Arrangements for Micro Generation

Decision and Response to Comments Received

CER/07/208

20th November 2007

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1. Background

Over recent years there has been an increase in the number of smaller commercial generator units connecting to the electricity network, although up until now there has been little demand for micro generation. Micro generation is often described as zero or low carbon generation by individuals, small businesses or local communities to meet their own needs. In terms of its technical parameters[1] it is generation that is rated at up to:

- 25A with a single phase low voltage [230V] connection, and/or
- 16A with a three phase low voltage [400V) connection, and
- Has been designed to operate in parallel with the low voltage network;

In practice these definitions would cover domestic micro generators that are rated at or below 11kW.

Against the prospect of a significant increase in micro generation the Commission for Energy Regulation ("the Commission") published a consultation paper setting out the proposed arrangements for the regulation of micro generation in Ireland[2]. The Commission has also consulted on prospective revisions to the licensing of generating stations[3] and the introduction of smart metering[4], which could facilitate the introduction of micro generation.

The Commission has received responses to its micro generation consultation from the thirty interested parties listed on the following page. Their submissions are available to download from the Commission's web site at www.cer.ie. Three respondents did not wish to have their responses published.

[1] EN 50438, 31st July 2007, "Requirements for the connection of micro generators in parallel with public low voltage distribution networks"
[2] CER/06/190, 10th October 2006
[3] CER/07/128, 31st August 2007
[4] CER/07/038, 13th March 2007

AIEA	IWEA
Airtricity	JK Forde
Coenergy AG	Labour Party
Connaught Alternative Technology	Limerick Institute of Technology
Cool Power Ltd	R McGrath
Dermot McDonnell	SAV Energies
DIT (Kevin Street)	SDLP
Dr Seamus Clarke	SEI
EirGrid	Sinn Féin
Enercom International	Surface Power Technologies
ESB Networks	Sustainable Development Ltd
Fingleton & White	Tyndall National Institute
Fuel Poverty Action Group	Westwind
The Green Party	A.N. Other (3 Responses)

The Commission would like to thank all those who submitted a response.

Section 2 of this paper summarises the Commissions decisions concerning the regulatory framework and arrangements for micro generation that should apply in the Republic of Ireland, whilst section 3 reviews the comments received on the various topics raised in the consultation paper.

2. Commission's Decisions

Following its consideration of the comments received from interested parties the Commission has determined that:

- The technical standards that shall apply to micro generation are those set out in European Standard EN50438 and approved by the European Committee of Electrotechnical Standardisation (CENELEC).

- An "inform, consent and fit" process will apply to the installation of micro generation. Owners must inform ESB Networks (ESBN) of any planned installation and follow a formal application process[5]. ESBN is required to respond to an application within 20 business days. In the event that no response is forthcoming then the application will be deemed to have been granted. This arrangement will apply to both residential and commercial installations.

- In any local area micro generation can be installed up to an initial limit of 40% of the substation transformer capacity serving that locality. ESBN is undertaking an assessment of the effects of increasing micro generation beyond this limit, which will be reviewed after two years or earlier if the 40% limit is reached in a particular area.

- Applications for the connection of multiple installations, such as may be associated with new housing estates, will be treated as part of the overall development. The connection application would then follow the same process as for new load.

- No application fee will be required in respect of single installations. However, developers installing micro generation as part of wider development will be required to pay the standard published fee. The Commission may consider introducing an application fee for all micro generation installations at some point in the future.

- Micro generators will be exempt from paying the Commission for Energy Regulation Levy.

- An approved list or register of type approved micro generation units will be maintained by ESBN.

- Micro generators will be included as a priority group in the smart metering implementation programme. In the interim, micro generators can apply to ESBN for an interval meter to be installed. The first one hundred micro generators who request an interval meter will only pay the installation costs. The actual cost of the interval meter will not be charged to the micro

[5] The ESBN application process and the answers to frequently asked questions can be found at:
http://www.esb.ie/esbnetworks/connections_metering/micro_generator_connections.jsp

generator. This interim arrangement will apply until the roll out of smart meters which is currently expected to commence in April 2008. Micro generators may choose to wait until this time and not be required to pay the installation cost.

3. Responses and Commission's Decisions

The remainder of this document reviews the responses to the issues raised in the consultation paper, and the Commission's views on the comments made.

3.1 Installation Process for Micro Generation

The Commission anticipates that over time there could be a significant number of micro generators installed in homes and small businesses. In the consultation document, the Commission sought comments on ESBN's proposal to set an initial limit on the installation of micro generation at 40% of the local transformer capacity.

3.1.1 Respondents' Comments

Respondents were evenly divided on the appropriateness of the 40% limit. Those that favoured the approach believed that the 40% limit would not be reached in any locality for many years, whilst others thought a limit appropriate on safety grounds. Despite favouring the limit, some respondents thought a review should be conducted within two years. One respondent suggested that the limit should take account of the effective capacity of the micro generator rather than simply relying on the nameplate rating.

Those who disagreed with the 40% figure suggested that analysis should justify any limit that was applied. It was noted that the DSO is already obliged to take account of new generation and loads when planning its network development[6]. One respondent cited Article 20(2) of EU Directive 2003/54/EC[7] which lays out the basis on which a system operator can refuse access to a network. This respondent argued that refusal to approve a micro generation application on the basis of an arbitrary 40% limit would be a breach of the Directive. Other comments included the observations that the limit would depend on the type of micro generation installed and whether it was a single or three phase connection. It was noted that small wind turbines would be predominantly sited in rural locations and the consequence of any associated voltage rise would be small.

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[6] 10(d) Part 4 of SI 60 of 2005

[7] Electricity Directive 2003/54/EC, Article 20 (2) states that 'The operator of a transmission or distribution system may refuse access where it lacks the necessary capacity. Duly substantiated reasons must be given for such refusal, in particular having regard to Article 3. Member States shall ensure, where appropriate and when refusal of access takes place, that the transmission or distribution system operator provides relevant information on measures that would be necessary to reinforce the network. The party requesting such information may be charged a reasonable fee reflecting the cost of providing such information".

3.1.2 Commission's Response and Decision

The Commission accepts that no analysis has been advanced in support of the 40% limit, and notes the comment concerning Article 20(2) of EU Directive 2003/54/EC. It understands that the limit is intended as a check and will not automatically trigger a refusal of any micro generation application, ESBN has indicated it will be assessing the consequence for the network of the 40% limit being reached and future applications will be considered in the light of this study.

Given the dearth of studies currently available the Commission has decided to approve the 40% limit at this stage. It is believed that this approach will support the development of micro generation whilst not compromising the security of the distribution system. Rather than removing the need to upgrade or replace parts of the distribution system it is anticipated that significant levels of micro generation would probably lead to increased investment in the reinforcement of the distribution network. The Commission intends to review the limit after two years or sooner if the limit is reached in any area.

3.2 Notifying the Network Operator

The consultation paper asked for comments on ESBN's proposed "inform, consent and fit" approach, or whether the maintenance of a register of approved micro generation designs could be an alternative to consenting individual installations. Comments were also sought on the enforcement of any arrangement and how prospective installers might be informed of the procedure to be followed.

3.2.1 Respondents' Comments

Generally respondents agreed that the DSO should be informed of micro generation installations connecting to the network, and that "inform, consent and fit" was appropriate, but requested more detail on the process. It was felt that the mechanism should be simple, straightforward and standardised, with some respondents suggesting that the consenting of applications should be "automatic". It was noted that making the application process for single and multiple installations the same would aid simplicity. It was also suggested that ESBN should be required to respond within 20 business days indicating the remedial actions that were needed if an application was unsuccessful. Another suggestion was that the consenting process should only apply to commercial installations and not to residential buildings.

Some respondents thought the process should simply be "inform and fit" since this would accord with EU proposals. Sustainable Energy Ireland (SEI) noted that the UK approach to small systems was based on type approval to meet industry standards, installation by accredited installers, and a "fit and inform" process without any need for specific consent. It was suggested that consent should not be required from the DSO provided all technical criteria are met. A further suggestion was that a manufacturer or supplier should make an application on behalf of the final customer, perhaps at the time of purchase.

A number of respondents suggested that an approved register of micro generation units could be made available for reference on a web site, possibly the Commission's. Others thought the register should reside with the National Standards Authority of Ireland (NSAI) or SEI. Two respondents were opposed to the publication of an approved list given the potential for "cloning" the details from approved units to support an application for a non compliant unit. A further suggestion was that some form of compliance labelling would indicate that the generator met the necessary technical specifications.

3.2.2 Commission's Response and Decision

The Commission notes the respondent's suggestion that only an "inform and fit" process should be necessary but believes that the view of the majority of respondents who supported an "inform, consent and fit" approach is the best way forward. This would better enable ESBN to assess the impact on the network and what reinforcement was needed as the amount of micro generation increased.

Furthermore the "inform, consent and fit" approach would reduce the likelihood of non-compliant units being connected which could have safety implications. These concerns apply equally for both domestic and commercial installations and thus it would be inappropriate to consider a different treatment between the two sectors. Applications for housing estates should be submitted in accordance with the conventional application process for the connection of new load. This would enable the design of the network to proceed optimally. The Commission agrees with the proposal that a manufacturer or supplier should be able to make an application on behalf of the final customer.

The Commission is of the view that an approved list or register of type approved micro generation units be held by ESBN but that technical detail from this register should remain confidential to guard against false applications from non compliant units. Making micro generator developers aware of the need to inform ESBN would appear to present certain practical difficulties. Retailers could be requested to inform their customers of this obligation but the Commission does not have any statutory powers to enforce this.

3.3 Safety Requirements

In its consultation paper the Commission proposed working with ESBN and the Electro-Technical Council of Ireland (ETCI) to address any safety requirements. ETCI Wiring Regulations currently cover the safety of installation on the customer's side of the meter. The ETCI is also the Irish member of CENELEC. Their published standard EN50438[8] outlines the safety standards for micro generation in Ireland, although it does not explicitly address installation methods or wiring practices.

[8] Op.cit.

3.3.1 Respondents' Comments

There were no specific comments from respondents related to the safety of micro generation installations. Respondents recognised the importance of safe installations and there was broad agreement with the Commission's proposed approach of working with ESBN and ETCI to develop the relevant standards.

3.3.2 Commission's Response and Decision

The Commission intends to work with ESBN and ETCI on safety considerations as outlined in the consultation paper. Further consideration will be given to the application and enforcement by the relevant parties of the CENELEC standard

3.4 Application Fee and Payment of CER Levy

The Commission also sought comments on the principle and level of the proposed application fees for connecting micro generation to the distribution network[9], and proposed that micro generators should not be required to pay the Levy Order. The work of the Commission is funded through a Levy Order where parties engaged in generation, transmission, distribution and supply of electricity pay a levy each year based on the number of kW or kWh.

3.4.1 Respondents' Comments

Most respondents did not favour the introduction of an application fee for micro generation. It was further suggested that the introduction of an "inform, consent and fit" process would significantly reduce ESBN administration and thus diminish the need for a fee. An application fee might also discourage the recording of installations by providing a disincentive to inform ESBN. It would also increase costs of market entry.

One respondent suggested a requirement to pay a nominal fee, which would inform ESBN of the connection of micro generation to the network. Another advocated a nominal fee of €20 for generation up to 100 kVA but thereafter the fee would increase with the generator capacity. A further view was that an application fee would introduce unnecessary expense for both the customer and DSO, although it may be appropriate if micro generation becomes widespread. A further proposal was that the registration fee should be borne by the manufacturer.

All respondents agreed with the Commission's proposal that micro generators should be exempt from paying the Levy. There was also support for the idea that there should be no requirement for micro generators that were below a de minimis level to be separately licensed. This accords with the Commissions proposals for revising the authorisation and licensing of generating stations[10].

[9] CER/06/190, Table 4.2
[10] CER/06/195,

3.4.2 Commission's Response and Decision

The Commission agrees that it is not appropriate at this stage to implement a system of application fees for micro generation. An application fee would create a disincentive both for the take-up of micro generation and in ensuring a flow of information to the DSO, and also impose unnecessary cost on ESBN. However, for multiple installations of micro generation units the Commission believes that the established connection arrangements should continue to apply since reinforcement of the network is likely to be required. In the event that micro generation become widespread it may be necessary to reconsider the introduction of an application fee for single site applications.

The Commission affirms that micro generators should be exempt from paying the Levy. The position of the licensing of smaller generators has been dealt with under a previous Commission decision.[11]

3.5 Commercial Arrangements

In its consultation the Commission set out a number of options for metering[12] and for the payment arrangements that might apply to any exports that were made by a micro generator. The payment arrangements contemplated were for a sale directly into the electricity wholesale market i.e., the Single Electricity Market (the pool), although this would be unlikely to be cost effective for micro generation, the sale to a supplier, or simply to spill to the system without payment. In this last instance the energy would appear as negative losses on the network which would in turn lead to a benefit for all users.

3.5.1 Respondents' Comments

Most respondents believed that non payment for exports to the system would create a serious disincentive to the adoption of micro generation and would inhibit its take-up. One respondent noted it was necessary for micro generation to be properly rewarded in order that investment was undertaken whenever the relevant micro generation technology was economic. Creating the perception that the export of micro generated electricity to the network would usually be without payment would discourage potential developers from assessing the viability of prospective projects.

It was further suggested that it would also be unacceptable if the DSO could benefit from the provision of "free" electricity to the network. Another respondent noted that the DSO would not be able to procure energy under the terms of its Licence. However, this would not preclude the provision of free electricity generally benefiting the system and thus the general body of consumers.

It was noted that the direct sale of electricity to the pool by a micro generator was unlikely to be economic, and that a micro generator should have the

[11] Decision on the Revised Process for the Authorisation and Licensing of Generating Stations, CER/07/128
[12] CER/06/190, section 3.4

freedom to choose whichever supplier he wished to make the off-taker for the output. Another respondent thought it appropriate for a micro generator to receive the top-up prices under the present arrangements, and the pool price once the SEM was implemented.

A further proposition was that the reward for micro generation should be linked to the size of the micro generator with larger units being paid more for their production. Finally it was noted that non-payment would discourage developers from making a formal application to connect thus leaving ESBN with no knowledge of the installation with consequent concerns for the safe operation of the system.

3.5.2 Commission's Response and Decision

The Commission agrees with the view that there should be a proper reward for the value of electricity exported to the network by micro generators. This is necessary if the economics of any micro generation investment are to be properly assessed.

Under the SEM there will be one prospective route for micro generators to be rewarded. The micro generator could dispose of its output to a supplier which would reduce the supplier's requirements for pool electricity. In such an event the value of the output would be derived from the price of electricity in the pool thus providing an appropriate signal for its value at any time.

The Commission does not accept the argument that the value should be linked to the size of the production unit. Pool prices are not linked to volume but will vary diurnally, with the day of the week, and seasonally.

The Commission notes that metering is required to facilitate payment to micro generators and considers that smart metering will best facilitate micro generators in this regard. The Commission refers the reader to the decisions regarding the metering arrangements for micro generators set out in section 3.6.2 below.

3.6 Metering Options

The system of payment for the output of micro generation will be dependent upon the type of measurement that was possible. Accordingly the consultation paper asked respondents to comment on the respective merits of:

- Standard Domestic Metering
- "Net metering", where the meter would run backwards when there was a net export to the system
- Non-interval import/export metering in conjunction with the use of profiles
- Interval metering with import/export channels
- Smart Meters

3.6.1 Respondents' Comments

Generally respondents were of the view that there were no technical reasons why any of the metering options considered in the consultation could not be used[13]. Most of the comments related to the use of net metering and smart meters.

One respondent thought that a range of metering options should be available for micro generators, but that it was reasonable for a supplier to insist on the separate recording of the import and export of energy. It was noted that the value of electricity varies widely over time and hence it was unlikely that any supplier would agree to net metering which would average both imports and exports irrespective of when they occurred. However, it was suggested that some averaging might be a practical proposition if periods were chosen when the value of electricity was similar.

In addressing the prospect that the outcome of a net metering arrangement would be indistinguishable from a situation where the meter had been tampered with for the purpose of disguising theft it was suggested that there were a number of other anti-fraud arrangements that could be employed. Another respondent suggested that the use of net metering was already prevalent in Northern Ireland and it would be discriminatory and inhibit competition not to adopt a similar practice.

A frequently expressed view was that the use of net metering was a pragmatic stop-gap until smart meters became generally available. At that time juncture the imports and exports of a site could be properly recorded. A further view was that a date should be set for the installation of smart meters, but until then net metering should be employed. Another respondent queried whether the costs of implementing smart metering have been assessed by the Distribution System Operator. It was also suggested that the Commission would be in contravention of SI 60 of 2005[14], if it did not allow net metering.

All respondents were of the opinion that the use of smart meters provided the best prospect for accommodating micro generation on the network. It was noted they would have the added advantage that by signalling periods of high price to the micro generator both demand and generation could be managed to provide the most benefit to the system, although this would of course require the real time display of prices. It was suggested that priority be given to micro generators in the roll out of any smart metering programme, especially if payment were dependent upon this, and that a timetable be published by ESBN.

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[13] "Metering Options for Small-Scale Renewable and CHP Electricity Generation in Ireland", A report prepared on behalf of Sustainable Energy Ireland, May 2005

[14] Section 3 (iii(c)) Part 2 of SI 60 of 2005, *"The Commission shall in relation to electricity monitor the terms, conditions and tariffs for connecting new producers of electricity to guarantee that these are objective, transparent and non-discriminatory, in particular taking full account of the costs and benefits of the various renewable energy sources technologies, distributed generation and combined heat and power".*

3.6.2 Commission's Response and Decision

The Commission is of the view that a micro generator should be appropriately rewarded for any electricity that is exported to the system. This will ensure that micro generation projects can be economically evaluated for the contribution they can make in the provision of electricity supplies. The alternative to the production of electricity from micro generation is its purchase in the wholesale electricity market, i.e. the pool and its transportation across the transmission and distribution systems. Thus, the economic value of the micro generator output is deemed to be the pool costs and losses that are avoided.

Net metering, which would automatically reverse the direction of a standard non interval meter is not a viable option for measurement. Firstly, it would result in the incorrect remuneration of the micro generator since it is estimated that only around two thirds of the costs recovered by a supply tariff are typically avoidable by the purchase of micro generated electricity. Secondly, net metering does not identify the time at which generation was exported onto the system by the micro generator and, as such, cannot facilitate payment that reflects the value of such output to the system. Thirdly, most standard non-interval meters are fitted with back stops and thus the direction of the meter will not be reversed.

Simple modification of these meters is not technically possible. Given the above, the Commission doesn't agree with the respondent's suggestion that the Commission would be in contravention of its duties under Section 3 (iii) (c) of S.I. No. 60 by not adopting net metering as an enduring solution. In this regard the Commission also notes that when micro generation becomes a significant proportion of overall system demand then net metering could result in other customers cross subsidising the micro generator or vice versa, which would be discriminatory.

The Commission considers that smart metering offers the best prospect for economic measurement in that smart meters have the capability to distinguish between import and export on a settlement period basis. The Commission is about to publish an information paper on Smart Metering (CER/07/198)[15] and currently envisages the first smart meters being installed during the second quarter of 2008. The Commission notes that in accordance with CER/07/198, micro generators will be included as a priority group in the smart metering implementation programme.

Smart metering will provide a metering solution for micro generators when available as above. The Commission recognises that micro generators may require an alternative metering option for the interim period until such time as the smart metering rollout commences so as not to discourage micro generation projects from proceeding when economic. The Commission has considered three alternative options for metering micro generation in this interim period and these are set out below.

[15] Smart Metering: A First Step in Implementation, Information Paper, CER/07/198

A. Standard Export Metering

This option involves the installation of a standard export meter for micro generators in conjunction with their existing import meter. However, ESBN has advised the Commission that this option is unworkable on the basis that hand held terminals currently used by ESBN to read meters are not equipped to support the reading of an import and export meter on a single micro generation site. In addition, ESBN have stated that there is a strong probability that a micro generation site would not have sufficient space to install a second meter on its premises. ESBN would be required to survey each micro generation site to ascertain its appropriateness prior to installing such a meter. Given the above it is considered that standard export metering is unable to provide a satisfactory interim metering arrangement for micro generators until smart metering implementation.

B. Import/Export Register Metering

This metering option involves replacing the existing import meters at micro-generation sites with new import/export register meters. These meters would provide register data for both import and export. ESBN currently do not purchase this type of meter so they would have to be purchased, configured and tested prior to commencement of installation at micro generation sites. Installation of such meters would, therefore, be quite a lengthy process and would not offer an appropriate interim arrangement until smart metering is implemented, given the timelines involved.

C. Quarterly Hour Interval Metering

Quarterly hour interval metering involves the replacement of the existing import meter at micro generation sites with a quarter-hourly interval meter with GSM connection. This could provide export data for both settlement/payment purposes and profile analysis. ESBN have advised that these meters could be available for installation from late November and would therefore offer the most appropriate interim metering arrangement.

The Commission has decided that micro generators will have the option of having an interval meter installed as an interim arrangement until smart metering is available. This approach would facilitate payment to micro generators for their output by their supplier. The Commission has been advised that an interval meter costs in the region of €500. The Commission is of the opinion that this may be a relatively expensive option for micro generators. Therefore, the Commission has decided that where a micro generator applies to ESBN to have an interval meter installed in advance of the commencement of installation of smart meters, the cost of the meter will not be charged to the first 100 micro generators who submit such a request. However the Commission further determines that the actual cost of installing the meter will be charged to the micro generator. An installation fee is considered appropriate because the micro generator has elected to have a meter installed in advance of the roll out of smart meters which is currently expected to commence in April 2008. Whilst the provision of free interval meters is limited to 100 micro generators, the

Commission will review this limit in the event that a significantly large amount of micro generators elect to have interval meters installed in the run up to the roll out of smart meters. In carrying out any review the Commission will be mindful of the impact on *all* customers, including micro generators, of continuing to offer free meters

If a micro generator is considering applying for an interval meter, the Commission suggests that the generator begin discussions regarding any payment arrangements with their supplier. Payment for output is a matter for negotiation between the off-taking supplier and the micro generator. The Commission is cognisant that such a customer-supplier arrangement will be new and as such may require a period of interaction to conclude.

The Commission advises micro generators that it is prudent to speak to their supplier regarding payment arrangements in advance of incurring the cost of installing an interval meter. A micro generator should also consider that under the smart metering project meters will be installed for free. Therefore, micro generators will not incur any installation costs if they wait to be included in the smart metering project.

3.7 Technical Aspects of Micro Generation

The consultation paper indicated that the technical requirements for micro generators should be in accordance with the European Standard EN 50438 established by CENELEC.

3.7.1 Respondents' Comments

One respondent noted that there could be technical issues associated with a higher future penetration of micro generation. Furthermore increased levels of micro generation were likely to give rise to higher network costs in the short run. EirGrid has also observed that increasing amounts of micro generation connected to the distribution networks would impact the planning and operation of the transmission system, and the central despatch of conventional generation.

3.7.2 Commission's Response and Decision

The Commission agrees that an increasing proportion of micro generation connected to the system will impact both the design and operation of the distribution and transmission networks. The Commission will work with both system operators to consider further the consequences of increasing amounts of micro generation. In this regard, the Commission has requested that both system operators provide a report annually to the Commission on these matters.