

COMMERCIAL CASCADES: MAXIMISING EFFICIENCY, MINIMISING COSTS



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IN COMMERCIAL HEATING, EFFICIENCY AND FLEXIBILITY ARE KEY TO ACHIEVING RELIABLE PERFORMANCE WHILE KEEPING ENERGY CONSUMPTION AND COSTS LOW. CASCADE SYSTEMS, WHICH LINK MULTIPLE SMALLER OUTPUT BOILERS OR HEAT PUMPS TO OPERATE IN HARMONY, OFFER A SMART ALTERNATIVE TO USING A SINGLE LARGE UNIT. BY DYNAMICALLY ADJUSTING THE THERMAL OUTPUT TO MEET FLUCTUATING DEMAND, THEY DELIVER SIGNIFICANT BENEFITS IN PERFORMANCE, ENERGY SAVINGS, AND SYSTEM RESILIENCE – MAKING THEM AN INCREASINGLY POPULAR CHOICE FOR A WIDE RANGE OF COMMERCIAL APPLICATIONS.

When heating a commercial property, you can opt for a single large output boiler or install several smaller boilers operating in cascade. In the latter, the boilers are activated as and when needed to match the heating demand at any given time.

WHY CASCADE COMMERCIAL BOILERS?

Using several smaller commercial boilers in cascade will provide you with increased output, but then single high-efficiency condensing boilers, such as our Imax Xtra EL and Evomod, can achieve a megawatt or more from a single large boiler. Both are valid solutions, and a single large boiler does have certain advantages, including being quicker to install and, if access isn't an issue, easier to install.



EVOMOD FLOOR STANDING BOILERS CAN ACHIEVE A MEGAWATT FROM A SINGLE MODULAR BOILER

The real benefit of using boilers in cascade isn't the achievable output or, indeed, the speed and ease of installation, but the ability to match the load, especially under low load conditions which can improve the overall efficiency of the package. At times where demand is low, a single large boiler will have a certain amount of turndown – the minimum output it can achieve – but the output may well still be far too large compared to the actual load of the system, meaning excess energy is consumed. Boilers operating in commercial cascade, on the other hand, have a higher turndown than a single larger boiler. Together with intelligent onboard controls within the boilers, the correct number of

appliances will be fired, as required to meet changing demands for heating over a day. It gives the operator a better opportunity to match the load on the system, and allow the boilers to operate more efficiently under part load conditions.

Further benefits of installing boilers in a commercial cascade include easier access to challenging install areas, and it can be a good space saving solution. You also increase the resilience of the system as even if one boiler needs to be isolated for service and maintenance you still retain a large proportion of the available output.

IN WHAT CIRCUMSTANCES ARE CASCADE HEATING SYSTEMS SUITABLE?

Being so flexible and able to achieve high loads, cascade systems are suited to a very wide range of commercial properties. They really come into their own though in buildings prone to fluctuating heating demands, or those where specific heating zones are more frequently in use than others, as they will dynamically adjust their output.

Hayling Island Sailing Club on the south coast is a prime example of where a cascade has made a positive difference. Three Ideal Heating Evomax 2 120kW commercial condensing boilers operating in cascade have been installed by J&B Hopkins for the clubhouse, providing 360kW output in total.



HAYLING ISLAND SAILING CLUB – EVOMAX 2 BOILERS IN CASCADE DELIVERING 360KW OF OUTPUT

Tony Stockton, Mechanical Project Manager (Technical Services) at J&B Hopkins explains about using boilers in cascade at the Hayling Island Sailing Club: *"I like to cascade the boilers as they offer good resilience. This is particularly important for this installation as the hot water demands are horrendous in that there is infrequent demand for a large part of the year but then during regattas there could be 500 showers in two hours!"*

IDEAL HEATING BOILERS IN CASCADE

Our market-leading floor standing Imax Xtra 2 boiler and the Evomax 2 – the UK's number one wall-mounted commercial boiler – have all been designed to operate in stand-alone or commercial cascade format. Evomax 2 is available with outputs from 30-150kW, which can be increased to 900kW using six Evomax 2 boilers in standard commercial cascades. Similarly, up to four Imax Xtra 2 boilers can be installed in a standard commercial cascade for an output up to 1120kW.



UP TO FOUR IMAX XTRA 2 FLOOR STANDING BOILERS CAN BE INSTALLED IN CASCADE TO PROVIDE 1120KW OUTPUT

TOOLS TO CASCADE A COMMERCIAL HEATING SYSTEM

Cascading a commercial heating system is understandably more time-consuming than fitting a single boiler. But with our prefabricated low height and standard

frame and header kits, along with our online cascade configurator tools to make choosing what you need straightforward, we've made that task quicker and easier. Building a three-boiler Evomax 2 cascade system, for example, can be completed in under 90 minutes!



SAVE TIME WITH EVOMAX 2 CASCADES – BUILD IN LESS THAN 90 MINUTES

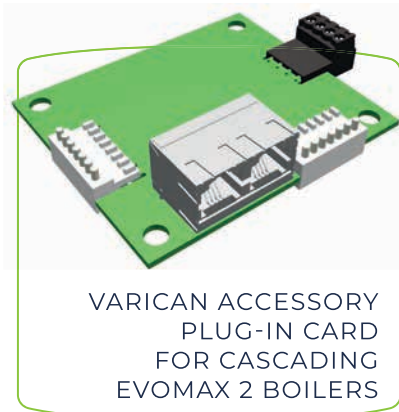
Tony agrees: *"Our Technical Services team fits between 60-100 Evomax 2 boilers a year, virtually always using the frame and header kits. They are so easy to work on – they are not overly complicated to get up and running. The boilers are very straightforward so we don't require a lot of support, but if we need it, we always get it. They really are very engineer friendly."*

CASCADE CONTROL MADE QUICK, SIMPLE AND LOW COST WITH VARICAN

The sequence in which boilers in a cascade are brought online must be carefully controlled, which can be done via the boiler itself or through a Building Management System (BMS).

In the case of our Evomax 2 boilers, a simple Varican accessory plug-in card gives you the ability to sequence the cascade independently, without a complex BMS. The Varican cards can be used to link each boiler on the cascade, or to link from a boiler to an extension module to provide additional

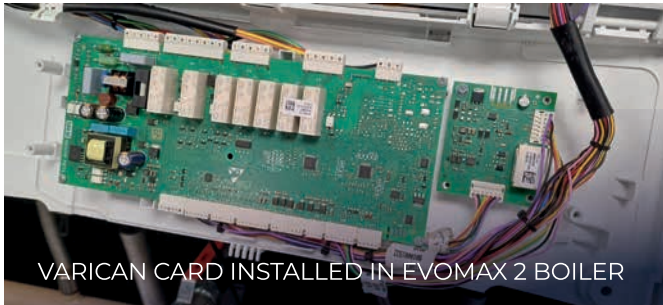
capability on the cascade. In this way, up to 16 boilers can be connected in cascade, or up to 12 boilers and four extension modules, or even a standalone



VARICAN ACCESSORY
PLUG-IN CARD
FOR CASCADING
EVOMAX 2 BOILERS

boiler and up to four extension modules. The extension modules themselves already have a pre-fitted Varican card.

In terms of control capacity, each boiler can control up to two constant temperature circuits, or one heating and one hot water. When you link boilers together with Varican in a cascade, you get an additional two circuits for each boiler; so, for two boilers you could control four circuits. Each of these circuits could have sensor inputs and outputs to control pumps or valves, for example.



VARICAN CARD INSTALLED IN EVOMAX 2 BOILER

Varican is not only an effective method of gaining the greatest possible flexibility and efficiency out of cascade, but also the most cost-effective when compared to a BMS system. Purchasing and installing a BMS system purely to run a heating system is cost prohibitive for most people. Even in sites that have a BMS in place, it may cost considerably more to upgrade parts of the panel and the software to enable a switch from a single large boiler to smaller boilers in cascade, compared to creating a boiler cascade using Varican cards. The heating system demand could still come from the existing BMS, but the boiler sequencing would be performed by the Varican.



Just as good news for contractors, the Varican is also really easy to install and use. Evomax 2 boilers can also be retrofitted with the card on site. Varican equipped boilers have a Cascade Manager level on the menu, where you can sequence boiler rotation, set the maximum and minimum modulation levels, and set the sequence on delay. Default settings, designed to spread the load over as many boilers as possible for maximum efficiency, are in place, which are often retained by contractors as they are effective. Where additional support is needed, a simple phone call or email to Ideal Heating is all that is required. We also offer training on cascades and Varican programming.

CAN HEAT PUMPS BE RUN IN CASCADE?

We've talked about running boilers in cascade, but heat pumps can also work in a commercial cascade system. Up to six of our ECOMOD monobloc air source heat pumps can be installed in a cascade arrangement, operating from an intelligent lead controller.



ECOMOD 290HT COMMERCIAL HEAT PUMPS CAN EASILY BE INSTALLED IN CASCADE TO OBTAIN HIGHER OUTPUT

At Ysgol Tir Morfa Community School in Rhyl, North Wales, two Ideal Heating 32kW ECOMOD heat pumps have been installed immediately outside the boiler house running in cascade into a 500 litre buffer tank to meet the heating needs of a new building. For Denbighshire County Council, it takes them one step further forward in their journey to become carbon neutral by 2030.



YSGOL TIR MORFA COMMUNITY SCHOOL, NORTH WALES HAVE TWO 32KW ECOMOD COMMERCIAL HEAT PUMPS INSTALLED IN CASCADE

CASCADE SYSTEMS: A FORWARD-THINKING APPROACH

Cascading systems represents a forward-thinking approach to commercial heating. With tools like Ideal Heating's online cascade configurator tools, which makes sure you have all the parts you need to build you cascade arrangements, the use of our prefabricated frame and header kits, which reduce the amount of time it takes to build a cascade, and the use of Varican control technology - designing, installing and managing a cascade has never been simpler or more cost-effective.



- ▶ Not sure what parts you need for your installation, then use our easy-to-use **cascade configurator online tool** - designed to save you time when building a cascade: idealcommercialheating.com/evomax2-cascade-configurator



- ▶ For contractors looking to expand their knowledge of heat pumps, including how to successfully integrate them into a plant room to create commercial cascades and hybrid installations, we provide a range of **commercial training courses** to book, go to: idealcommercialboilers.com/training

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To discuss Ideal Heating Commercial products, get in touch

idealcommercialheating.com/contact-us