two jurisdictions has a significant contribution to make in this regard.

The purpose of this paper is to provide EirGrid's response to each proposal outlined and set out some of the context in which the response is given. EirGrid believes the most significant

proposals and issues in the consultation can be broken down into the following 6 areas discussed in brief below:

- The Principles of the Market Design
- Construction of the Market Schedule
- Dispatch Principles
- Deemed Firm Access
- Access Arrangements
- Priority Dispatch.

The principles of the market design

The consultation presents a strong focus on the principle of the market design as providing infra-marginal rent to generators. These rents provide the driver for long term investment signals. EirGrid agrees with the SEMC that infra-marginal rents are a significant signal for future investment but emphasise that they are not the only ones. In particular, EirGrid considers that in order to meet the multi-objective policy issues from both governments a holistic approach to the total investment climate, created by not only the energy market but also capacity, ancillary services, use of system, levies and support mechanisms, needs to be considered. In particular EirGrid believes, as discussed in previous responses to SEMC consultations, that, going forward, ancillary services may need to have a more significant role in shaping the investment climate if the government renewable policies are to be met.

Construction of the market schedule

The SEMC propose that an alignment between the market schedule and actual dispatch is the ideal design and will keep the performance of the market under review to help ensure this. However it should be noted that the alignment of the market schedule to actual dispatch should differ as, by design, reserve and transmission constraints are not explicitly modelled in SEM. Thus, it is only necessary to consider alignment when the market schedule deviates from the physical dispatch outside of the SEM high level design principles. However, given the nature of the significant transformation happening in the power system at present, EirGrid believes that significant differences between market schedule and actual dispatch could emerge in the future. In order to provide a degree of certainty to the industry the SEMC could indicate the issues that are of the most concern to them in this regard and a

consideration of the level of materiality that would precipitate a change. EirGrid is available to assist the SEMC in this regard and can provide market assessment and analysis along with assistance in drafting any necessary modifications if and when required.

Dispatch Principles

EirGrid strongly supports the SEMC's proposal to employ least cost dispatch principles, ignoring access arrangement considerations. This support follows significant qualitative analysis examining different dispatching mechanisms, including respecting access arrangements. The SEMC proposal is the only mechanism that accommodates efficient short term dispatch with appropriate long term decisions, combined with the pragmatic considerations for implementation. EirGrid acknowledges that this proposal as outlined can have potential consequences for generation units that have firm access. The potential impact of this proposal on firm units will be discussed in more detail under the access arrangements section below.

Access Arrangements

EirGrid recognises the importance of the allocation of access rights for the long term development of the power system and electricity markets. Given the implicit change in dispatch principles precipitated by the introduction of the SEM, combined with the number and size of likely new non-firm units on the power system a review of the access arrangements is essential. The SEMC proposal considers 3 options which provide a range of principle approaches to access arrangements. These principled approaches are:

Option 1: Financial Firm Access has no standing

Option 2: Financial Firm Access has an absolute standing

Option 3: Firm Access has a financial standing but non-firm units where there is capacity also have a right to access in the market.

It is EirGrid's considered view that Option 1 will increase the uncertainty and cost of capital to new entrants which may result in delays to investment decisions. Option 2, while increasing certainty to entrants, may prohibit new non-firm entrants access to the market even when the transmission system has a physical capability to accept it. This will increase

the price in the wholesale market and is not a prudent use of a scarce transmission resource. It is for these principled reasons that EirGrid is not supportive of either Option 1 or 2.

The principles enshrined in Option 3 provide the best balance between the short and long term and will lead to the most appropriate development consistent with both government's policy objectives. However as Option 3 has not been studied in any detail, further analysis is required. This is likely to take some time.

In response to the SEMC request for other alternatives, EirGrid has proposed another mechanism consistent with the principles of Option 3 but with a simpler implementation approach. EirGrid's proposal, which is detailed in section 5.5, has also not been studied in detail and at this stage is high level in nature.

Finally, EirGrid considers that because of the importance of this issue to the long term development of the industry, and that no option providing a degree of financial firm access has been studied, it is important this work be conducted before any decision is made. EirGrid looks forward to working with the RAs and industry in this regard over the coming months.

Deemed Firm Access

The issue of deemed firm access is ultimately one of compensation in the event there is an undue delay on the construction of deep reinforcements. In certain circumstances EirGrid considers that a level of compensation is appropriate. However establishing this level is difficult and would need to cater for issues such as force majeure situations. EirGrid would also note that the differing institutional arrangements and structures in Northern Ireland and Ireland add additional complexity to this.

EirGrid favours incentives on system operators to deliver the firm access through delivery of infrastructure where those incentives appropriately balance risk and reward. The levels of these incentives should reflect, among other things, the level of control the system operator's have, which is limited in the current model both in Northern Ireland and Ireland. EirGrid would also note that a fully deemed firm financial access model may shift an inappropriate level of risk, and ultimately cost, to the electricity customer.

Priority dispatch

As there will be a significant increase in priority dispatch units connecting to the system in the coming years clarity in this area is essential. In particular, an all island co-ordinated approach towards reaching a decision is important given that priority dispatch as outlined in the EU directive could be applied differently in two jurisdictions on the island. EirGrid welcomes the SEMC efforts in this regard and consider the proposals sufficient to give this.

EirGrid is confident that both the proposed mandatory or qualified dispatch mechanisms can be implemented without any significant consequences for system security. However the implementation of any form of dispatch mechanism should not result in any irrational outcomes when broad government policies are considered. In this regard, it should be noted that absolute priority will at times lead to dispatch costs that are higher than may be achievable if some form of qualified priority incorporating appropriate set of prices was used. Nevertheless this may appropriate in considering the balance between the short run efficiency and long term renewable policy objectives.

Finally, the treatment of generators with priority dispatch status who elect to be price makers in the market and to nominate their short run marginal cost bids needs to be considered carefully.

1. Principles of the Single Electricity Market (SEM) Design

The Single Electricity Market (SEM) arose from the desire of both governments in Northern Ireland and Ireland to have access to safe, secure and sustainable energy supplies, obtained through competitive energy markets. This vision was outlined in the document “An All-Island Energy Market: A Development Framework” published in November 2004. In this document the high level policy objectives were in the short term to establish an all-island wholesale electricity trading arrangements, while in the longer term maximise the benefits of environmentally sustainable energy. In essence, the SEM was to be a short term goal to establish wholesale trading on an all-island basis which would play an important part, but not the only part, in a broader All-Island Energy Market.

The Regulatory Authorities (RAs) were tasked with delivering this aspect of the framework. To this end, the high level SEM design was set out in a number of consultation and decision papers in 2005. Together, the consultation paper “Proposed High Level Design – AIP/SEM/06/05” and the decision paper “High Level Design Decision Paper – AIP/SEM/42/05,” contained the objectives underpinning the SEM market design. The RAs’ stated objective for the SEM would be 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. This primary objective is supplemented by the following five objectives:

- ensuring a secure supply of electricity;*
- promoting competition in the electricity market;*
- minimising transaction costs for participants and customers;*
- fostering the use of renewable, sustainable or alternative energy sources;*
- and*
- enabling demand side management”*

An evaluation of different models was conducted against 6 core criteria that included: Security of Supply, Stability, Efficiency, Practicality, Equity and Competitiveness. The outcome of this evaluation was a gross mandatory pool with explicit capacity payments.

In the SEMC consultation paper the “Principles of Dispatch and the Design of the Market Schedule – SEM/09/73,” there is a specific focus on the infra-marginal rents that are earned in the SEM being used to reward units that are useful in the real time dispatch only. EirGrid agrees with this, but it is important to note that infra-marginal rents are an outcome of the high level design principles, particularly efficiency and competitiveness, as outlined in AIP/SEM/42/05 and are not in themselves a stated objective.

In addition, as the high level design noted, there will be differences between dispatch for transmission constraint reasons and physical access, and EirGrid does not see that the SEM always has to match this principle exactly. Indeed, EirGrid specifically acknowledges that there may well be differences between the infra-marginal rents earned in the SEM with what is useful in the real time dispatch. Provided these differences remain relatively small and do not lead to inappropriate investment signals, and other financial instruments in the broader All-Island Energy Market reward for the plant useful in dispatch, then it may be appropriate for these to remain.

There is little doubt that increasing quantities of renewable energy integration are changing the characteristics of the power system and that this change poses significant operational and infrastructural challenges. In order to ensure the security of the system, it is likely that an improved and wider range of ancillary services will be required going forward. EirGrid believes that transparent and open ancillary services could be used to provide these “*infra marginal rents*” to incentivise the necessary portfolio mix to meet the stated objectives of the All-Island Energy Market. EirGrid is of the view that this could be done without having a market schedule that always rewards infra-marginal plants useful in the short term dispatch. The essence of this recommendation is analogous with the RAs’ decision on the adoption of an explicit capacity payment mechanism in the SEM.

2. Construction of Market Schedule

Proposal: It is proposed that the RAs should seek to ensure that the construction of the market schedule is such that infra-marginal rents are allocated to generating units that are of value to the real-time operation of the system, and where deemed appropriate to make the necessary changes.

Response: This proposal follows on from the principles of the SEM design section of the consultation paper. In the paper, the SEMC conclude that generators get paid their bid costs and infra-marginal rent in the market. Over the long-term, the SEMC want infra-marginal rents to be paid to those generators that can be used in the actual dispatch. In essence, the SEMC proposes an alignment between the market schedule and actual dispatch and will keep vigilance to ensure that this is done where appropriate.

EirGrid agrees that the total reward offered in the whole market (including SEM, capacity payments, ancillary services and government supports), of which the SEM is an important part, should incentivise plant that is useful in the real time dispatch, both in the short and long term. EirGrid also acknowledges that where there are material differences between the SEM market schedule and actual dispatch that impact on the long term development of the industry, these should be addressed and changes made where appropriate. However, it should be noted that the original high level design allowed for differences between the two. In particular, there was to be no distinct modelling of either transmission or reserve within the market schedule. These modelling differences give rise to the dispatch balancing costs which are re-covered by a charge across all suppliers in the SEM (this is detailed in the Trading and Settlement Code as the imperfection charge). To date, EirGrid does not see any reason to alter the market schedule.

EirGrid also notes that, without clarity, this proposal could cause concern amongst market participants that the SEMC intend to change the market schedule when a discrepancy with the actual dispatch emerges. However, following the bilateral meeting between EirGrid and the RAs on 7th September 2009, EirGrid recognise that this potential concern is unwarranted. Indeed, EirGrid acknowledges that in this meeting, the RAs described a pragmatic approach

to alterations that is not reflected in the original proposal. Therefore EirGrid recommends that the RAs indicate the issues that they consider might lead to material discrepancies between the market schedule and the physical dispatch and the level of materiality below which changes would not be considered. This will give greater clarity of the proposal to the wider industry.

With this aim in mind, the RAs, during the meeting of 7th of September, requested that EirGrid advise them of any issues which may lead to a material difference. On consideration, EirGrid believes there are 2 likely reasons the market schedule may materially deviate from the physical dispatch over and above the high level design principles in the near future. These are:

- The modelling of price takers generators (PTG) is not related to the capability of the power system to run them (significantly more so than price makers). With the increasing amount of PTG generation in the future this could lead to a material difference between market schedule and physical dispatch.
- There is discrimination between how access rules are applied in the SEM between predictable price making generation and all other categories. With the likely increase in these other categories of units this discrimination needs to be addressed. EirGrid appreciates that this is being dealt with in the access arrangements proposal, but would note that if there is a delay in a decision in this regard, a modification should be brought forward to remove this discrimination in the short term. EirGrid is available to assist in this.

The other issue that is likely to significantly increase the difference between market schedule and physical dispatch, but which is allowed for in the high level design principles, is that transmission congestion is not explicitly modelled in the SEM. The fact that the reinforcement of the transmission and distribution system takes longer to implement than securing planning consent or building a generator means that it is likely that network congestion will become an increasing feature of power system dispatch in the future. EirGrid believes, however, that this issue does not necessarily require a modification to the market schedule.

EirGrid believes any alteration to the market schedule must be cognisant of the wider impacts and the degree to which the change accords with the overarching policy objectives.

This may include considerations beyond the remit of the RAs to include co-ordination with the relevant government departments regarding the design of support mechanisms.

Finally, EirGrid notes that any changes to the market schedule will require appropriate modifications and analysis to the SEM and is available to assist the RAs in this process.

2.1. Curtailment

Proposal: The RAs propose there is no need for a separate definition of curtailment. Rather if the market schedule reflects what is required in dispatch constraint and curtailment can be considered the same.

Response: EirGrid accepts that in a situation where, if the market schedule reflected what can be used in dispatch, there would be no need for a separate definition of curtailment and constraint. However, as the alignment of the market schedule to actual dispatch can and will differ, it may still be appropriate to distinguish between curtailment and constraint and reward differently. In particular, EirGrid is concerned that its responsibilities in managing dispatch balancing costs (“constraints”) will be compromised where differences in the design of the market schedule lead to dispatch balancing costs that are due to modelling artefacts and not a function of the quality of dispatch.

3. Dispatch Principles

Proposal: Given that it would represent the most efficient short-term use of available resources, and is consistent with existing dispatch processes, the RAs propose that the TSOs should continue to dispatch the system to minimise production cost of generation, taking into account system security requirements and, as now, disregarding any concept of firmness in the dispatch process.

Response: EirGrid has conducted a qualitative examination of a range of alternatives for how to dispatch the power system in real time and how they meet policy objectives. These methods have included respecting the level of firm financial access a unit has. Accepting that there will be a significant increase in non-firm units, as well as renewable units in the coming years, EirGrid fully supports the SEMC's proposal. This proposal represents the only mechanism which can meet the balance between of short and long term objectives of the All-Island Energy Market.

EirGrid acknowledges that dispatching to least cost principles combined with the introduction of the SEM has altered the intent of the access arrangements for firm and non-firm units. This should be addressed in the proposals put forward in the Access Arrangements.

Context:

The issues addressed in this paper are concerned with achieving short run efficient outcomes and long run efficient development of the generation plant portfolio. EirGrid believes that considerable focus in developing electricity markets has been in achieving short run efficiency, sometimes at the expense of superior longer run outcomes. A market which is always and everywhere short run efficient, but does not deliver optimal longer term outcomes, is not necessarily beneficial to society.

Nowhere is short run efficiency more evident than in the area of dispatch. Any system of dispatch which differs from minimum production cost creates inherent short run production inefficiency. That is, society could achieve the same productive outcome for the use of less input resources.

EirGrid believes one should only deviate from short run efficient outcomes where there is a longer term or significant benefit to be derived. Such a benefit could, in theory, come from a situation whereby it was important to grandfather rights to incumbent plant in order to improve and lower their investment cost (1st come 1st served access rights). However, should benefits exist from granting such rights, their reward and treatment could be dealt with elsewhere - in the area of financial compensation and financial access rights – rather than in dispatch.

Notwithstanding this, EirGrid has examined the concept of how the dispatch respecting the principles, set out in section 5.3 of this paper, might be implemented. In essence, if a non-firm unit is in merit and there is transmission capacity available, they should be in the schedule. If the non-firm unit prevents a firm unit who is also in merit from access to the system because it has used the scarce shared physical access then, in this situation, the non-firm unit should not get access. This drives efficient outcomes and makes best use of a limited resource.

In order to determine dispatch with a significant amount of non-firm units dissipated across the network a merit order is needed. However the order of the merit order is directly affected by the access to the system as it is constrained (significant amount of non-firm units). However the access is directly related to what generation is on at any given time. This problem is an algebraic loop that has no theoretical solution. The best that can be achieved is an approximation to the intent of the original principles and if implemented would lead to not only inefficiencies in the short run dispatch but also the long term portfolio development.

4. Priority Dispatch

Proposal: *The Regulatory Authorities welcome comments from interested parties on the options for priority dispatch, as presented in this Section 4.8. Specifically the RAs seek comments on:*

(a) The case for affording absolute priority or qualified priority to plant having priority dispatch;

(b) In the event that qualified priority were to apply, the relative merits of the alternatives posed for the purpose of attaching an effective price or other objective measure for use by the SOs when making dispatch decisions taking account of the proportionality principle;

(c) Whether a distinction is to be drawn between the priority to be applied when making a decision to place a generating unit in the dispatch schedule as distinct from subsequently dispatching that unit away from that level of output in real time;

(d) The extent to which non-renewable plant (e.g. peat) who are afforded priority dispatch present particular issues which might require that they are treated in an alternative way to renewable generators.

Response: EirGrid welcomes efforts to clarify the meaning of priority dispatch legislation for the SEM. EirGrid is of the view that both options as outlined by the SEMC can be implemented, and implemented without consequences for system security. The implementation of the European directive into Member State law needs to be carefully considered in the context of a cross jurisdictional energy market. In addition, EirGrid would consider that any implementation should not lead to irrational or unreasonable economic outcomes which lead to a higher overall cost to consumers.

Context:

Article 16 (2) (c) of the new EU Renewable Energy Directive states that member states "*shall ensure that when dispatching electricity generating installations, transmission system operators shall give priority to generating installations using renewable energy sources in so far as the secure operation of the national electricity system permits and based on transparent and non-discriminatory criteria.*" This article sets out the provisions for priority dispatch as it applies to renewable generation going forward, but does not answer the question of how to achieve this.

With the increase of the amount of priority dispatch units expected in the coming years and the likelihood that it will not be possible at all times to securely run the system with these units at full output, a mechanism is required to inform the system operators of the appropriate dispatch to make. Based on a legal interpretation of the EU Renewable

Directive, the SEMC has offered two options for the priority dispatch process: absolute and qualified priority.

Absolute Priority requires that units are dispatched at their full output, irrespective of the economic cost, save for the security of the power system. EirGrid agrees with the SEMC paper's discussion on this where non-intuitive dispatches occur. Indeed EirGrid would require confirmation that dispatching in this manner would not be in breach of its licensed requirements in Northern Ireland for "economic dispatch". However, EirGrid does recognise that absolute priority may have other policy benefits which taken in aggregate may make this dispatch mechanism appropriate.

Qualified Priority: Under this interpretation of Article 16 (2) (c) of the EU Renewable Energy Directive, the legal principle of proportionality is applied. The SEMC argue that evoking the legal proportionality principle would enable an interpretation of the duties outlined in article 16 to be considered in conjunction with other relevant articles that bestow a duty on the system operator. By interpreting article 16 in this light it is possible to argue that priority should be given to renewable generation sources, but not absolute priority; a qualified priority instead. Qualified priority dispatch model uses a price to determine the dispatch of renewable generators. There are several variants of qualified dispatch proposed by the SEMC, including: dispatching purely on economic merit; priority dispatch in tie-break situations only; dispatching taking into account subsidies and dispatching at some other effective price.

The setting of a "price" for qualified priority dispatch needs to be made cognisant of the policy objectives to be met. For example, EirGrid can see merit in adopting a mechanism that would distinguish between renewable and non-renewable priority dispatch units in the event a security reason would require a dispatch of one or more of these units. In addition, the price of the priority dispatch would need to at least be less expensive than non-renewable generation would bid in.

In consideration of point (C) in the proposal EirGrid does not see any reason why there would be a distinction between application of the priority dispatch mechanism for scheduling or dispatch.

In response to point (D) of the proposal EirGrid can see that depending on what decision is made and how access arrangements are implemented there could be an increase in the differences between market schedule and physical dispatch as outlined in Section 2.

5. Allocation of Access Rights

Proposal: The RA would welcome views on how access to the market schedule for plant situated behind export constraints should be limited and on the options described in this Section. Respondents are also invited to propose alternative options to those presented in the above section.

Response: EirGrid recognises the importance of the allocation of access rights and is mindful that any system adopted should seek to deliver the most efficient overall outcome taking into account both the short run/real time and any effect on the equilibrium in the long run operation of the power system. EirGrid considers the implementation of financial firm rights is the best principled option to adopt for the long term development of the system. To this end, Option 1 and 2 represent alternative principled models which EirGrid would not support. Option 3 is a variant of a financially firm access rights model. EirGrid believes Option 3 seeks to preserve the principles of granting financially firm access rights. As requested, there is an alternative proposal consistent with a financially firm access right principle for consideration outlined below. EirGrid supports options consistent with this principle and recognises that none of the approaches to the implementation are likely to be perfect.

Given the importance in getting the appropriate balance between short and long term incentives, EirGrid recommends further consideration of the effects of these Options before making a final decision. Furthermore, EirGrid believes that any decision made must remain cognisant of the different standards of design on the distribution and transmission networks, reasonable maintenance and generation station design.

Context

The use of financially firm property rights in transmission access is a decision, which although not unique to the global electricity business, is rarely applied in other industries. In most industries a decision to make an investment has to take account of the full commercial risks of market participation. These might include possible congestion in the distribution or transport channels to final consumer and the risk that a more efficient competitor will locate near or beside that investment at a date in the future. There is no physical withholding of the public transport asset for the sole use of the original investor/market participant. In

essence, competitors are free to compete on an equal footing within the market. According to market theory, it is the ability to compete equally, that engenders the most appropriate long term market efficiencies.

The electricity industry is different in this respect as many electricity market designs around the world wide seek to financially compensate, to varying degrees, the original mover when a local new entrant uses and limits the physical access of the first unit to the market even though it was competitively priced. This concept is known as a form of financially firm access right.

Financial access rights are a form of property right to a scarce resource, transmission capacity. We know from the Coase theorem¹ that where markets in property rights are well defined, and transaction costs insignificant an efficient outcome can always be achieved in that parties who value the rights will always be those who ultimately acquire them. In such instances the problem in determining to whom to grant the rights therefore abstracts to an allocation problem.

However Real options theory² informs us that in industries with large irreversible capital investments, and where uncertainty exists, there is both an increased cost of capital (and hence a higher hurdle in terms of making investment) and a value to waiting to see both how, and if, such uncertainty is resolved giving rise to delays in investments. While commercial uncertainties will always exist, uncertainties associated with the right to use scarce transmission capacity, or to be compensated, can be mitigated through the allocation of financially firm access rights.

This higher cost of capital and possible delays in investment, which Real Options theory informs us maybe present in a decision to invest in new power generation, may be contrary to government policy objectives in the area of renewables and in the case of all plant lead to less investment to the ultimate cost of consumers.

¹ R.H. Coase, "The Problem with Social Cost", Journal of Law and Economics, Vol 3 (1) pp 1-44, 1960.

² A. K. Dixit and R. S. Pindyck, "Investment under uncertainty", Princeton, 1994

Nor is the idea of firmness unique to the SEM. Kristiansen³ has reviewed the electricity markets in North America which employ forms of Financial Transmission Rights (FTRs). These financial instruments, depending on whether obligations or options, duration and auctioning principles affect different forms of firmness. Even outside North America these concepts are applied in FTR markets including New Zealand⁴. In Europe, while most markets are bilateral in nature, the issue still exists and forms of firmness are offered⁵.

On the island of Ireland forms of firmness have applied in both jurisdictions since the beginning of deregulation. In Northern Ireland this happened in February 1999 with the launch of the Interim Electricity Market (IME) and in February 2000 when the Transitional Electricity Settlement System (TESS) began in Ireland. Both these markets were bilateral in nature with top up and spill prices. In the early stages in both jurisdictions an absolute firm principle was embedded and parties had to wait until the construct of system reinforcements to access the market. This principle was subsequently amended in Ireland with parties being granted access to the market on a non firm basis pending completion of deep reinforcements. However dispatch principles differed at that time.

The SEM High Level Design also provided for this principle of financially non firm access pending completion of system reinforcements. The fundamental principles of dispatch changed to meet the licensed requirements for the system operators (e.g. dispatch economically). These changes have, in effect, altered the intent of the original decisions. Clarity is required as to what principles of financial firm access rights should apply from now on in the SEM and how will they be implemented. It is in a consideration of these criteria that the SEMC proposed options are examined below.

There are 3 principled mechanisms for implementing a form of financial firm access

- Models that ignore financial firm rights
- Models that absolutely respect financially firm access rights
- Models that provide for financial firm rights for competitive firm units disadvantaged by access

³ Tarjei Kristiansen, "*Financial Transmission Rights – Experiences and Prospects*", KEMA Consulting GmbH, 2008

⁴ Transpower report on "FTR Design Issues and Options", July 2009

⁵ ETSO Background Paper, "Transmission Risk Hedging Products", April 2006

5.1. Models that ignore financial firm rights

In these models a new entrant has the same rights to the existing transmission infrastructure as the incumbent. This allows the most efficient plant into the market at the earliest opportunity with the resultant reduction of market schedule prices in the short term. However, because the entrant has to ensure not only that the investment has sufficient revenue certainty against competitive new entrants, but also cognisant of the scarce transmission resource which he does not own, nor control this increases the uncertainty in making such an investment. This additional uncertainty manifests itself in increased cost of capital to the electricity industry and potentially delayed investment.

5.2. Models that absolutely respect financial firm access rights

In these models the incumbents are the only participants who get access to the market. All new non-firm entrants will only receive short run costs if dispatched and no infra-marginal rents or *in extremis* may not be dispatched at all. These models reduce the uncertainty to investors if they know they have "firm" access. However, they ultimately raise the price in the energy market as newer more efficient plant, which may have non-firm access, cannot assist in setting price even when there is a physical capability of the power system to accept their output. This approach does not encourage investment in advance of transmission capability nor does it make best use of the scarce transmission resource.

5.3. Models that respect a degree of firmness

In these models a financial firm right is afforded a unit which provides financial compensation if their access is taken away from them by a non-firm unit and they are financially disadvantaged because of it. To understand this in detail the following 3 principles hold:

- If the power system cannot physically accept the output of the non-firm unit, given the other firm units which are in merit, it will not get access to the market schedule.
- If the power system can physically accept the output of a competitively priced non-firm unit, given the other firm units which are in merit, and no firm unit is being disadvantaged for reasons outlined in the next principle, the non-firm unit should be allowed access to the market schedule.

- Where a competitively priced firm unit cannot get access to the market schedule because the physically shared access point is utilised by a non-firm unit then the firm unit should be compensated as if it was in the market schedule.

This option attempts to balance allowing efficient new entrants into the market where limitations of the power system allow with not unduly disadvantaging existing generators. It seeks to make best use of the scarce transmission capacity available. This is in order to achieve a balance between the long term outcomes and short term efficiencies.

5.4. Discussion of Options

5.4.1. Summary of Option 1

Determine appropriate physical access capabilities using the same mechanism that is used to determine FAQ. In theory work out what the actual export capability is in each half hour from a planning perspective.

Principled Response: This Option represents a principle where there is no concept of financial firm access rights at all. EirGrid does not support this model.

Implementation Issues: The proposal does not go in to any detail on how the export constraints will be calculated, how frequently they will be updated and at what level of discrimination they occur on (e.g. half hourly, daily, monthly). Depending on these the resourcing levels to produce this information could be considerable. In addition it would appear that a significant change is required to the SEM market systems to account for generator group constraints.

5.4.2. Summary of Option 2

Do not let a unit access to the market if it has non firm rights.

Principled Response: This Option represents a principle where there is absolute financial firm access. EirGrid does not support this model.

Implementation Issues: The proposal would require alterations to the market system to ensure that no generator is allowed to receive more than their firm access quantity. This will require changes to the market application pre-processing routines but not the core pricing

engine. In that regard it would appear simpler to implement than Option 1. However there is no clarity on how to handle situations where there is not sufficient firm generation to meet demand. Depending on exploring these and similar issues could result further implementation requirements.

5.4.3. Summary of Option 3

Run the Market Schedule ignoring all units with non firm access. Calculate based on outputs from the market schedule which export constraints have additional capacity. Re run the market schedule allowing the non firm units behind the constraints to have an availability of the additional capacity.

Principled Response: This Option best represents the principle of financially firm access favoured by EirGrid.

Implementation Issues: The proposal is the most complicated and in addition to the implementation issues of Option 1 requires at least two runs of the market pricing engine. This has significant issues and will be the most expensive and difficult option to deliver. In addition it is not clear that the access of non-firm units will be as great as expected. For example where a non-firm unit after the initial market run has a number of non-contiguous periods where it has an availability it is possible the market engine in the second run will not commit the non-firm unit in any of these periods.

In addition, there has been no quantitative analysis presented of how this mechanism is likely to perform. Without this analysis, EirGrid does not recommend implementing this Option.

5.5. Option 4 - Possible Alternative Proposal

This proposal is premised on the assumption that it is not theoretically, nor practically possible, to identify exactly if a non-firm unit has been scheduled in the market schedule ahead of a firm unit because of access limitations (see section 3 for further discussion). However, it is possible to calculate exactly which non-firm units have access to the market in a trading period and the infra-marginal rent they have earned. This can be calculated ex-post, simplifying the implementation process. At the same time it is possible using some

basic algebraic rules to approximate which firm units could have been possibly disadvantaged at the same time. While it is possible to use the market pricing engine to achieve this it is not deemed necessary. Then the non-firm units identified can pay part or all of their infra-marginal rent in these periods to the firm units that could have been possibly disadvantaged. The mechanism for choosing how much of the infra-marginal rent can be set on any number of mechanisms. These could include, but are not limited to, regulated tax rates over defined periods of time (e.g. 80% falling to 20% in 5 years time) to using the constraint reports.

EirGrid proposal

1. In every trading period calculate the amount of MWh that non-firm generation, (Non-Firm Generation Limit, NFGL_t) have got access to the market.
2. This limit is an upper bound to the amount of MW that possibly got access contrary to the financial firm access principles.
3. Calculate the infra-marginal rent for these non-firm units above their FAQ and charge a percentage of it to them. This percentage can alter on a regulated basis.
4. Determine the NFGL number of firm units that were just outside the market in each trading period. This can be done algebraically rather than re running the pricing engine.
5. Pro rata the charge on the non-firm units across the additional firm units.
6. This mechanism can algebraically account for when there was not sufficient additional firm access units to meet demand.

Principled Response: This mechanism is a variant of financially firm access rights which EirGrid supports. However, it acknowledges that the exact right answer cannot be calculated.

Implementation Issues: The mechanism can be designed without re-running the market systems and could be linked to monthly or annual runs. This significantly reduces the implementation complexity.

Given that the windfall tax only approximates the principle it would be necessary to analyse various variants to ensure that the intended outcomes would happen. EirGrid would like to

explore with the Regulatory Authorities the issues associated with the implementation of Options which respect the principle of financially firm access rights.

5.6. Considerations on Transmission, Distribution Design Standards and Reasonable Maintenance

Access arrangements should not only consider financial instruments in the cases outlined above where generally there will be a form of partial access, but also in the cases where there is no physical access available at all. This can arise for any number of reasons in reality. They include loss of the lines to and from a station due to either fault or maintenance conditions or construction of new build.

EirGrid believes that constraints paid for these reasons needs to be cognisant of the control the system operators have and the standards of design of the station. Specifically EirGrid does not consider that it is likely to be appropriate that the Transmission System Operators (TSO) should incur constraint costs for distribution network outages impacting a generator. Similarly where a generator chooses to be fed from a single transmission line it seems inappropriate to pay constraints when there is reasonable and prudent maintenance being conducted on this line. Finally consideration may need to be given to constraints arising from significant outages due to the build of new transmission.

6. Deemed Firm Access

Proposal: The RAs propose that “Deemed Firm Access”, whereby Firm Access Quantity (FAQ) or Maximum Export Capacities (MEC) is allocated in advance of the completion of necessary transmission system infrastructure reinforcements, should not be introduced to the SEM.

Response:

The issue of deemed firm access is ultimately one of compensation in the event there is an undue delay on the construction of deep reinforcements. It is about determining what risks it is reasonable for new entrant generators to bear and which risks should be borne by customers. EirGrid considers that a level of compensation is probably appropriate in certain circumstances. Compensation in the event of delays to the construction of shallow connection assets for those matters within the control of the party carrying out construction has recently been discussed in Ireland. The Commission has a current live consultation considering this matter.

EirGrid welcomes appropriate incentives on system operators to deliver the firm access through delivery of infrastructure which seek to balance risk and reward and which recognise the degree to which the matters in question are under the control of the parties being incentivised. The levels of these incentives should reflect, the level of control the system operator’s have, which is limited in the current model. EirGrid would also note that institutional arrangements and structures in Northern Ireland and Ireland add additional complexity to this. The appropriate balance is therefore difficult to establish.

EirGrid believes that a fully deemed firm financial access model, where a unit is deemed firm at a point in time irrespective of likely transmission build, may shift an inappropriate level of risk, and ultimately cost, to the electricity customer.

7. Technical Constraints

Proposal: The TSOs and asset owners should continue to make available information relating to: (a) their understanding of what changes to the scheduling and dispatch of generation are being contemplated in light of the increasing level of renewable generation on the system, including where there may be technical limitations on the quantity of certain types of plant that can be accommodated on the system; and (b) their view of how technical issues (for example system inertia, fault levels etc.) will be resolved.

Response: EirGrid supports the SEMC proposal as outlined. Indeed EirGrid, throughout this paper and other initiatives is, and will continue to, inform the industry and the RAs of issues in this area. In particular, EirGrid would point to the TSO Facilitation of Renewables studies underway at present, the Renewable Integration Development Project and the Grid 25 strategy which are representative of our commitment in this regard.

7.1. Other Technical Constraints

Proposal: In relation to the Grid Code; (a) the current initiative from the TSOs to place additional emphasis on enforcing existing Grid Code obligations on incumbent and new generating units should continue; and (b) the TSOs should also keep the Grid Code under review in order to ensure that future generation portfolios continue to support the satisfactory operation of the system.

Response: EirGrid supports the SEMC proposal as outlined. EirGrid maintains, through its system operator licences in Northern Ireland and Ireland, the Joint Grid Code Review Panel under which common governance issues on an all-island basis can be discussed and agreed. Work is on-going regarding any future harmonisation of procedures on an all-island basis, including issues related to incentive charges. Of course, it is recognised that any changes in the rules of conduct and operation would need to be approved by both Regulatory Authorities.

8. Hybrid Plant

Proposal: The RAs propose that the rules applying to hybrid plant should depend upon which of the options for treatment of priority dispatch plant are eventually chosen. The RAs welcome views on how the principles of priority dispatch should be extended to hybrid plant as part of the response to this consultation.

Response: EirGrid recognises that a number of generation units will be part renewable, part conventional. Given the inherent difficulties associated with attempting to measure the output from a renewable source at any moment, EirGrid believes that consideration of Hybrid plant can only be effectively managed by treating the unit as either priority dispatch or not in the dispatch and scheduling process. EirGrid believes that there can be no useable concept of partial priority dispatch.

9. Treatment of Variable Price-Takers

Proposal: If any of the options in Section 4.5, for allocating infra-marginal rents behind export constraints, is adopted then that option should apply also to Variable Price Takers. If none of these options is adopted and the existing arrangements for allocating infra-marginal rents behind export constraints is retained, then Variable Price Takers should be limited in the market schedule to the maximum of actual output and FAQ (or MEC when infrastructure works are complete and the VPT becomes fully firm).

Response: EirGrid agrees that firm/non-firm access rules should apply across all generation technologies without exception and that any rules relating to the allocation of infra-marginal rents should be consistent for Variable Price Takers and all other units.

Nonetheless, EirGrid believes there are a number of outcomes to this decision that need to be examined in detail. Firstly, EirGrid notes that changes to the current access arrangements and allocation of infra-marginal rents for Variable Price Taking Generators could impact on the investment climate for these units. Consideration needs to be made of this impact, including possible co-ordination with government support mechanisms. Secondly, there is discrimination between the treatment of predictable price makers and all other categories of generation in the SEM. While this is being addressed in the access arrangements, it may be prudent to remove this discrimination sooner.

10. Determination of SMP when demand is met by Price Takers

Proposal: The RAs propose that if Option 2(a) or 2(c) in Section 4.8 is adopted, SMP should be set using the effective bid prices of the marginal Variable Price-Taking generation, rather than at PFLOOR, in the event that the quantity of price-taking generation exceeds demand and reflecting any external subsidies received by the plant (i.e. it should reflect the price used in the dispatch of the plant by the TSOs). PFLOOR would still be used as a lower limit to SMP.

Response: EirGrid supports the SEMC proposal as outlined.

EirGrid accepts that the RAs are concerned that if negative pricing is introduced for priority dispatch then the PFLOOR should be adjusted accordingly. In addition, EirGrid notes that while the dynamic variation of PFLOOR is not possible within a trading schedule, it would be possible with the SEMO system changes to set PFLOOR to the lowest bid price for every schedule.

11. Quantity of Generation Paid PFLOOR

Proposal: The RAs propose that the quantity of generation charged PFLOOR (or paid at the revised SMP set out in proposal 4.11) in the event of an Excessive Generation Event arising from an excess of Price Taking Generation should not exceed System Demand. The MSQs of Price Taking Generation should, in such circumstances be pro-rated down so that the total quantity is equal to System Demand.

Response: EirGrid supports this proposal as outlined.

EirGrid notes that it is possible that the System Marginal Price (SMP) can be negative, and in the event of an excessive generation pricing event (for example more wind than there is demand) windfarms would end up not only having to pay for the energy they generated, but also the energy that they could have generated in reality. The windfarms will not be fully dispatched to their availability as there is insufficient demand. As EirGrid understands the SEMC position outlined above, this proposal limits their payments in this special case to the energy they actual generated as opposed to their availability.

EirGrid notes that this situation is a consequence of how VPTG are currently modelled in the SEM and that it is possible that the proposed changes the RAs may consider under proposal 1 could effectively remove the probability of this situation ever arising.

12. Tie Breaks

Proposal: The RAs propose that where tie-break rules are required, de-loading should be instructed on a pro-rata basis in a manner determined by the TSOs.

Response: EirGrid supports the SEMC proposal as outlined and intends to propose appropriate tie break rules to the industry during the implementation phase of this consultation.