

Energy and Innovation in Historic Houses



An Evaluation of EPBD Requirements

Smith & Garratt
Rural Asset Management

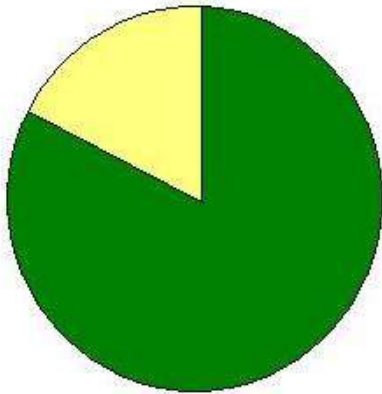
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(Hugh)
16th October 2009**

The EPBD was introduced in 2006; the 3-year implementation period is over and the Directive is being reviewed in the light of carbon emission reductions to date. It applies to all buildings, including historic buildings.



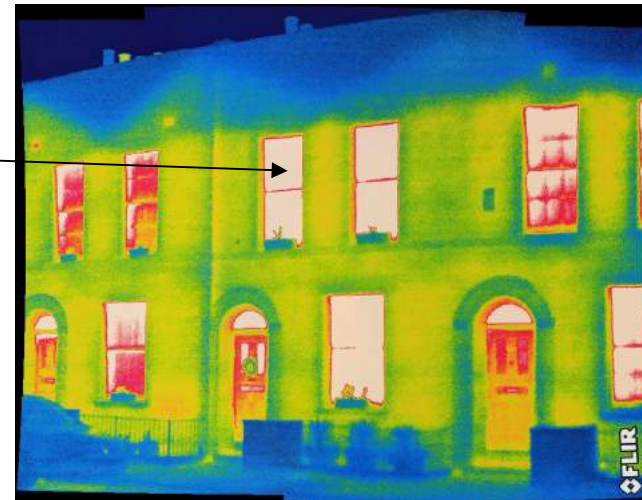
1. 80% reduction by 2050

80% is a lot; and 2050 is only 40 years away – the same time as has elapsed since the first moon landing.



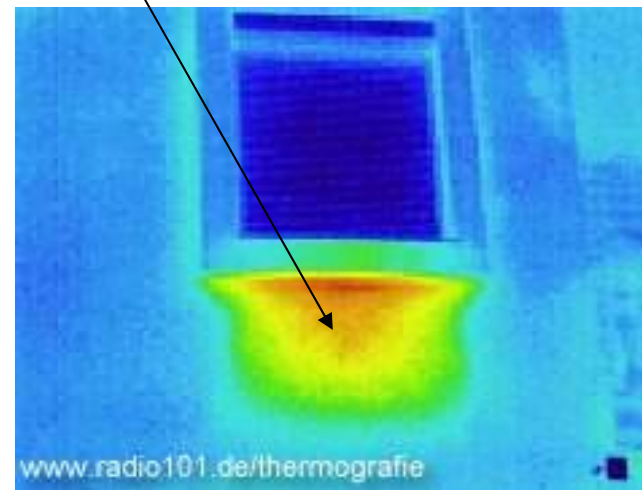
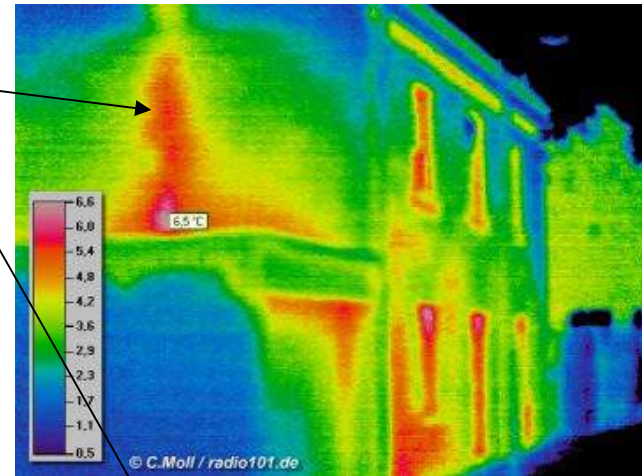
2. The state of our building stock (seen here with thermal imagery)

- ❑ heat losses at windows
- ❑ lack of insulation
- ❑ thermal bridging



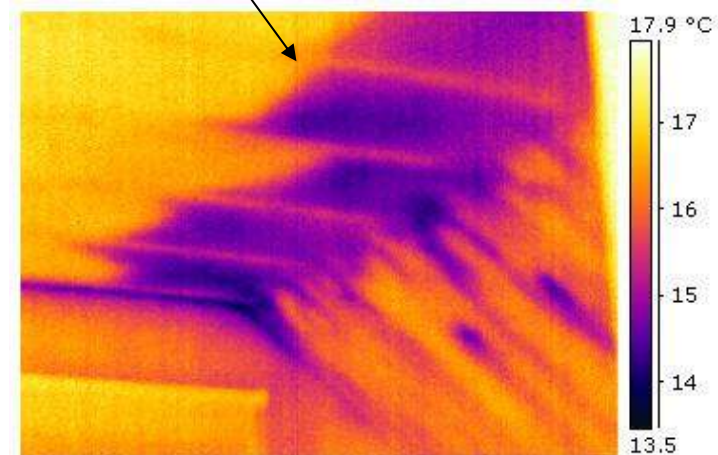
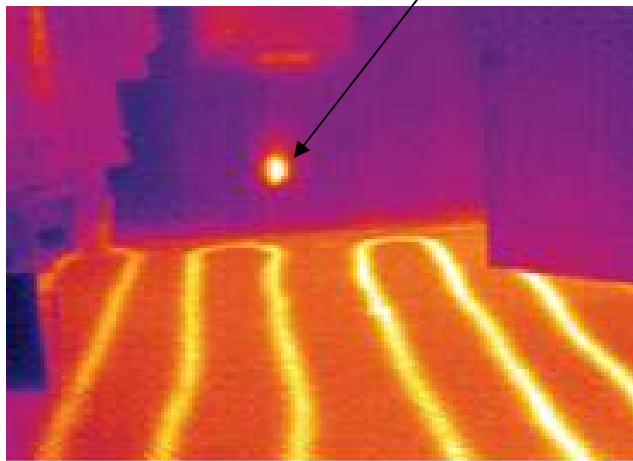
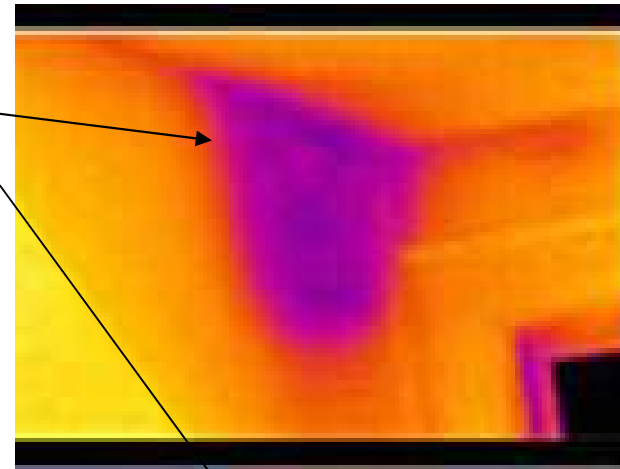
More common defects, viewed from the outside ...

- heat losses up a chimney
- from a badly sited radiator
- from an un-insulated floor slab

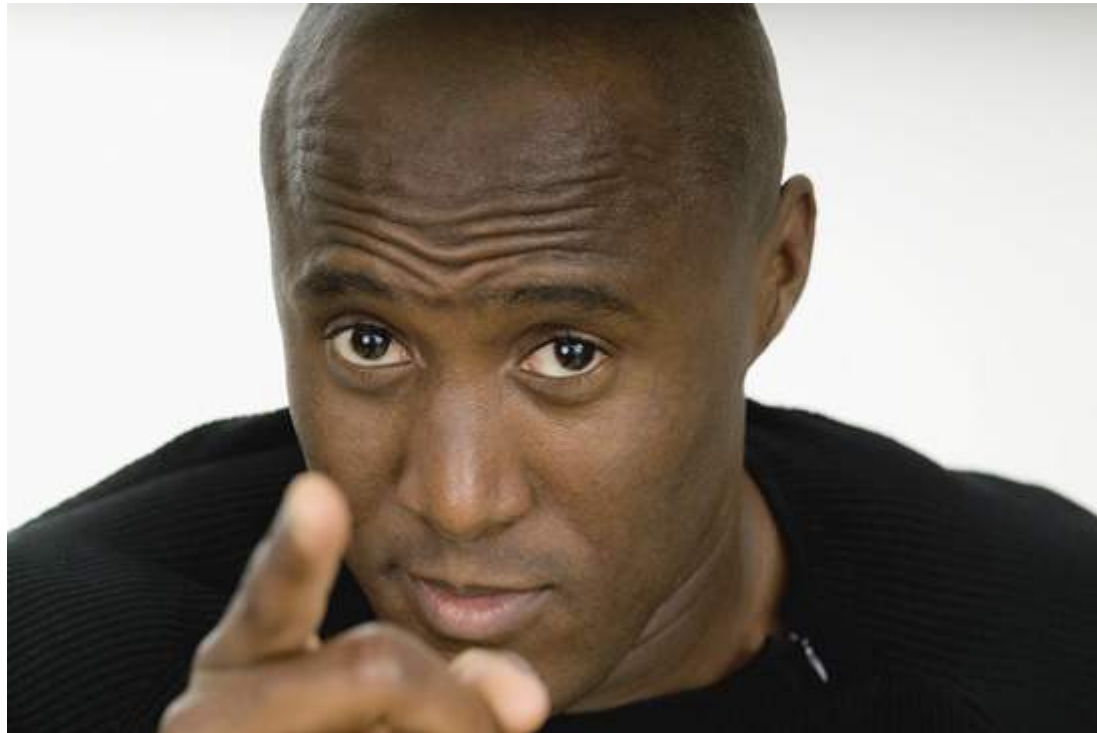


... and from the inside

- ❑ water ingress
- ❑ poorly fitted loft insulation
- ❑ other defects, in this case an electrical fault



Finger-wagging and blaming others will not do



... every one of us should start cutting carbon tonight.

Article 6

Existing Buildings

"Member states shall take the necessary measures to ensure that when buildings with a total useful floor area over 1000m² undergo major renovation, their energy performance is upgraded in order to meet minimum requirements in so far as this is technically, functionally and economically feasible. Member States shall derive these minimum energy performance requirements on the basis of the energy performance requirements set for buildings in accordance with Article 4*. The requirements may be set either for the renovated building as a whole or for the renovated systems or components when these are part of a renovation to be carried out within a limited time period, with the abovementioned objective of improving the overall energy performance of the building."

* Article 4 sets out the energy performance requirements and includes an opt-out for certain classes of building.

Exceptions to Article 6

“Member States may decide not to set or apply the requirements ... for the following categories of buildings:

- ❑ buildings and monuments officially protected as part of a designated environment or because of their special architectural or historic merit, where compliance with the requirements would unacceptably alter their character or appearance
- ❑ buildings used as places of worship and for religious activities”
- ❑ (temporary buildings and industrial or agricultural buildings with low energy demand)
- ❑ (short-term accommodation)
- ❑ (buildings providing less than 50 sq m floor-space)

Also in the Directive:

- Article 7 requires that energy performance certificates are produced whenever buildings are sold or let (and these must be displayed in certain circumstances)
- Article 8 requires periodic inspection of most boilers
- Article 12 requires periodic inspection of most air-conditioning plant

What does this mean for the owner of historic property?

- ❑ The Directive requires that when large buildings (over 1,000 sq m net-internal) are renovated, or part renovated, the energy performance of the renovated portion is to be upgraded to meet minimum standards *so far as is feasible*, unless excused on heritage grounds.
- ❑ Any boiler and air-conditioning plant are to be regularly inspected (but there is no *duty* to maintain or replace faulty plant).
- ❑ An energy performance certificate has to be made available when any building is sold or rented (but not when ownership changes other than by sale).
- ❑ Where a large historic building is publicly occupied, or open for public visits, a current energy performance certificate (less than 10 years old) must be displayed.

We know the Directive, as currently worded, will not have its desired effect because if measuring and publishing energy-efficiency, combined with periodic inspections, was enough ... no-one would drive any of these cars!



Forthcoming Amendments

The consultation period on proposals for a 're-cast' of the EPBD has just closed. If adopted, the main provisions of the re-cast will mean:

- ❑ A 'display energy certificate', showing how much energy was used in the building in the previous year, will have to be displayed in every public building over 250 sq m.
- ❑ The energy performance certificate of any commercial or public building over 250 sq m will have to be put on display.
- ❑ There will be no minimum size of building which, when renovated, has to be upgraded to meet minimum energy performance standards.
- ❑ **Minimum standards will be set for boiler and air-conditioning plant.**
- ❑ Definitions will be set for low- and zero-carbon ('LZC') buildings.
- ❑ Targets will be set for increases in LZC buildings in the new-build, refurbished and public sectors.
- ❑ **Penalties will be introduced for non-compliance** (the UK already has penalties; from £200 for dwellings up to £5,000 for non-dwellings).

Case Study 1

14th Century Keep near Edinburgh



A very energy-efficient historic building

- no heating plant
- huge thermal mass

Case Study 2

Category A-listed 'Panmure House', Royal Mile, Edinburgh. (Former home of economist Adam Smith; to become flagship university education and reception centre). Approx. 400 sq.m.

Insulation

- Floor
- Walls
- Roof

Windows

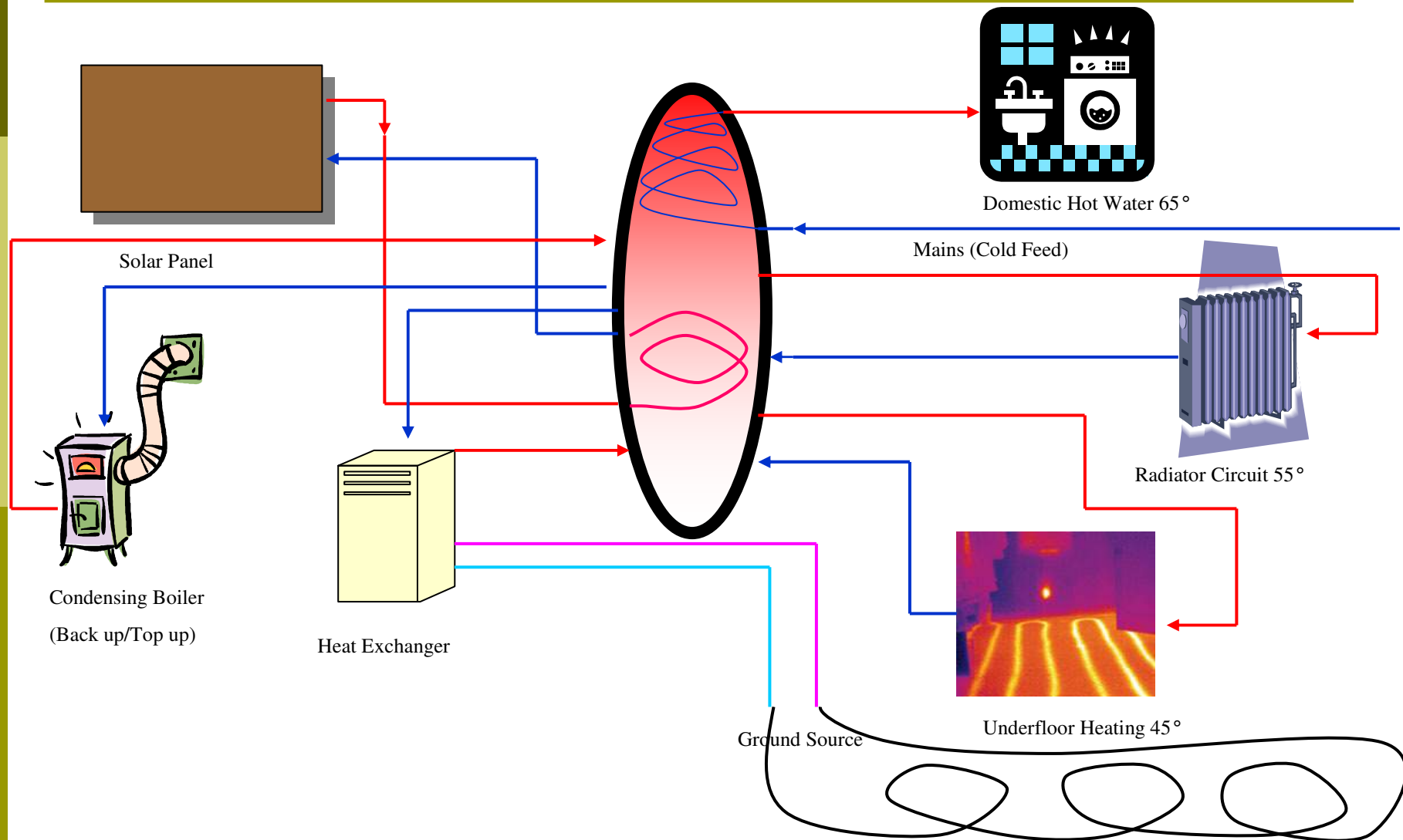
- Double glazing
- Shutters
- K-Glass



Heating & Hot Water

- Ground source heat pump
- Underfloor heating
- Mains gas back-up
- Condensing boiler
- Zoned control

Managing Heat



Case Studies 3 and 4



Both these houses are being fitted with a calorifier (accumulator) heat-store, for the efficient management and storage of energy.

Case Study 5

Marchmont House, Scottish Borders. Former care-home; now a private house.



- Approx. 5,100 sq.m.
- Wood-chip boiler
- Fuel from own grounds

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