

# tenement fact sheet

## 4 Selecting an appropriate heating system and heating controls

4 হিটিং ও কন্ট্রোলস

4 暖氣系統及調節裝置

4 الحرارة و أجهزة التحكم في التدفئة

4 گھر کو گرم رکھنے کیلئے ہیٹنگ اور اس کو کنٹرول کرنے کے طریقے

This is the fourth of six fact sheets on how to improve the energy efficiency of traditional stone-built tenemental property.

It describes heating systems and heating controls. It also discusses the issues to consider in relation to their siting how get the most out of the system, whilst also reducing the impact on the original features in the home. It explains how a well chosen and designed heating system can operate at lower cost when compared to alternatives. Where other energy saving measures have been installed in the property, particularly insulation, the size of the heating system can be reduced. This can reduce installation costs, and lower the running costs.

These insulation measures are described in other fact sheets in this series.

### Choosing a heating system

The main options are a central heating system or heating based around the use of individual room heaters. Most people opt for central heating, since it is designed and tailored to the particular property. This can be electric, gas, oil or solid fuel. The fuel storage requirements for oil and solid fuel make these less attractive, impractical options for people living in tenements.

### Electric heating

Electric central heating is now available as a boiler and wet (radiator) system, although by far the most common form of electric central heating is storage heaters which take advantage of special electricity tariffs which make them a reasonable alternative to gas central heating. Electric storage heating is more expensive to run, but has some advantages. The heating is not provided by a boiler. This reduces demands on space, and there are no servicing requirements and associated costs as in the case of annual boiler maintenance, and repair contracts. There may also be savings if all appliances are electric and no gas service is necessary, avoiding the costs of the standing charge for gas supply. This avoids

the need for a separate gas meter and pipework. However in deciding on which fuel to use it is necessary to weigh up the higher running costs and environmental impact.

Electric underfloor heating is an option, particularly in rooms where space is at a premium. This is usually laid on solid floors, though there is no reason to prevent it being installed on intermediate floors. The design of underfloor heating can slightly raise floor levels however. This form of heating usually runs on off peak or special tariffs.

Certain types of special electricity tariff also allow for lighting and appliances to be operated at these lower tariffs delivering savings on the costs of running these

### Gas central heating

The most popular form of heating is gas central heating, a 'wet' system that circulates hot water around a property to radiators in each room.

There are various types and size of boiler. The size of the boiler and the radiators is determined by the heat load, the level of heat required to heat the home. By insulating the home prior to installing the heating system, a smaller and cheaper system can be installed



Electric Storage heaters

## Electricity Tariffs Compared 2003

Company	Electricity Tariff	Daily standing charge	Day rate 1 Unit charge	Day rate 2 Unit charge	Night rate Unit charge
Scottish Gas	Economy 7	None	16p (A)	7p (B)	3.1p
Scottish Hydro Electric	Domestic Economy	16.6p	7.4p	None	3.1p
Scottish Power	White meter rate 1	19.7p	7.7p	None	3.2p

NOTE Night rate is for 8.5 hour period chosen by supplier between 10.00pm and 8.30am.  
(A) First 2.5 day rate units used each day. (B) Rest of the day rate units used each day.

Conventional boilers heat up the water, which is circulated through the pipes and radiators. Cooled water then returns to the boiler to be reheated.

These boilers can be fitted to an outside wall with a flue (a balanced flue allowing for fresh air intake and for noxious air to be expelled at the same time with equal 'balanced' pressure). Conventional boilers can be floor or wall mounted, and can usually be integrated with a modern fitted kitchen layout.

An alternative is to install the boiler in an existing fireplace and chimney space as a back boiler. This is usually installed with a gas fire to the front for occasional use when the central heating is not required.

Combination (combi) boilers combine the functions of a central heating boiler and hot water tank, but by providing instantaneous hot water, avoid the need for hot water

storage. This frees up space, otherwise required for the hot water tank. This also saves on the costs of storing hot water and the heat loss that occurs, and heats hot water only on demand.

Condensing boilers are available as energy efficient versions of conventional or combi boilers. Condensing boilers work more efficiently than conventional boilers by capturing the heat that's normally lost from the flue. Fuel bills can be cut by approximately one third by replacing a 15 year old boiler with a new condensing model. There is a cost difference between conventional and condensing boilers, though this additional amount (£250 – £300) will be recouped over time through reduced fuel bills. (Typically 3 to 5 years)

Condensing boilers also have certain additional requirements and characteristics. The siting of a flue to an external wall may be dependent

on a building warrant. Gas condensing boilers, when working in condensing mode, extract heat from the flue and emit a large plume of water vapour. If the boiler is sited wrongly this plume can be visually intrusive, and a nuisance to neighbours where the plume crosses an adjacent window and restricts the view. Dependent on the siting of the flue extract this plume of water vapour can pass into roofspaces, condensing on roof timbers, and contribute to their deterioration.

Condensing boilers require close connection to drainage to take condensate from the boiler. Condensing boilers are therefore not available for installation as back boilers. Condensing boilers also require regular servicing since they have a tendency to accumulate sludge.

Under the revisions to the Building Standards (Scotland) 2002, there are now minimum efficiency

standards for boilers. Information on boiler efficiencies is available under the SEDBUK scheme (Seasonal Efficiency of Domestic Boilers in the UK), which is the industry 'benchmark' which grades all boilers on a scale of A-D. A is the most efficient and D the least efficient. Information is available online at [www.boilers.org.uk](http://www.boilers.org.uk).

It is possible to replace a conventional boiler with a higher efficiency condensing boiler, though this may also require a slight modification to the radiator layout originally designed for use with a conventional boiler. Condensing boilers are not appropriate for smaller properties, with three rooms or less.

Condensing boilers remain relatively cool to the touch, whereas conventional boilers can contribute to the heating of the space they are in. Any boiler replacement should be accompanied by a power flush or jet flush to remove debris in the system.

## Controls

Energy efficient heating systems rely on having appropriate controls, the most common of which are

- Programmer/timeclock: this switches the system on and off, dependent on how it has been programmed. Most manufacturers include a standard programme based on 9 hours a day operation.

- Room thermostat: the main temperature control for the heating, which is usually located in a hall at eye-level. These should not be used as on-off switches, since this can lead to other rooms being cooler than required.
- Thermostatic radiator valves (TRVs): these are usually fitted to each radiator (except the radiator in the space where the room thermostat is located). TRVs react to the temperature in the room and allow for heat from other sources such as heat from the sun.
- Hot water cylinder thermostat (HWCT): is fitted to the hot water storage tank and controls the temperature of the water. The recommended setting is 60°C. Setting this higher will result in the householder having to dilute hot water with cold water to make it comfortable to use and to prevent scalding. Combi boilers have the hot water thermostat on the boiler.
- Boiler interlock: a control between the room thermostat and the boiler, which stops the boiler from firing when the level of warmth corresponds with the room thermostat setting.



Heating controls and programmers



Heating controls, TRV and HWCT

## Other gas and electric heating appliances

Wall or hearth mounted appliances are available. Some electric panel heating appliances incorporate a timer which allowing for their operation on special tariffs. Gas heating appliances have to be ducted to the outside of the property, and feature gas 'living flame' fires are usually installed with a flue liner. Feature gas 'living flame' fires are not an efficient form of heating.

## Siting of gas heating appliances

Those appliances which require a vent will always be positioned on an external wall or connected to a chimney. Radiator siting needs to take account of the way the room is used, in particular furniture layout options, as well as the need to provide warmth across the room. Siting a radiator at one end of a room will result in cold spots. The conventional view was to site radiators under windows, to take advantage of the air movement caused by cold air off the window. This is certainly not necessary where the window has been double or secondary glazed, and is not recommended where full length curtains may block the passage of heat. It may be more efficient to site radiators on internal walls, particularly where these can reduce the length of pipework, and reduce heat losses from them.

Radiator siting needs to avoid situations where these are likely to be obscured by curtains, doors or large items of furniture.

## Other energy efficiency measures

Radiator shelves fixed above the radiator, and reflective radiator panels fixed to the wall behind the radiator are useful additional measures which increase the benefit of individual radiators, particularly where these are sited on external walls.



Radiator with reflective radiator panel

## Ventilation

Gas and solid fuel appliances require fresh air to operate and to avoid the build up of noxious fumes. Where there is no other form of fresh air vent in the room it is recommended that a length of 2.5m of draughtproofing is omitted from the windows. For comfort this length of undraughtproofed window frame should be as high up as possible. This is described in fact sheet 2.

## Sources of funding/grants for heating systems and other energy efficiency measures and sources of energy advice

There are various grants and special offers for heating systems and other energy efficiency measures. For details contact the local Energy Efficiency Advice Centre on 0800 512012.

