

Micro Electricity Generation Association Of Ireland (MEGA)

NREAP CONSULTATION PROCESS

Submission To Department Of Communications Energy and Natural
Resources

**Consultation by the Department of Communications, Energy &
Natural Resources on sub-section 4.2.7 of the NREAP template**

Submission, as requested by DCENR,
Submitted by email to Una Dixon at NREAP@dcenr.gov.ie

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NOTE:

Please note that all comments put forward by the Micro Electricity Generation Association Of Ireland (MEGA) are designed to be constructive and to re-inforce the current policy-forming framework which is developing the final text for Ireland's National Renewable Energy Action Plan, NREAP.

The MEGA Methodology: In this consultation process MEGA will concentrate on specific areas where MEGA members have real experience and expertise. MEGA will first quote text from the sub-section. This will help to pinpoint the issue. Second, MEGA will make a submission below in this regard. This will be followed by a proposed text change. MEGA recognises that plans, once made, generally require some amendment during implementation and arising out of new knowledge but credibility is at the core of international collaboration, in this regard. Therefore, our NREAP must not only be detailed and comprehensive – it must also be credible and amenable to assessment. Ireland's NREAP will sit together with the NREAPS (Renewable Energy Action Plans) of every single other country in the EU, available to the public and once published – final. It is of extreme importance that Ireland presents itself in this context as an intelligent, smart, forward-looking and business-like country. MEGA submission, therefore, are designed, in this context, to help achieve these ends.

ITEM 1

As quoted from below

(a) How is the transmission and distribution of electricity from renewable energy sources guaranteed by transmission and distribution system

operators?“Distribution System Operator (DSO) does not dispatch any generation and DSO connections are designed such that the distribution connection can accommodate the full MEC and are not a factor in limiting output. “

ITEM 1 MEGA SUBMISSION:

MEGA Submits that the above statement is misleading and could, if left unaltered, undermine the credibility of Ireland’s NREAP. To quote a practitioner in Biomass generation “The last line of 4.2.7 (a) above is **completely** wrong in its assumption, the distribution system will be the only point for export for the vast majority of AD and biomass projects coming down the line, and since the distribution system will be saturated with wind it will be impossible for these generators to get onto the system. As there is no geographic constraint (hills) to the location of biomass or AD plants it is likely they will be dispersed and therefore unlikely to benefit to any large degree in future group processing approaches (Gates).” The problem here is that there are no active power control/diversion or intelligent control and networking system to avoid system overload and saturation through the volatile mix of distributed (undispatched) electricity generation and dispatched. This further complicated by the unpredictable Wind Power Factor – penetration levels are planned to rise to the highest level in any developed country – far beyond engineering experience. No such experiment would be permitted by Senior Project Engineers without the ability to intervene intelligently through intelligent monitoring and control systems. ESNB engineers are no different. The fear of this factor leads to parallel action to prevent new RE installations i.e. to avoid uncertainty. This leads to a Wind-only RE solution which will lead to wastage, losses and huge opportunity cost in loss of RE electricity from other sources to balance wind. It is time to call on SME’s to start developing these new intelligent network equipment (Early smart grid technology) and software for, at least, local area useage (Smart Auto Producer Clusters) and improve the knowledge of the operators on what can be done and what “not to fear”.

ITEM 1 MEGA Proposal:

MEGA proposes to inclusion of the following sentence after the words “limiting output” quoted above – It is recognised that more work and innovation is required to improve the reliability of this statement. The SME sector is expected to become more active in the development of intelligent network and support systems in local area network to ensure that “the distribution connection can accommodate the full MEC and are not a factor in limiting output”.

ITEM 2

As quoted from below

(c) How are grid- and market- related operational measures taken in order to minimise the curtailment of electricity from renewable energy sources? What kinds of measures are planned and when is implementation expected?

.....Ireland’s commitment to facilitate the integration and operational control of renewable forms of energy is underpinned by EirGrid’s involvement in a range of major technical studies, including the Facilitation of Renewables studies. The

Facilitation of Renewables studies is a suite of pioneering studies that aim to identify the dynamic issues associated with operating a power system with high levels of renewable generation, and how to best solve these issues. The final results are expected in early 2010 and will inform the basis for EirGrid's renewable operational strategy in the years ahead."

ITEM 2 MEGA SUBMISSION

MEGA submits that the statement included in the above quoted section avoids the obvious – the need to move more speedily into broad ranging field trials (monitored and controlled) to introduce intelligent elements into the system. The SME sector is obvious place to look for help in this are. It is dangerous to assume that big operators will solve all of these problems. The expertise alone would not develop well in either the big operator or academic environment. SME's hold out the best option to develop the engineers and small solutions which will enable the bigger operators to pull together larger solutions.

ITEM 2MEGA PROPOSAL

MEGA proposes the addition of the following sentence in this section:- "It is intended early in the first year of NREAP to introduce new ways of involving the SME sector in the exploration and development of better smarter ways of advancing solutions in this area and providing leadership useful throughout the European union and further."

Consultation by the Department of Communications, Energy & Natural Resources on sub-section 4.2.7 of the NREAP template

Summary:

Section: 4.2.7 (Electricity Network Operation)

Date of circulation: 1/4/2010

Deadline for feedback: 30/4/2010

Email feedback to: nreap@dcenr.gov.ie

REDG Reps to consult those who they represent on the REDG

4.2.7. Electricity network operation (Article 16(2) and Article 16(7) and (8) of Directive 2009/28/EC)

(a) How is the transmission and distribution of electricity from renewable energy sources guaranteed by transmission and distribution system operators? Is priority or guaranteed access ensured?

Ireland has a process in place for the processing and issuing of connection offers (see 4.2.6 (b)) through which sufficient capacity is reserved on the system to meet the Government's RES-E target.

As noted in 4.2.6 (b), RES-E will play a significant role in meeting Ireland's overall target under Directive 2009/28/EC (covering RES-E, RES-H and RES-T.) The Government has set a RES-E target of 40% and it is estimated that between 4630MW and 5800MW of renewable generation would be required, depending on

economic growth assumptions and demand projections, to ensure 40% of electricity consumption from renewable sources.

To date there have been 3 'Gates.' Under Gate 1 and Gate 2, 1755MW of connection offers were made and accepted. Under Gate 3, 3900MW of offers are currently in the process of being issued to renewable generators. This amount of renewable generation is sufficient for the achievement of Ireland's RES-E target and with falling demand may even mean that the RES-E target is exceeded.

The Gate process is thus a form of priority access commensurate with the achievement of our 2020 RES-E target. In addition, Eirgrid has developed a range of operational procedures to ensure priority dispatch of renewable resources in real time (ensuring our RES-E target can be met) while maintaining the reliability and safety of the grid as appropriate. The Distribution System Operator (DSO) does not dispatch any generation and DSO connections are designed such that the distribution connection can accommodate the full MEC and are not a factor in limiting output.

(b) How is it ensured that transmission system operators, when dispatching electricity generating installations give priority to those using renewable energy sources?

In Ireland, legislation^[1] requires that priority dispatch be afforded by the system operator to generation from renewable resources. The Transmission System Operator (TSO), EirGrid, achieves this by allowing all renewable sources to be dispatched prior to dispatching fossil fuel generation. Notwithstanding that, the situation has occurred where the TSO has had to dispatch down renewable generation at times for security reasons.

(c) How are grid- and market- related operational measures taken in order to minimise the curtailment of electricity from renewable energy sources? What kinds of measures are planned and when is implementation expected? *(Market and grid design that enable the integration of variable resources could cover measures such as trading closer to real time (changing from day-ahead to intra-day forecasting and rescheduling of generators), aggregation of market areas, ensuring sufficient cross border interconnection capacity and trade, improved cooperation of adjacent system operators, the use of improved communication and control tools, demand-side management and active demand-side participation in markets (through two-way communication systems - smart metering), increased distributed production and domestic storage (e.g. electric cars) with active management of distribution networks (smart grids).)*

On 1st November 2007 the Single Electricity Market (SEM) went live, commencing the trading of wholesale electricity in Ireland and Northern Ireland on an All-Island basis. The Single Electricity Market consists of a gross mandatory pool market, into

which all electricity generated on or imported onto the island of Ireland must be sold, and from which all wholesale electricity for consumption on or export from the island of Ireland must be purchased.[\[2\]](#)

Hence, the wholesale electricity market is operated across two legal jurisdictions and wholesale trade takes place across a larger area than in the past. This involves close cooperation of the System Operators in Ireland and Northern Ireland - EirGrid[\[3\]](#) and SONI[\[4\]](#) - on market related matters, including dispatch of generation plant on the island in the context of the SEM.

The SEM is regulated by the Commission for Energy Regulation and the Northern Ireland Authority for Utility Regulation under the auspices of the Single Electricity Market Committee (the SEM Committee).[\[5\]](#) Further information on the SEM can be found on the 'All Island Project' website, the website of the Single Electricity Market Operator and the websites of the System Operators.

The SEM is connected to the UK via the Moyle connector (linking Northern Ireland and Scotland) at present. Interconnection plans are set out in the response to Question 4.2.6 (d) above. In addition, it is noted that the efficient use of available capacity of the existing connection capacity is a key objective for the SEM Committee.

This is in the context of the increasing focus by policy makers across Europe on how national electricity markets can be more closely integrated with one another to allow consumers to reap the benefits of the internal European market for electricity. It is also in the context of increasing wind penetration and EU legal requirements in relation to the allocation of cross border capacity.

Given the above, the SEM Committee has consulted on SEM regional integration examining how best to coordinate the allocation of available transfer capacity on connectors across various timeframes - from long to medium term through to day ahead, intra-day and in balancing markets. In examining these matters it is necessary to do so in the context of the wider, more strategic implications for the integration of the SEM with its neighbouring markets in light of the France-UK-Ireland (FUI) regional grouping. Further information on this consultation process can be viewed on the All Island Project website.[\[6\]](#)

Efficient use of Moyle and future interconnection is one matter that will assist in the minimisation of curtailment of wind. Demand side response has the potential to also play a role in this regard. At present a number of demand side measures are currently in place and demand side bidding is facilitated under the SEM Trading and Settlement Code.

A programme has been initiated to develop a coordinated and sustainable demand response on the island of Ireland in the context of the SEM. This commenced in December 2009 and will cover a number of matters including demand side bidding in the wholesale market, smart grids, load shifting and overall demand reduction.

The TSO, DSO, regulator, Sustainable Energy Authority of Ireland along with the Department of Communications, Energy and Natural Resources are working closely on the development of smart grid technologies. A smart metering pilot has commenced in Ireland and information on this has been outlined at 4.2.6 (c).

Eirgrid has developed a range of operational procedures to ensure priority dispatch of renewable resources in real time (ensuring our RES-E target can be met) while maintaining the reliability and safety of the grid as appropriate.

In addition when these generators are not run, there is a financial compensation mechanism in the Single Electricity Market (SEM) which currently compensates qualifying controllable wind farms who are impacted in these cases with the market price by the volumes curtailed. These financial arrangements rely on the quality and reliability of the control and availability signals to achieve this in practice.

To this end EirGrid has, with the industry, substantially reworked the wind farm commissioning process as well as designed a standard for availability signal which has significantly improved the quality, reliability and accuracy of these signals.

Some current operational initiatives in place to facilitate renewable generation are:

- remote control capability of windfarms at transmission level and those larger than 5MW on the distribution network from the National Control Centre (NCC), which allows response to active and reactive power dispatch instructions
- week ahead, day ahead and intra day wind forecasting for use in dispatch and scheduling of generation
- agreed commissioning process with the wind industry
- priority dispatch

The specific rules employed currently for priority dispatch are as follows:

- Re-dispatch of conventional generation will be considered on an all island basis before any priority dispatch unit is instructed to reduce output from its desired or expected market output. This may also include the re-dispatch of tie line phase shifting transformers. Conventional generation moved to their minimum generation levels in line with the market expectations can be de-committed to facilitate the wind output provided this action does not endanger the security of the power system.
- Priority dispatch hydro stations will be instructed to reduce output before priority dispatch wind farms - even if this results in water being spilt - provided this does not endanger the security of the power system and that appropriate consideration of issues like flooding are taken into account. Appropriate tie-breaking criteria will be used if necessary.
- Priority dispatch wind farms, which are registered in the SEM as Variable Price Takers (VPTs) will be instructed to reduce output before other priority dispatch wind farms, provided this does not endanger the security of the power system. Appropriate tie-breaking criteria will be used if necessary.
- The remaining priority dispatch wind farms will be instructed to reduce output if all the other measures were unable to prevent part or whole of the

system being put at risk. Appropriate tie-breaking criteria will be used if necessary.

EirGrid is working to develop a range of grid related tools, in the area of wind forecasting, stochastic scheduling, on line dynamic stability assessment, real time wind dispatch and others. More detail is provided below. Many of these tools are already operational in the National Control Centre. The Wind Security Assessment Tool (WSAT) is designed to assist real time stability and is a leading edge development planned to be operational in 2010. At the penetrations of wind that Ireland is attempting to reach, system stability is a technical limitation. Accurately knowing this limit in real time will help maintain a secure power system while meeting the policy targets.

The following grid initiative schemes are noteworthy:

- Real time dynamic stability assessment: The addition of large amounts of non-synchronous generation to a power system fundamentally changes the behaviour of the power system especially during and following disturbances. Broad safety margins will need to be implemented in the real time dispatch. The TSO is tackling this issue by conducting long term frequency and stability studies to understand the issues better as well as developing a real time on line dynamic stability assessment tool. Both these measures will allow the system to accommodate more wind without threatening the security of the system.
- EirGrid is developing the use of real time dynamic line ratings which allow for the actual weather conditions in assessing the thermal capacity of lines. This capability will in most cases allow for an increased use of certain transmission lines which will reduce the dispatch down of renewable plant for security reasons
- EirGrid is working to develop a range of grid related tools, in the application of wind forecasting, in the stochastic scheduling of generator units. This research aim is to analysis if there is a better, more secure and efficient mechanism to schedule units on line given that wind forecasts will undoubtedly always have uncertainty in their accuracy
- ESB Networks and EirGrid are working together to assess the reactive power control in real time of distribution connected windfarms. This project can release the reactive capability of the embedded distribution windfarms in a constructive manner which if managed correctly could help an increased penetration of renewables;

Ireland's commitment to facilitate the integration and operational control of renewable forms of energy is underpinned by EirGrid's involvement in a range of major technical studies, including the Facilitation of Renewables studies. The Facilitation of Renewables studies is a suite of pioneering studies that aim to identify the dynamic issues associated with operating a power system with high levels of renewable generation, and how to best solve these issues. The final results are expected in early 2010 and will inform the basis for EirGrid's renewable operational strategy in the years ahead.

(d) Is the energy regulatory authority informed about these measures? Does it have the competence to monitor and enforce implementation of these measures?

The Commission for Energy Regulation (CER) is the independent body responsible for overseeing the regulation of Ireland's electricity and gas sectors. The CER was initially established and granted regulatory powers over the electricity market under the Electricity Regulation Act, 1999. The enactment of the Gas (Interim) (Regulation) Act, 2002 expanded the CER's jurisdiction to include regulation of the natural gas market, while the Energy (Miscellaneous Provisions) Act 2006 granted the Commission additional powers in relation to gas and electricity safety.

Under the 1999 Electricity Regulation Act, it is a duty of the CER to require that the system operator gives priority to generating stations using renewable, sustainable or alternative energy sources when selecting generating stations. The Electricity Regulation Amendment (SEM) Act 2007 outlined the Commission's functions in relation to the Single Electricity Market (SEM) for the island of Ireland. This market is regulated by the Commission and the Northern Ireland Authority for Utility Regulation (NIAUR).

In the context of the above, the Commission regulates the electricity wholesale market, including rules for trading across interconnectors, licenses the System Operator, approves the Grid Codes and has responsibility for the approval of cost recovery for network investment and revenue requirements of the electricity network businesses.

(e) Are plants generating electricity from renewable energy sources integrated in the electricity market? Could you please describe how? What are their obligations regarding participation in the electricity market?

Yes, renewable generators are integrated into the Single Electricity Market (SEM) in Ireland. Generators, including renewable generators, below a defined de-minimis level do not have to participate in the Single Electricity Market (the SEM). The de minimis level is set out in the market rulebook, the Trading and Settlement Code, and is set at a Maximum Export Capacity of 10MW. Generators above this level must participate in the market or, where this is facilitated, appoint an Intermediary to participate on their behalf.

Renewable generators, as others, must sign up to the Trading and Settlement Code, and fulfil the necessary registration requirements to participate in the SEM. The Trading and Settlement Code and requirements in this regard are publicly available on the website of the Single Electricity Market Operator (the SEMO).[\[7\]](#)

At a high level, renewable generators get paid the market price by their tradable volume in the SEM. Depending on whether the generating unit is controllable or not will impact on its treatment in the SEM. If a qualifying unit is controllable and dispatched down for security reasons, the qualifying unit is rewarded as if they had generated their available output.

More specifically, in the SEM, units are classified and paid according to the type of output and bidding arrangement of the generating unit.

A unit can be classified as:

- Predictable if the generation source does not vary e.g. thermal unit or;
- Variable where the output can change from one trading period to the next e.g. wind unit.

In addition, the unit can either be treated as Autonomous (i.e. embedded), a Price Taker or Price Maker. Autonomous units are typically treated as embedded units i.e. they are treated as negative demand and are assumed scheduled first in both the market (day-ahead) and dispatch (within-day) schedules. Autonomous units do not receive constraint payments in the event that the system operator curtails their output. Their tradable volume is their actual physical output.

Price Takers are units which have priority dispatch status which opt to register as Price Takers and are treated the same as Autonomous units except where in the event of the unit being constrained down these units will receive constraint payments, i.e. the units will get paid for their availability, not their output. Price Makers submit price quantity pairs and are scheduled according to their offers in the market and receive constraint payments if constrained up or down.

In general renewable generators fall into three categories Autonomous (non controllable wind), Variable Price Takers (Controllable Wind) and Predictable Price Makers (Hydro).

- An Autonomous Price-Taker Generator, if its MEC is excess of 5MW, is a unit which cannot or has yet to be confirmed as capable of being controlled up or down by the TSO.
- A Variable Price-Taker Generator (VPTG) is typically a wind farm whose MEC \geq 5MW, is controllable according to Grid Code and opts to be priority dispatched. It is therefore included by default in the market schedule.
- Predictable Price-Maker Generators (PPMG) are treated as a price-maker as they are able to reduce or increase their output when requested by the system operator.

Certain obligations for generators participating in the market include:

- the renewable generator must be licensed by the regulator (Commission for Energy Regulation)
- they must have a connection to the grid
- they must comply with relevant conditions of the Grid Code, and
- as the SEM is a collateralised market they must provide the required collateral cover.

There are other obligations on all units participating in the market and these are detailed in the Trading and Settlement Code. [8]

(f) What are the rules for charging transmission and distribution tariffs to generators of electricity from renewable energy sources?

All, renewable and non-renewable, transmission connected generators and those distribution connected generators with a contracted Maximum Export Capacity greater than or equal to 10MW are charged locational generator tariffs.

These can either be capacity based charges (€/MW/Month) or energy based charges (€/MWh). Capacity based charges are charged for a generator's portion of its MEC that has firm access to the transmission system while energy based charges are charged for a generator's portion of its MEC that has non-firm access to the transmission system. See:

<http://www.cer.ie/en/electricity-transmission-network-decision-documents.aspx#TariffDocuments>

ESB Networks is the Distribution System Operator. A document on 'ESB network charges for 2010 Operation and Maintenance Charges for Generators CER 09188' is available at: http://www.esb.ie/esbnetworks/commercial-downloads/operation_maintenance_charges_2010.pdf



Image (1) Copy

[1] 1999 Electricity Regulation Act (section 9 (5) (e))

[2] Note that a de minimis level applies in relation to mandatory participation in the SEM.

[3] <http://www.eirgrid.com/>

[4] <http://www.soni.ltd.uk/>

[5] Ref: <http://www.allislandproject.org/>, http://www.allislandproject.org/en/SEM_semc.aspx

[6] <http://www.allislandproject.org/en/>

TS_Decision_Documents.aspx?article=beea10b1-a6c2-4993-8cfe-037a57dee8f9

[7] Ref: <http://allislandmarket.com/MarketRules/>

Ref: http://allislandmarket.com/market_registration/

[8] <http://www.allislandmarket.com/MarketRules/>