

Single Electricity Market

Treatment of Curtailment in Tie-Break situations

Consultation paper

26 April 2012

SEM-12-028

Background

The SEM Committee (SEMC) has been dealing with considerations associated with the increasing penetration of intermittent generation, mostly wind, on the SEM and on the all-island electricity system for the past number of years. This process commenced in February 2008 with the publication of the discussion paper SEM-08-002,¹ and evolved into the workstream known as *Scheduling and Dispatch*. One of the key issues which emerged over the course of this workstream and the various consultations held by the RAs has been how to treat the curtailment of wind energy in the SEM.

The central question that has arisen in relation to this issue is the following; on what basis do the Transmission System Operators (TSOs) make the decision for curtailment, when the plant available is seen as equal by the TSOs, i.e. no deciding indicator, including a bid price differential, exists to support such a decision? This is of particular relevance to windfarm generation operating within the SEM, which has a marginal cost of zero and where no deciding indicator, including a bid price differential, currently exists.

The SEMC published its final decision on Scheduling and Dispatch in August 2011 (SEM-11-062). This decision paper outlined decisions in a number of areas but indicated that the treatment of constraints and curtailment in tie-break situations would be subject to a further consultation. Subsequent to this, the SEM Committee published a consultation paper, SEM-11-063 and a clarification note, SEM-11-086 on this matter. Following consideration of the responses to this consultation, a decision paper, SEM-11-105, was published on 21 December 2011.

In section 3.5 of SEM-11-105, the SEMC decided to treat curtailment issues in a tie-break situation on a firm access quantity basis, i.e. applying a grand-fathering approach to curtailment issues. Since the publication of SEM-11-105, the SEMC received a number of submissions in relation to section 3.5 of the SEM-11-105. On 23 February the SEMC met with representatives of IWEA, NIRIG, Meitheal Na Gaoithe and NOW Ireland at the SEMC meeting. These bodies presented their views and opinions in relation to Section 3.5 of SEM-11-105.

At an Extra Ordinary SEMC Meeting held on 5 March 2012 the SEMC determined that further consultation was necessary to provide an additional opportunity for all members of the industry and the public to comment on the merits of the options for the treatment of curtailment issues in a tie-break situation. This decision was taken in order to ensure that a full and transparent consultation process has been carried out prior to making a final decision on this matter. The SEMC is of the view that on reflection aspects of its consultation process which led to the decision outlined in Section 3.5 of SEM-11-105 were deficient. Therefore the SEMC has decided that its decision to treat curtailment issues in a tie-break situation on a firm access quantity basis (as set out in Section 3.5 of the SEM-11-105) is to be withdrawn.

As noted in the SEM Committee Communication of 29 March 2012 the withdrawal of Section 3.5 of SEM-11-105 took effect as of the date of publication of the communication. The communication also stated that the SEMC would issue a consultation document in relation to the treatment of curtailment issues in a tie-break situation inviting responses from industry and the public. In this consultation paper the SEMC would be seeking evidence and views of all stakeholders on this matter.

¹ Please refer to 'Wind Generation in the SEM: Policy for Large-Scale, Intermittent Non-Diverse Generation', which can be found [here](#).

For the avoidance of doubt, all other parts of SEM-11-105 (i.e. Section 3.1, 3.2, 3.3, 3.4, 3.6) remain as final decisions of the SEMC with full force & effect as and from 21 December 2011.

Purpose of this Paper

The purpose of this paper is to carry out a full, open and transparent consultation process on the treatment of curtailment in tie-break situations. The SEMC outlines the problem of curtailment and a number of options for the treatment of curtailment in tie-break situations. It should be noted that these options do not solve the core problem of curtailment; rather they are mechanisms to share the burden of curtailment in a fair manner, against a set of criteria. In arriving at the most appropriate mechanism for dividing up the burden of curtailment, the SEMC must first of all consider its primary duties, set out in legislation in Ireland and Northern Ireland.

Primary Duties of the SEMC

In considering the matters outlined in this paper, the SEMC has remained entirely cognisant of the primary duty accorded to it under the Under Section 9 of the Electricity Regulation (Amendment) (Single Electricity Market) Act 2007 (the 'SEM Act') and the Electricity (Single Wholesale Market) (Northern Ireland) Order 2007 (the 'SEM Order'). At this point, it is worth noting those duties.

Section 9 of the SEM Act and the SEM Order states that the principal objective of the SEM Committee in carrying out its functions is to 'protect the interests of consumers of electricity in Northern Ireland and Ireland (...) wherever appropriate by promoting effective competition between persons engaged in, or in commercial activities connected with, the sale or purchase of electricity through the SEM'.²

The section goes on to state that SEMC shall carry out (its) respective functions (...) in the manner, which (it) 'considers is best calculated to further the principal objective of protection of customers'. This is with having regard to (among others), 'the need to secure that all reasonable demands for electricity in (Ireland and Northern Ireland) are met, the need to secure that authorised persons are able to finance (their) activities and the need to avoid unfair discrimination between consumers in (Ireland and Northern Ireland)'.²

Furthermore, in carrying out any of the functions mentioned above, section 9 of the SEM Act and SEM Order states that the SEMC 'shall have regard to the need, where appropriate, to promote the use of energy from renewable energy sources'. Section 9 also states that in carrying out any of the functions above the SEMC 'shall not discriminate unfairly between authorised persons, or between persons who are applying to become authorised persons, where authorised person means the holder of a licence'.

The legislation makes it clear that the primary duty of the SEMC is the protection of electricity customers in Ireland and Northern Ireland. Therefore, in considering the treatment of curtailment, it is important that the SEMC considers the likely impact of each option on electricity customers. However in carrying out this primary function, the SEMC must balance its considerations with those of security of supply on the island, the promotion of renewable energy and the ability of generators to finance their activities. The SEMC's responsibilities are not mutually exclusive; the Committee must balance its responsibilities to arrive at decisions which, in its view are the correct decisions in the interests of customers.

² Please refer to the Electricity Regulation (Amendment) (Single Electricity Market) Act 2007 which can be found [here](#) and the Electricity (Single Wholesale Market) (Northern Ireland) Order 2007 which can be found [here](#).

As stated in SEM-11-105, the treatment of curtailment is a challenging one for the SEMC. The options for allocating the burden of curtailment do not solve the core problem; rather they attempt to share the curtailment burden in a manner which most appropriately meets the objectives of the SEM. In order to do this in an open and transparent manner, the SEMC has set out a number of criteria against which it considers the options for the treatment of curtailment.

Finally, both Ireland and Northern Ireland have renewable targets of 40% of electricity consumption from renewable sources by 2020. These renewable targets can best be achieved by a combination of having sufficient wind (and other renewable) capacity connected (MWs) and having sufficient firm network capacity to allow those connected wind farms to export (MWhrs). Efficient grid roll-out is key in this regard. In its decision-making the SEMC must look to facilitate and not frustrate the delivery of those targets on the island.

However, stakeholders should be aware that the SEMC has, at all times, ensured that its principal duty, i.e. the protection of consumers of electricity in Northern Ireland and Ireland, remains central to the SEMC decision-making process.

Curtailment

As noted previously in the *Scheduling and Dispatch* workstream a number of definitions have been suggested for 'curtailment'. Nevertheless the general usage of the term suggests that the term applies to situations whereby generation is dispatched down from a level at which it would otherwise wish to run, typically for a reason other than a transmission constraint.³

Curtailment of wind generation occurs when there is excess wind generation available to meet system demand when taking account of system operation restrictions. In situations such as this, the Transmission System Operators (TSOs) must 'turn down' some of this wind generation. This is due to there not being sufficient quantities of the system services necessary to run a safe and secure electricity system.

Curtailment is a different type of event to constraints and has been identified as such by the SEMC. Constraint events are explicitly linked to the availability of network. If there is not sufficient capacity on the network to accept the export of a (wind) generator, then there is a constraint event. Curtailment is a system operation issue and is not linked to network capacity. It occurs when there is not sufficient demand in the SEM, when taking into account system operational restrictions for security of supply, i.e. a combination of low demand, excess wind production and technical minima of plants which can result in system security issues.

The core of the problem is that curtailment is an unavoidable consequence of high levels of wind penetration. It is worth noting that the TSOs on the island are currently leading a project – DS3, *Delivering a Secure, Sustainable Electricity System*⁴ – which aims through a number of mechanisms to increase the secure level of system non-synchronous penetration (typically wind) from 50% (currently) to 75% in the coming years. If this project is successful, it will help minimise the level of wind curtailment, while still maintaining security and reliability of supply. It is also worth noting that further interconnection, demand side participation and smart metering are examples of other areas which can help in reducing the over-all level of curtailment on the system.

³ Please refer to the consultation paper – *Principles of Dispatch and the Design of the Market Schedule in the TSC*, which can be found [here](#).

⁴ For further details on the DS3 Programme, please refer to [here](#) on the EirGrid website.

Curtailement is a problem for electricity systems. It is an economic loss to customers as electricity which would otherwise be exported to customers is turned down. It can affect the market remuneration of plant and hence may impact on investment decisions. It is considered that this turning down of wind generation directly affects the risk profile pertaining to those windfarms affected. The level of curtailement which each individual wind development can accept before calling into question economic viability is specific to each individual project. The TSOs currently estimate that total levels of wind curtailement in 2020 on the island, with a high level of instantaneous wind penetration, will be a base-case of circa 5%.

This is heavily dependent upon a number of factors including levels of wind connected, demand and levels of wind availability.⁵ Curtailement is also a problem for system operators, charged with maintaining security and reliability of supply in an economic and efficient manner, whilst respecting the priority dispatch status of renewable plant.

The treatment of curtailement in a tie-break situation involves dividing up the total level of system curtailement between different wind generators. In line with its statutory duties and to ensure levels of curtailement are minimised to the greatest extent possible, the SEMC has already decided to endorse the TSOs DS3 Programme Plan and objectives. The SEMC will be working to ensure that the objectives of DS3 are delivered by the TSOs in an efficient and cost effective manner.

A number of approaches can be considered to address curtailement, depending on how its cause is viewed. Curtailement can be seen as being driven by the marginal wind generator in the dispatch stack, i.e. the last wind generator on the system causes the curtailement event. Under this viewpoint, a causer pays approach can be taken to solve the curtailement event, effectively a last-on, first off approach. This approach has been termed 'grandfathering', in that existing plant have different rights to new plant, under certain circumstances.

An alternative view is that curtailement is a system wide problem; with each individual wind generator contributing partially to the overall problem and therefore each should make a contribution to solving the problem. This approach is termed 'pro-rata' as each generator contributes to solving the problem in proportion to their availability.

Both of these views relate to the allocation of risk. It is important that risk is allocated appropriately amongst generators. Furthermore consideration needs to be given to whether all of the risk of curtailement is allocated amongst generators or whether some of it is shared by consumers.

The concept of 'firmness' is also an important consideration in this debate. Firmness is an important network *and* market (SEM) concept, bestowing both preferential network and market rights on the holder of that Firm Access Quantity (FAQ). From a network point of view, an FAQ allows access to the network for a level of export capacity up to the limit of that FAQ. This is dependent upon network delivery, in that failure of the System Operators and System Owners to deliver deep network reinforcements delays the delivery of an FAQ to a generator. From a market point of view, firmness bestows additional rights on a generator compared to a non-firm generator. Non-firm generators have access to the market schedule, but do not enjoy the same financial rights as firm generators.

⁵ Please refer to section 2.3 of the June 2011 TSOs publication "*Ensuring a Secure, Reliable and Efficient Power System in a Changing Environment*", which can be found [here](#).

Where the system cannot accommodate the available export (partial or full) of a firm generator, the generator has the right to receive market compensation in the form of constraints payments up to the value of their FAQ. As noted above under the SEM High Level Design, non-firm generators do not have this financial right.⁶

Both firm and non-firm wind can contribute to meeting renewable targets (2020) although non firm could be seen as not contributing to the same extent as firm. This is due to the fact that if the required firm network capacity is *not* delivered, then the output of wind generators who connect to the network (by definition on a non-firm basis as the required deep transmission reinforcements have not yet been completed) risks being constrained down.

It is noted that at present some curtailment events are accompanied by a constraint event and that the curtailment event is often resolved by turning down sufficient wind to address the constraint. The constraint event in these cases may mask the curtailment event. Progress on network reinforcement will significantly reduce the number of constraint events, but will not reduce the level of curtailment on the system.⁷

Furthermore, both non-firm and firm wind delivers significant market benefits to the SEM and the all-island customer. As wind has zero marginal cost, the greater the level of wind (firm or non-firm) in the market schedule, the greater the likely dampening impact on SMP, although the actual price will depend upon the price setting marginal plant. However, the impact of wind penetration on the number of thermal plant start-ups, with the corresponding impact increasing uplift costs, acts in the opposite direction and cannot be ignored.

Another SEMC duty outlined above is to ensure security of supply on the island, which could be impacted by the decision on the treatment of curtailment. It is noted that the divergence of the market schedule from real dispatch is a genuine concern in terms of the effect on Dispatch Balancing Costs. Furthermore, if particular generators are allowed in the market schedule, which subsequently cannot be dispatched in real time by the TSOs, whilst others which can be dispatched (and are needed) are excluded from the market schedule, this could ultimately affect security of supply on the island in the long-term. The above affect could induce inefficient entry and exit signals in the SEM.

As is clear from this deliberation, that there is a whole catalogue of issues, most of which interact and many of which compete, that the SEMC must consider when making any ultimate decision on the treatment of curtailment. In addition, this decision-making must remain aware of the duties accorded to the SEMC under the SEM Act and SEM Order.

The next section of this paper outlines the options that the SEMC has identified in relation to the treatment of curtailment in tie-break situations. It also outlines the perceived positive attributes of each option under a number of criteria. It should be noted that the criteria outlined below should not be viewed in isolation of one another and that there is a significant degree of interaction between them, e.g. the financial viability of windfarms projects directly affects the attainment of the 2020 renewable targets.

⁶ It should be noted that, the RA's discovered an error within the market settlement process that lead to non firm generators being paid.

⁷ As noted above DS3, further interconnection, demand side participation and smart metering are all examples of areas which can help in reducing the level of curtailment on the system.

Criteria for SEMC decision-making

1. Impact on the consumer and Dispatch Balancing Costs (DBC):

This criterion relates to the SEMC's primary duty to protect the interests of electricity consumers in Ireland and Northern Ireland. Curtailment is ultimately an economic loss to electricity consumers on the island of Ireland, which should be minimised to the extent possible and must be done as the allocation of risk. Minimising curtailment facilitates improved consumer welfare but is also a requirement of the European RES Directive.. In carrying out its duties to protect the interests of consumers, the SEMC must be mindful of the approach to curtailment which is most favourable to consumers in the long run, within existing SEM structures.

2. Facilitation of Ireland and Northern Ireland 2020 Renewable Targets

This criterion relates to the SEMC's duty to promote the use of energy from renewable sources on the island. As noted above both Ireland and Northern Ireland have renewable targets of 40% of electricity consumption from renewable sources by 2020. These renewable targets can only be achieved by a combination of having sufficient renewable capacity connected (MWs) and having sufficient firm network capacity to allow those connected to export (MWhrs). The SEMC's decision on curtailment should facilitate and not frustrate the achievement of renewable targets.

3. Efficiency of Entry Signal

This criterion relates to the SEMC's duty to promote and ensure security of supply on the island. An efficient electricity system has the correct level and mix of plant to meet all reasonable demand scenarios in a reliable and economic manner. Therefore, a key function of the regulatory regime is to provide the appropriate investment / entry signals, exit signals and to ensure that inefficient over entry of plant does not occur. It is suggested that the approach to treatment of curtailment should promote the connection of economic and efficient wind projects. It should not result in wind capacity located such that it which would result in excess inefficient curtailment.

4. Stable Investment Environment

This criterion relates to the SEMC's duty to have regard to financeability of generation investments. A stable investment environment will reduce the risk faced by investors and will help support a well functioning market over the longer term. The SEM market structures attempt to minimise the investment risk for generators by ensuring that in merit firm generators are paid DBC, when the Dispatch schedule varies from the Market schedule. As noted above, non-firm generators are not entitled to such payments and therefore carry this risk when connecting.⁸ In order to promote investor confidence, SEM policies should encourage investment by viable, efficient projects that can deliver benefit in a reasonable timescale to consumers.

5. Consistency of treatment for constraints and curtailment

This is an operational criterion related to whether a similar approach to the treatment of curtailment and the treatment of constraints should be taken, given that the two events often occur together.

⁸ Please refer to footnote 6.

As outlined above, constraints and curtailment are different types of event. Constraints are a network specific issue which can be alleviated by network roll-out. Constraints can be seen to be temporary nature. Curtailment, on the other hand, is a market and system operation issue. It applies to situations whereby wind generation is dispatched down from a level at which it would otherwise wish to run, typically for a reason other than a transmission constraint. The SEMC deliberations involve considering whether it is appropriate that both events are treated in a similar manner or whether it is appropriate that they are treated differently.

Option 1 - Grandfathering

Grandfathering involves creating a merit order list on the basis of appropriate criteria, which the TSOs can follow in determining which plant should be turned down first in a curtailment event. Grandfathering can take a number of forms, e.g. 'last-on first off', where the last plant connected would be the first to be turned down, or grandfathering with reference to FAQ or Gate or some other distinguishing characteristic.

In SEM-11-105 the SEMC decided that constraints in a tie-break situation should be treated on a grandfathered basis, with reference to firm access quantity. One of the options for the treatment of curtailment is to treat curtailment in the same manner as constraints, i.e. grandfathering with reference to Firm Access Quantity. For clarity, this approach would involve the following:

For controllable wind generation units in tie-break situations, the following would apply post application of the principles and hierarchy set out in section 4.4 of SEM-11-062:

- I. those controllable wind generation units with a FAQ of 100% (i.e. 'fully-firm') of their MEC;
- II. those controllable wind generation units with a FAQ of between 0.1% and 99.9% (inclusive) of their MEC (i.e. partially firm); and
- III. those controllable wind generation units with a FAQ of 0% of their MEC (i.e. 'non-firm'). As per the proposal in SEM-11-063 those with temporary connections, or those that have not been allocated FAQs, will fall into this category for their entire installed capacity. This will be done up to the MEC that they have applied for in a completed connection application submitted to the relevant body.

Dispatching down of these units set out above will be carried out in the following manner for curtailment. Category (iii) will be dispatched down before those in Category (ii), with those units in Category (i) being dispatched down last.

Within categories (ii) and (iii), Gate 3 non-firm are to be turned down before pre Gate 3 non-firm in Ireland. For Northern Ireland no similar categories will apply in (ii) and (iii) at present. If categories are subsequently required for Northern Ireland, these will be proposed to the SEMC by SONI. As per SEM-11-105, the TSOs should first deal with constraints and then deal with curtailment on an all-island basis.

1. Impact on the consumer and Dispatch Balancing Costs

As noted above under Section 9 of the SEM Act and SEM Order the principal objective of the SEM Committee in carrying out its functions is to 'protect the interests of consumers of electricity in Northern Ireland and Ireland (...) wherever appropriate by promoting effective

competition between persons engaged in, or in commercial activities connected with, the sale or purchase of electricity through the SEM'.⁹

All other things being equal, it is likely that the grandfathering of curtailment will be cheaper for the all-island customer, as firm wind generators that are curtailed are eligible under the SEM Trading and Settlement Code to receive market price compensation in the form of Constraints payments, while non-firm generators are not eligible for these payments.¹⁰ Essentially if firm generators are constrained or curtailed down they are financially compensated (kept whole). Non-firm generators in such a scenario are not.

Grandfathering reduces the level of curtailment faced by firm generators, thereby reducing the level of Dispatch Balancing Costs paid by the all-island consumer. The risk of curtailment under grandfathering is borne mostly by non-firm generators. Consumers only face this risk if firm generators are required to be curtailed, which is less likely under grandfathering than pro rata.

The grandfathering approach is consistent with the SEMC's objective of customer protection in that (all things being equal), the impact on DBC of curtailment is minimised because under grandfathering the divergence between the Dispatch Schedule and Market Schedule is generally less than that under a pro-rata approach.

2. Facilitation of Ireland and Northern Ireland 2020 Renewable Targets

Grandfathering of transmission access rights on the basis of firmness may lead to a more reliable and efficient achievement of the Ireland and Northern Ireland 2020 renewable targets, than alternative approaches. It is suggested that a grandfathered approach to curtailment issues will help the viability of those generators with firm connection offers or who are earlier in the connection queue. Grandfathering favours the financial viability of those projects where investments have already been made as opposed to potentially speculative projects. It also favours those projects looking to invest in the short-term, where the project is located in a favourable location on the network (i.e. where firm access is available) or where the project can connect and export on a firm basis (i.e. "guaranteed MWhrs") sooner.

It is considered that grandfathering will ensure that sufficient firm capacity is connected by 2020¹¹ as surety is provided to these generators. If pro-rata is adopted, these firm projects will carry a larger proportion of the curtailment pot than under grandfathering, the net result of which may affect their financial viability, albeit that these plant received constrained off payments. It is argued that a pro-rata approach would result in a situation where plant, which had made investments and were ready to connect, would be disadvantaged to accommodate potential future plant (which may or may not proceed in any case).

A grandfathering approach may enhance investor confidence in genuine viable projects and help delivery of such renewable projects. This by extension should contribute towards steady progress on achieving the 2020 renewable targets.

3. Efficiency of Entry Signal

From an economic theory perspective, grandfathering of curtailment should provide a signal to the marginal renewable plant in future years of whether it is financially viable to connect to

⁹ Please refer to the Electricity Regulation (Amendment) (Single Electricity Market) Act 2007 which can be found [here](#) and the Electricity (Single Wholesale Market) (Northern Ireland) Order 2007 which can be found [here](#)

¹⁰ Please refer to footnote 6.

¹¹ Assuming the required network capacity is delivered by the System Operators and Owners.

the system. With the level of renewable generation looking for connection to the system far exceeding that required to meet the 2020 renewable targets grandfathering of curtailment provides an efficient entry signal for those in the connection queue.

In essence grandfathering allocates the risks and cost of curtailment onto the 'marginal' wind generator, i.e. the non-firm wind generator connecting to the system in the long-term. While generators are allowed to connect on a non-firm basis, they take this decision at their own risk as the nature of non-firm access means that at times there is not network capacity for that generator while their market rights are lower than firm generators. It is argued that a pro-rata allocation of curtailment would not provide the appropriate signals to ensure the optimal level (and timing) of connection.

Pro-rata may result in a situation of over-entry, resulting in excess curtailment, which ultimately is an inefficient cost to the whole electricity system and in particular to those projects which were more genuinely viable. Over entry may also cause excessive network build to provide firm access for this 'surplus' generation.

4. Stable Investment Environment

The financeability of SEM investments is an important consideration for the SEMC. As indicated above grandfathering increases certainty for generators who are closer to connection. This approach would promote the financial viability of generators who have made investments, particularly those generators in the most efficient locations. It is suggested that grandfathering will provide predictable and stable cash-flows for these generators and promote certainty of the regulatory environment. As more windfarms connect and the occurrence and level of curtailment becomes greater, grandfathering provides those generators who have firm access with a continued stable environment.

If this stable environment had not been created in the first place, these investments may never have taken place. Grandfathering therefore provides enough certainty to ensure investment by a 'critical mass' of generators. On the other hand, pro-rata, while providing greater certainty to later investors, may do so at the expense of earlier investors.

5. Consistency of treatment for constraints and curtailment

It is clear from the 'Scheduling and Dispatch' consultation process that up until SEM-11-063, the SEMC favoured a pro-rata approach to tie-break situations. However, with the move towards a grandfathering approach to constraints in SEM-11-063, there was an implicit assumption that constraints could be clearly distinguished from episodes of curtailment by the TSOs. If curtailment can be clearly separated from constraints in all instances, then it is possible to adopt a different approach to deal with constraints from that of curtailment.

However, to adopt a different approach to curtailment than that which is used for constraints, without that certainty of differentiation in all instances, may lead to a non-transparent and potentially incorrect solution / allocation in certain instances.

During the consultation process of SEM-11-063 it became clear to the SEMC that it was not always possible for the TSOs to unambiguously identify constraints from curtailment at all times in dispatch. This was acknowledged by the SEMC in the Clarification Note of 12 October 2012 (SEM-11-086) and in SEM-11-105.

Option 2 – Pro Rata

The pro-rata treatment of curtailment essentially means that wind generators, irrespective of allocated FAQ will be turned down by the TSOs by an equal percentage in order to ensure system security.

Take the following example where Demand at a particular instance on the island was 3,400 MWs and there was 3,500 MWs of generation available, 1000MWs of which was wind. In order to alleviate the curtailment for system security, the TSOs need to turn down 100 MWs of wind. Under a pro-rata approach the TSOs would turn down all 1000 MWs of available wind generation by an equal percentage to meet the requirement of 100 MWs. In this instance no account would be taken by the TSOs of FAQ allocation or Gate, a uniform percentage would be applied to all available windfarm generation.

1. Impact on the consumer and Dispatch Balancing Costs

Arguments in favour of pro-rata treatment of curtailment suggest that a greater number of projects will connect on a non-firm basis under the pro-rata treatment compared to grandfathering. This 'extra wind' will further dampen the SMP¹². Indeed if projects do not connect on a non-firm basis under grandfathering (due to the fact that non-firm would carry a greater curtailment burden), then any potential benefit in lower DBC under grandfathering may not materialise.

Under pro-rata the impact on DBC may be somewhat off-set or balanced by a possible slight decrease in the level of SMP, when compared to grandfathering. This is due to the calculation of Scheduled Demand in each trading period contained in the Trading and Settlement Code (Appendix N – paragraph 32). Under the Trading and Settlement Code the difference between a non-firm variable price takers' availability and its actual output is subtracted from the market demand and under a grandfathering approach this figure could be higher than a pro-rata approach, as non-firm generators are curtailed first in grandfathering.

2. Facilitation of Ireland and Northern Ireland 2020 Renewable Targets

Non-firm generators would have to accept greater levels of curtailment in the short to medium term under grandfathering, than would otherwise have been the case under a pro-rata approach. In converse to this, if pro-rata is adopted, these non-firm projects will carry a lesser proportion of the curtailment pot, which would improve their financial viability and could be said to promote the attainment of the 2020 renewable targets. A pro-rata approach to curtailment will provide certainty of equal burden sharing across all wind generators, irrespective of the level of firmness/ market access which the generator enjoys.

It is suggested that grandfathering will make some non-firm investments unviable (at least in the short-term until the network build out is delivered), due to combined levels of constraints and curtailment¹³, being placed on them under this approach. The financial viability of these largely long-term non-firm plants could be affected by a decision to grandfather curtailment. The question must be asked, is it fair to effectively 'lump' all curtailment issues on to these future projects, which in turn could put at risk the attainment of the 2020 renewable targets if these projects become unbankable due to the combined effects of constraints and

¹² Although with more wind available, there may be a need for more curtailment

¹³ Note where there is both constraint and curtailment, the constraint event will be resolved by the TSO first. Under this approach, the requirement for additional turn-down of wind is minimised. Therefore for many non-firm wind generators, the level of constraints is a key concern.

curtailment. It is suggested that placing curtailment on all wind generation in an equal fashion is a fairer solution, considering it is not a network-specific issue.

3. Efficiency of Entry Signal

In an unconstrained power system, where renewable market entry is supported by non-market mechanisms (PSO), there is no priority given to existing wind generators ahead of new entrants. It is argued that regulatory structures should incentivise efficient market entry and should not dis-incentivise a more technologically-advanced wind generator, or one with better wind resources, from entering the market and providing an exit signal for older, less technologically-advanced windfarms (or one with poor wind resources). It is suggested that grandfathering of curtailment may provide such a disincentive, as a disproportionate level of curtailment is placed on the 'newer' renewable plant, whereas pro-rata would promote such investment.

Furthermore, the argument could be made that any economic signal regarding investment only makes sense for investments that have not been made yet, including medium to long-term non-firm projects. It is suggested that the theory of grandfathering weakens if there are not enough financially viable future projects (i.e. those with good wind resources), with enough transmission capacity to be assigned firm capacity. Pro-rata of curtailment may promote that economic signal for future, more technologically-advanced, wind generators.

On the other hand, pro-rata may risk entry which could lead to higher levels of curtailment and an increased divergence between the SEM market schedule and actual dispatch.

4. Stable Investment Environment

It is suggested that considering that all windfarms, both firm and non-firm are effectively 'contributing' to the problem of curtailment, the argument could be made that attributing this problem across windfarm generators in an equal fashion, will provide greater certainty for all projects (connecting or expected to connect) and not just a particular subset of windfarms (i.e. firm).

It is proposed that as pro-rata equitably manages curtailment by turning down all generation equally to meet system stability limits, this establishes a reasonable principal by which risk can be assessed by potential investors. As curtailment can be viewed as a system-wide issue unrelated to the network access or any right derived from network access rules, incumbents should not receive preferential treatment compared to new entrants on the basis of their level of access to the network.

5. Consistency of treatment for constraints and curtailment

Curtailment is not associated with network-specific issues, in that no amount of grid roll-out will alleviate times when there is too much intermittent wind generation on the system. Therefore it is clear that constraints and curtailment are two different issues that need to be addressed by the SEMC.

With constraints being a network issue, and curtailment being a market issue the TSOs should be directed to explore how to treat them separately in all instances. It is argued that, even in a tie-breaks situation, it is not appropriate to treat the two separate events, with differing characteristics and net effects on stakeholders, in the same fashion. The argument is made that treating constraint and curtailment in such a manner is discriminatory and in direct conflict of the SEM duty not to discriminate.

Option 3 – Temporary Pro-Rata

The various Scheduling and Dispatch and Tie-Breaks consultations to date examined how to attribute curtailment in tie-breaks situations in the perceived fairest manner available, taking into account the SEM duties accorded under Section 9 of the SEM Act and Section 9 of the SEM Order. The debate has focused on two approaches, pro-rata or grandfathering, an either/or distinction.

However the SEMC believes that it is worth considering a third option, which is essentially a middle ground position. This option is a slight alteration to Option 2. It involves the pro-rata treatment of curtailment up to the 40% all-island target and then to moving to grandfathering, with reference to firmness after that point (i.e. at 40% +) has been reached.¹⁴ For clarity, all generators firm and non-firm would be turned down on a pro-rata basis up until the renewable targets are reached (or in advance of a certain date). After this point, non-firm generation would be turned down ahead of firm generation, with no reference to Gate.

It is suggested that the primary benefit of this option is in terms of efficiency of entry signal, which is discussed below. It is acknowledged that there is the distinct problem of identifying when the 40% target has been met. The fact that Member States will not know if they have reached the target until electricity consumption data is collected over three years is central to this.

However, it is argued that fixing the date of 1 January 2018 as the move to grandfathering of curtailment is a reasonable proxy, especially considering the median expectations of demand calculated by the TSOs.¹⁵

1. Impact on the consumer and Dispatch Balancing Costs

The point raised in Option 2 concerning the impact on DBC being somewhat off-set or balanced by a possible slight decrease in the level of SMP applies here also. This option would facilitate early connection of wind which should dampen SMP. In addition, post achievement of the renewable targets (or post a certain date), DBC would be lowered as non-firm generation are not entitled to constraint compensation and these generators would be turned down first.

2. Facilitation of Ireland and Northern Ireland 2020 Renewable Targets

As noted in Option 2 it has been argued to the SEMC that placing curtailment on all wind generation in an equal fashion is a fairer solution, considering it is not a network-specific issue. The pro-rata treatment would make these long-term more financially viable than grandfathering, therefore helping to meet the 40% renewables target.

This option explicitly references Ireland and Northern Ireland's renewable targets and the attainment of the 40% renewables target may actually be quicker under this option. With the knowledge that there is a date for the implementation of grandfathering (e.g. 1 December 2018), serious short-to-medium term non-firm generation will be provided with an even greater incentive to accept their offer and start building their plant.

¹⁴ Note – this option 3 could be designed in a number of ways. For example, grandfathering could be applied once the TSOs have indicated that the 40% targets have been achieved. Alternatively it could be applied from a certain date (e.g. 1 January 2018). Grandfathering could then apply with reference to firmness or with reference to connection date.

¹⁵ Please refer to the All-Island Generation Capacity Statement 2012-2021 published by the TSOs which can be found [here](#).

3. Efficiency of Entry Signal

The TSOs have estimated that Ireland will need a total installed wind capacity of between 3,500 and 4,000 MWs by 2020 to meet its 40% renewables target. In addition Northern Ireland will need a total installed wind capacity of circa 1,300 MW by 2020 to meet its 40% renewables target.¹⁶ Therefore, taking a median approach would imply a total all-Island need of circa 5000 MWs of renewable generation. There is currently circa 2000 MWs of wind generation connected on the island (1600 MWs Ireland and 400 MWs Northern Ireland), which indicates that another 3000 MWs of renewable generation is required to meet the 40% target on an all-island basis.¹⁷

Section 9 of the SEM Act and SEM Order states that the SEMC 'shall have regard to the need, where appropriate, to promote the use of energy from renewable energy sources'. However as increasing levels of wind generation connects to the system, curtailment levels will increase, unless measures are taken to alleviate curtailment. Increasing levels of curtailment of windfarm generation will affect connected parties ability to finance their activities, another duty of the SEMC under section 9 of the SEM Act and SEM Order. As noted above DS3, further interconnection, demand side participation and smart metering are all examples of areas which can help in reducing the level of curtailment on the system.

This option treats curtailment in a manner which allows generation irrespective of firmness to connect and contribute to the achievement of the targets, yet limits the exposure of customers post achievement of the targets is an appropriate way. Only efficient levels of entry will be encouraged as generators will know that curtailment is treated differently once the 40% targets are reached and therefore those non-firm generators who are not viable post achievement of the targets will not connect. Over-incentivisation of connection beyond the 40% renewables target may have a direct impact on consumers in terms inefficient grid roll-out and the Public Service Obligation levy.

4. Stable Investment Environment

It is argued that this option addresses the concern that moving immediately to grandfathering will make non-firm investment in the medium term unbankable. Like Option 2 this option establishes a reasonable principal by which risk can be assessed by potential investors with the knowledge that the treatment of curtailment will change as of say 1 January 2018.

Within the interim period, curtailment is shared across all wind generation, irrespective of allocated FAQ, in an equal fashion, until the 40% renewables target has been met on the island. Generators who are still non-firm by the time the 40% targets are nonetheless in a better position than under option 1, as they will have seen lower levels of curtailment in the year preceding achievement of the targets, plus they will be closer to their firm date.

5. Consistency of treatment for constraints and curtailment

As constraints and curtailment are two different issues that need to be addressed by the SEMC. Like Option 2 for this option to be implementable the TSOs should be directed to explore how to treat them separately in all instances.

¹⁶ Please refer to footnote 15.

¹⁷ Please refer to the All-Island Wind and Fuel Mix Report February 2012 which can be found [here](#).

Option 4 – Pro-rata with generators taking the risk

The options examined so far in this paper have all involved different approaches to sharing the risk and economic loss associated with curtailment, amongst generators and consumers in an appropriate and fair manner. However under each of Options 1 – 3, part of the risk of curtailment was carried by the all-island consumer in terms of Dispatch Balancing Costs (DBC). As already highlighted, when firm wind generators are turned down by the TSO in a curtailment situation, they are currently entitled to market compensation, under the Trading and Settlement Code. This compensation is paid for by electricity customers on the island through DBC.

The SEM Committee is now proposing an option which would see the risk of curtailment borne by wind generators only, with no impact on DBC and no direct cost to the all-island electricity customer. Under this option, wind generators would be turned down on a pro-rata basis in a curtailment event. A modification to the Trading and Settlement Code¹⁸ would be made which would see wind curtailment events treated differently in terms of market compensation compared to other events where wind generation is turned down by the TSO (e.g. constraint events). Wind generators would not receive market compensation when turned down in a curtailment event. The SEMC is aware that if this option were to be decided upon, it may take some time to fully implement in terms of finalising a modification to the TSC and possible changes to the SEM market systems.

1. Impact on the consumer and Dispatch Balancing Costs

The impact on the consumer and on DBC would be positive under this option as firm wind generators would no longer be entitled to market compensation through DBC. This should lead to a reduction in the DBC pot and a reduced burden on customers. As there would be favourable advantage for firm generators in terms of curtailment, wind developers could connect on a non-firm basis and not be disadvantaged.

However it could be argued that less wind generation would connect in this scenario as market compensation would no longer be available to firm wind generation, in curtailment events. This may impact on the business case/ viability of some wind projects. If less wind generation connected than under options 1 – 3, the dampening impact of wind on SMP would potentially be less.

2. Facilitation of Ireland and Northern Ireland 2020 Renewable Targets

As with options 1 – 3, the impact of this option on the achievement of Ireland and Northern Ireland's renewable targets depends on the actual level of wind generation which will connect. On one hand, it can be argued that as curtailment would be treated on a pro-rata basis and there is no longer an advantage (in terms of curtailment) to being firm, then wind generators will connect on a non-firm basis as soon as possible in order to avail of potentially less curtailment in the early years (less wind in total connected).

On the other hand, some wind projects may no longer be viable as their business case may have been premised upon the availability of market compensation for firm generators in curtailment situations. However if wind generation is prepared to connect on a non-firm basis under Options 2 and 3 (pro-rata and temporary pro-rata), then it is suggested that their business case already takes account of an "acceptable" level of curtailment and is less linked to the availability of market compensation.

¹⁸ It is acknowledged that it may take some time for this modification to be drafted and implemented into the SEM market systems, if this option were approved by the SEM Committee.

3. Efficiency of Entry Signal

This option would provide an efficient entry signal to viable generation. Only wind generation which is viable in the absence of being paid compensation for being turned down in curtailment situations would proceed to connecting. The viability of wind generation in this option is heavily linked to the actual electricity output of the project. Therefore those projects located in the best wind locations would be favoured ahead of less good wind sites.

However there would be no linkage to network availability as all available wind would be turned down on a pro-rata basis. As a result there would be a potential for less efficient network delivery as the link between generation and network is somewhat weakened. Also the better wind sites which are favoured under this option may not always be the best locations in network terms (i.e. a considerable distance from network). This too may cause the delivery of a different network than under options 1 – 3.

4. Stable Investment Environment

As discussed previously the SEMC has responsibility for ensuring that efficient generators are in a position to finance their activities and that the SEM environment does not frustrate these investments. While this option would treat all wind projects on an equal basis, thereby providing as much certainty as possible over levels of wind curtailment for each, it would be a significant change in SEM policy. To date firm wind generation has received market compensation when turned down in curtailment events; to change this policy would represent a change to one of the key assumptions which investors would have taken account of when considering their project. This policy also represents an increase in risk for wind projects; some may consider this additional risk too great for their project to bear.

On the other hand, while the SEMC aims to provide as much certainty as possible in order to encourage appropriate and efficient levels of investment, this is not a guarantee to investors that SEM policy cannot change or should not change when the SEM Committee considers its overall objectives, particularly those relating to customer protection. In addition to this, it can be argued that now is a good time to change the policy related to payment of firm wind generation in curtailment events.

This is because many project investors have not made their investment yet (e.g. Gate 3 in Ireland) and are waiting for the conclusion of this policy workstream and associated outputs (e.g. delivery by EirGrid of constraint reports to Gate 3 generators in Ireland) before committing to an investment. Therefore, it is appropriate to clarify the policy now rather than at some point in the future when investments have been made.

5. Consistency of treatment for constraints and curtailment

If this option is pursued, it is important that the TSOs are able to reliably distinguish between constraint and curtailment events. This is because firm wind generators would continue to receive market compensation when they are turned down due to a network constraint, but would not receive compensation in a curtailment event.

In proposing this option as part of this consultation paper, the SEM Committee will ask the TSOs to identify how constraint or curtailment events can be classified and identified appropriately where there is any level of ambiguity over the nature of the event. The responsibility will be on the TSO to ensure that it classifies the event appropriately.

Summary

In taking any final decision of the treatment of curtailment in tie-breaks, the SEMC needs to be guided by its statutory objectives, chief of which is the obligation to protect the interests of consumers. In this paper the SEMC has outlined four potential options for adoption, with each being discussed against a number of criteria. The SEMC wish to make clear to stakeholders that it has not adopted a favoured position towards any of the options outlined, including the previous option – grandfathering – detailed in section 3.5 of SEM-11-105. The purpose of this consultation process is to listen to the evidence based views of industry on this issue before making any decision.

Invitation to respond

The SEMC invites submissions from the industry and members of the public with regard to this consultation paper. It will carefully consider all submissions and evidence received before proceeding to a proposed decision on this matter.

In relation to the options outlined above the SEMC specifically requests supporting factual/ impact based data, which will clearly demonstrate the net effects of any ultimate decision on curtailment on the below issues, whether that is a grandfather, pro-rata, temporary pro-rata or other approach.

- Impact on the consumer and Dispatch Balancing Costs;
- Facilitation of Ireland and Northern Ireland 2020 Renewable Targets;
- Efficiency of Entry Signal;
- Stable Investment Environment;
- Consistency of treatment for constraints and curtailment.

This list is non-exhaustive and the SEMC would welcome any other supporting factual/ impact based data which could inform the decision-making of the SEMC. Respondents are also welcome to put forward alternative approaches to dealing with curtailment in tie-break situations.

Responses to this paper

All responses and supporting data/information should be sent in electronic format to Jamie Burke (jburke@cer.ie) at the Commission for Energy Regulation. Responses are due by close of business (5pm) on Friday 25 May 2012.

The SEMC will consider all responses received and will then publish a proposed decision on this matter.