

CASE STUDY: GB162 100KW x 24

24-7 HEATING

Wandsworth Town Hall



Buderus have commissioned one of their largest ever multi-boiler installations at Wandsworth Town Hall, featuring two cascade systems, each comprising 12 individual Buderus GB162 100kW output boilers.

The new heating system was designed by Wandsworth Council Design Services working closely with the Buderus technical team and installation contractors T. Brown of Surrey. The result is a highly efficient heating and hot water system servicing the needs of the 1930s municipal building and the later 7-storey council office block extension. The Town Hall building is used seven days a week for a wide range of activities and functions so the heating and hot water system has to be flexible enough to provide energy efficient operation whilst meeting the varied pattern of usage. In addition the building has a large thermal inertia, so once heated only requires

relatively low boiler outputs to maintain the required temperature levels.

Until the recent development and availability of multi-boiler cascade systems, the only previous option would have been a like-for-like replacement. The cascade option particularly suited the usage pattern as each boiler in the 12-boiler cascade can provide continuous heat output which will automatically modulate according to the demands of the system down to just 19kW.

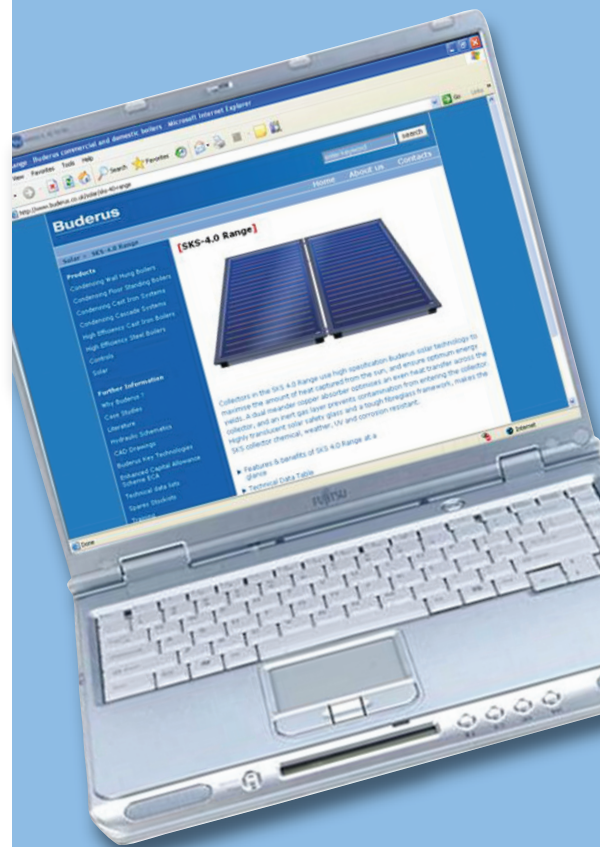
David Higgins of Wandsworth Design Service says "We opted for a Buderus system for a number of reasons. As well as their expertise in cascade systems, they were able to offer the most complete solution, providing all the necessary components from a single source. This includes pumps, headers, fluing, all gas connections and the complete framework to attach the boilers to, making the whole job much more straightforward.



Wandsworth Town Hall

Buderus Online

For more details on Buderus heating projects around the world, comprehensive technical and specification information for all products in our commercial boiler range and the latest on energy legislation visit www.buderus.co.uk. We want our website to become your first resource for commercial heating and energy management issues, and welcome any comments and suggestions for improvements or additional information that you'd like to see. Please use the feedback form in the 'Contacts' section on our site or email us directly on general.buderus@uk.bosch.com.



CAD Drawing Downloads

The website has been designed to give you free access to installation, servicing and user manuals for boilers, solar and controls, plus a selection of common system schematics, detailed dimensional drawings, wiring diagrams and product performance information. In addition to this, users can also download CAD drawings for individual boilers and cascade systems to assist in the planning and specification process.

Book Training

For those interested in booking product or ACS courses at any of our technical training centres around the UK the training section on the website contains a synopsis of the content of each course along with information on costs and availability. Places on all courses can be reserved through the website, and if you book 3 places on any of our ACS courses, you'll get a 4th place absolutely free, worth up to £780 (terms & conditions apply).



Buderus BULLETIN

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It makes commercial sense

In times of economic uncertainty it is often tempting to sit tight, keep your cards close to your chest, and wait for someone else to make the next move. However one thing we are certain of, is that there are lots of proactive heating installers and contractors out there promoting their business, investing in training, looking for opportunities in new markets, and filling their order books.

2008 saw encouraging growth in the large domestic and light commercial sector, specifically installations in the 50 and 150kW bracket. Single, high output boiler installations in large privately owned residential properties, including luxury mansions with swimming pools and home-spas are likely to be less affected by an economic downturn, with demand for comfort, efficiency, quality and hot water higher than ever. And as high output condensing boilers become physically smaller, and multi-boiler cascade heating systems more prevalent in the commercial sector, the suitably qualified installer looking to expand his business in this direction has fewer barriers to

contend with than they might initially expect. We've seen an encouraging uptake in our range of commercial ACS training courses in recent months, especially from installers who have until recently operated only in the domestic market.

Clive Holt of Surbiton based Plumb-4-U added his commercial ACS certificate to his existing domestic ACS after taking the CODNCO1 conversion course at the Buderus Training Academy in West Thurrock. He is now carrying out commercial service and repair contract work which his new certification allows him to do. He is also actively seeking commercial installation work. "I was impressed with the various high output working boilers which provided hands-on training. Quite simply this is the best way to learn how to recognise faults and how to set up commercial boilers to achieve the low NOx levels which are a particular requirement for many commercial installations. The course has helped us to create our own niche market in the commercial sector."



www.buderus.co.uk

Intelligent Heating Solutions

Buderus

Summer 2009

Buderus BULLETIN

For M&E contractors, consultants & specifiers



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CASE STUDY: SB615 640KW x 3

UNIVERSITY UPGRADED

Plymouth University

Plymouth University is home to the national subject centre for Geography, Earth and Environmental Sciences, and employs a specialist energy and environmental team to continually evaluate sustainability across the university premises.

The university has recently replaced its old heating equipment with modern condensing boilers from Buderus and set up a separate district heating scheme. At the same time the whole heating system was reorganised into an integrated installation designed specifically for the varied usage pattern of the buildings, which cater for over 32,000 enrolled students.

Working closely together with the university environmental team, installation contractors Mitie Engineering specified three 640kW Buderus SB stainless steel condensing boilers to meet the complete heating requirement.

Richard Bell of Mitie Engineering adds "With a remit to ensure a high efficiency system, we conducted thorough testing and evaluation of several brands of boiler for fuel efficiency, economy of operation, carbon emission levels, reliability and sustainability. We also felt Buderus went that extra bit further with their technical assistance."

Thanks to the significantly increased boiler efficiency, together with the improved thermal properties of the building fabric, total heating capacity could be reduced from the previous 2700kW to just 1920kW. The installation also incorporates Buderus 4000 series modular controls which provide

comprehensive levels of functionality, further maximising energy savings and allowing for expansion of the system with renewables or additional heating circuits at a later date.



Paul Niles, who heads Plymouth University's specialist team on environmental issues says "Working together with Buderus and Mitie Engineering we have provided a high efficiency, low carbon heating system which will also reduce our heating bills. The team is continuing to monitor savings achieved in fuel efficiency which are expected to exceed 20% as well as significantly reducing carbon emissions.

CASE STUDY: SKS 4.0s x 18

SOLAR SWIMMING POOLS

Oxford Brookes University

Oxford Brookes University founded as the Oxford School of Art in 1865, became one of the first polytechnics to confer degrees in 1991. The following year it achieved university status and established its first research institute, the Oxford Institute for Sustainable Development. It is fully committed to sustainability in all aspects of its activities and in 2007 received a first class rating for its environmental credentials.

Darren Taylor of specialist solar installation company Solar Solutions worked closely with the Buderus technical team to design the solar system to heat the University's 25m swimming pool. "Although we have been installing solar for a number of swimming pool installations recently, this was the first time we had actually used the Buderus collectors. In addition to helping with the system design, they also advised on grant availability, provided detailed analysis of performance, carbon footprint and payback periods as well as giving our installation team special training at their training centre. We were very impressed with the panels too, with high build quality and performance," remarked Darren.

There are 18 Buderus solar panels, fitted using the on-roof mounting system, giving a 40m² collector surface area in order to keep the pool at a constant 29°C. Buderus SC40 solar optimising controls, and a KS pump station were also fitted to maximise operating efficiency between the boiler and the

panels, and optimise flow rates through the solar system. The specification was created using a comprehensive database of weather and temperature conditions in the Oxford area and included external weather sensors as part of the controls package.



The new solar installation heats the pool for the majority of the year, and only calls on supplementary heat from the existing boiler on the handful of dull days where there is not a sufficient level of solar irradiation. This type of system significantly reduces boiler start-ups and subsequently lowers fuel consumption for the university.



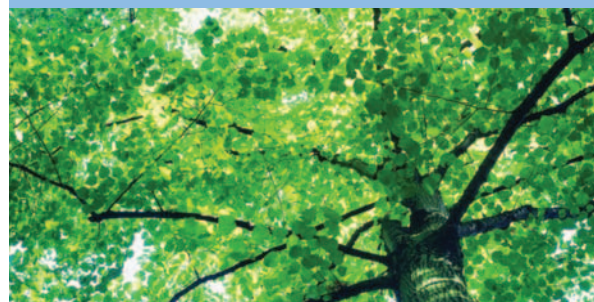
Oxford Brookes University swimming pool building

MARKET OPINION

Sensible sustainability

In our collective efforts to reduce carbon emissions and hit government energy targets the commercial market needs to decide if it is more important to fit renewable heating technology, or to reduce fuel consumption for investors.

We should of course do both. Theoretically the first part of this equation should ensure that the second part (a reduced fuel bill) will occur anyway, but in some circumstances this is not the case. For every renewable appliance that doesn't deliver the expected energy savings, or costs more to maintain and install than it saves, the harder it becomes to encourage other investors to switch to alternative forms of heating. Getting the specification right by taking the time to understand heating and hot water requirements, and gaining a thorough appreciation of the limitations of the existing heating system is more important than ever when recommending renewable technologies. In some situations renewables aren't the answer, so is this focus on renewable and next-generation heating technology getting in the way of simple, tried and tested energy saving measures?



There is a great deal of talk about alternative heating technologies, and understandably so, but while the market preoccupies itself with discussions about which particular solution is going to provide the biggest carbon savings, the need to reduce fuel consumption remains as pressing as ever. By focussing only on emerging renewable technologies, are we confusing potential investors and hindering progress? We know it is possible to reduce fuel consumption, lower fuel bills and carbon footprints using more established heating equipment, but do investors? Modern condensing and high efficiency boilers fitted with intelligent controls that are replacing costly and inefficient 20 and 30 year old boilers, are currently doing more to reduce fuel consumption in the UK than many renewable technologies. Biomass installations account for less than 2% of all commercial boilers being installed.

Renewables working in conjunction with condensing boilers seem to be the sensible option for the majority of new installations, especially when the specification of the rest of the heating system can be designed accordingly. However, if renewables are not a practical or economically viable option at the time of upgrading, then choosing a condensing or high efficiency boiler with a controls system that will allow them to be added later is a good idea. Delaying projects while trying to justify the high capital investment of some renewable technologies, when significant carbon and fuel savings can be made by simply upgrading boilers or fitting better insulation, is not going to help us reach energy targets, does little to promote the benefits of renewable heating, and could ultimately put off investors altogether.

Richard Evans
Director of Sales, Buderus

Technical perspective #2

The pitfalls of oversizing

In general, large-scale solar thermal systems are best suited for applications where there is a constant need for large volumes of stored hot water such as swimming pools, leisure centres, hospitals, care homes, and the like.

For those new to renewable technology there is often a tendency toward oversizing solar systems in a bid to "maximise the free energy gained". This is not a good idea, either from an efficiency viewpoint or for the general good of the panels themselves. Temperature sensors in the system protect it from overheating, particularly at the height of the summer months when the solar storage tanks quickly reach their maximum level. In these circumstances, the sensors turn off the pump to avoid reaching temperatures which would be too high for the safety of the system.

If overheating does occur then the 50-50 mixture of glycol and water that flows through the panels will stagnate if the system remains switched off and there is no flow. At this point the water will turn to steam and separate from



glycol. If this occurs too often, the solar fluid will start to deteriorate and crystallise. When a system stagnates in this way it can only start to deliver solar energy again when the collectors cool down, and by then it can be early evening! A system which is oversized actually delivers less solar energy than a smaller correctly sized system which captures energy throughout the day.

For these reasons it is preferable to slightly undersize a solar system - unlike the boiler system - to retain durability and ensure reliable and efficient operation. The critical detail required when designing and sizing solar thermal

installation is an accurate assessment of the domestic hot water usage. This can be obtained either from existing records or by the temporary installation of a metering system. Accuracy is essential as larger commercial sized solar system design can be complex.

Pete Mills
Technical Service
Manager



ON-SITE

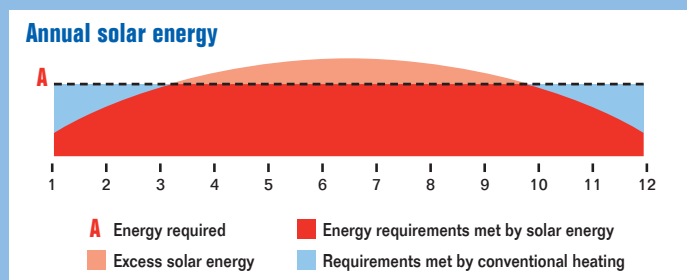
Integrating boilers and renewables

The integration of condensing boilers with renewable technology is increasingly recognised as one of the best ways to achieve a good balance between energy savings, system performance and capital outlay. But what does integration mean in a practical sense, and why does it work? Fundamentally it is about having the right controls, and a good understanding of the limits of the heating system and the thermal properties of the building.

In effect a properly integrated heating system is one that will allow the controls to give priority to the renewable heat source by holding back the firing of the boiler for as long as possible.

A fully-compatible controls platform should measure the heat demand of the building using a combination of external weather compensation controls and internal temperature thermostats and send this information to the boiler and the renewable heat source. Based on a variety of heating curves, the system knows precisely how much heat is available from the renewable heat source and estimates if this will be sufficient to meet the demand or if a boost is required from the boiler. Solar for instance can generally be expected to meet around 60% of the domestic hot water requirement for commercial buildings (see graph opposite). However a high efficiency condensing boiler will be needed to provide the majority of the heating and to supplement the hot water provision when levels of solar irradiation are lower. Specifying a system where boiler and solar controls are properly integrated could reduce boiler start-ups by up to 24% and provide additional energy savings of up to 10%, according to our figures.

This decision is managed by the controls which continually monitor and assess the need for heat or hot water, communicate this information to both sources, calculate the heat requirement, and identify the optimum combination of heat sources to fulfil the heat demand in the most efficient way.



If controls are separate for each heat source it is not possible to get a complete picture of what is happening throughout the heating system so appliances cannot work together to produce the optimum result. Whatever combination of system is specified, it is the controls which bring everything together to maximise the system's efficiency, regulate performance and reduce emissions.

Stefan Gautsch
Design Engineer



4000 Series Energy Management

Intelligent Controls Solutions

The Buderus 4000 series of modular energy management controls is being expanded in July to meet new environmental legislation and growing customer demand for renewables. The upgraded control modules allow the integration of Buderus boilers with practically any renewable heating plant such as heat pumps, CHP or biomass, as well as solar.



4000 series benefits at a glance:

- **Energy management** - Efficient control for the whole heating system including heating circuits and hot water.
- **Modular units** - Minimise cost and complexity.
- **Retrofit** - Extend and expand as heating needs change.
- **Plug & play** – With hassle free colour-coded connections..
- **Mixed boilers in cascade** – Combine and control different boiler types efficiently and economically.
- **Boiler sequencing** – Switch lead boilers according to hours run, outdoor temperature etc. to balance wear and tear and increase longevity.
- **Ramp up** – Cascades can be ramped up in series or parallel.
- **End user simplicity** – Easy end user operation with ON, Setback and AUTO room temperature settings.
- **Tamper resistant** - Removable MEC2 handset prevents unintentional tampering with settings..
- **Offsite programming** – Simply click MEC2 handset into place to upload heating system parameters.
- **Legionella protection** – Fossil fuels only used when thermal disinfection has not already been achieved by solar.
- **Renewable heating** – Simultaneous boiler and renewable control to maximise energy savings and minimise boiler firing.
- **Load compensation** – Controls modulate boiler as desired room temperature is reached to prevent energy wastage and improve comfort.
- **Building management interface** – Interface with existing BMS via a 0-10V or 0-20mA input. Alternatively, upgrade inferior BMS with additional modules where two or more boilers need to be sequenced.

Carbon Trust Loans & Grants explained

Upgrading or replacing inefficient heating equipment with modern fuel efficient technology can require a significant investment in many cases, but there are a number of grants and loans available that can help investors to take that first step toward improved efficiency, reduced fuel bills and a lower carbon footprint.

The Enhanced Capital Allowance (ECA) scheme, run by the Carbon Trust, is a simple way of improving cash flow using accelerated tax relief, making it easier to invest in fuel efficient technology. The Energy Technology List (ETL) specifies which particular energy saving products qualify for ECA claims. A full list can be found on www.eca.gov.uk/etl.

Following investment, businesses are able to write off the whole cost of the equipment, including installation and transportation, against

taxable profits made during the year of purchase. For example, if your business spends £10,000 on products from the ETL and you pay 28% corporation tax, you would receive a £2800 cash flow boost.



Businesses are often tempted, especially given current economic conditions, to opt for low cost equipment. However, such immediate cost savings can prove to be a false economy. Considering the life cycle cost before investing in equipment can help enhance the cash flow benefits still further.

Investing in energy-saving equipment can reduce running costs through increased efficiency, lower energy bills and reduced Climate Change Levy payments, which in turn helps reduce payback periods.

So the next time you're thinking about a capital investment in plant or machinery, think life cycle cost not lowest cost, and make sure you check the ETL.

Interest Free Loans

The Carbon Trust also offer interest free energy efficiency loans between £3000 and £400,000 for small to medium sized businesses with less than 250 employees which can be claimed in conjunction with ECA. These are applicable for a wide range of investments in energy saving technology, including all Buderus commercial and industrial products, and are payable over a period of up to four years. There are no arrangement fees and the application process is straightforward.