Management of Maximum Import Capacity

A Consultation Paper

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1 Introduction

When reviewing ESB Networks' connection charges and connection agreement policies, it was brought to the Commission for Energy Regulation's (the CER) attention that there is a need to introduce a clear policy with respect to the use of different types of metering. This is necessary to offer incentives to customers to manage and maintain the capacity that each customer reserves on the Distribution network at the level agreed in their connection agreement. This is particularly the case for LV customers with Maximum Import Capacity (MIC) less than 70 kVA as at present Maximum Import Capacities are not contracted at a level below this threshold. In addition the existing policy does not prescribe the level at which different types of meters must be installed and therefore the level at which maximum demand and MIC tariffs are set.

At present significant investment is being undertaken in electricity networks. A significant portion of this investment results from growth in customer consumption and the pattern of consumption by customers. While new customers connecting to the system are given incentives to choose a reasonable size of connection by way of connection charges, it is also important to offer existing customers clear incentives to manage their load to minimise network reinforcement. This is because if the appropriate customers do not pay the appropriate charges for their requirements, the resultant effect would be higher charges to other customers. It is therefore necessary to offer customers clear signals to manage their consumption.

One such mechanism is to monitor the maximum electricity usage each billing period and when the agreed MIC is breached, an additional charge is levied on the Supplier who passes it to the customer. Suppliers may opt to charge customers a premium for electricity consumed at peak times. However such an approach is contingent on the Supplier having the relevant data available to them hence the need for more sophisticated metering.

The installation of maximum demand meters is one method that can facilitate and incentivise customers to better manage their demand. This is because, where maximum demand meters are not installed, continuous breach of the MIC will not be evident due to the type of meter used. Further it is likely that the general purpose tariff applies. Meters used for general purpose tariffs cannot reflect the consumption pattern of the customer and establish if a customer is exceeding MIC.

2 Scope

The purpose of this consultation paper is to seek views on the following:

1. Does the current policy adequately encourage the management of MIC?
2. What threshold should apply to the installation of maximum demand (MD) meters and On-line meters ?
3. What threshold should apply to the installation of day-night metering, (if any) for non-maximum demand customers?
4. Should the same threshold be applied to new and existing customers?
5. How should customers without Maximum Demand metering have their MIC monitored? Does it need to be monitored for very small customers?

The paper also aims to high-light the importance of managing MIC and examine the means by which MIC can be better managed by the ESB Networks as Distribution System Operator and by customers.

It is important to note that changes in metering policy will have an impact on customers through the tariff that will be applied to them. This should be taken into account when considering any changes to thresholds.

3 Maximum Import Capacity (MIC)

The maximum import capacity is the maximum electrical capacity of the connection point agreed between ESB-Networks as the Distribution System Operator and the customer[1]. It is measured in kVA.

The MIC is formalised when the customer signs a connection agreement with the network operator. This entitles the customer to call on the signed capacity at any time without notice. Under the Distribution Code, ESB Networks is obliged to maintain the signed capacity at the connection point. If the customer decides to increase or decrease the MIC then ESB-Networks will offer a new connection agreement subject to a connection charge.

The MIC is one of the main determinants of the cost of connection. This capacity is associated to a connection point and cannot be transferred to another Connection point. For safety and in order to maintain standards of supply, the customer's demand (adjusted to kVA) should not exceed the customer's installation over 24 hours a day, 365 days a year. It is important for MIC maintenance that Maximum Demand information is available at all connection points where it is material. This is achieved through the use of Interval meters or Maximum Demand meters. Maximum demand meters interpret customer's consumption over 15 minute periods. Interval or Profile metering provides the same functionality as the MD meter however the meter is linked by telecommunications to a central data collection centre and measures energy consumed by the customer within every 15 minutes.

[1]This document addresses distribution connected customers. There are a small number of transmission connected customers who have a connection agreement with ESB National Grid.

When a new connection is constructed, the networks operator charges 50% of attributable cost of connection prior to constructing the connection. The balance of the cost is recovered from ongoing Distribution Use of System Charges (DUoS). Presently the DUoS tariff contains a component of charge based on the customers MIC where the customer has a connection agreement. MIC Charges where applied are the main mechanism for the networks operator to recover this investment in new or increased connections assets. If the capacity is set significantly above the customers requirements a higher than required fixed cost would be charged to the customer if the demand exceeds the capacity at anytime during the month a penalty charge is applied to the customer. This charge is calculated as: 2*capacity charge rate*excess kVA will apply in the billing during which the MIC was exceeded. These charges are in the first instance passed to Suppliers through the DUoS tariff and ought to be passed on to the customer by suppliers and often appear separately on the customer's bill.

3.1 Management of Maximum Import Capacity

The MIC level of a customer sets the working limit of the electrical connection of a customer. It is important that these levels are effectively managed and do not exceed the contracted amounts as continuous breach of the MIC levels has serious safety, quality of supply and cost implications.

The continuous breach of MIC could cause the electrical equipment to overheat and stress the plant beyond its design. This would not only shorten the design life and maintenance interval of the equipment, but also increase the need for reinforcements of the system in order to maintain the quality of the network and supply to other customers. It is equally important customers reserve a more accurate capacity on the system to prevent inefficient allocation of capacity on the system.

3.2 Quality of Supply and Safety Implications

Very often customers are not aware of the effect MIC has on the quality of supply or the effects on the network equipment. Quite often the level of demand of the customer's installation or that of a nearby customer may be the cause of a voltage complaint.

In order to address the lack of customer awareness the CER propose:

1. The DSO publish an MIC information guide that would address issues that relate to the effects of exceeding MIC and managing MIC
2. Include the following in their procedure for dealing with voltage complaint:
    - Installing a measuring device that would record the voltage and the MIC of the customers.
    - Investigate the load used by neighbouring customer if it is considered that they are the cause of the voltage problem.
    - Spot-check customers whose two-monthly consumption exceeds a predefined level indicating that they may be exceeding agreed MIC levels.

- If the customer's demand over a period of time exceeds the MIC, invite the customer to apply for an increase

The CER invites comments on the above proposals and whether such proposals would be beneficial

3.3 Customer Exceeds MIC

Inevitably customers will exceed their MIC as their level of consumption increases. In many instances this is a result of gradual change and the customer will not be aware of the increase. It is the responsibility of the networks operator to monitor and manage this change. Where the safety or quality of supply to other customers is compromised, the DSO has the powers to de-energise the customer under the general conditions of connection. However, this should be seen as the last resort and it is not the preferred approach to managing breaches of MIC.

The CER propose the following options and invite comment on each:

- Install an MD meter and apply a tariff that has a penalty charge for exceeding the agreed MIC. If the customer declines to apply for an increase in capacity or to control demand, then the necessary works should be carried out to ensure safety and quality of supply and the costs should be recovered through penalty charges to the customer.
- Install a current limiter device as a means of alleviating the situation when other alternatives fail, subject to a code of practice to be approved by CER. Current limiters de-energise the connection point when the limit is exceeded and can then be reset by the customer.

It is proposed that the principles below would apply where there is a safety risk or where supply to another customer is outside the standards of the Distribution Code due to electrical demand or disturbing loads at the customer's premises.

TABLE 1: COURSE OF ACTION FOR EXCEEDING MIC

	Principle	Action
1.	Notice of breach of MIC and installation of current limiter	The customer should be invited in writing to apply for a higher capacity (MIC) or to reduce demand where there is a continuous breach of MIC. ESB Networks will take this action on confirmation that the customer's demand is the cause of the problem. Unless there is a risk to safety, the customer will be given adequate notice and opportunity to respond. The customer and supplier will be given adequate notice if a current limiter is to be installed. The customer

		shall also be given the opportunity at this stage to remedy the situation.
2.	Change in Meter	Where the breach is material, ESB-Networks may advise the customer that an MD meter would be required. This alternative may also be used if the installation of an MD meter and tariff change is feasible and preferred by the customer.
3.	Informing the customer on the day of installation	The caller will attempt to contact the customer at the premises before effecting the installation. Except where the premises are vacant or the customer refuses entry, the customer should be given the reason for the installation and the means of resetting the limiter should be explained. A contact number should be given to the customer for use in the event of difficulties in resetting the limiter.
4.	Handling of installation	Cases of illness, bereavement or potential of financial loss should be handled sensitively.
5.	Removal of the Current Limiter	Removal will be effected as soon as possible after the customer has remedied the situation and it is safe to do so.
6.	Customer Service	Once the decision to install a current limiter has been issued, adequate information will be available to customers by contacting the ESB Networks. Customers should continue to receive the same standard of service and courtesy as any other customer.
7	Confidentiality	ESB Networks will not disclose the presence of the current limiter or the underlying problem except where it is necessary to carry out its duties or in the interests of safety.

Views are invited on the above course of action.

4 Present Policy on Meters

In general there are three types of metering arrangements, namely:

- Electricity Volume meters which measure the number of kWh that a customer consumes. These may be referred to as General Purpose meters, which measure the volume over 24 hours a day for two months. Alternatively they may be referred to as Day-Night Meters or Dual Tariff meters, which segregate the volume, consumed into day and night by the use of a timer.
- Maximum Demand (MD) metering which measures the volume of energy consumed segregated into day and night, the maximum consumption integrated over each 15 minute period during a billing cycle and the reactive energy consumed by the customer over the billing period.
- Interval or Profile metering which provides the same functionality as the MD meter. The meter is linked by telecommunications to a central data collection centre and measures energy consumed by the customer within every 15 minutes. Due to the added costs of on-line metering, the

addition features are generally provided for customers whose MIC is greater than 100kVA or whose annual consumption is greater than 300MWh.

CER invites comments on the threshold for the installation of on-line metering, the installation of MD metering or Dual Tariff metering. As a definitive threshold does not exist at present, customers may have different meters installed based on a subjective assessment of their requirements. This can have a direct bearing on the type of tariff a customer is charged.

The present policy for determining the type of meter installation considers the expected retail tariff based on the PES tariff structure and the Technical guidelines. At present MD meters are installed where customers are expected to be on a maximum demand tariff. Generally MD meters are installed for customers with MIC greater than 30kVA. MD meters are also installed where meters require current transformer (CT). A CT is required where the volumes are too large to input directly to the meter. CT provide readings which are proportional to the volume of electricity passing through the customer's connection.

The policy with respect to installation of General Purpose or Dual Tariff is also not prescriptive. Customers who do not have Interval or MD meters are equipped with such meters. There are no prescriptive limits for the application of 24-hour measurement as opposed to day-night measurement and it is left to the customer to decide.

5 Considerations for Threshold Levels

The CER requested ESB Networks to put forward their views of an appropriate threshold for the installation of MD meters. The table below presents some of the factors that ESB Networks considered important and that will impact on the costs of implementing various alternatives.

Considerations in Setting a Threshold for MD Metering

KVA	€ per Installation	Policy
>100 kVA	1500	Limit of current plans for retrofitting interval metering (and remote data capture).
>50kVA <99kVA	800	This is the limit of CT metering. Above this level CTs are required as the volume of electricity is too great to measure directly. The present practice is to install MD metering in all new installations above this level. Where retrofitting meters above 50kVA most installations will accommodate a like-for-like swap.
>45kVA <50kVA	500	Above this level urban connections are reviewed for network implications. Retrofitting existing

		installations may have higher cost implications as some older installations may require significant physical work to accommodate MD Meters.
>30kVA <44kVA	100 – 300	This level coincides with the limit of single-phase connections. At this threshold the PSO is applied. Retrofitting existing installations will have higher cost implications, as older installations will require significant physical work to accommodate MD Meters. In addition the number of installations increases exponentially as the threshold is reduced.

CER invites comments on the threshold at which MD meters should be installed for new connections and retrofitting MD meters for old connections.

6 MD Metering and effect on DUoS

At present where MD metering is not installed, the General purpose DUoS tariff applies.[3] This tariff does not contain an MIC charge as MD information is not available. In these situations the recovery of the investment in new connections is on an averaged basis. The deficiency of this is that the GP DUoS tariff would not be suitable for situations where the MIC charges is large or where the site demand may grow over time. MD customers with an MIC greater than or equal to 50kVA are on LVMD tariffs.

At present an inconsistency lies in the MD DUoS tariff. This is because, a new customer with an MIC of 20kVA that takes over an existing premises where the previous customer's MIC was 50KVA would attract MD DUoS tariffs. However another similar business may be on GP tariff. Effectively the application of the LVMD tariff would be linked to the MIC of the previous connection and not the MIC of the current agreement.

The CER consider that an MIC threshold for the application of an LV MD tariff should apply to the current MIC level rather than the original level. A further effect of this policy would be that above a threshold value of MIC, the LV MD DUoS tariff would apply. Below that threshold, the GP rate would apply even if MD metering were present.

A point to consider when deciding the threshold is the effect such a change would have on LV MD customers and GP DUoS tariff customers. It is important to determine a level that would not cause significant changes to the tariff structure and the DUoS charges.

There will be some customers who incur significantly higher or lower charges because they are inappropriately metered at present.

[3] As customer's demand (kVA) is not read for general purpose customers it is not known how many general customers have a tariff greater than or equal 50kVA.

Views are sought on the introduction of a threshold for LVMD DUoS tariff for all new connection agreements.

7 Conclusion

The criteria used to determine the appropriate type of metering used by customers and hence the DUoS tariff applied to customers is not prescribed on the basis of customer capacity for some categories of customers. In addition the policy for dealing with customers that increase their consumption is predominantly determined by the procedure for dealing with voltage complaints and does not address scenarios where customers are increasing their capacity.

The CER invites comments on the metering policies and capacity management policies that should be applied by ESB Networks.

DEFINITIONS

Term	Definition
Connection Point	The point at which the customer's installation is connected to the Distribution System.
Consumption	The electrical energy (measured in kilowatt-hours - kWh) consumed in a premises.
Current Transformer (CT)	In installations where current transformers are installed, the current drawn by the customer from the Distribution System on each phase passes through the primary coil of the CT on that phase. The current flowing in the CT secondary coil is stepped down in a known ratio to the primary current. This secondary current passes through the meter current coil.
Current Transformer (CT) Meter	A meter designed for use with CTs. The meter current coil carries the CT secondary current. CT meters used by DSO have a standard rating of 5A. A range of CT ratings are used to cater for different load sizes.
Demand	The instantaneous rate of energy use (power) drawn from the Distribution System in kW. For the purposes of the voltage standard[4], the average demand in any ten-minute interval is relevant. In metering demand is averaged over 15-minute intervals. ('see also maximum demand')
Distribution Code	An industry code approved by the CER, covering the operation, planning of and connection to the Distribution System.
Distribution System Operator (DSO)	ESB in its licensed role as operator of the Distribution System.
Distribution Use of System tariff (DUoS).	The set of tariffs paid by suppliers to the DSO in respect of use of the distribution system for each connection point registered to them.
Disturbing load	A mains-operated electrical appliance or fitting of a type that is prone to cause disturbances to the electricity supply. E.g. welders, large

[4] The standard applying in Ireland is EN50160 'Voltage characteristics of electricity supply by public distribution systems' *1994, CENELEC*

Term	Definition
	electronically controlled heating loads.
DUoS Group	A particular DUoS tariff.
KVA	Kilovoltampere. (1,000 voltamperes). (The kVA value is equal to the kW value divided by the power factor)
KW	kilowatt (1,000 watts)
KWh	kilowatt-hours (1,000 watt-hours)
Load Limiter	An electronic switching device similar to a standard domestic mcb. It interrupts supply when a set current level is exceeded and can be manually reset by the customer.
Maximum Demand	The maximum value of demand in a premises over a defined time, usually refers to the metered maximum demand i.e. the maximum 15-minute demand.
Maximum Import Capacity (MIC)	The maximum rate of energy use (power) to be borne by the connection as agreed between ESB and the customer (in kVA). (The MIC is on the basis of a year i.e. it is not seasonal.)
Multifunction (MFM) Meter	An electronic meter suitable for demand measurement and the full range of DUoS tariffs.
Profile MFM Meter	An MFM meter that also stores information on the consumption profile over time. The MFM meter types currently used by used by DSO also have profile capability.
Public Service Obligations Levy (PSO)	A proposed levy to be paid on electricity bills in respect of public service obligations imposed on ESB in relation to peat and renewable energy generating stations.
System Improvement	Network reinforcement carried out free of charge where, following a voltage complaint, it is confirmed that the voltage is outside standard.
Units	Usually refers to kWh (see ‘kWh and ‘consumption’ above.)

Term	Definition
Whole Current (WC) Meter	Meters where the current drawn by the customer from the Distribution System passes directly through the meter.
Voltage Recorder	A recorder installed in investigating a customer's voltage complaint.