

The 2006 Profit from energy diary

Trend Control Systems Ltd
P.O. Box 34, Horsham, West Sussex, RH12 2YF, UK
TEL: +44 (0)1403 211888 Fax: +44 (0)1403 241608

Introduction

Through close control and monitoring of building services such as heating, ventilation and air conditioning, your building energy management system (BEMS), maintains optimum environmental conditions without unnecessary use of energy. And as well as cutting utility bills it can also make substantial savings on plant maintenance costs. The content of this White Paper covers 12 mini case studies, which illustrate real life techniques for getting the best out of any BEMS.

The case studies are presented as monthly opportunities for improvements and system optimization - of course you can undertake any of the actions listed at any point during the year. Some are very simple, which can be easily actioned some however, may require the assistance of your BEMS supplier for implementation. In any case you can contact Trend at energydiary@trendcontrols.com and we will provide you with some initial assistance.

This document and its contents do not replace the need for a structure support agreement. It will however, provide you with practical steps that you can take to ensure your BEMS makes a positive contribution to energy conservation and cost savings

There is much more to the maintenance of a BEMS than just dealing with breakdowns, which tend in any case to be relatively rare owing to the reliability of modern equipment.

There is frequently a need to re-optimize the performance of a BEMS because of periodic changes to a buildings layout, usage or occupancy patterns. The quality of control will also gradually deteriorate due to factors such as loss of sensor accuracy and unnecessary system overrides, which again shows the necessity of a proactive service regime. Without one, the building user will usually face higher energy bills and poorer comfort conditions.

When a BEMS performs as it is suppose to, it can make considerable savings on energy and other costs – as well as consistently comfortable conditions for a building's occupants. But for this to happen it needs to be maintained regularly – and by experts. In the case of a Trend system this can only mean Trend itself or one of its approved partners.

Table of contents

- 1.0 **January** - "Time for the first New Years resolution" Set the building parameters up for the rest of the year (BST's, B/H's etc)
- 2.0 **February** - "Occupant satisfaction is.... never having to say sorry" Using BEMS to ensure occupant satisfaction. Occupants could be workers, shoppers or pictures.
- 3.0 **March** - "User abuse" How to use the BEMS to spot plant overrides.
- 4.0 **April** - "Time for a Spring clean" Using CCR's (Control check reports) to globally check operating times and setpoints.
- 5.0 **May** - "Justify yourself" Lots of good energy saving initiatives are going on throughout the year. Use your BEMS to evidence your impact eg VSD analysis
- 6.0 **June** - "Keep the cooling bills down - get it for free" Free cooling example
- 7.0 **July** - "Get the early warning" Alarms are about more than just failed plant.
- 8.0 **August** - "Do the job once" Use the remote capability of the BEMS to rectify problems quickly and effectively through a Bureau
- 9.0 **September** - "Use your BEMS over and over again" Energy monitoring using existing infrastructure.
- 10.0 **October** - "OSS ready for winter" Energy saving is an all year round activity but before the heating season there are some simple optimisation
- 11.0 **November** - "Triads are coming" Trend Bureau Demand management case study.
- 12.0 **December** - "Thinking outside of the orange box" Using the BEMS to monitor retail activity and provide commercial benefit tasks

"Time for the first New Years resolution" Set the building parameters up for the rest of the year (BST's, B/H's etc)

Summary

What could be better to do in January than to think about the year ahead, and in particular, the implications for your BEMS? There are going to be several times during the year that there will be an effect on your BEMS operation. BST will be changing not once but twice is your BEMS set up to cope with gaining and losing an hour. What happens to your site when there's a bank holiday? Does your site close down or operate longer hours?

Description

A BEMS system should be able to allow the user to plan ahead for the whole year and set up their system to take in the changes to the sites occupation. BST should be set up to automatically change the times within the system and be set for the different days in the year, making sure that your building is not effected by the hour time difference.

Bank Holidays are known in advance for the year ahead and using the BEMS provides an energy saving opportunity to turn off plant for the whole day. These can all be set up for the year ahead and automatically implemented at the right time.

Some sites have seasonal changes in occupancy. Retailers will be extending their trading times from normal hours to cope with increase demand whilst Schools will be on holiday. The BEMS is used to control changes to lighting and heating times, and all this can also be set up in advance. The obvious benefits include savings in both energy and plant use.

Actions

Review the key operational times for your building and ensure that the BEMS is set to act appropriately.

Is the capability of the BEMS being used or are staff relying on manual intervention to turn plant on and off?

"Occupant satisfaction is.... never having to say sorry" Using BEMS to ensure occupant satisfaction. Occupants could be workers, shoppers or pictures.

Summary

Think about your building's occupants and how the environment affects them. Are you trying to create the perfect conditions for customers in a retail type environment or keeping office staff happy who are in the building all day and do not expect to wear coats and scarves.

You can also think of occupants as being whatever a building houses: cars, animals, paintings etc. They all have their own needs and you need to satisfy them.

Description

The point of a BEMS is to maintain the environment of a building within a set number of parameters such as temperature, light, humidity or energy consumption. This should create ideal conditions for the occupants of that building but the term occupants doesn't always mean people, it could mean IT equipment, paintings, drugs or animals. These all need to have a degree of control over their environment or they will deteriorate in health, wealth or condition. People in a building can also vary: from office workers sitting at desks, customers walking in from the street in coats and scarves, patients in an operating theatre. They all have different needs and demands on their environment.

All Intelligent BEMS should be able to control environmental conditions to the parameters set by the person who engineered them. The intelligence really comes into it when you try tailoring the BEMS for the needs of the building and more importantly your occupants. There's no point in controlling a building's heating to be on 24/7 when its a school open 8am till 5pm, or having the setpoint for heating set to 25 degrees in a busy factory where manual labour is taking place. You have to think about the buildings usage and then create the BEMS around that usage and utilise the full functionality of your system to enable you to provide the best environment for your occupants.

If the temperature of a pharmaceutical building is not controlled within agency standards the batch of drugs has to be destroyed and potentially, millions of pounds of produced material is wasted, is saying sorry really enough.

The important point is that there is not one optimal strategy for controlling a building and that an intelligent BEMS will allow you to control areas and times appropriate to the individual occupants.

Actions

Are your occupants satisfied with the conditions?

Are conditions for critical occupants, without voices, such as IT servers properly addressed?

"User abuse" How to use the BEMS to spot plant overrides.

Summary

Although a BEMS can be implemented as a very complex system, it should help the building to be managed with the minimum of intervention from maintenance managers and engineers.

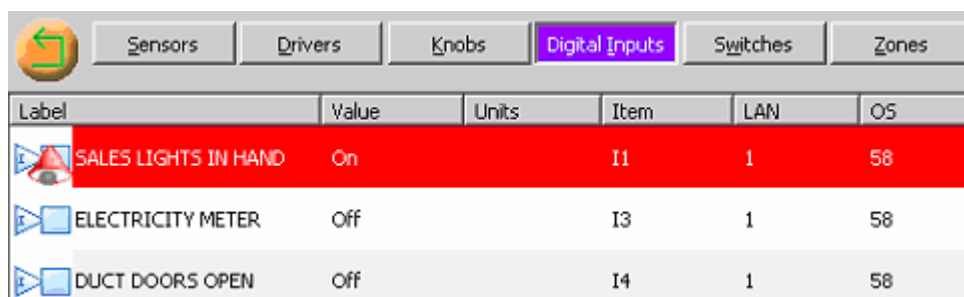
No matter how effectively a BEMS is configured and indeed serviced there will always be the potential for site based engineers and occupants to abuse the system.




Description

The following example site reported a high number of lamp changes and large energy bills over the recent months.

An engineer discussed the situation with the customer confirming the occupancy requirements of the building and identifying some internal lighting circuits that were currently overridden by way of an electrical switch found locally on site.

All this was achieved using remote BEMS engineering software via a modem link. Below is a screenshot of how the plant override has been highlighted by the Supervisor Software. The switch was then returned to its normal position and the bills and maintenance levels showed a significant reduction in the months that followed.



Label	Value	Units	Item	LAN	OS
 SALES LIGHTS IN HAND	On		I1	1	58
 ELECTRICITY METER	Off		I3	1	58
 DUCT DOORS OPEN	Off		I4	1	58

By using this process both time and money can be saved when checking for plant overrides. More importantly, this enables plant to control to the designed performance specification ensuring that a building's environmental conditions are achieved.

Any overrides can be set up to be monitored by the BEMS by way of alarm logging and monitoring by a remote engineering Bureau, these problems can then be highlighted before system conditions are effected.

Actions

Are you sure that all plant is being controlled by the BEMS?

Are alarms configured to warn you of any unnecessary plant overrides?

"Time for a Spring clean" Using CCR's (Control check reports) to globally check operating times and setpoints.

Summary

Basic BEMS settings i.e. Setpoints and Time Zones have a direct effect on energy consumption. To have a monthly report highlighting the current settings of your BEMS in an easy to read and interpret format can be a huge benefit to managing a building or estate of buildings. This can provide the basis of a spring clean of the system to make sure that your BEMS is running at its optimum and providing the comfort levels you require within your energy budget.

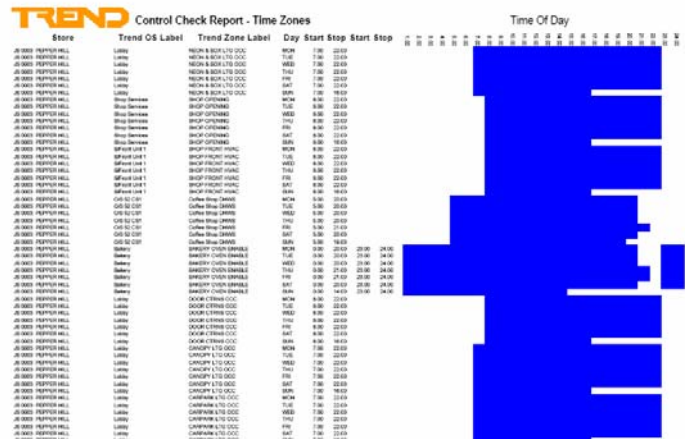
Description

During the month of April it can be a good time to review your sites BEMS, as it sits between the busy heating and cooling periods. Occupation times and setpoints directly influence a site's energy consumption and simply checking these settings and changing them accordingly can make savings.

CCR's or "Control Check Reports" can be produced by the BEMS to highlight where parameters are not what they should be across a single site or estate in a graphical and easy to read format.

The ability to have a graphical report displaying time zone information in a way that quickly identifies where there is an error in occupation times and setpoints, enables the BSM to quickly address issues that may of not been noticed until the next utility bill is received and by then its too late.

As you can see in this example of a CCR you can easily see where there are times zones set incorrectly and energy is being used when not necessary. This report produced on a monthly basis would allow a BSM to keep tight control over his sites settings and will prove invaluable when discussing issues with BEMS engineers.



As the data is pulled straight out of the BEMS there is other information that can be overlaid onto this including energy consumption, space temperatures, footfall etc. In fact, anything that is being recorded by the BEMS.

Actions

Ensure that your BEMS service provider can demonstrate the current control settings in a user-friendly format.

Have the information made available to you on a periodic basis.

"Justify yourself" Lots of good energy saving initiatives are going on throughout the year. Use your BEMS to evidence your impact eg VSD analysis.

Summary

As discussed in several of these examples, the BEMS is both a control and reporting tool. The Trend Bureau is party to many innovative and cost effective energy management initiatives carried out by consultants, plant engineers, ourselves and even end users. As a reporting tool, the BEMS is ideally suited to M&V (Monitoring and Verification). The absence of M&V can result in the benefits of otherwise effective projects not being properly reported.

Description

In the following example, VSD's (Variable Speed Drives) were used to match the speed of main supply fans to the required demand levels rather than either running at 100% demand or off. Naturally, the control algorithms were incorporated into the BEMS control strategy, but our interest here is in also using the BEMS to evidence the achieved savings.

Under a range of environmental conditions running one week on and one week off tested the new energy efficient VSD control strategy. The recorded energy values were automatically logged in the BEMS and then periodically uploaded to a Web based reporting system.

The following screen grabs clearly illustrate the impact of the changes in a simple enough form for any interested party to understand. Furthermore, tabulated reports were used to provide the financial justification and payback analysis.



Actions

Utilise the BEMS in preference to manual meter reading to record interval energy data.

Make sure that the results of your energy initiatives are being properly captured.

Use one of the range of Web based reporting tools to communicate these results.

"Keep the cooling bills down - get it for free" Free cooling example.

Summary

In the current climate, there are many extra demands placed upon a building's environmental controls. An increase in usage by the occupants, the office equipment and the IT facilities can all lead to greater demands upon cooling systems.

The BEMS control strategy can be configured more efficiently to meet these extra demands whilst not impairing the building's environmental conditions. The overview below explains how by modifying the existing system with a fresh-air cooling strategy, significant savings can be achieved.

Description

The example office's fresh air, heating and cooling demand was met by a central Air Handling Unit (AHU) supplying air at a constant temperature to Fan Coil Units (FCU) that carried out the local temperature control. The chillers were activated whenever the AHU return air temperature was above its set point. This resulted in all the cooling being handled by the chillers, which are energy intensive and therefore costly. Furthermore, whenever the outside air was below the required supply temperature, the AHU would then have to heat it up but sometimes due to internal heat gains this air would then have to be mechanically cooled, thus wasting both gas on heating and electricity on cooling. Finally, ineffective use of the optimiser had resulted in an increase in the air conditioning time zones during hot weather so that during the summer period the plant is set permanently to run for longer hours than normal.

The control strategy was changed so that while the cooling demand was between 0-50% the fresh air dampers would modulate to meet this requirement by using fresh air only without the need to initiate the chillers. Then, if the fresh-air cooling was not sufficient and the cooling demand continued to rise above 50%, the chillers would be activated. In order to make this more effective the supply air setpoint was also reduced to make maximum use of the fresh air cooling effect. A fringe benefit of this was gas savings as the need to pre heat the external air was reduced.

This principle was also used in setting up the optimiser during hot weather. This removed the need to change the air conditioning time zones permanently over the summer period.

The optimiser was set to pre cool the building using early morning fresh air in a far more effective manner.

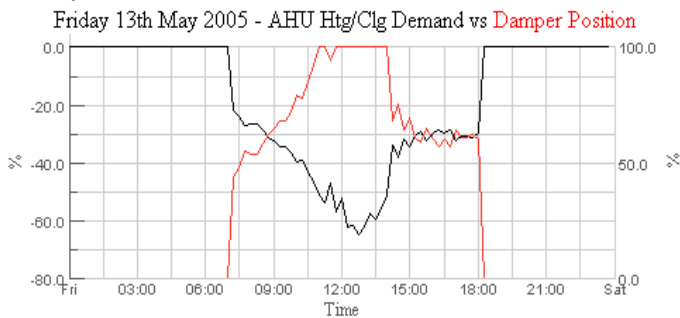
The following graphs illustrate the free cooling strategy in operation and its impact upon the energy consumption.

Graphs 1 and 2 show the AHU heating /cooling demand with the damper control position and chiller demand signal respectively. The AHU heating /cooling demand is an internal log of the calculated demand for heating/cooling the supply air of the AHU. Where +100% is full heating and -100% is full cooling.

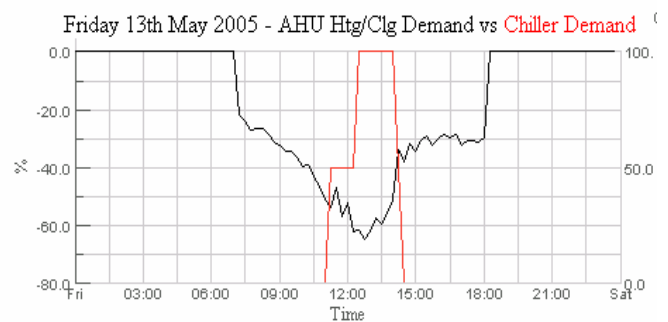
Graph 1 illustrates how, as the cooling requirement increases so the damper opens to allow more fresh air.

Graph 2 illustrates that the chiller is only activated when there is a cooling demand of 50% (-50% on the graph)

Graph 1

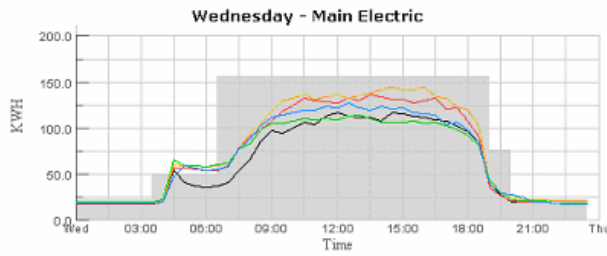


Graph 2



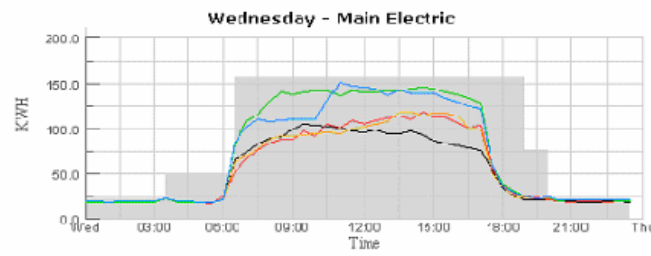
Graphs 3 and 4 show a snapshot of the electrical consumptions on Wednesdays in June for 2004 and 2005 respectively. The grey area shows the approximate profile of consumption for 2004. Even with an increase in occupation times in the mornings by one hour in 2005 the savings achieved can be clearly seen when comparing the two graphs. Note the reduced pre occupancy consumption along with the lower daytime consumption for the first few cooler weeks in the month in 2005.

Graph 3



02/06/2004 ---- 09/06/2004 ---- 16/06/2004 ---- 23/06/2004 ---- 30/06/2004 ----

Graph 4



01/06/2005 ---- 08/06/2005 ---- 15/06/2005 ---- 22/06/2005 ---- 29/06/2005 ----

The BEMS can be modified to make significant savings without the cost of installing new equipment. The estimated annual savings in this case were almost £8,000 with payback on investment much less than one year! By using a more suitable strategy, the BEMS now controls the building's environmental conditions in a more cost effective and energy efficient way.

Actions

Does your HVAC plant allow you to introduce free cooling?

Does your BEMS allow you to implement this strategy?

"Get the early warning" Alarms are about more than just failed plant.

Summary

Temperatures are not just about the degree of comfort (or discomfort) that a building's occupants will feel throughout the working day. Important changes occur in both nature and the more controlled environment at specific points. A BEMS can be configured to transmit alarms when conditions fall outside of any predetermined critical point and when coupled to a remote service, provide a 24 hour warning mechanism.

Description

- Legionella

The following is an extract from: Legionnaire's disease - essential information for providers of residential accommodation HSE

"Legionella are bacteria that are common in natural (rivers and lakes etc) and artificial water systems, eg hot and cold water systems (storage tanks, pipework, taps and showers)..... Legionella can survive in low temperatures, but thrive at temperatures between 20oC and 45oC. High temperatures of 60oC and over will kill them."

- IT Equipment Failure

As an example, A Sun Fire V40Z Server has an operating temperature range between 5oC and 35oC. Whilst temperatures outside these limits will probably not immediately result in system failure, the risk will increase. Whilst the rated power of 760W may not seem excessive, the typical server room will have a range of IT equipment and in the case of cooling failure to the server environment, the temperature will rise to critical levels very quickly.

- Drug Storage

A recent study looked at drugs stored in typical conditions by medical staff, whether kept at site or transported in cars. On a shelf, in silver car and a blue car, recorded temperatures reached 37oC, 43oC and 49.5oC respectively! Whilst this won't adversely affect all drugs, not surprisingly, some are sensitive to temperatures and do degrade in effectiveness.



Actions

The point of these examples is that, in our experience, they all represent scenarios where temperature monitoring and alarming both is and isn't carried out! Have you fully utilised the capability of the BEMS to mitigate safety risks or financial losses?



"Do the job once" Use the remote capability of the BEMS to rectify problems quickly and effectively through a Bureau.

Summary

As a Building Services Manager you will no doubt be bombarded with all manner of complaints, issues and requests. These will not only come from the occupants but also colleagues, maintenance contractors and even visitors! Many of these issues may appear to be straight forward, such as a simple parameter change. However, it is our experience that expert intervention can be cost effective, even in simple cases, as they can often mask more serious or complex problems.

As the title suggests, addressing the real issue straight away means only doing the job once.

The following example illustrates the benefits of having intelligent remote BEMS response on tap.

Description

Scenario 1

The actual fault in this building is a stuck heating valve. As a result the heating stays on even when there is no demand. The occupants get too hot and complain, although this process takes a few days...

The FM responsible responds in person when his busy schedule allows and calls the M&E contractor who gets in his van and comes to site. Again, this takes a while because after all it's not really urgent. When he finally arrives, he dusts off the BEMS interface located in the Plant Room and changes the setpoint. This has the effect of bringing on the chiller earlier and doesn't solve the underlying problem. Heating and cooling are fighting each other, energy is wasted, plant used unnecessarily and he will be back....

Scenario2

In the second scenario we have information being brought back to a centralised technical response function or BEMS Bureau. This team can also control the building remotely, not just to make time and setpoint changes, but also to respond to plant alarms, carry out remote diagnostics, temporary fixes, liaise with maintenance contractors, look at energy problems etc.

As before we have the faulty heating valve. The occupants complain – more quickly this time because they are used to a quick response! The FM calls the technical response team with the details and doesn't even have to leave his desk, come off the roof or otherwise be distracted from whatever he was doing.

Because the response team has been dealing with these sort of issues for many years, they don't just change the setpoint. They make some simple adjustments for diagnostic purposes – drive heating valve open and shut note that supply air temp doesn't change. The change request is recognised as coming from a fault and even isolated to a particular item of plant. This can then be relayed directly to the M&E contractor who attends site knowing what to expect.

Actions

If you have remote connectivity to your BEMS, is it being utilised to maximum efficiency for remote diagnostics?

Are you coming back to the same problem time and time again or could you shift recurring BEMS issues to an appropriate expert?

"Use your BEMS over and over again" Energy monitoring using existing infrastructure.

Summary

Increasing energy monitoring requirements from changing legislation, corporate directives and evolving best practice need not necessarily result in significant additional costs. One way of reducing the cost burden is to reuse the existing BEMS infrastructure to record more information.

Description

Our experience of mixed estates is that a range of measuring and logging devices can have been installed. Generally this follows changes in Energy Management policy, technical staff and building ownership. We often find that pilot monitoring projects are left partially completed or may have installed hardware without suitable software to gather recorded data. This could be due to budget restrictions or the selling of unworkable solutions.

The BEMS provides an ideal solution for carrying out additional energy monitoring as it will probably have unused capacity, have an existing service arrangement and generally, as a mission critical system, be better supported than a stand alone energy logging application. The equipment itself may also be more robust and modular, and in the case of a modern BEMS have the capability to carry out virtual energy measurements from plant run times.

Actions

Determine whether changing monitoring requirements can be met by your existing BEMS system?

If not, is it a case of some simple upgrades or reprogramming?

OSS ready for winter" Energy saving is an all year round activity but before the heating season there are some simple optimisation tasks.

Summary

If a BEMS is set up to use OSS it can be an efficient and automatic way of maintaining space temperatures while controlling the amount of energy used to achieve this. It can be set up in advance of winter and left to control your heating time zones, bringing on the heating at an earlier time dependent on the Outside air temperature and avoid the need to run heating 24 hours just to keep your building warm.

Description

During the month of October we are fast approaching the winter and temperatures will start to drop. One way to combat the demand on heating is to run 24 hours or to other preset extended times but this will increase energy consumption significantly.

The best way to address the issue of reaching temperature setpoints and controlling the amount of extra energy consumed is to use OSS (Optimum Start Stop). OSS is a part of BEMS control strategy that enables plant to start earlier than normal occupation times by monitoring the outside air temperature.

Using OSS is a good way of ensuring that the temperature for a building reaches the set point at occupation times by bringing on plant earlier. By using the outside air temperature as a trigger and using a rolling profile of when the setpoint was achieved the previous day, it calculates a time for the heating to be brought on to reach setpoint at the start of the operating times.

If there were no OSS set up then the building would take time to warm up to setpoint, which depending on plant efficiency could take hours rather than minutes! Maximum warm-up times can also be set to ensure that if the buildings take a long time to warm up the heating is not being asked to run 24 hours by the OSS.

Actions

Ensure that OSS is available for your control system.

Review OSS even if it is in operation, settings can become corrupt & energy inefficient.

This information can be readily obtained from your BEMS service and monitoring provider.

"Triads are coming" Trend Bureau Demand management case study.

Summary

Triads are just one aspect of energy load management; achieving cost savings with the BEMS.

Triads are defined as the peak demand charges levied by NGT (National Grid Transco) and are the mechanism by which a site will pay for use of the Electricity Transmission Network or National Grid. To calculate a site's transmission costs it is necessary to multiply the zonal tariff charge by the site's average electricity demand over the 3 half hours known as Triad Periods.

Either on receipt of a Triad warning, or as a result of other forecasting, changes can remotely be made to reduce demand between 16:30 and 18:30 without adversely affecting a site's environmental conditions.

Triad costs have recently increased significantly and this is forecast to continue. For one Trend customer total savings of over £100,000 are regularly achieved from over 12,000 remote interventions.

Description

The Trend Bureau's Triad management is quantified in terms of quantity of activity, impact on demand, energy reductions and cost savings.

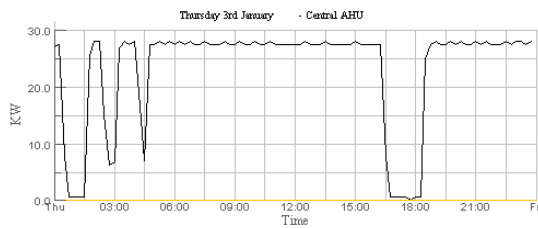
- **Triad Actions.** On receipt of a triad warning, The Trend Bureau dials in over the Trend network and changes the time settings of the heating and ventilation systems within a site. The areas that are effected include the central plant and any dehumidification units. These changes incorporate an individual time zone adjustment for each area of the store, between 16:30 and 18:30. The time zone adjustment effectively reduces the occupation set point from its normal setting to the Non-occupation setting of, typically, 17.5°C. This could involve anywhere between 1 and 7 changes for each site.
- **Average Demand Reduction.** The direct Triad avoidance benefits derive from reducing the site's demand during the 3 Triad half-hours. As many as 25+ Triad days will be called and the actual 3 are not confirmed until after the winter period.

- Energy Saving. An indirect consequence of reacting to all the Triad warnings is that overall consumption is reduced leading to KWh savings.
- Cost Savings. The financial savings, which are the product of the zonal charge published by NGT, increases sharply from the North to the Southwest.

Graphs – Impact of Demand Management (iMAT data)

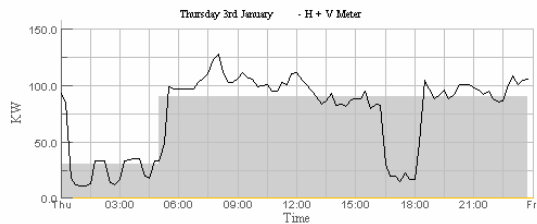
Date	Sensor	SiteName
	3817	

To zoom in select the area you wish to view using your mouse.
To zoom out right click on graph.



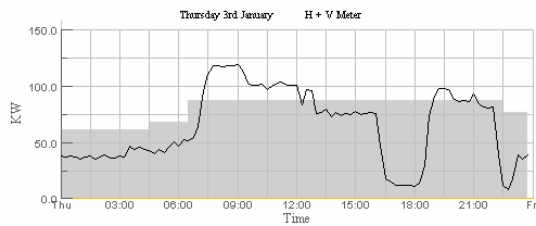
Date	Sensor	SiteName
	3811	

To zoom in select the area you wish to view using your mouse.
To zoom out right click on graph.



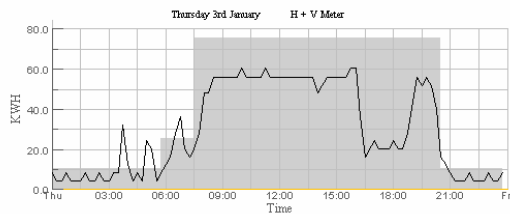
Date	Sensor	SiteName
	6799	

To zoom in select the area you wish to view using your mouse.
To zoom out right click on graph.



Date	Sensor	SiteName
	8086	

To zoom in select the area you wish to view using your mouse.
To zoom out right click on graph.



Actions

The above case study applies to Triad demand management across hundreds of sites. Individual sites can also benefit from load management. Is there any proactive demand management within your site's control strategy?

Load management can be carried out to avoid increases in fixed supply capacity charges or other predetermined peak rates. Does your BEMS, plant and supply contract allow for this?

In problem cases, a load management strategy can also be used to physically limit the demand from the site where the supply infrastructure is unable to cope.

“Thinking outside of the orange box” Using the BEMS to monitor retail activity and provide commercial benefit.

Summary

A BEMS system can provide us with intelligence, not just about how effectively a building is controlled, but also information about the business activity that goes on inside.

Description

December is a key time for retail businesses and they will be using all available methods to maximise the revenue from Christmas shoppers. Naturally, the correct operation of a BEMS is vital in ensuring that retail outlets are able to extend their trading times and maintain environmental conditions that are conducive to shopping! This often has to be balanced with extreme weather conditions and challenging energy costs.

It is here that other opportunities may present themselves. A modern BEMS contains considerable data gathering and computational capability, which will not always be fully used in controlling the Building. Furthermore, the system should be able to capture any digital or analogue measurements that can be carried out. A range of software solutions exists for retrieving, storing, displaying and analysing data that is logged within the BEMS. In this way, data is not lost or overwritten when the internal capacity of the BEMS system is reached.

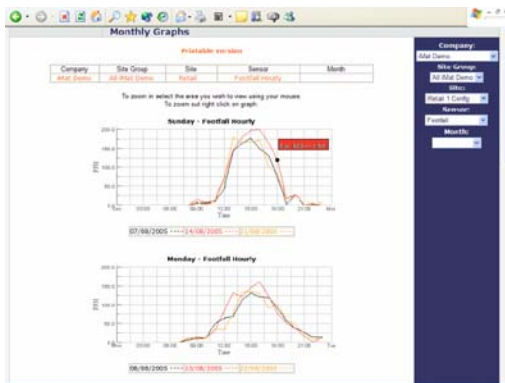
The following example is an illustration of the type of innovation that can be achieved with minimal cost by using existing infrastructure:

Recognising the importance of accurate customer data, a national retail chain was looking for the most cost effective way of obtaining the information. The solution that presented itself was the BEMS! In each store, a light beam is broken every time a shopper enters the premises. The information is logged in the BEMS alongside the more usual space and plant temperatures that are used to control the heating plant.

To provide visibility to Commercial and Marketing staff who may not have the ability or inclination to interrogate the BEMS, a Web based reporting front end was implemented. In this way, any authorised staff, requiring only a connection to the Internet and a compatible Browser, can access the information.

Recent wireless developments make this kind of post occupancy data gathering even more straightforward to implement.

The following graph of customer throughput serves to illustrate just how accessible BEMS data can be made to be.



Actions:

Don't assume that the BEMS can only be used for building control – explore wider commercial opportunities.

Control data such as temperatures and light levels may have other business uses.