Electricity Billing

Refer to Sample Maximum Demand Electricity tariff for Small and Medium enterprise.

The Electricity Bill is a sum of several elements:

1. A Standing Charge (which increases if you are a generator (autoproducer))

2. A Maximum Demand Charge based on your maximum demand (P in kW) for any 15 minute period during the monitored hours (8:00 - 21:00 Mon - Friday).

3. A charge for the quantity of electric energy (measured in kWh = 1kw for 1 hour = P x time). The price per unit varies between Winter and Summer and between day and night.

4. A maximum import capacity (MIC) charge (Apparent power S in kVA). The MIC is a pre-agreed maximum kVA that you can safely draw. The MIC determines the size of the feed that is supplied to your premises. You are charged for the agreed MIC whether you use it or not. On the other hand if you exceed the agreed MIC you will be charged a punitive excess capacity rate.

5. A Charge for any Wattless units in excess of on third of your total kWh. Wattless units are vars x time ( kvarh) = Q x time. This is actually a penalty for poor power factor. If your power factor is high Q will be much lower than P and you will not have to pay a Wattless charge.

6. A PSO levy. This is a fixed charge set by the commission for energy regulation and is intended to cover “the additional costs of generating electricity from native sources and environmentally friendly forms of fuel”. It is currently set to zero.
Ways to pay less for electricity:

1. Reduce demand through energy efficiency measures.

2. Ensure that your MIC is appropriately sized for your load profile.

3. Eliminate any Wattless charge using power factor correction.

4. Reduce max demand charge by peak lopping – switch off selected loads during peak hours, switch some load to off peak, use local generation to reduce peak demand.

5. Shift Load from day to night or from winter to summer to avail of lower unit pricing.

6. Eirgrid the Irish Transmission System operator run a Winter Peak Demand Reduction scheme which offers financial incentives over and above the normal savings in Max Demand charges to participating businesses who can reduce their demand during peak winter hours (5pm – 7pm November – February).

Sample Problems

1. Using the table of Maximum Demand Low Voltage charges for Small and Medium Customers calculate the minimum power factor allowable before a Wattless power charge is applied.

2. A manufacturing plant fed with a 400V 50Hz three phase runs from 9:00 to 17:00 Monday to Friday. During opening hours the factory’s load is a constant 60kVA with PF 0.8 lagging. Outside of normal hours the load is negligible. The factory is on a Max Demand Low Voltage Small and Medium Business tariff with a pre-agree MIC of 80kVA

   a. Calculate the electricity bill for this plant for a typical week in November.
   b. Calculate the kvars of Capacitance require to eliminate the wattless power charge.
   c. Calculate the savings for a week November from power factor correction.
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4. Maximum Import Capacity Price & Pro-rating

All premises have a specific electrical capacity contract with ESB Networks for the amount of electricity that can safely be used at any one time. This capacity is called the Maximum Import Capacity (MIC) and the price for this is called the Maximum Import Capacity price.

The amount charged for your MIC (the Maximum Import Capacity in kVA) is pro-rated to the exact number of days in the billing period.

Example: If your MIC is 200kVA and the number of billing days is 56, then the amount charge for MIC = your MIC x (MIC price per kVA per day) x Number of days that your bill covers. 200 x €0.0720 x 56 = €635.20

Maximum Import Capacity Excess Price

For customers whose meters are manually read (Non QH), (indicated by meter readings displayed on the bill)
The Import kVA is calculated by dividing the Maximum Demand by the Billing Power Factor in the same billing period.

Import kVA = Demand (kW)/Billing Power Factor

A formula is used to calculate Billing Power Factor:

\[
\text{Billing Power Factor} = \frac{\text{Total kWh}}{\sqrt{(\text{Total kWh})^2 + (\text{KVARh})^2}}
\]

An Excess Capacity price will apply where Import kVA exceeds the MIC. The Excess Capacity price is €15.14 per kVA per excess kVA

For customers whose meters are remotely read (QH), (indicated by no meter readings on the bill)
The Import kVA is calculated every 15 minutes and is calculated as follows:

Import kVA = Demand (kW) / Power Factor

Power Factor:

\[
\text{Power Factor} = \frac{\text{kW}}{\sqrt{\text{(kW)}^2 + (\text{KVAR})^2}}
\]

An Excess Capacity price will apply where the highest 15 minute Import kVA exceeds the MIC during the monitored period of 08:00 - 21:00 (Monday to Friday), except during August when the monitored period is 07:00 - 19:00 (Monday to Friday) for customers on WDRL. In this case the Excess Capacity price is €10.95 per kVA excess.

N.B. It is important that your power factor is maintained as close to unity as possible.

5. Wattless Unit Price

In a business operation some items using power, for example motors may require an amount of wattless energy, often called reactive power, for their operation. Wattless energy is measured separately and in certain circumstances will give rise to a separate charge.

Customers can eliminate this charge by installing Capacitors to improve the Power Factor of their equipment. Customers should contact their electrical supplier.

A price of €0.00714 per reactive-kilovolt-ampere-hour (wattless unit) is charged for all wattless units recorded in excess of one third of all day and night units (kWh) per bill.

6. Public Service Obligation (PSO) Levy

The PSO Levy was introduced to cover the additional costs arising from producing or purchasing electricity from non-conventional and environmentally friendly forms of fuel. As CER has deemed there to be no additional cost, the PSO Levy has been set at zero (and will appear as a price of €0.00 on your bill).

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