Making the most of Distribution Use of System (DUoS) Charges

TREND

Distribution Use of System (DUoS) charges can have a massive impact on how much a company spends on electricity.

By using a Building Energy Management System (BEMS) to reduce demand during the highest tariff period or 'Red Zone', it is possible to make significant savings and Trend Control Systems has now made this easier to achieve with its Red Zone Management software solution.

Even though every electricity bill factors in Distribution Use of System (DUoS) charges, very few people are aware of them or their impact. Even amongst those who have heard of DUoS, there is still confusion about how they can address this issue and reduce the amount they pay. Before looking at the ways Trend's Red Zone Management software solution can help, it is important to understand how Use of DUoS System charges work.

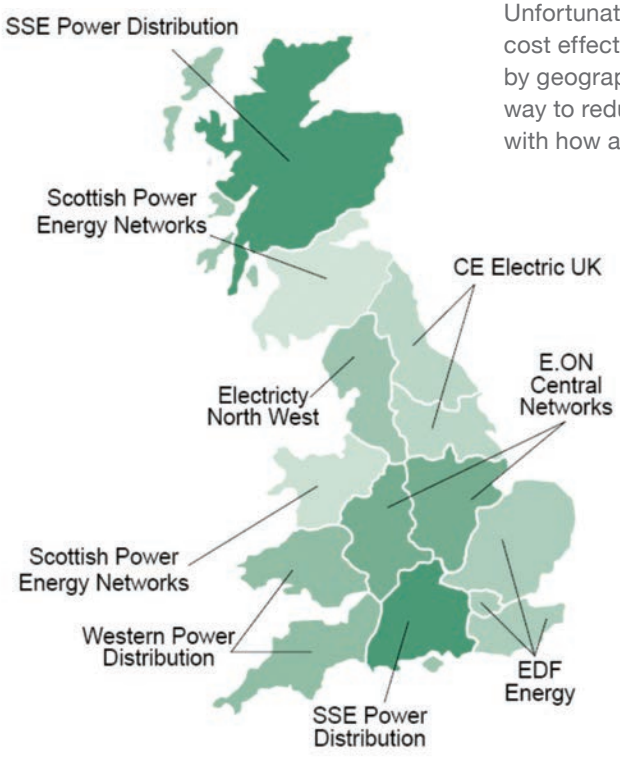
1. Distribution charges

UK electricity consumers pay two Use of System charges, DUoS being one of them. The other – the Transmission Network Use of System Charge (TNUoS) – covers the cost of using the national transmission system, which is owned and operated by National Grid, and delivers electricity from power stations and distributes it across the transmission network. Electricity suppliers repay this charge to National Grid on the consumer's behalf and there's nothing that can be done to influence how much is paid.

DUoS differs from TNUoS, as the money that is accrued from DUoS covers the expenses associated with receiving electricity from the national transmission system and supplying it into homes and businesses through the regional distribution networks, which are operated by Distribution Network Operators (DNOs).

The distribution networks deal with items such as overhead lines, underground cables, substations, transformers and other related equipment. DUoS charges contribute towards the cost of installing, operating and maintaining the regional distribution network, so that a safe and reliable electricity supply is available to all. These charges vary from region to region but normally account for 15-19 per cent of a typical non-domestic electricity bill – a significant figure.

Unfortunately it is not possible to 'shop around' for the most cost effective DUoS provider - DUoS rates are determined by geographical location and are not negotiable. The best way to reduce the impact of the DUoS charge is to be smart with how and when energy is used.



2. Measuring usage

Industrial and commercial electricity users are under mounting pressure to reduce the cost of their energy bills in light of ever increasing prices and more stringent legislation, such as the CRC Energy Efficiency Scheme. More and more consumers are taking the necessary steps to reduce their energy bills and are looking to utilise any means at their disposal to address this issue.

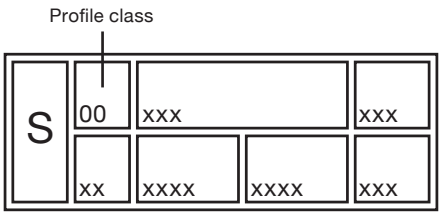
For UK based customers with an electricity capacity of 100kW or more, half hourly metering is not only mandatory but is a pre-requisite in all electricity supply agreements, regardless of supplier. This is an obligation under the Balancing & Settlements Code, which governs electricity supply and is part of the electricity supply licence conditions.

In general terms, if a business pays more than £30,000 per year in electricity then it is likely to be in this category. Half hourly meters are read remotely via a telecommunications link and the consumption data provided to the energy supplier allows it to bill an organisation accurately. It's easy to tell if a business has a half hourly meter, as a bill will feature a meter point administration number (MPAN) with an '00' prefix on the top line.

MPAN as it would appear on a bill

Broad breakdown of profile classes:

00: Half-hourly metered
01 – 02: Domestic non-half-hourly
03 – 08: Non-domestic non-half-hourly



3. Component parts

DUoS is not just a single charge for those with half-hourly meters, as charges comprise a number of distinct elements. They are as follows:

- **Fixed charge**
  This is a fixed daily amount that suppliers apply to an organisation's bill, regardless of how much electricity it has actually used. This charge is used to cover the maintenance and administration costs of maintaining connection to the network.

- **Capacity charge**
  This is also referred to as the availability charge and is a fixed daily fee that relates to a site's Maximum Import Capacity (MIC). If a site has a higher import capacity than it needs, money is effectively being thrown away. It is possible to reduce this figure by scheduling plant and other building services equipment and processes so they do not operate simultaneously.

- **Reactive power charges**
  Some products and systems commonly found in buildings – such as fluorescent lights and air conditioning – use what's known as reactive power, which can lead to increased power flows in the distribution network. Reactive power charges will apply if more reactive units over and above a pre-determined figure are used. If levels are high then large amounts of useful electricity will, in effect, be wasted, which then drives up costs. This, however, can be controlled through the installation of power factor correction equipment, such as capacitors. Power factor correction can also help improve energy efficiency by reducing the amount of energy that is lost and lowering bills.

- **Unit charges**
  These charges are for each unit of electricity used at various voltage levels and vary according to the time of day and how many kilowatt hours (kWh) of electricity have been consumed during each particular period.

4. Time is of the essence

While it is possible to reduce the costs of some of these charges by installing energy saving technology, unit charges represent an opportunity to make the most immediate savings with the lowest possible capital outlay.

Unit charges are separated into red, amber and green time zones. Charges are highest during the red zone (anything up to 21 pence per kWh on top of the purchase price per unit) and are significantly lower than this during the green zone –. The time zones are broken down as follows:

- **Red**
  From 16:00-19:00 hours, Monday to Friday, including bank holidays.

- **Amber**
  From 07:30-16:00 and from 19:00-21:00 hours, Monday to Friday, including bank holidays.

- **Green**
  From 00:00-07:30 and from 21:00-24:00, Monday to Friday, including bank holidays, and all day Saturday and Sunday.

Any changes that can be made to shift consumption from the red zone into the amber or, preferably, green zones will result in lower unit charges. However, it should be noted that an organisation's ability to take advantage of adjusting its pattern of usage depends on its existing procurement contract. At renewal, any company that is serious about addressing its energy costs should negotiate a contract that is based on payment against when energy is used and in what amount, as opposed to negotiating a reduced fixed tariff. Doing so will open the door to greater savings.

5. Solution provider

Now that the times to avoid the red zone unit charges have been identified i.e. between 16:00 and 19:00 on weekdays, the next step is to reduce energy use during this period of time.

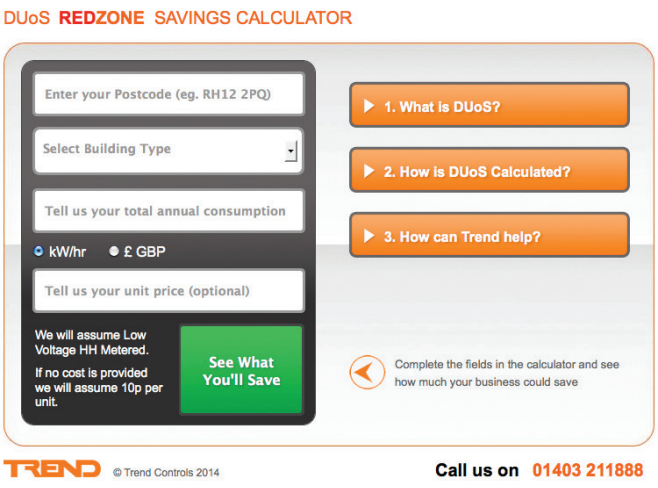
The best way to do this is via a Trend Building Energy Management System (BEMS), which can be optimised and configured to minimise plant use during red zone times without adversely affecting occupancy comfort conditions or operational effectiveness. From its close relationship with its customers, Trend knows that maximising the effectiveness of an existing BEMS is the best way to save energy and money.

To help achieve reduced DUoS charges, Trend has developed an innovative, low cost, and easy to implement software solution called Red Zone Management, which has already been proven to cut DUoS charges by up to 10 per cent.

Red Zone Management was created as a result of an ongoing project with a major national supermarket retailer, which wanted to lower energy costs across its multi-site estate, while also reducing carbon emissions. The savings resulted in the retailer recouping the initial outlay within first year of operation in DUoS Charges and kWh. Subsequent years generate year on year savings. This was all managed using already installed BEMS technology

To discover more about potential savings to be made, Trend has developed a useful online energy savings calculator.

CLICK HERE to use it. http://www.bems.trendcontrols.com/en/solutions/trend-energy-savings-calculator

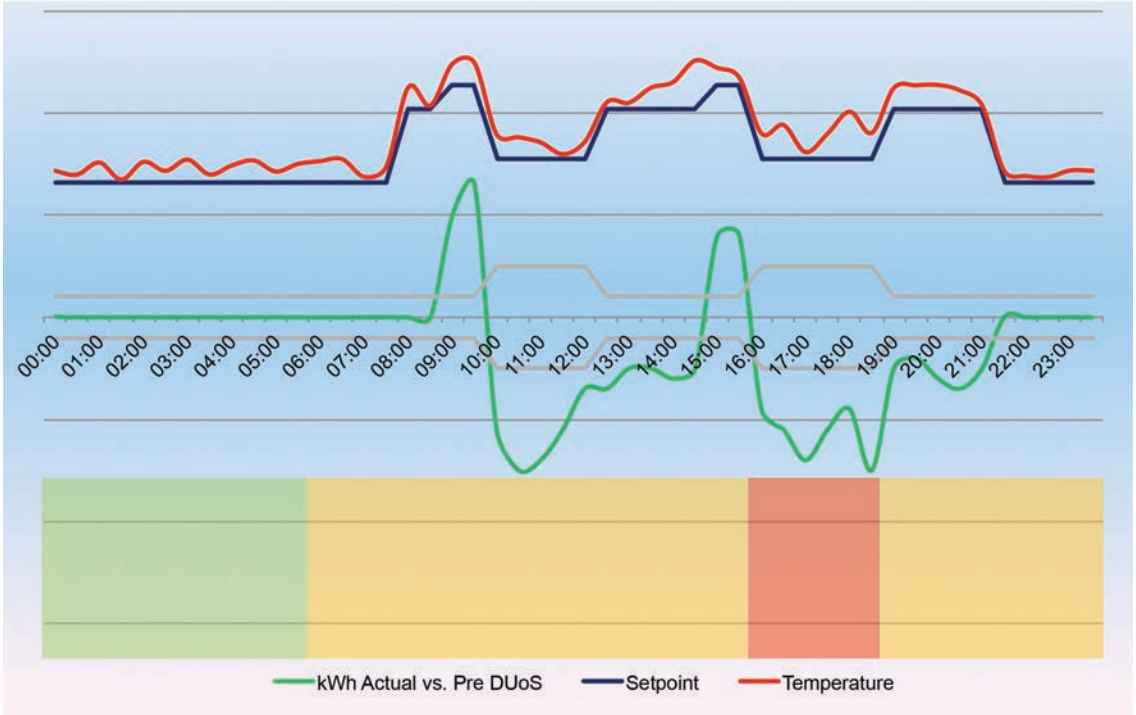


6. How it works

Red Zone Management initially involves carrying out a full audit and perform an operational analysis programme, which examines the building infrastructure and how the BEMS is being used, as well as patterns of occupation. In order to ascertain the maximum effectiveness of the setpoints, tests can be carried out to monitor operational performance and record temperature during the red time zones.

Once this is completed, Trend experts will devise a strategy that identifies how to maintain comfort conditions while lowering, or even turning off, certain elements of the building services infrastructure via the BEMS during the high tariff unit charge period.

At a specified time prior to the red time zone period, setpoints will be increased and this will make the temperature rise by 1°C, thereby increasing the energy that goes into the building fabric. This process utilises the thermodynamic properties of the building to build up heat storage, and once the temperature has increased to a defined point the setpoints are reached and the deadband (the amount of time in which no action occurs) is increased.



This process allows the temperature in the building to ‘coast’ during the red time zone, providing a period of decreased energy demand that results in a reduction of high cost kWh used. At the end of red time zone period the setpoints are put back and deadbands are decreased.

To ensure that comfort conditions and overall building operation is not compromised, safeguards are put in place so that the building never falls below certain low limits. It is also possible to carry out a similar operation during amber time zone periods and, while it is usually applied to the heating requirements of a building, it can also be used to excellent effect for the cooling system during warmer months by reducing the temperature by 1°C prior to the onset of the red time zone.

Existing Red Zone Management projects have also highlighted a number of unexpected benefits, as energy has been saved from heating, ventilation and air conditioning (HVAC) plant not having to work as hard to maintain temperature. This results in extended plant life through reduced wear and tear.

7. Features and benefits

Red Zone Management software can be easily integrated into an existing Trend BEMS. It features an intuitive graphical user interface (GUI) that enables the user to easily identify how energy is being consumed, and data is presented in a format that clearly shows how costs are being managed and savings made. For additional convenience, there is also the option of having a remotely managed system.

Within the software, a variety of information can be entered, such as utility tariffs, CO_2 targets, and cost and consumption targets. Degree day data can be called up and entered to allow for differences in weather conditions so that there is no impact on the setpoints. Daily energy usage profiles can be created to enable comparison of actual and expected consumption and if the former exceeds the latter by a preset amount, an email report can be automatically generated and dispatched. This enables rapid diagnosis and rectification of any problems, thereby limiting energy waste and unnecessary expense.

Perhaps the most impressive aspect of Red Zone Management deployment is that if a Trend BEMS is already installed, no capital investment is required– all existing hardware is used, which also simplifies implementation. Red Zone Management can be installed, configured and maintained by any one of Trend's growing network of Approved Partners and the incumbent strategy can be easily adapted and amended to accommodate any future changes in charging structure or timing.

8. Smart thinking

Anything that can help businesses lower the cost of their energy expenditure should be welcomed. DUoS might not yet be widely understood but Red Zone Management from Trend is set to change all that by providing a solution that achieves the maximum level of savings through limiting the amount of high cost units that are required. It is another reason why Trend BEMS are at the forefront of the drive towards greater energy efficiency, helping to provide cost savings and environmental benefits that make a genuine difference to the bottom line.