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Considering Installing a New BMS?

Before procuring a BMS

To ensure you get the most from a new BMS, you first need to consider a number of questions:

Who will be using it?

There is little to be gained from installing an all singing all dancing system if the people expected to use the system have not bought into the idea. Prior to procuring a new BMS, it is worth engaging with the staff members who will be using it. Find out what they like about the current system, what they do not like. Ask them for input on what they would like to see from a new system. For example, on a new build school project, the premises manager really wanted a plant extender control on the panel as it gave a simple way to extend the heating for events such as parents evening without having to adjust the hours of operation on the BMS and risk forgetting to reset them. Do not take comments at face value. If someone states they want everything automatically controlled, ask them what they mean by that to ensure you fully understand what they are hoping for. By undertaking stakeholder engagement upfront, you will be able to get some useful input, manage expectations and address any concerns.

Where there are training needs, ask the BMS contractor to provide a training programme for you to review. It is advisable to include for additional follow-up training to be provided 6–12 weeks post installation.

How will it interface with other systems?

Many BMS systems are open protocol, meaning they can communicate with different systems; these include air conditioning, room booking systems and other proprietary packaged controls such as those found in boilers and Air Handing Units (AHU). Depending on your requirements, you may want the BMS to simply give an on off signal to the plant, leaving the more complex control management to the packaged inbuilt controllers.
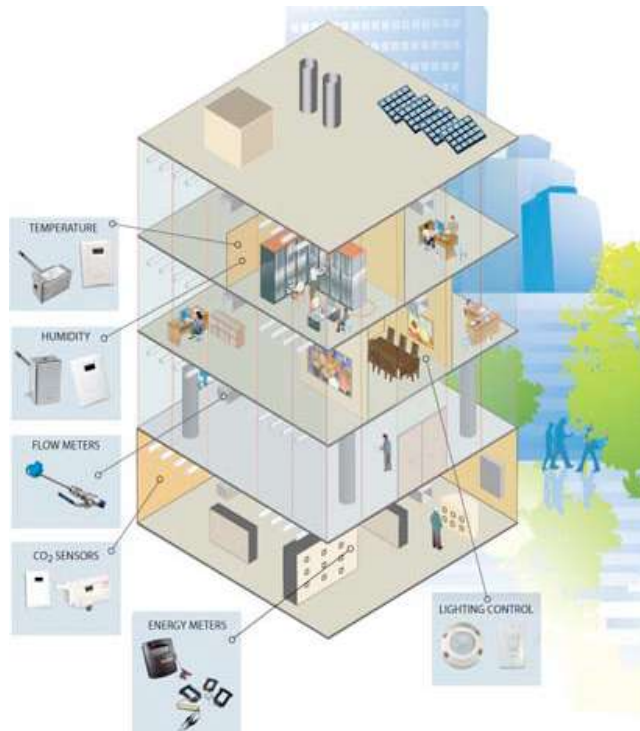
Where you have existing split dx units (comfort cooling) with room controllers, you need to ensure the two systems are working together rather than against each other. It is not uncommon to find the centralised BMS controlled heating on and attempting to achieve a certain set-point at the same time as local split dx units attempting to cool the space down to a lower set-point. This can be avoided by interlocking the two systems so that when the heating is on, the cooling is not. Where you have centralised control of your room cooling systems, then it is advisable to have a wide deadband between heating and cooling; for example heat to 20°C and cool to 24°C.

It is possible for a BMS to interface with some room booking systems, allowing for automatic control of the space in for example a meeting room or lecture theatre. This has the potential to save energy as you are not conditioning an unoccupied space.

How will the BMS be maintained?

It is important that your chosen BMS system can be maintained by a number of different companies to ensure that you do not end up locked into a maintenance contract with a single supplier. Do you have local engineers qualified to maintain your chosen system?

Engage your IT department!

You need to consider where you want to locate the head end/supervisor. The modern facilities office will probably already have a number of screens for CCTV and entry systems. It is possible to use the same screen with a simple manual switch to move between, for example, an entry gate system and the BMS. You need to engage with the IT department early in the process to understand their

requirements and keep them in the loop. This is especially important if you are hoping to have remote access to the BMS. There may be security issues to consider, and your IT department may want the BMS to exist on a completely separate network. For example, on a new build office project, the BMS contractor installed the head end in the server room. The IT department refused to give access to the FM team and, due to security concerns, remote access could not be given either.

What to consider in design?

Graphics

Most BMS contractors will install their standard in house graphics pages. It is really important to ask the BMS contractor to provide you with some example graphics pages for you to review and comment on. Where the building layout is used in the BMS graphics, be sure to provide the BMS contractor with the correct naming convention for the different spaces.

Another new build school project had specifically recruited a person with experience of operating a BMS. However, this ended up providing no advantage as firstly they were trained in a different BMS system and secondly the level of detail on the graphics pages far exceeded what the premises manager needed to see, resulting in confusion and then disengagement.

Sensor points

You need to consider what sensors you want to have visible on the graphics page. A sensor needs to be clearly labelled with what it is monitoring and the units, for example °C. Do you want to be able to see a historical graph showing the sensor readings for a specified period of time? You need to specify what sensor data points you wish to be logged and for how long. The default logging period is 10 days at 15 minute intervals. It is possible to save logging data for longer; however, this needs to be specified upfront with the BMS contractor.

Set points

What set points do you want to be able to alter via the BMS head end? Depending on the age and responsiveness of the heating and cooling system, it may be necessary for you to be able to override the automatic control of mixing valves and change the % its open. You may also wish to consider logging the % open of a mixing valve as a data point so enable you to check to see if it is operating as anticipated or if it is broken.

Central vs local control

What level of occupant control do you want to have? Do you want full automatic control with no local control or do you want to provide local thermostatic control with just a monitoring facility at the BMS head end? It is possible to have centralised control of room temperatures with an element of local control within a pre-specified temperature range that resets to the set point overnight. The second option is likely to impact

on the capital cost of the system due to the increase in BMS points required. The amount of resource you have to respond to complaints and potentially make alterations to the set-points on the BMS head end will inform where you sit between fully automated centralised control and providing localised control only.

Energy meters

It is possible to link energy meters to the BMS; however, they are not designed for this and the functionality is limited. If you want to do more than simply remotely read the meters, then you will need to consider a separate energy management system. There are a number of recognised issues when using a BMS to remotely read meters.

Firstly, the meters will log cumulative consumption, which means that if you want to interrogate the data, you will need to export it.

Secondly, the sub-meters start logging as they are installed so the readings did not all start at the same time and cannot be directly compared.

Thirdly, the sub-meters are often labelled in the BMS by distribution board, not by end use which can be confusing.

Finally, sub-meters reading in the BMS is rarely checked against the actual sub-meter reading. Often the two are different and the BMS cannot be relied on.

Future proofing

You may wish to consider future proofing your new BMS install by requesting the BMS contractor allows for future expansion of the system without the need to purchase additional controllers; including spare capacity for each point type.

What to consider during install?

Sensor location

Prior to and during the install check with the BMS contractor where they are intending to install sensors. For example, an outside air temperature sensor needs to be in a shaded north facing wall away from any flues or vents. Room temperature sensors should not be located in a ceiling void or above heat generating equipment such as a printer. Once the BMS has been installed check the sensor readings and make sure they are what you would expect. Also, check the historical graph to ensure the sensor reading changes over time. This enables you to identify any faulty sensors.

Alarms protocol

It is important to define the alarms protocol with the BMS contractor. What alarms are required, what priority do they take; e.g. high, general and low and who receives the alarms and how are they notified? If this is not defined the default alarms protocol will result in people being excessively notified about alarms. In addition, it is important that valid email addresses and contact details are provided.

Hours of occupation

The BMS system will be installed with default hours of occupation; to realise the potential energy savings it is important to set the correct hours of occupation for the various zones within your building. Be aware that unlike simpler boiler programmers, it is the hours of occupation and not the hours of heating/cooling operation that you need to programme in. The BMS will then monitor the temperature outside and inside to calculate when the heating plant needs to be started to reach the targeted temperature set point by the defined start of occupation.

Access

Finally, at the point of installation you need to specify who will have access to the BMS and what level of operation they will need. It is possible to have only monitoring rights, with no ability to alter set points.

Aftercare

Seasonal commissioning

It is highly recommended to allow for seasonal commissioning of the new BMS to fine tune the controls under a variety of external conditions. Prior to the BMS contractor arriving on site to conduct the seasonal commissioning, it is highly advisable to speak to building occupants and operators to get some feedback on how the internal conditions have been maintained over the past three months. This information can then be used to inform the seasonal commissioning visit and get the most from it.

For example, at a new built leisure centre the staff reported the changing rooms were stuffy from 9pm with mirrors fogging up. The hours of occupation were set correctly to finish at 10pm. When the BMS contractor came back for a seasonal commissioning visit we reported the staff member's observation. The contractor was then able to look deeper into the controls architecture and found the individual AHU serving the changing rooms had an incorrectly set timeclock. This was not visible to the user on the BMS and could only be found by the BMS contractor with their programming software.

Window controls

If you are hoping to control window actuators with the BMS, this will require close attention. If there is a requirement for a graduated response in the opening or closing of the window be sure to observe this in operation. It is also wise to ensure the BMS contractor allows for all the windows to shut at a set time to reset the actuator openings. If this is not included, then there can be drift resulting in the windows open at different levels.

Author's Profile:
Emma has a background in energy management and building performance. She is currently responsible for developing and delivering Octavia's Environmental Strategy, the efficiency of their heat networks, energy procurement & management for existing stock whilst also providing technical support on new developments specifically district heating schemes.