National Energy Foundation

Energy Efficiency and Insulation Tips

Buriton B-earthday 22nd April 2023

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- Understanding watts
- How to calculate the electric an appliance uses
- What to focus on to reduce your costs, heating and hot water, insulation, heating controls and draughts.
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Understanding what you already use

- The average UK home size is about 100 meters squared with 2.4 occupants.
- The average energy use in electric, is under 3,000 kWh per year.
- The average energy usage in gas will be 10,000kWh per year.

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Your Bill, Unit price and kWh

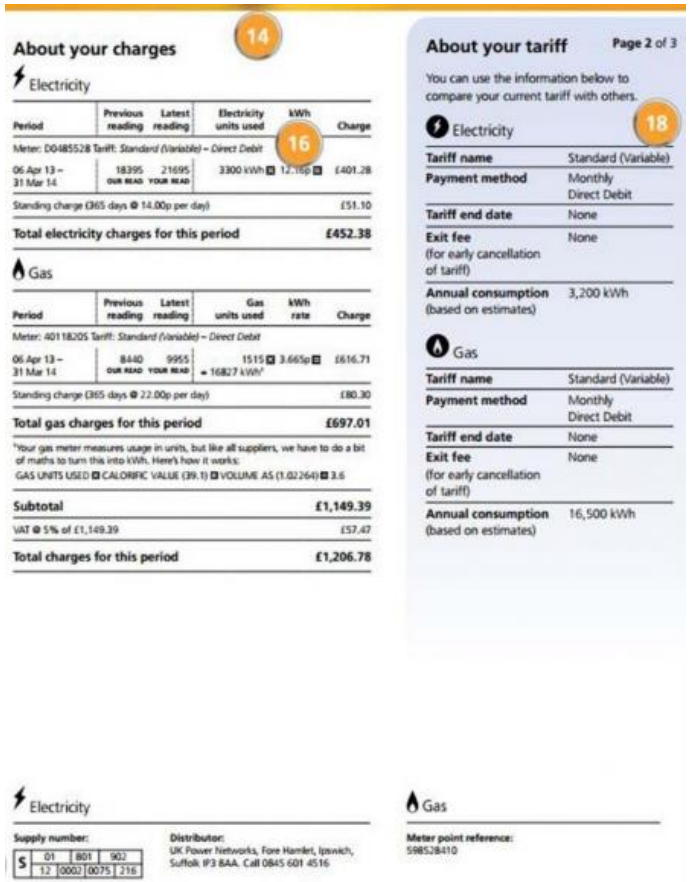
- The current price cap implemented by OFGEN following the is 34p for electric and 10.3p for gas per unit (1kWh)

- Standing charge cap is:

  Electric 46.36p daily x 365 days= £169.21 per year

  Gas 28.49p x 365 days = £104 per year

- Energy bills have an estimate of your annual usage in kWh for each fuel, so you can work out your likely charges for the coming year, if your circumstances are similar.



About your charges

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Electricity

Period	Previous reading	Latest reading	Electricity units used	kWh	Charge
Meter: D0485528 Tariff: Standard (Variable) – Direct Debit					
06 Apr 13 – 31 Mar 14	18395 OUR READ	21695 YOUR READ	3300 kWh	12.18p	£401.28
Standing charge (365 days @ 14.00p per day)					£51.10
Total electricity charges for this period					£452.38

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Gas

Period	Previous reading	Latest reading	Gas units used	kWh rate	Charge
Meter: 4011820S Tariff: Standard (Variable) – Direct Debit					
06 Apr 13 – 31 Mar 14	8440 OUR READ	9955 YOUR READ	1515 = 16827 kWh*	3.665p	£616.71
Standing charge (365 days @ 22.00p per day)					£80.30
Total gas charges for this period					£697.01

*Your gas meter measures usage in units, but like all suppliers, we have to do a bit of maths to turn this into kWh. Here's how it works:
GAS UNITS USED × CALORIFIC VALUE (39.1) × VOLUME AS (1.02264) × 3.6

Subtotal	£1,149.39
VAT @ 5% of £1,149.39	£57.47
Total charges for this period	£1,206.78

About your tariff

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You can use the information below to compare your current tariff with others.

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Electricity

Tariff name	Standard (Variable)
Payment method	Monthly Direct Debit
Tariff end date	None
Exit fee (for early cancellation of tariff)	None
Annual consumption (based on estimates)	3,200 kWh

Gas

Tariff name	Standard (Variable)
Payment method	Monthly Direct Debit
Tariff end date	None
Exit fee (for early cancellation of tariff)	None
Annual consumption (based on estimates)	16,500 kWh

Electricity

Supply number: S 01 801 902 12 0002 0075 216

Distributor: UK Power Networks, Fore Hamlet, Ipswich, Suffolk IP3 8AA. Call 0845 601 4516

Gas

Meter point reference: 5985B410

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What uses Watt

The pecking order is:

- Heat
- Cooling
- Moving parts
- Screens
- Sound and Lighting

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You can’t food budget without knowing prices, the same applies to energy

For many appliances, you can work out how much it costs to run, by multiplying its wattage by the usage time, multiplied by the unit cost of electricity.

Example: A 300 W Dehumidifier, run it for a whole day (24 hours)

0.3 kWh x 24 h = 7.2 kWh used). Energy costs 34p, plus 5% VAT, which is 35.7 p/kWh.

If 7.2kWh of electricity is used and it costs 35.7p per unit:
7.2kWh x 35.7 p = **£2.57 per day**.

ALDI STORES
A LIMITED PARTNERSHIP
BONDI JUNCTION
ABN: 90 196 565 019

		$	
7419	Milk Light 3L	2.99	A
47086	Long Grain Rice 2kg	2.79	A
1725	Eco Friendly Bag	0.15	B
58050	GoldnVale Quick Oats 7	1.08	A
42534	Chk Drumsticks 2kg	5.99	A
1725	Eco Friendly Bag	0.15	B
38066	Tomatoes Diced 400g	0.60	A
38066	Tomatoes Diced 400g	0.60	A
7355	Bacon Middle 1kg	7.69	A
9314	Eggs Cage 700g	2.79	A
45732	Frz Mixed Vegetables 1	1.59	A
55187	Spaghetti 500g	0.65	A
47406	Apct/PearHlves Aus 825	2.49	A
77399	T: Potatoes Brushed 3k	3.49	A
56234	2 Star Beef Mince 500g	3.39	A
77306	Onions Brown 1kg	1.99	A
77053	Broccoli per kg	2.60	A
0.580kg	Net @ 4.49 $/kg		
57166	Marg Original Spread 5	1.79	A
1332	Dried Sultanas 1kg	3.99	A
76024	Royal Gala Apples per	1.70	A
0.855kg	Net @ 1.99 $/kg		
49207	Popcorn Microwave	0.89	A
38066	Tomatoes Diced 400g	0.60	A
3683	Flour Plain 1kg	0.75	A
2534	White Slc 650g Brd	0.99	A
2534	White Slc 650g Brd	0.99	A
	Subtotal	52.73	
1725	Eco Friendly Bag	0.15	B
	Subtotal	52.88	
SUBTOTAL (INCL GST)		52.88	

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Quick quiz

What uses the most electric?

- Leaving 20 LED lights bulbs on for 2 hours or takings a 10 minute Electric shower ?
- Tumble drying a load of clothes for one hour or a fridge running for 24 hours?
- Watching TV for 4 hours or using the grill for 15 minutes?
- Half an hour vacuum cleaning or using a game console for 3 hours?

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Were you right?

- LED 15 watts X 20 X 2 = 600watts

Shower 7.5kWh x 1/4(15 is a quarter of 60min) = 1.875 kWh or 1875watts

- Tumble dryer 2.5kWh x 1 hour = 2.5kWh

Fridge on average uses 1.5 kWh per day as it is not running continuously 1.5kWh

- TV 300watts x 4 = 1.2kWh

Grill 1.5kWh x 1/4 = 0.375kWh

- Vacuuming 900w x 0.5 = 450 watts = 0.45 kWh

Game console 120w x 3 = 360 watts = 0.36 kWh

Priorities in reducing energy usage

Heating and hot water are key areas to focus on. To reduce these cost insulate, use heating & hot water controls and draught proof.

Heating

- Insulation: Loft and cavity wall insulation, hot pipe runs and the cylinder are the basics
- Effective heating controls allow you to have, heating, where, when and to what level you need it. Heat is too expensive to be heating in between floor voids or empty rooms.
- Dealing with draughts is cheap, and adds to your comfort. Look at letterboxes, windows, cat flaps, floor boards, loft hatches and all holes, many are created by services into the home. Find the gaps and seal them.

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Insulation

- Loft insulation at joist level is the most effective, the standard is 270mm rockwool. For awkward spaces, a loose material can be used.
- Want to use your loft for storage, use a proprietary raised board system with legs so the insulation is not compressed and air can circulate around the joists. Xmas decorations are not good insulation.
- Cavity wall insulation, has had a bad press and some failures, but if the walls are accessed carefully and the cavities checked, correct material installed, there should be no issues. Get CIGA accredited installer.
- For specific cold rooms consider adding insulation to internal walls. (IWI)

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Heating controls

- **Thermostat** You can have a fixed thermostat, or a wireless mobile device, the thermostat controls your boiler telling it start or stop.

- **Thermostatic Radiator Valves** allow you to control the temperature of a room by regulating the flow of water through the radiator. For example, if the upstairs bedrooms aren't used until late evening, set the valves on low until in use and close the doors so that the heat from your warm rooms doesn't travel there It's not good to turn radiators off completely, as damp and mould could develop.

- **Smart controls** New apps for smartphones coupled with smart thermostatic valves, allow fine tuning of heating in individual rooms. Hive, Nest and Tado are some of the brands available. Rooms are heated on a room by room basis.

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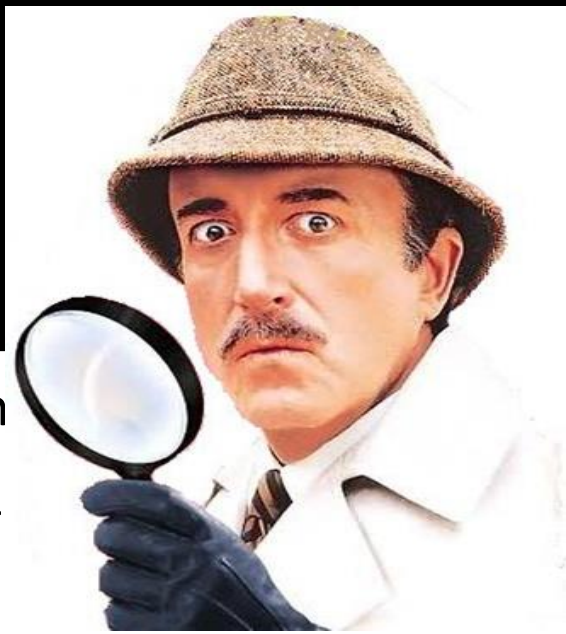
Find the Gaps, draughts,



- **Windows**: Use foam, metal or plastic draught strips. For sash windows you can use brush seals. Temporary secondary glazing is another option.
- **Exterior doors**: Fit brush or hinged-flap draught excluders along the bottom of the doors and rubber or foam around the door edge
- **Interior doors**: Cut draughts with ‘snake’ draught excluders, brushes or strips of material.
- **Unused chimneys:** Use chimney draught excluders – often called chimney sheep or chimney balloons.
- **Around pipework**: Apply silicone mastic, wall-filler or expanding foam as appropriate.
- **Floorboards and skirting boards:** Fill the gaps with flexible fillers, silicone mastic, decorators’ caulk or similar products.
- **Redundant extractor fan outlets**: These should be blocked up**.**
- **Loft hatches**: Fit draught excluder strips around the frame edges and insulate the hatch.
- **Lighting and electrical fittings**: Plug the gaps around the fittings with wall-filler.
- **Key hole and Letterboxes** Fit flaps or brushes to keep cold air out.

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Hot water

Example: if a family, uses 400 litres of water per day (hot and cold) how long do they need to heat their hot water for daily?

- 4 hours?
- 2 hours?
- 1 hour?
- 40 minutes?

- When heat engineers set up timers they will ensure you have ample hot water. Reduce it to as much as you need.

- A Thermostat on your cylinder will tell your boiler when to stop heating the water.

- New cylinders will have insulation of about 80mm, if your cylinder insulation is thin add another jacket. All the hot water pipes that you can access around the cylinder and boiler should be insulated fully. This is a cheap DIY measure.

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Any questions

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Case Study A – The House

- Family, 3.5 occupants, Detached, 1950s cavity wall house. 3 of them work from home. Currently use Gas 17,000 kWh Electric 36000 kWh. In addition, they have a wood burning stove which is used occasionally

- They are careful users; their usage is above average for the average UK household but not above average for the size of their house and the number of occupants.

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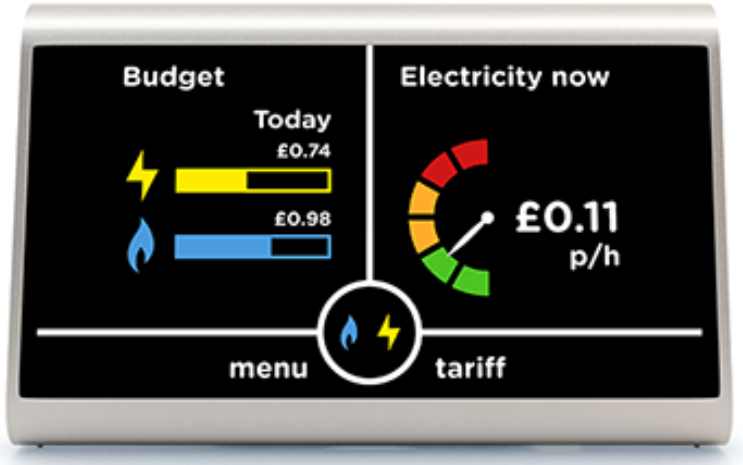
Case Study A – The Findings

- Loft insulation, 270mm (11inches) with a raised boarding so they can store stuff.
- Perfect
- Retrospective cavity wall insulation, unsure how effective it is, consider thermographic imaging to see how CWI is performing.
- Front door and a leaky porch, poorly draughtproofed, particularly the panel with the cat flap. Thorough draft proofing and consider a thermal door curtain.
- Draughty loft hatch, recommendations insulation on the hatch board, draught proofing edges, fix a hook to keep it firmly closed.
- Double glazed windows, about 25 years old, couple of windows are draughty, Advised to use a stick on draught strip where the opening frame is not closing flat onto the fixed frame.
- Their boiler is a 25 year old Potterton, D rated and some of the hot pipe work is uninsulated, temperature is set at 75 degrees, Insulate the pipework, lower the temperature down, and replace the boiler when it next needs repairing or when affordable.

Case Study A – The Findings

- The family are conscientious at turning off appliances, I recommended a power down plug for the two work stations set up in the house. Also an electricity monitor as they don't have a smart meter.
- They had some interlined thermal curtains, they finished just above the radiator so much of the heat was trapped between the curtain and the window. Recommended adjusting the curtain so that it could be tucked inside the radiator
- Lighting is 95% LED
- Appliances are generally A rated
- Family habits around using appliances and heating was fairly frugal.



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Case Study A – The Findings

- 1.Thermostat is in the hallway, where the radiator does not have a TRV, the hall is often too warm, and the upstairs cold, The thermostat is best placed in the room they occupy the most, lounge, the hall temperature can be a couple of degrees lower as it is not habitable space, so install a TRV and remove TRV from the lounge radiator
- 2. A couple of the radiators are heating up unevenly, advised to bled the them and possibly flush out the system if that does not work.
- 3. A couple of the TRV are not responding. Repair or replace and consider smart controller and TRVs.
- There is only 20mm factory foam on the cylinder, and only 70%of the hot pipes are lagged. Apply another jacket over the factory foam and lag pipes
- The hot water is on for 3 hours a day. Experiment and see if it can be reduced to 1.5 hours.

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Case Study B

- Elderly man in a one bedroom flat, solid very thick walls and large south facing windows. No gas, only economy 7 with electric storage heaters, there is a mixture of old style storage heater and one modern programmable heater. He has an off-peak electric immersion.

- He has limited money and is trying to reduce his fuel costs. He moved into the property 8 months ago and is not familiar with this heating system. His energy is electric only and his usage is high for his situation.

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Case study B The Findings

- Occupant, didn't understand the basic principals of the storage heating system and the controls on the storage heaters. The older heaters were easy to explain to adjust the input according to the weather forecast and leave the output on a lowest setting until the evening, when he could increase the output of heat until the evening when he needed it most.

- The newer storage heater was on an all-day setting in his bedroom, Recommended changing the programme to a more suitable option (out all day). So it would come on late evening and warm the room before bed time.

- The immersion was wired into the off-peak electricity, there was no timer on it so it was on every night from11.30pm to 6.30 am, however he had an electric shower so he hardly used any hot water. Advised to get a timer on the immersion and only running it every few nights when he felt the temperature of the water was cooling. Experiment with it, this was a huge user of electric even on the cheap rate.

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Case study B The Findings

- Minimal insulation on his cylinder and pipework not insulated, recommended getting another jacket on his hot water cylinder, recommended a rail so he could still use it for clothes drying

- He had an old style prepayment meter, and was never shown how to read the information on it, This was quite important, as he had no way of knowing the unit price, standing charge, or if he was using his Economy 7 system efficiently, showen him how to access the information on the meter. A better alternative would be a smart meter and being shown how to access all the information on it, so he could manage his costs better.

- He had a chest of drawers in front of the storage heater in the bedroom, which was blocking the heat, Advised to reposition the furniture so that the heat could circulate around the room.

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Case study B The Findings

- Large south facing windows were a significant heat gain on a sunny day, but a lot of heat was lost from them in the evening, so thermal lined curtains were recommended and advised to draw them at dusk.
- He had an oil filled electric fire for the evening time if the heat from the storage heaters wasn't adequate, which he was to anxious to use due to cost, we were able to calculate the running cost per hour, another alternative was to use a heat blanket.
- He dried clothes on his storage heaters which would contribute to the mould in the ceiling corners, advised to open windows when drying clothes and use an airing rack or his airing cupboard instead.

- His fridge was almost empty and too big for his needs and inefficient it was a C rating, change it when he could afford it and store other foods in there in the meantime.
- General habits that would help him to save energy, Ask his carer to batch cook and freeze and chill meals for later in the week and reheat with a microwave. Use a steamer with his saucepan so reduce using an extra electric ring. Wash his clothes at 30 or below. Turn his tv off when not watching it,

General tips for saving energy

- Cooking, pecking order is microwave, hob then oven, it is important to use lids on saucepans. Cook in batches and chill or freeze portions
- Cheaper to run a full fridge than an empty one. Make sure it is defrosted.
- Clothes washing, full load, lower temperature and line dry clothes avoid tumble dryer as much as possible
- Manage moisture in your home, high humidity spaces are much harder to heat and contribute to mould and condensation.
- Draw the curtains at dusk and make sure heat is not trapped between the window and the curtain.

General tips for saving energy

- Use LED light bulbs.
- Reduce the power of your shower if possible to 7 litres per minute flow, and take shorter showers. Avoid the water running continuously
- Boiler what you need when making a cuppa.
- Make sure that the air can circulate around radiators, use reflective panels on external solid walls.
- Use a smart meter, energy monitor or plug monitor to discover the energy hungry appliances in your home.
- Watch those KWh reduce

Q & A

Thank you for listening

An excellent resource is Centre for Sustainable Energy, Advise Sheets, we have some advise sheets available on the table.

Also the Energy Saving Trust website.

Any questions?

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