

EFFECTIVE HEATING CONTROL FOR MULTI-OCCUPANCY BUILDINGS

Yan Evans, Technical Director of Andrews Water Heaters and Potterton Commercial, takes a look at the reasons why there is a return to centralised boiler plant for the provision of heating and hot water in multi-occupancy residential buildings and how its use can be most effectively controlled.

During the years when North Sea Gas was comparatively inexpensive and in plentiful supply, heating and hot water for multi-occupancy residential buildings moved away from commercial centralised boiler provision to, wherever possible, domestic gas-fired boilers installed in each individual dwelling. The main benefit was that each household could define and control its own comfort levels while being individually responsible for their energy consumption.

However, experience over the years revealed several disadvantages to this approach.

From a system design point of view, numerous individual condensing boiler flue terminals can be unsightly in themselves and there is the added potential visibility of plumes discharged by condensing boilers. Long runs of gas supply pipes around the building and a multiplicity of boiler connections are also more costly to provide than a supply to just one plant room, which could also be considered a safer option.

For landlords, who must observe the legal requirement for all individual boilers in the building to be serviced annually, it could be difficult to arrange for the necessary access. Where tenants are out at work, access is sometimes only possible during evenings and weekends, raising the costs per boiler serviced which could amount to a significant sum in larger developments.

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All these issues can be overcome by utilising centralised boiler plant in larger residential buildings. Flueing is vastly simplified with the number of flues being dramatically reduced, sometimes requiring only one terminal. Boilers and water heaters are all in plant rooms external to individual dwellings, simplifying access for servicing and although per appliance-cost for servicing may be higher, as there are far fewer of them the overall costs will be lower. Moreover, mains gas being supplied only to plant rooms makes for greater safety and reduces the cost of gas installation.

But what about the modern day challenges presented by centralised plant in a building of this type?

Most notable of these are facilitating use of the highest energy efficient technology and the ability of individual dwellings to have their consumption controlled, monitored and charged accordingly. This type of application would require a commercial boiler and water heater installation, and historically large plant rooms supplying heating and hot water via a single traditional commercial boiler with a calorifier for hot water would reduce the amount of valuable space available for let. However, larger output wall hung commercial condensing boilers are now available and can be installed in series, modulating in operation according to demand alongside commercial direct fired condensing water heaters. These again can be closely matched to peak requirements, so there is no need to oversize appliances, which saves energy and running costs. These boilers are considerably smaller than their predecessors reducing the amount of plant room space required.

Moreover, with centralised heating and hot water plant it is possible to take advantage of the benefits of integrating low and zero carbon technologies into the services design. The diversity of load across multiple dwellings served by a centralised plant offers a higher base load that can maximise the performance benefits of, for example, ground source heat pumps and combined heat and power (CHP) units. The supplementary high efficiency condensing boilers would fire only to provide any additional heat required over and above that supplied by the heat pump and CHP unit, which would operate as the lead heating appliance. The electricity generated by the CHP unit on-site could be used to power the ground source heat pump, saving further energy and running costs.

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A commercial solar installation could be used to pre-heat the hot water so that the direct fired water heaters only operate to top up the temperature of the hot water as necessary.

But how can the heating and hot water consumption by individual dwellings be controlled and monitored effectively?

The UK's leading heating company and provider of complete boiler house solutions, has developed advanced 'heat box' technology to act as a hydraulic interface between high efficiency/LZC heating equipment and individual dwellings. The Heat Box is used to distribute space heating within the dwelling sourced from the central plant room and for the local generation of domestic hot water. The heat box includes a heat meter for resident consumption-based charging, the latest technological advance providing optional transmission of the data signal through a wireless interface. This allows the metering of heating and hot water consumption in each dwelling to take place from a single remote location, reducing meter reading costs. Heat metering also means residents can be more readily aware of their consumption and adjust their demand accordingly. The cost of heat meters has reduced in recent years, which has also supported the trend back to centralised plant rooms for multi-occupancy residential buildings.

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