Rising Gas Prices for Home Heating in the UK

Reasons for installing the Clear Heater System to save money on home energy heating bills and reduce our reliance on fossil fuels.

Logicor (CH) Ltd
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1. Introduction

The world is increasingly aware that fundamental changes will be necessary to meet the growing demand for energy and combat the negative impacts of Climate Change.

The UK is heavily reliant on gas for energy. We use it for the majority of our heating (2) and generating almost half of the UK's electricity. (1 p. 2)

Over the last decade gas has got more expensive, which is why energy bills have shot up so much. There are plans to use more gas in future – not just in the UK but across the world. Diminishing global fossil fuel reserves and increasing global demand for energy are pushing fossil-fuel prices ever higher. These high prices have already imposed significant additional costs on UK households and businesses.

From the point of view of climate change, burning ever more fossil fuels would be a disaster. Without action [to reduce the effect of climate change], the overall costs of climate change will be equivalent to losing at least 5% of global gross domestic product (GDP) each year, now and forever. Including a wider range of risks and impacts could increase this to 20% of GDP or more, also indefinitely. (3)

But given rising gas prices, it also looks like bad news for our energy bills.

This report sets out the reasons why we need to reduce our dependence on gas for domestic heating not just for environmental, but economic reasons too.

One viable alternative now available to the mass market is the newly released Clear Heater System from Logicor (CH) Ltd. The Clear Heater System is a truly intelligent phased-electric infrared heating system. Comparative data from customers has already shown that average savings of 50% on heating bills can be expected, and in some cases up to 80% or more. (4) With a 20 year performance guarantee and 33 years life expectancy on its Clear Heater units, these savings will continue for years to come as gas prices continue to rise.

It is only a matter of time before fossil fuels such as oil, gas and coal are either phased out of use, run out of easily accessible reserves or priced out of use by a complex mix of economics, politics, environmental protection policies and geological limitations.

Global climate politics rapidly needs to find and implement a fossil fuel free solution if we are to have any chance of avoiding unimaginable global change through the effects of climate change.

Future prosperity requires a combination of energy efficiency and renewable energy.

2. When will fossil fuels reserves run out?

It is only a matter of time before easily accessible fossil fuels run out. Known oil deposits will be gone by 2052, but that still leaves gas and coal deposits.

If gas production is increased to fill the energy gap left by oil, those reserves will only give us an additional eight years taking us up to 2060.

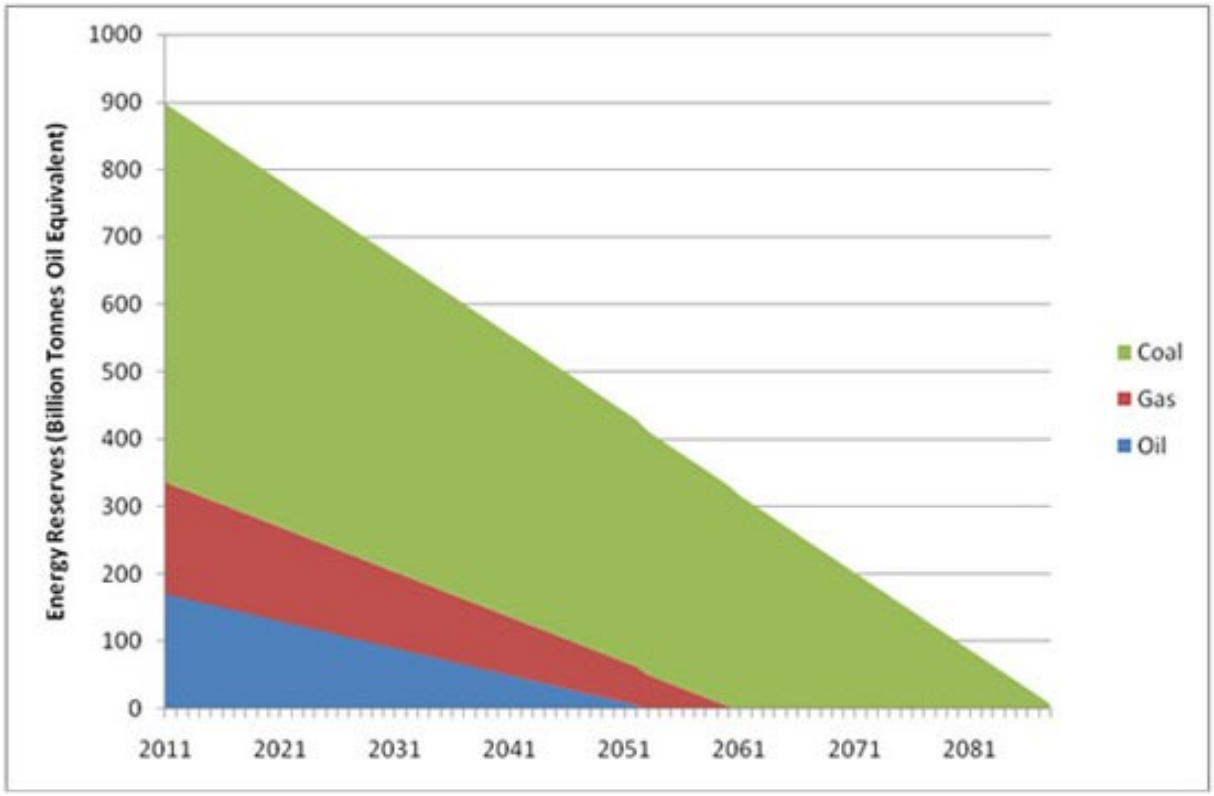

Figure 1: Projected end of fossil fuel reserves (5)

If coal production is then used to take us beyond our know gas reserves that will take us to around 2088.

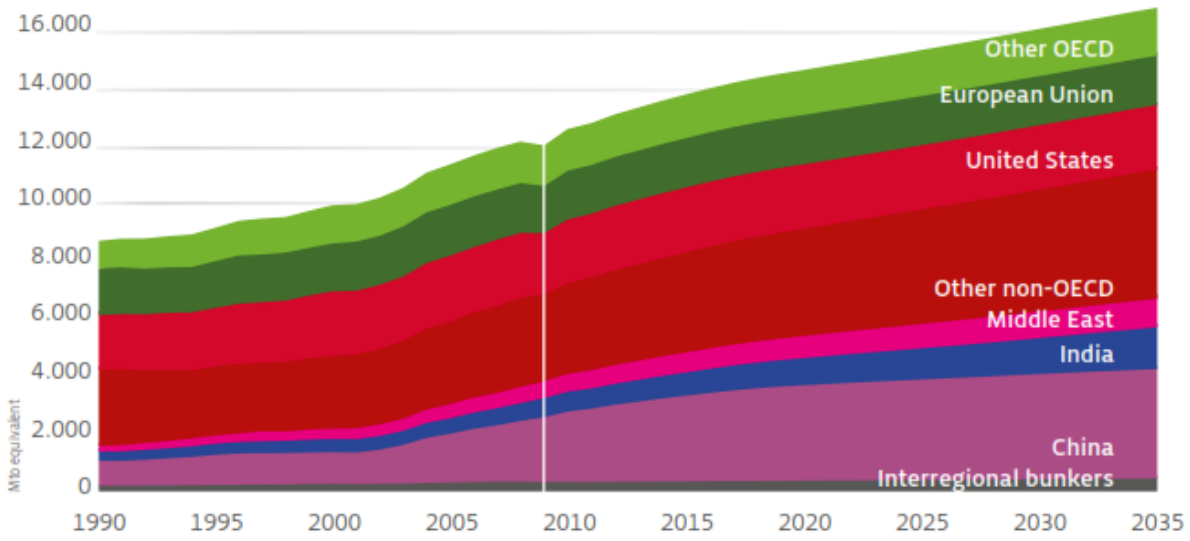

Figure 2: World primary energy demand by region up to 2035. Scenario based on national climate and energy policy targets (World Energy Outlook c OECD/IEA, 2011) (6)

As the world population increases and developing countries consume ever more fossil fuels, the end of fossil fuels reserves could run out much sooner than the forecast in Figure 1.

At what point will energy from oil and gas become too expensive and drive more people into fuel poverty?

2.1 What about new fossil fuel reserves?

Easily accessible fossil fuels reserves will soon run out and the boom time of cheap fossil fuel is over.

There is a growing scramble from energy companies to extract ever more fossil fuels in higher risk areas, such as drilling for oil in the Arctic or fracking shale gas in the UK. All these options carry associated environmental risks and contribute to climate change.

If the UK does go down the route of extracting shale gas through fracking, experts say it would take about 20 years for this new gas to make much dent on gas supply - and even then would not necessarily be cheaper than imports. (1 p. 3)

2.2 UK's over reliance on gas

Gas prices in the UK have typically been lower than many other EU countries in part due to its high domestic production and also because of the UK's relatively competitive gas market. (7)

But, North Sea gas is running out. Gas imports have risen in the UK from just 2% of UK demand in 2003/04 to over 50% in 2009. By 2020, 80% to 90% of the gas needed will have to be imported. (7)

As we have become more reliant on gas imports, UK gas prices have become more unreliable and have continued to rise. (1 p. 10)

Supply instability could eventually interrupt supplies. For example, in 2013 Britain almost ran out of its storage of natural gas. *"We really only had six hours' worth of gas left in storage as a buffer,"* said Rob Hastings, director of energy and infrastructure at the Crown Estate, the property portfolio managed on behalf of the Queen. *"If it had run any lower it would have meant . . . interruptions to supply."*

The UK Government's own gas price projections (Figure 3) show that for most scenarios the price of gas in the UK will rise.

(in 2014 p/th)	Low	Central	High	Notes
2014	47.5	55.8	64.2	*Central scenario*
2015	46.8	62.1	80.8	2014-2015 – based on forward curve.
2016	46.0	63.9	82.6	2016-2019 – an average of external forecasts.
2017	45.3	61.5	84.4	
2018	44.6	58.7	86.3	2020-2024 – linear interpolation
2019	43.9	58.0	88.2	2025-2030 – linkage to US price (Henry Hub)
2020	43.2	60.3	90.1	2030-2035 – flat-lined
2021	43.2	62.6	92.1	
2022	43.2	64.9	94.2	*Low scenario*
2023	43.2	67.2	96.2	2014 – based on historical error from forecasting short term prices using forward curve
2024	43.2	69.4	98.4	
2025	43.2	71.7	100.5	2015-2019 – linear interpolation
2026	43.2	72.5	102.7	2020-2035 – low estimate of long-run marginal cost of supply
2027	43.2	73.4	105.0	
2028	43.2	74.1	107.3	
2029	43.2	75.1	107.8	*High scenario*
2030	43.2	76.4	107.8	2014 – based on historical error from forecasting short term prices using forward curve
2031	43.2	76.4	107.8	
2032	43.2	76.4	107.8	2015-2029 – oil-linked prices
2033	43.2	76.4	107.8	2030-2035 – flat-lined
2034	43.2	76.4	107.8	
2035	43.2	76.4	107.8	

Figure 3: Department of Energy & Climate Change 2014 Gas Price Projections (8 p. 9)

These gas price projections are for the average wholesale day-ahead gas price as traded over the National Balancing Point (NBP) delivered to GB over a given year.

Factor [Most important first]	Uncertainty	Why this matters for UK	Trend	Broad impact on price
Will global gas demand continue to rise?	In absence of policy, global gas use will rise. **By how much?** And what will the UK and international leaders do about **the carbon impact?**	The UK will soon import the majority of its gas via LNG, prices for which are driven by global demand and supply.	All other things being equal, most experts see global gas use increasing.	↑ **More demand = higher prices.**
Will global supply keep up?	There is no shortage of gas, but can supply keep pace with demand?	As above.	3x Russia's output needed to keep pace with demand. USA's shale gas can't necessarily be replicated widely.	? **Only if supply outstrips demand, in theory, would prices be lower than otherwise: unlikely.**
Will we have to compete with Asian markets for gas?	Experts don't agree on whether a truly 'global' market for gas will emerge.	The more we need to compete with Asian markets, the more we may end up paying.	LNG has shown it can go where it is needed, ie post-Fukushima, but regional gas markets still exist.	? **Competition may push prices down globally, but expose the UK to Asian demand.**
Will the traditional link of gas to oil price weaken?	Experts expect **weakening of the link between gas to oil prices** which has driven EU gas prices higher, but by how much?	Pipeline contracts are typically linked to the price of oil – which is rising.	Some weakening has been seen as a result of over-supply and competition from LNG.	↓ **the oil price is only going up, so breaking the link to it should lower prices than would otherwise have been the case.**
How much gas can we produce domestically?	Some trumpet new sources of **shale gas** for the UK, but this seems optimistic – leaving aside environmental concerns.	In the USA the shale gas revolution has made them self-sufficient. Could the same happen here?	Experts warn that the UK will find it hard to have the same shale success as the USA.	? **No reason to assume that domestic gas would be cheaper than imported**
How much competition will there be in the EU gas market?	**Competition in the EU market** ("liberalisation") should increase due to new EU rules, but progress is very slow.	More competition is expected to have an effect on the oil:gas price link.	First moves by EU to increase competition started in 1998, but little sign of major change yet.	? **"Liberalised" UK's prices are low compared to EU, but prices are still rising nonetheless.**
OVERALL	**There are many unknowns, but the overarching factor is robust predictions of increased global demand. Pressure on the oil:gas price link and more EU competition could lower prices compared to where they would otherwise be, but globally and in the UK it is hard to see global supply exceeding demand to the point of pushing prices down in absolute terms. So the main question is perhaps not 'will prices rise,' but 'by how much?'.**			

Figure 4: Summary of the key uncertainties that affect the price of gas (1 p. 4)

2.3 Should we be searching for and burning more fossil fuels?

In 2000, Sheikh Ahmed Zaki Yamani, former oil minister of Saudi Arabia, gave an interview in which he said:

"Thirty years from now there will be a huge amount of oil – and no buyers. Oil will be left in the ground. The Stone Age came to an end, not because we had a lack of stones, and the oil age will come to an end not because we have a lack of oil." (9)

A statement like this would normally be expected from the 'Green Lobby' but the fact that it was made by the former oil minister of Saudi Arabia adds weight to its forecast.

Considering the growing pressure on the upcoming United Nations Climate Change Conference in Paris 2015 (10) the most likely reason for stepping back from oil and gas as fuel will be climate politics to reduce the impact of climate change.

The G7 group of industrialized nations announced after their meeting in Germany in June 2015 that they would move towards 100% decarbonisation by the end of the century and, *"We commit to doing our part to achieve a low-carbon global economy in the long-term, including developing and deploying innovative technologies striving for a transformation of the energy sectors by 2050 and invite all countries to join us in this endeavour. To this end we also commit to develop long term national low-carbon strategies."* (10)

2.4 The climate question

Scientists are clear that the threat of climate change is urgent. (11)

Representatives from every country in the world are meeting in Paris in December this year to discuss a global agreement to cut carbon emissions. (12)
Global pressure is mounting to develop a zero carbon future based on an energy mix without gas, oil and coal.

It is only a matter of when, and not if we move away from fossil fuels and towards a cleaner energy mix with renewable forms of energy production.

Any future scenario that relies upon a massive usage of gas is simply not compatible with the urgent need to cut carbon emissions, domestically and globally. (1 p. 16)

The economic implications of failing to avert dangerous climate change are estimated by the Lord Stern review to be anywhere from 5 to 20 percent of global GDP. (3)
This would make discussions about fluctuations in the gas price seem unimportant.

3. Fuel poverty in the UK

Heating energy is by far the biggest slice of Britain's household energy use. To make serious progress in cutting CO_2 from housing and saving money on energy bills, heating energy has to be part of any solution. (2 p. 26)

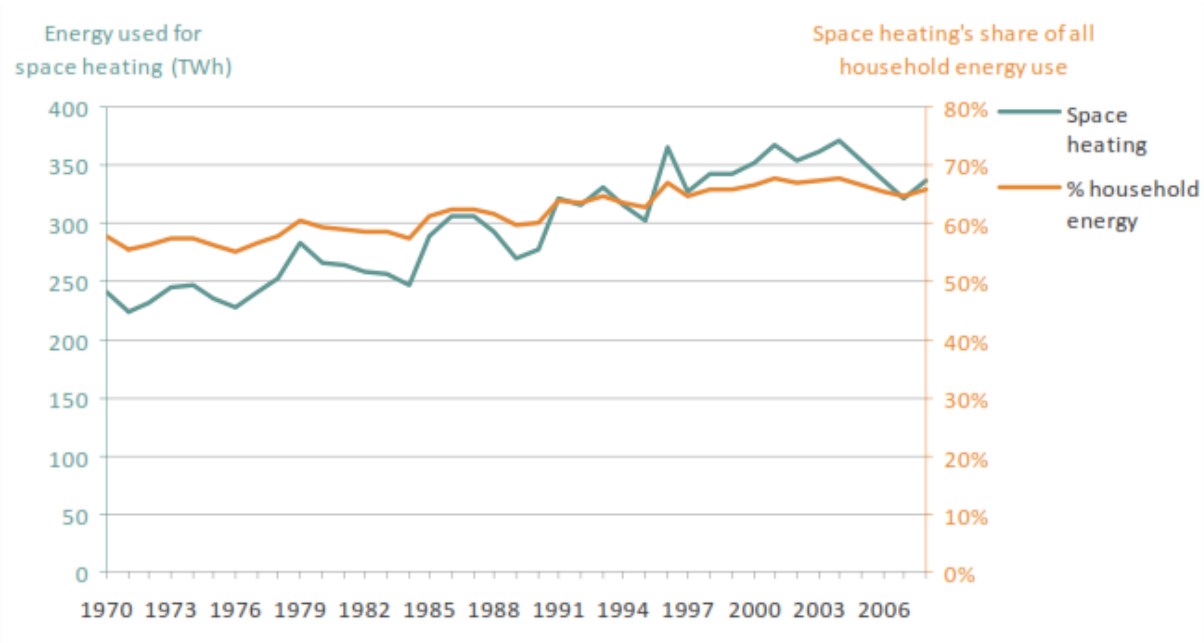

Figure 5: Household energy use for space heating (Twh) (2 p. 27)

Figure 5 shows that about two-thirds of our home energy use goes on space heating. If gas prices continue to rise, it is likely that fuel poverty in the UK will also rise.

In the UK fuel poverty is defined by the Warm Homes and Energy Conservation Act as: "a person is to be regarded as living "in fuel poverty" if he is a member of a household living on a lower income in a home which cannot be kept warm at reasonable cost". (13)

In simple terms, this used to be defined when a household would need to spend more than 10% of its income to maintain an adequate heating regime. (14)

A new more complex definition of fuel poverty is now used in the UK, based on the Hills review. (15)
This gave the following definition; *"fuel poverty is now defined as when a household's required fuel costs are above the median level; and if they were to spend what is required, then the household would be left with a residual income below the official poverty line."*

Additionally, a Fuel Poverty Indicator has been created, which shows how far into fuel poverty households are, not simply if they are in poverty or not. (14 p. 9)

To put this into numbers, government figures expected the number households in fuel poverty in the UK to increase from 2.28 million in 2012, to 2.33 million in 2014, with increases in energy costs a key factor. (16 p. 6)

Better home insulation and more efficient space heating systems will play an essential part in reducing fuel poverty.

4. What are the alternatives to gas?

4.1 Renewable energy

Solar Power in the UK almost doubled in 2014 to nearly 5GW, enough to supply the equivalent of 1.5 million homes. (17)

The cost of solar power has fallen quicker than expected and the trend is expected to continue. (18)

Installing Photovoltaic Panels to homes provides free energy from the sun, reducing your energy bills and can pay you for generating electricity through government feed-in tariffs. (19)

Solar Panels can sometimes be installed for free on qualifying properties with average reductions in energy bills reported as 37%, and some of 50% and over. (20)

Renewable energy such as wind and solar is even much more cost effective than Nuclear in the fight against climate change. (21)

4.2 Energy efficiency

Energy efficiency is one of the cheapest ways to save energy and reduce energy costs. (16)

A simple example such as changing incandescent light bulbs to modern Energy Star rated LED bulbs use at least 75% less energy. (22)

The UK's housing stock is amongst the least energy efficient in Europe, and is responsible for nearly a quarter of our annual carbon emissions. The refurbishment of our homes and buildings is one of the greatest challenges we face to reducing carbon emissions. The majority of our existing stock requires some level of retrofit to enable us to live and work more sustainably. Refurbishing the existing housing stock will be key to reducing the UK's carbon emissions so that we can achieve our ambitious carbon reduction targets. (23)

The Green Deal launched in January 2013, is the Government's flagship energy efficiency policy. It aims to drive energy efficiency improvements in millions of UK homes at low or no up-front cost to the customer. (23)

It's vital that our new homes and non-domestic buildings are designed and built to be as sustainable as possible and to contribute as little as possible to the carbon emissions from the sector. The UK has some of the most ambitious targets in the world for so-called 'zero carbon' standards for domestic and non-domestic buildings. (24)

4.3 The potential of energy efficient space heating

Since approximately two-thirds of home energy bills is spend on heating (1), an efficient space heating system would have huge potential in saving money on energy bills and reducing carbon emissions. (2 p. 27)

Logicor's Clear Heater System has helped save its customers on average 50% off their heating energy bills and in some cases more. (4)

5. The Clear Heater System

Electric infrared heating systems have been around for some time. A common misconception is that gas fired central heating systems are cheaper to run than electric infrared heating systems. We have never defined if that is cheaper in monetary terms or in long term costs associated with climate change from burning fossil fuels. Either way this is often based on outdated information and old technology.

The Clear Heaters System is an all-electric phased infrared radiant heating system and consists of two main elements: the Clear Heater units which radiate infrared heat and the control panel to monitor and regulate the system.

Designed and built in the UK, the Clear Heater System is now revolutionizing the concept of space heating. For the first time, an efficient electric alternative to gas-based heating systems is available to the mass market at an affordable price with cheaper running costs. (4)

5.1 How much could the Clear Heater System save you?

We've worked with our customers to monitor actual energy savings of using a Clear Heater System in comparison to standard electric or gas central heating systems. Provided you run the CHS system at the same temperatures and for the same length of time as you previously ran your old heating system, we expect you to save at least 50% on your heating energy bills and in some case much more. (4)

5.2 How does the Clear Heater System save energy and money?

The Clear Heater System saves energy and money on your heating bills through a variety of innovative methods, including:

1) Its patented technology is super efficient at converting 100% energy into heat.

2) The radiant heat produced by infrared waves warm materials and objects directly rather than the surrounding air, so the heat loss through air is drastically reduced. Properties could save up to 90% from the estimated heat loss expected through poorly insulated homes or draughts using a conventional convection heating system. (25)

3) The comfortable warmth created by radiant heat means that users tend to heat their rooms 2°C lower than with a conventional gas central heating system, therefore using less energy.

4) The phased energy function means that each Clear Heater unit only needs to heat for 25% of the time to maintain the target temperature. When the Clear Heater unit switches off, the surface temperature continues to heat for a short time before cooling again. If we imagine this as a series of four-second time loops, a Clear Heater unit would only need to heat for the first second of each four-second phase to maintain the heater surface temperature within 0.5°C of the target temperature. *(Note: Room temperature is different from the heater surface temperature.)*

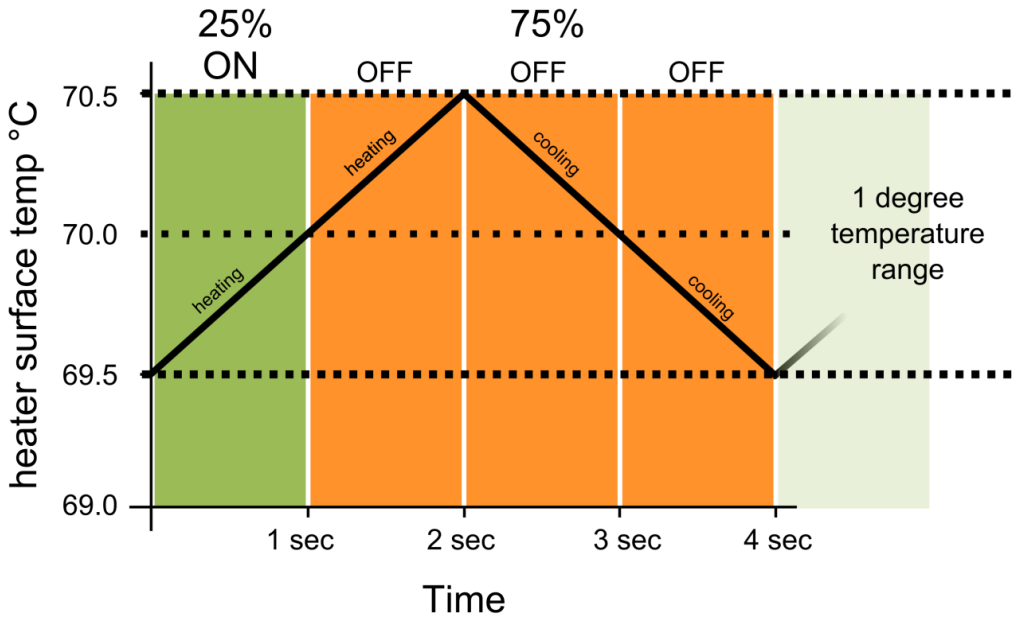

Figure 6: How the Clear Heater System's phased operation saves energy

5) The Clear Heater smart control panel gives users full control over how much they spend on heating, with real-time values on energy-use and energy-spend. This level of control allows users to plan heating budgets with confidence.

6) The Clear Heater System allows users to independently switch-on individual heater units via the control panel to warm specific rooms or zones.
Since the reaction time of Clear Heater units is very quick and the warmth of radiant heat is quickly felt, rooms need to be heated for a shorter period of time than with a conventional heating system to achieve a comfortable temperature.

   Compare this to a gas central heating system: if you wanted to warm one room quickly you would normally need to turn on the whole central heating system and all radiators for a longer period of time to achieve a comfortable temperature. This is a very inefficient use of energy and quickly adds to heating bills.

5.3 A carbon free combination

The Clear Heater system is fully compatible with all types of home electric generation systems (e.g. solar panels) making it possible to reduce running costs even further. The combination of these systems would ensure future sustainability for domestic heating and the potential of a carbon free existence independent of the fluctuations of gas and oil prices.

For those unable to install their own electricity generation system to their property, a simpler solution for a carbon free future is to simply swap your energy supplier to one that supplies 100% renewable energy. The tariffs are comparable to conventional energy suppliers which use fossil fuels in their energy mix and are sometimes cheaper, but with the knowledge that 100% of the supplied energy is from renewable sources.

6. Summary

Energy bills will continue to rise. Exactly how much they will rise is unpredictable. Reliance on gas as a source of energy for domestic heating will continue to be more expensive.

In the end we will be forced to move away from fossil fuels for either cost reasons or environmental ones. It is clear that we can generate electricity in an environmentally green way for a period of time that spans many millennia not decades. The move to more environmentally friendly electric heating systems is inevitable; the only real question is when.

The Clear Heater System brings that choice into 2015 and for the first time a truly first rate intelligent infrared heating system is available on the mass market. Making the decision to use it ensures that you are taking the first steps to not just reducing your energy bill but your burden on the environment too. It is up to you to decide which is the most important.

Further savings could be made through a combination of retro fitting existing buildings to be more energy efficient, making new buildings 'zero carbon', generating our own electricity with solar panels and using the Logicor Clear Heater System to heat our buildings. This could substantially reduce heating energy bills and our impact on the environment.

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