

# How to Keep People Warm & Houses Dry (& save fuel)

. David Huw Stephens, M.Sc., Consultant Building Scientist, Copyright 25 June-24 Aug 08. /Lit08  
Tir Gaia, off East St. Rhayader, LD6 5DY sustain2020@talktalk.net.

**New research explained overleaf** shows that official energy efficiency notions waste fuel and cause dampness and mould.

**Key to keeping warm while saving fuel is 24/7 heating and slow ventilation:** Heat one or two downstairs rooms where you need sitting comfort. Turn heating on in Autumn, leave on 'til Spring with thermostatic control. Warm air convects through house, keeps bedrooms dry.

- warms and dries walls; improves insulation;
- improves thermal comfort with warm dry walls;
- warm outgoing air removes moisture efficiently,
- ventilation rate and heat loss can be reduced;
- improves indoor air quality; cuts mould, asthma.

**Avoid traditional cold drafts,** prewarm fresh air from a hit or miss vent beneath heater.

**Even central heating is likely to be more economical left on 24/7.** But boilers may be inefficient on low load. Turn off bedroom radiators.

**Try 24/7 heating with an electric fan heater on half setting of 1kW** blowing across beneath living room window. Plug-in thermostat gives closer control than one on fan heater. Max cost at 12p/kWh is about £20pw. (24kWh/day).

Large storage heater on full averages 0.75kW. With halogen heater top-up costs about half on Economy 7. Gas fire on low costs about same.

**Even on "brown" electricity 1kW causes 60% less CO<sub>2</sub> than UK average,** meeting 2050 target, gives frugal comfort in small houses

**Ventilation through unsealed window joints may be enough with continuous heating.** If condensation persists on windows, increase ventilation. Open landing window slightly.

**Most efficient is variable speed small fan extracting 24/7 in bathroom,** preferably from low level. Ventilates whole house sucking air around door. Close windows and vents. Save tumble drying; dry washed clothes on rack in bathroom, not

in other rooms. Reduce evaporation. Don't let water stand in sink. Cover tank above cylinder.

**Benefits of continuous heating were dramatically shown in the severe 1981 winter** when leaving a gas fire on low 24/7 gave an always warm living room, cleared condensation in bedrooms, and burned less gas than previous intermittent heating. Ventilation via window joints was enough in this 1930s semi. Principles are confirmed by Fresh Air Heating.

**Upstairs day rooms heated 24/7,** with cool downstairs bedrooms, can save even more fuel.

**Sleep snugly** in a polyester fibre duvet or sleeping bag on a foam mattress. Wool and cotton absorb moisture, get damp in cold conditions.

**Fresh Air Heating is next stage** of upgrading. (Coming shortly). Proved making six poorly insulated old houses warm and dry. Typical consumption of 1kW gives 24/7 heating with prewarmed fresh air plus heat recovery from an air to air heat pump, giving cheaper heating than gas. Works without insulation or air sealing. Can be installed anywhere, uses only electricity. Costs a third of ground source heat pumps. Fresh Air Heating saves about 60% CO<sub>2</sub> without insulation. Insulation can then save another 20%.

*Many people find continuous heating economical, but comparisons are difficult and scarce. If you try these suggestions, please help produce data on actual consumption, and experience of dampness and thermal comfort by reading your meter each week and reporting monthly to address above.*

# What's wrong with "energy efficiency" advice?

**Simple physics shows unarguably that official energy efficiency notions of time switched heating and tight air sealing cause dampness and mould, waste fuel, and almost certainly are a major cause of asthma and 25,000 annual deaths from cold related diseases.**

£Billions is wasted trying to remedy resultant condensation and mould in social housing.

**Crucially, time switched or intermittent heating pumps moisture into houses!**

- While heating is off, moisture is absorbed by plaster, paper, wool, cotton and wood. from cold ventilating air at its high relative humidity.
- When heating switches on, moisture evaporates from these hygroscopic materials, but cannot escape through tight air sealing.
- Statutory trickle vents funnel warm moist house air out via cool upstairs bedrooms, condensing on the way, causing damp bedding.

**The hygroscopic effect adds much more moisture than domestic evaporation, always blamed for condensation and mould.**

**The effect wastes fuel even where dampness is not visible.** In well heated houses, 30kW boilers can belt out enough heat to dry a house each day, given enough ventilation.

**"Airing" a house and opening upstairs bedroom windows at night**

- adds even more moisture;
- drains out heat stored in walls, which has to be replaced next day.

**Ground floor trickle vents cause cold drafts** and waste warm air rising from radiators.

**Time switched heating leaves walls cold**, likely to be below the dew point temperature of internal air, so moisture condenses within external walls. Progressive condensation within walls seriously reduces their insulation value.

**People cannot get warm with damp walls.** Just think how cold one's head feels when one's hair is damp after washing!

**The dungeon effect of cold damp walls destroys thermal comfort:**

- evaporating moisture absorbs small heat inputs.
- cold walls drain radiant heat from one's body,
- cold walls cause cold down draft
- cold down draft chills the room air.

**"Safety" vents increase risk of carbon monoxide poisoning**, which kills 50 people a year and brain damages many more. Wind blowing from the side opposite to a safety vent depressurises a house, causes back draft in flue, and flue gas leakage. Even balanced flues can be affected, which may not be tightly room sealed. Coal and wood stoves always contain carbon monoxide. Risk is aggravate by tight air sealing.

**Insulation benefits are exaggerated.** Of course houses should be better insulated. But benefit of insulation depends on the temperature difference between inside and out. Superinsulating a loft has little effect if upstairs rooms are not heated. And cavity insulation is less effective with time switched heating because the inner leaf of a cavity wall takes several hours to get warm.

**The most effective insulation is insulating shutters fitted to living room windows**, closed at least 16h overnight in winter when light and view are not available. Insulates the worst heat loser, in the best heated room, where people most need comfort. Stops cold down draft and radiant heat loss to cold window surface.

**Burning all fuels in power stations to drive Fresh Air Heating**, can convert 200% of fuel to heat instead of 80% of a boiler. Even coal generation would cause 35% less CO2 than gas boilers. When enough wind and water power is available, FAH can heat existing houses with near 100% renewable energy.

**More information, plus about 200 little known points about saving resources is available in an 80 page booklet. £5 incl p&p from the above address. /1082 words**