Power supply fails due to earthing faults and to over load conditions. The former happens invariably due to wet weather and the latter, which is preventable is due to sudden surge of power mainly arising from industrial loads such as motors etc. These motors which need current consist of two components known as active and reactive. Only the active component is needed to do the useful work that the motors are expected to perform, and the reactive component is also needed only for it to function but not used up for the performance of its duty. Hence, capacitors are installed at site to supply this reactive component of power instead of drawing from the supply mains.

However in Sri Lanka, my own survey to set up a business of power factor correction in partnership with an engineering firm in 1983 confirmed that this reactive component too had been drawn from the supply. At that time cost of a unit of electricity was only a few cents and hence it was not taken seriously by CEB. Although I am not sure whether this has been subsequently done. The news that the industrialists are not happy with the frequent supply failures prompted me to write this, as it is not possible to fail so frequently unless this problem has not yet been solved properly.

To illustrate this problem in practical terms let me give an example. If a motor takes about 100 amperes for it to perform its duty and if the capacitors are not installed at site for it to tap the reactive component, it will draw 133 Amperes instead, in order to meet the relevant reactive component of 88 Amp. The entire power system is very sensitive to current and this extra current is not even registered in the meters. In order to compensate this additional unregistered current. The CEB used to charge an extra amount in addition to the units that the industrialists consumed. This is only a penalty for operating the machinery at low power factor and it did not relieve the CEB from supplying this too unnecessarily from their system. When the supply system is loaded thus with reactive current unnecessarily, its tendency to cut off supply suddenly cannot be avoided. From this information of frequent supply failures, I feel that the industrialists may be operating at low power factor yet. These industrialists use 70% of the electricity supplied by CEB and hence their role in the electricity consumption plays a significant impact on the supply system.

A low power factor not only draws more current unnecessarily making the power system more vulnerable for frequent failures but also contributes to losses in the power system along with other associated costs involved in generating extra power to meet the demand of reactive power too. According to the present cost of electricity and inadequate generation capacity this situation can never be justified. This in fact demands remedial measures to get the industrialists to install capacitors at site to maintain a unity power factor so that only the power component is drawn from the supply mains. At present, the capacitors are available for

automatic operation to keep the entire load at unity power factor all the time under varying load conditions with a few capacitors without installing capacitors at each and every motor individually as done years ago.

In the eighties there were about 5000 industries and just a very small number had power factor correcting capacitors installed in their factories to maintain unity power factor. At present there may be over 15,000 industries and it is very unlikely that all these are operating at unity power factor. It is therefore, very important that the CEB insists that on the industries to install power factor correcting equipment in their premises. CEB, then in return does away with the additional charge known as KVA demand charge. It is not only an incentive for them to get it done, but also a bigger saving for the CEB to the tune of saving of about 400 MVA along with at least a million units a day from line losses alone arising from reactive power caused by low power factor.

It is also interesting to note that this need to operate at unity power factor, is beneficially applicable to homes too, because of the high cost of electricity. A medium size refrigerator is working at 0.6 power factor, and even CFL is at 0.7 because of the inductive components in it. With other inductive appliances that operate for long durations such as fans, TV etc. the overall power factor is much less than unity. Since there are about 5 million consumers and if half of them have refrigerators the reactive power drawn by them without getting registered in the meters, is considerably high. Just by installing a small capacitor at the consumers' premises where refrigerators are in use the CEB will save over 150 MVA and also 200,000 units of electricity daily from line losses. Although this is a small amount for developed countries where they produce hundreds of millions of units a day, it is a significant amount when our total production is very much less than that.

However, I suggest the CEB to look into this too, as I am not aware of the local cost of materials and labour involved in the exercise of domestic power factor correction in order to determine its economical viability.

~ island.lk/ ~ M. Bertie Perera
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