

Energy Cost Comparison Trend Report

(April 2010 – March 2011)

NEP, 2011

Version 3, 12/01/2012



Task	Name	Date
Prepared by	Estelle Nma, NEP	21/12/2011
Approved by	Jerome Baddley, NEP	12/01/2012

Contents

Executive Summary.....	3
1.0 Introduction	4
2.0 Energy Cost Trends – all fuels	5
3.0 Short Term Energy Cost Trend – all fuels.....	7
4.0 Energy Cost Trend by Fuel type	9
4.1 Propane.....	9
4.2 Heating oil (Kerosene and Gas oil).....	10
4.3 LPG	12
4.4 Butane	14
4.5 Coal and smokeless fuel.....	15
4.6 Electricity.....	16
4.7 Gas	18
4.8 Pellets.....	19
4.9 Seasoned wood (logs)	20
4.10 Air-source Heat pump (ASHP) and Ground-source Heat Pump (GSHP).....	21
References:	22

Executive Summary

The need to choose the best and cheapest fuel for heating purposes is becoming more essential as the price of energy continues to rise. It is very difficult to compare the actual cost for powering a heating system between differing energy sources as they are measured in different units such as litres, therms, BTU, kWh, cubic metres and many more. To this effect, at Nottingham Energy Partnership (NEP), we have done the calculations to standardise the units and costs for easy comparison. Having closely monitored the prices over the last year (April 2010 – March 2011), it has revealed that LPG had the highest increase with over 30% rise, followed by Kerosene with almost 29.53% increase. The most stable fuel of all was seasoned wood with a little increase of 0.55%. However, butane prices have been fluctuating and eventually fell by 8.26% by the end of March 2011. One of the major factors affecting the prices of most fuels was the price of oil. In this last year, the price of oil rose by 33.79% and this led to an increase of almost all of the fuels except for butane whose price is inelastic.

The most widely used fuel for heating purposes is mains gas, and this has risen by 8.88% for standard rate and 17.12% for online rate. Despite this high increase, main gas remains one of the cheapest fuels for heating purposes and also has low CO₂ emission factor compared to other heating oil such as kerosene and gas oil or even LPG.

In a short term trend analysis (3rd quarter 2007 – 2nd quarter 2011) of the changing prices of the different fuels, this revealed that Butane was the most volatile with over 100% increase whereas Electricity Standard rate was the lowest with 23% increase. Oil prices has seen a 50% increase over this period.

1.0 Introduction

With the high prices of energy, more and more people wants to know the best and cheapest fuel for heating purposes. As energy sources are measured in different units: litres, therms, BTU, kWh, units, cubic metres and many more. This makes it very difficult to compare the actual costs for powering a heating system between differing energy sources. For this reason, standardised units and costs are needed and at NEP we have done these calculations for the main fuel types. As prices change constantly, we have endeavoured to monitor the price changes over the year and beyond to show the trend in the prices.

The average monthly prices used were based on the supply of fuel volumes suitable for a medium sized domestic property (around 16MWh of annual heat demand) with quotes taken from suppliers within the East Midlands region. Supply of larger and bulk volumes across all fuels and energy sources for very large domestic or non domestic sites will result in lower costs. Fuels in other regions may cost more or less dependent on the local supply chain.

This report is the first annual report of the NEP energy cost comparison. It presents the trend of different energy sources' prices over the past one year (2010/2011 financial year). Monthly updates of the energy cost comparison are available online at:

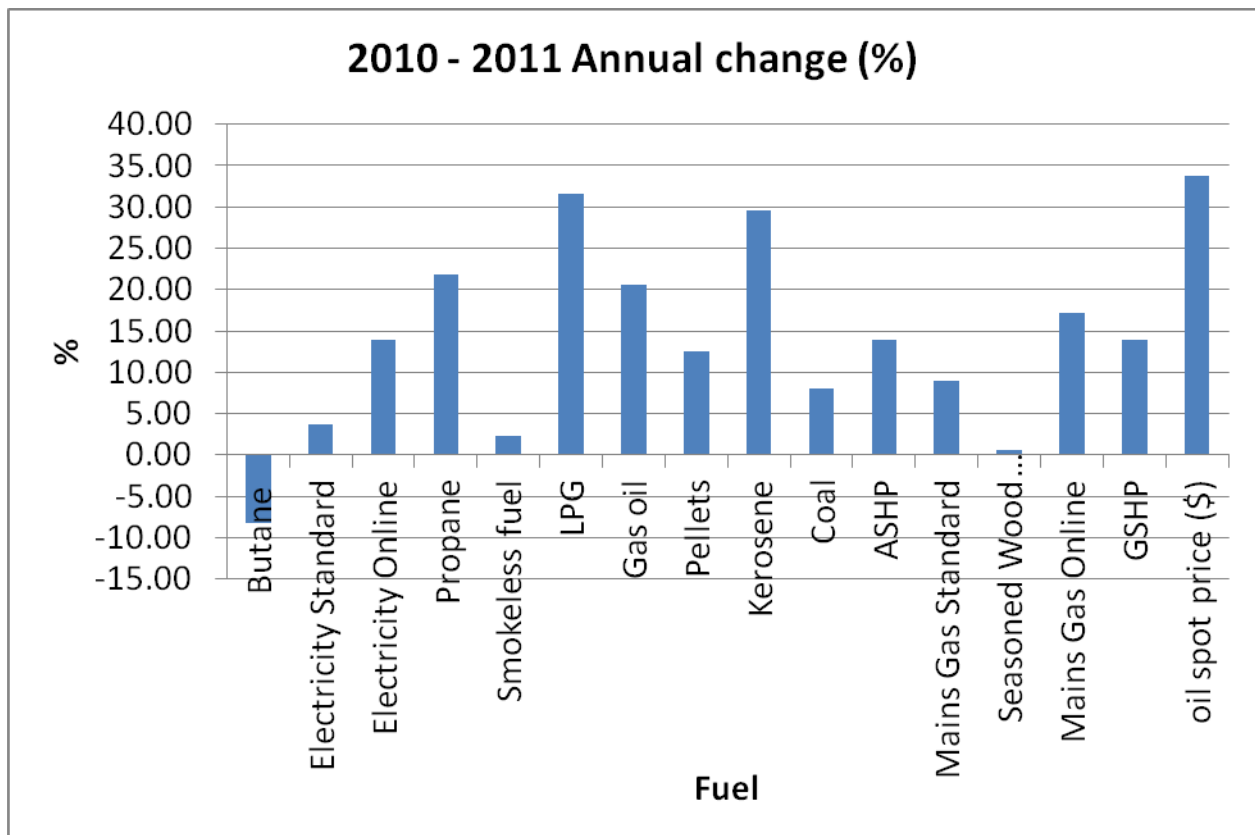
http://www.nottenergy.com/energy_cost_comparison/energy_comparison_data/

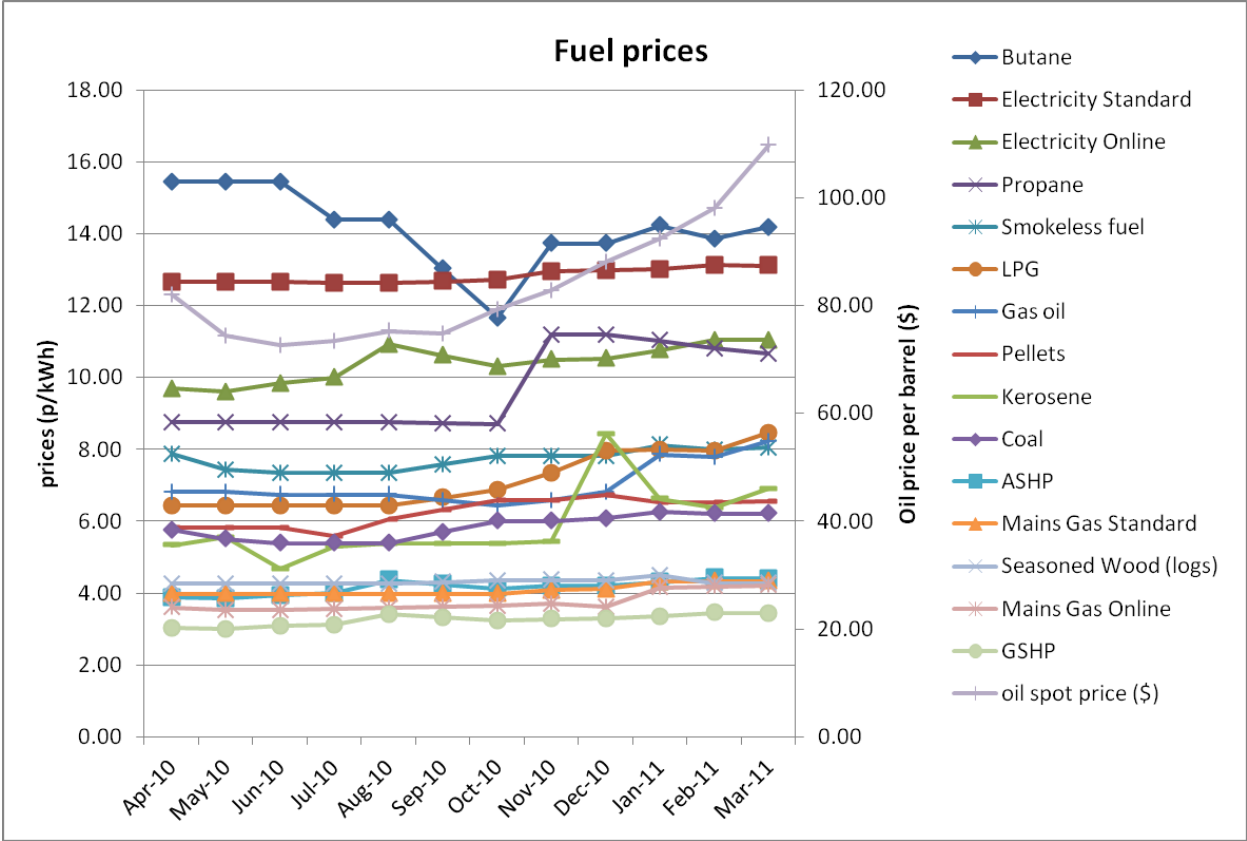
2.0 Energy Cost Trends – all fuels

In the last year (April 2010 – March 2011), there has been a significant increase in the price of the different energy sources most especially LPG, heating oil (kerosene and gas oil) and propane except for butane which has shown a decrease (8.26%).

- Domestic electricity standard rate had shown an increase of 3.64% and its online rate an increase of 13.93%.
- Domestic gas standard rate had shown an increase of 8.88% while its online rate rose by 17.12%
- Seasoned wood appeared to be a bit stable with a little increase of 0.55%.
- LPG, gas oil, kerosene, and propane had shown a huge increase of 31.51%, 20.65%, 29.53% and 21.9% respectively.
- Wood pellets saw an increase of 12.54%; smokeless fuel - an increase of 2.28% and coal 8%.

The charts below show how the prices have changed and the trend in the last year.

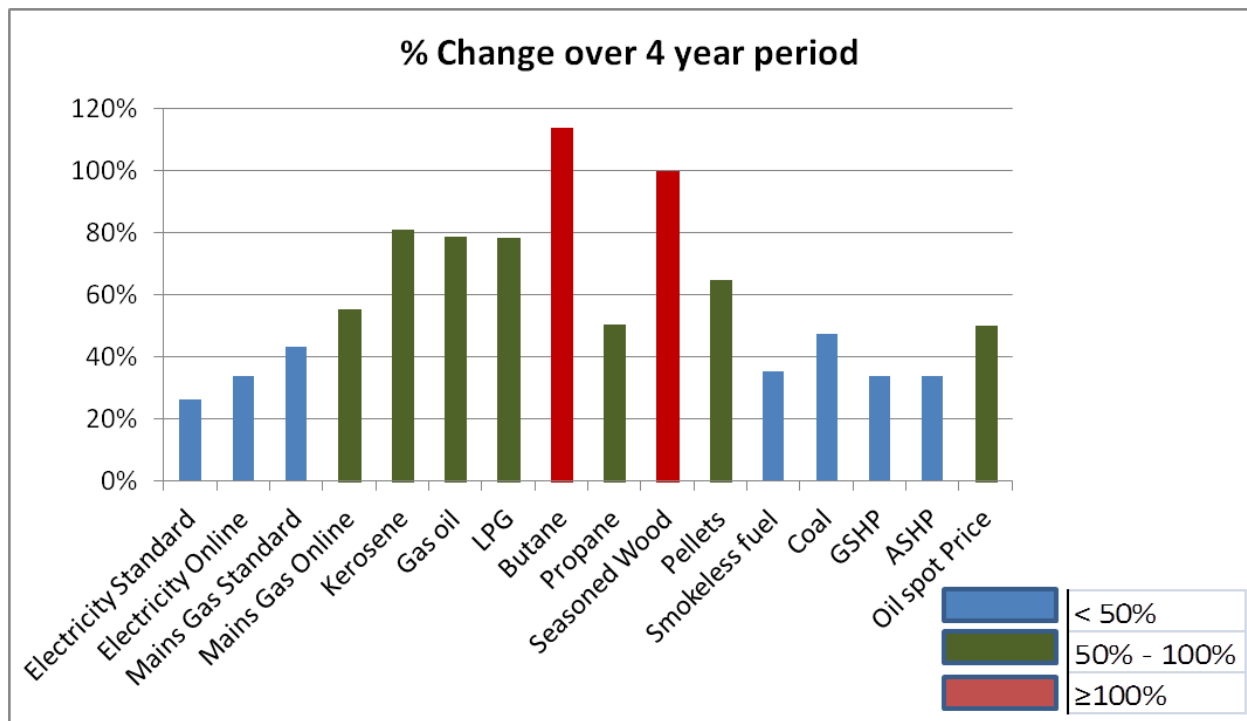




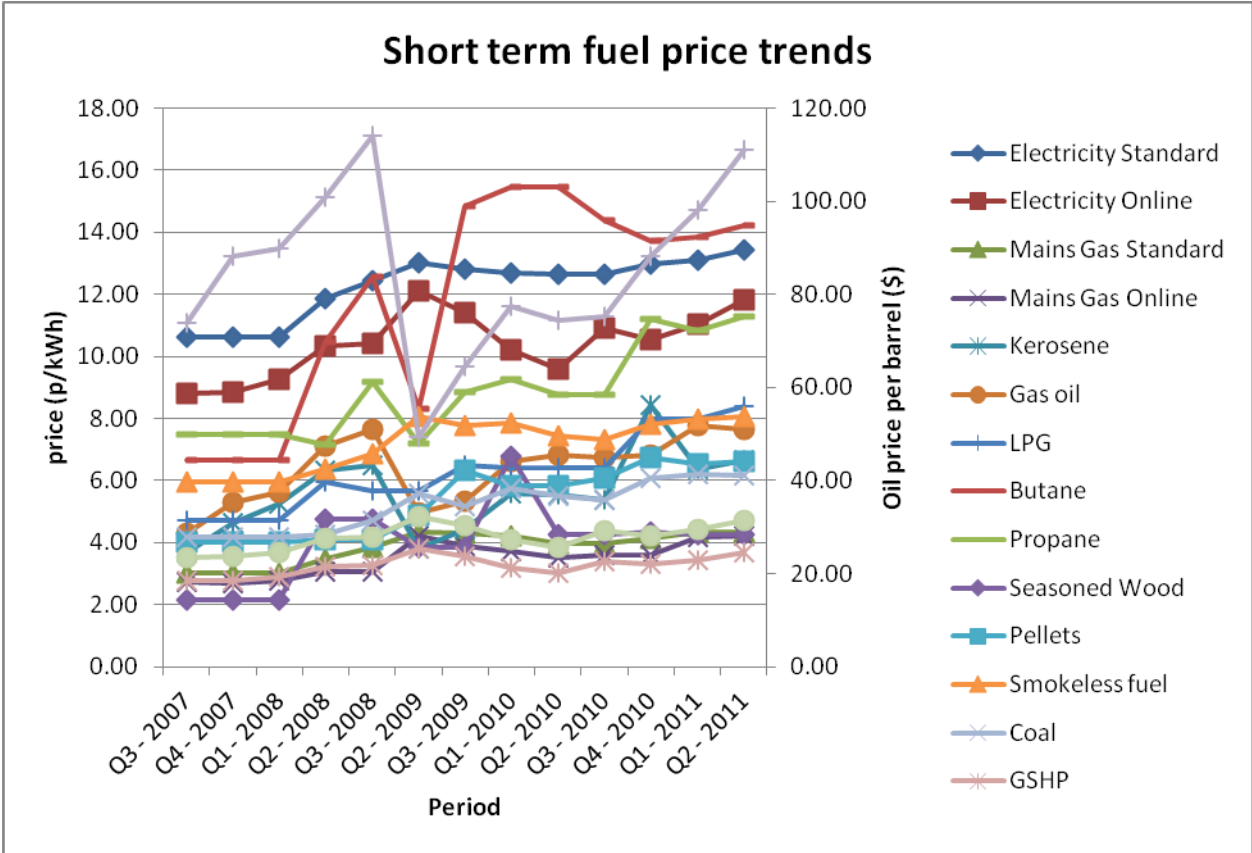
3.0 Short Term Energy Cost Trend – all fuels

In the past four years (3rd Quarter (Q3), 2007 – 2nd Quarter (Q2), 2011), there has been a significant increase in the price of the different energy sources most especially Butane with over 100% increase; Propane, LPG, pellets, Gas oil, kerosene, mains gas standard and seasoned wood with more than 50% increase. Most of the fuels have seen a fluctuation in prices over these years. Butane recorded the highest with over 100% increase whereas electricity standard rate recorded the lowest with an increase of 23%.

The price of oil rose to its highest in the 3rd quarter of 2008 (Q3, 2008) and fell to its lowest in the last quarter of 2008. It started to rise again in 2009 and have been on the increase since then except for Q2, 2010 where it dropped and started to rise again in the Q3, 2010 and has reached over \$110/barrel in the Q2, 2011.



Short term fuel price trends



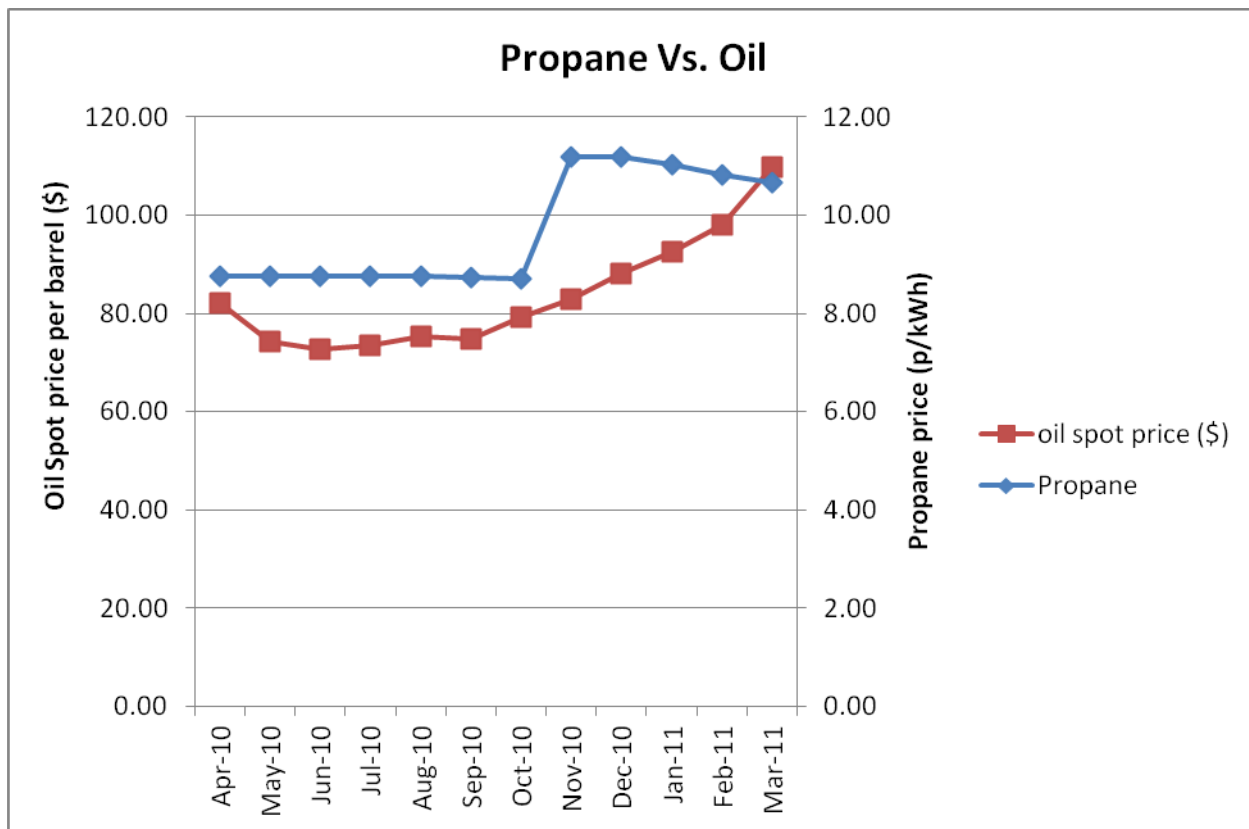
4.0 Energy Cost Trend by Fuel type

4.1 Propane

Propane generally supplied in the UK consists of concentrations of other hydrocarbon gases, such as propene and butanes. Propane is commonly used for domestic heating, cooking and numerous commercial and industrial applications. It is also used for leisure applications when it is found in red cylinders or green patio gas cylinders.

Propane prices are subject to a number of influences, some common to all petroleum products, and others unique to propane. The price of propane is influenced by many factors, including the prices of competing fuels in each market; the distance propane has to travel to reach a customer; and the volumes used by a customer. More specifically, propane prices are affected by: crude oil and natural gas prices. Although, propane is produced from crude oil refining and natural gas processing, its price is influenced mainly by the cost of crude oil. This is because propane competes mostly with crude oil-based fuels. The demand of propane for domestic purposes is highly seasonal, its demand is usually high during winter months and as a result this affects the prices too.

The chart below shows that Propane prices respond to increase in crude oil prices and most especially the high demand during cold period. However, during the summer period, it remained stable. Over the last year (April 2010 – March 2011), Propane had shown an increase of up to 21.90% as oil prices had increased by 33.79%.



4.2 Heating oil (Kerosene and Gas oil)

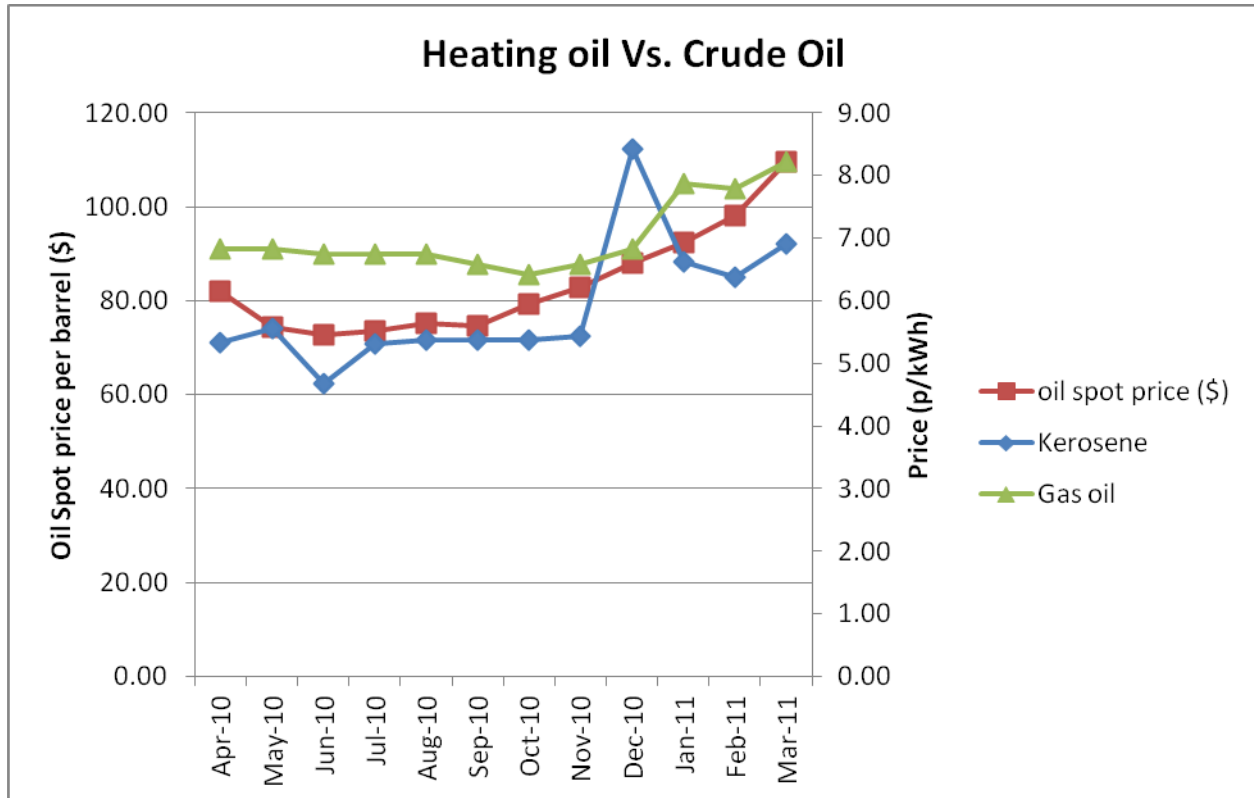
Heating oil is often used as an alternative to traditional gas central heating. Households may choose not be connected to the gas grid, or it can be as a result of location; it can be expensive and/ or difficult to connect homes in remote, rural locations to the gas grid. Heating oil is often delivered to home by road tanker and pumped directly into the households' storage tank.

The price of heating oil is determined by supply, demand and other competitive factors, and is affected by the price of crude oil, refining costs and distribution and marketing costs.

The home heating oil industry has blamed the rise in prices on a combination of higher crude oil costs and on cold, snowy weather in the UK making deliveries more difficult and expensive¹. The chart below compares the crude oil prices with the heating oil prices. It shows that crude prices tend to be more volatile and 'lead' heating oil prices. There is some evidence of a seasonal increase in heating oil prices as shown below, with a spike in December (Kerosene) due to really cold weather, hence, high demand, resulting to high price. The two fuels have followed each other fairly closely for much of the period. Directions of change have been very similar, although the magnitudes have varied with Gas oil being 16% higher than Kerosene on average over the last year.

Over the last year, the prices of gas oil and kerosene had increased by 20.65% and 29.53% respectively whereas oil prices had increased by 33.79%.

Despite the increase in the price of all widely available heating fuels, oil remains the most cost-effective for those without access to the mains gas network.



¹<http://www.parliament.uk/briefingpapers/commons/lib/research/briefings/snc-05806.pdf>

4.3 LPG

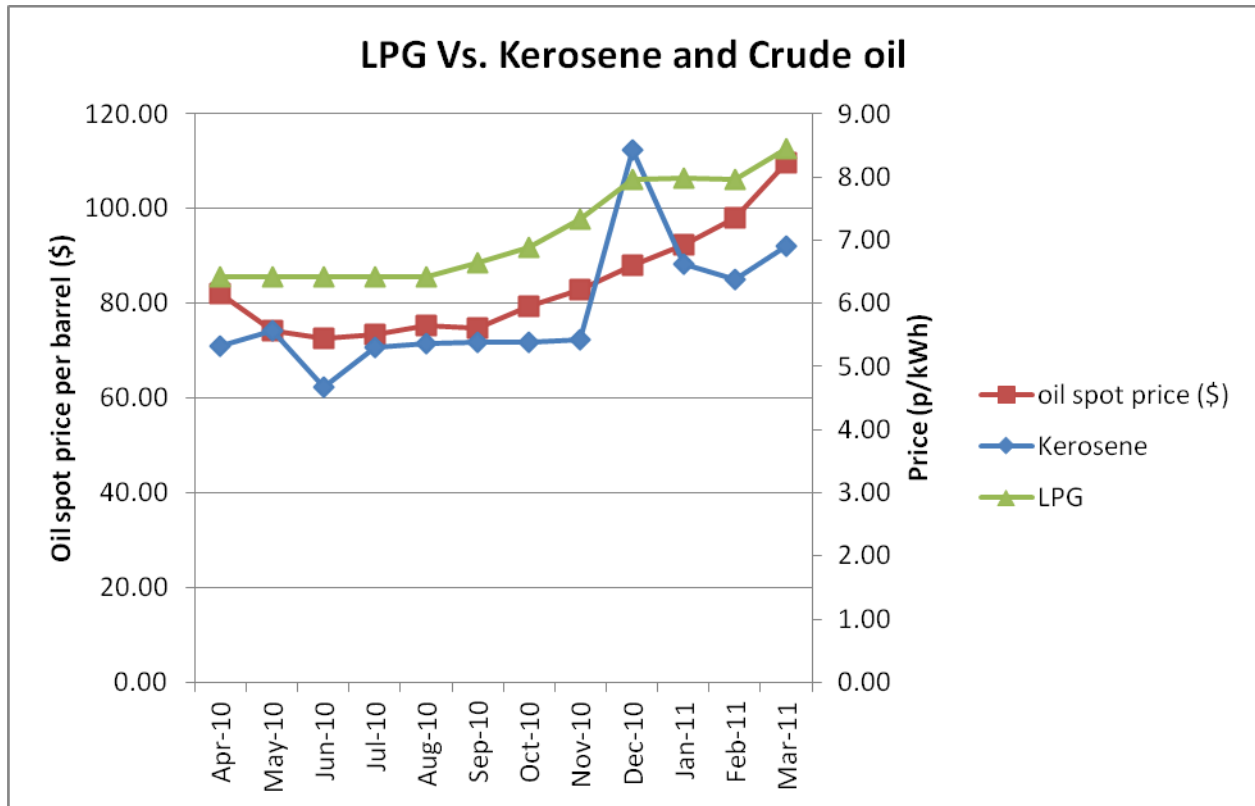
LPG (Liquefied Petroleum Gas) is a mixture of gaseous hydrocarbons, produced from natural gas and oil extraction (66%) and from oil refining (34%). LPG exists in two forms: propane and butane.

LPG is usually cited as the most suitable alternative for home heating for those not on mains gas supply. But the price of LPG heating has been consistently much higher than heating oil (kerosene) for over three years and the difference between the two is unlikely to narrow.

The average percentage difference between the prices of LPG and Kerosene is 17% with LPG on the higher side. LPG increases as oil price increases, so does kerosene but the margin between LPG and Kerosene price difference is high.

The main factor influencing LPG prices over the last year was a strong link to the increasing price of crude oil. Although subject to rising price over the last year, LPG remains a growing source of clean energy. LPG has a positive future as a portable off-grid energy solution. Whether in the developing world as a precursor or alternative to natural gas, or in the developed world as a low-carbon fuel that can mitigate against climate change. LPG will continue to be a leading source of clean energy and will contribute to a healthier and more prosperous world.

The chart below compares the crude oil prices with LPG and kerosene price over the last year. LPG showed an increase of 31.51% which is almost as high as crude oil with an increase of 33.79%.



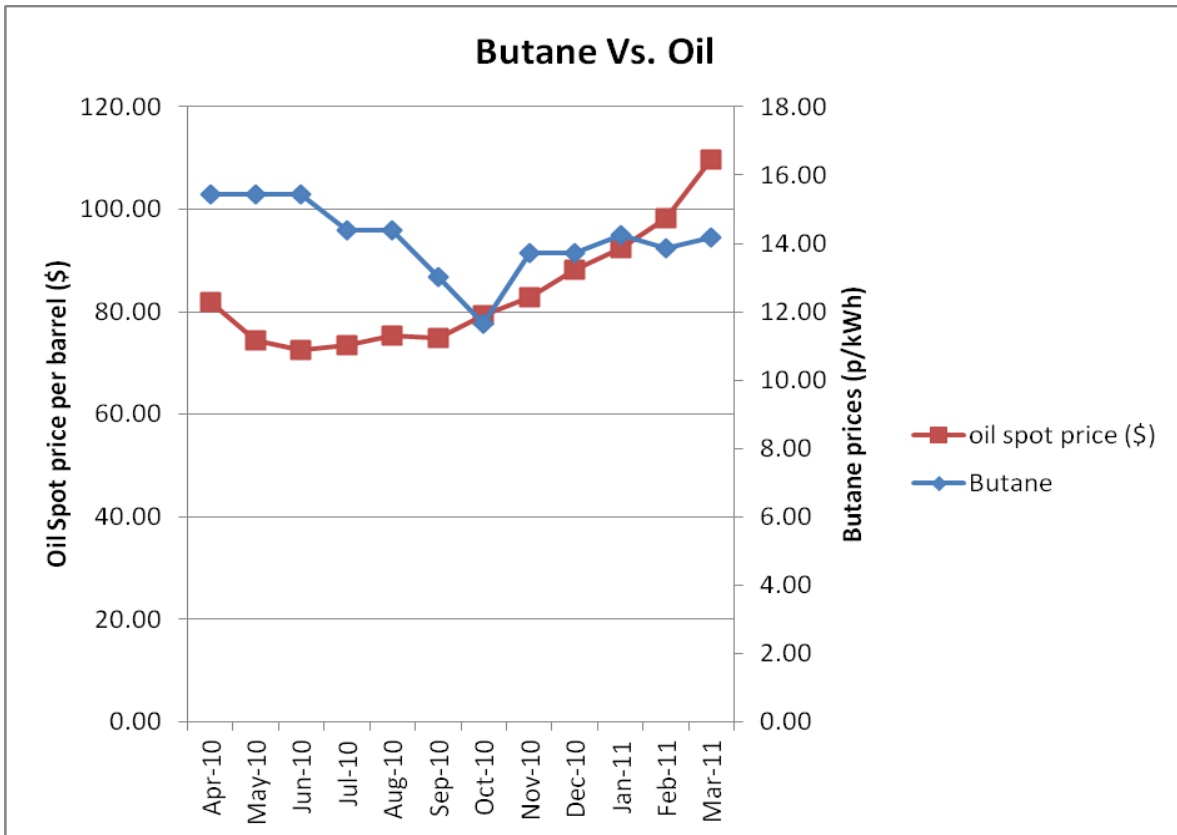
4.4 Butane

Butane generally supplied in the UK primarily consists of butane (n-butane and iso-butane) along with concentrations of other hydrocarbon gases, such as propane and butanes.

Butane is mainly used for portable heaters, leisure applications through the warmer months - barbecuing, and caravanning.

The relationship between natural gas and butane prices is not easily determined. The price of butane is most influenced by demand-side rather than supply-side factors. Butane is a naturally occurring hydrocarbon present in both crude oil and wet natural gas and supply is relatively price inelastic.

In the last year, the price of Butane had been fluctuating and is invariably independent of crude oil prices. There has been a decrease of 8.26% over the last year. It has remained stable in the months of April and May 2011.



4.5 Coal and smokeless fuel

Coal is a combustible, sedimentary, organic rock (composed primarily of carbon, hydrogen and oxygen) formed from vegetation, which has been consolidated between other rock strata to form coal seams, and altered by the combined effects of microbial action, pressure and heat over a considerable time period.

Different types of coals are used for different purposes because of the heat that they produce or their chemical makeup. In general terms, coal that is used in domestic or industrial heating is anthracite. From this, smokeless fuels are also produced.

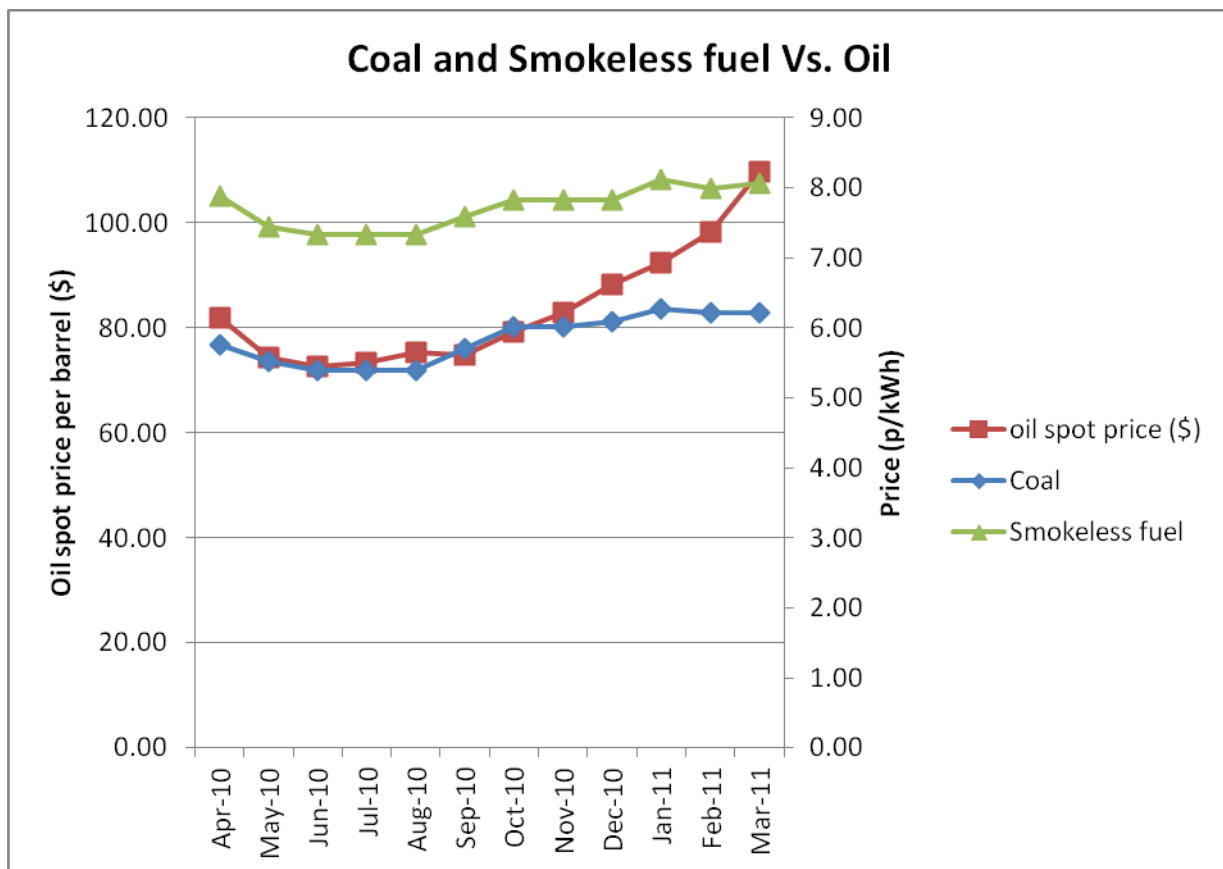
Smokeless fuel refers to natural or manufactured coal that unlike standard coal does not produce smoke when burnt. Instead it provides an environmentally form of heating which releases less carbon emissions than ordinary house coal. Smokeless fuel has some features such as:

- Longer fire life and higher heat and therefore less refueling
- Creates a smoke free environment.
- Usually around 20% less CO₂ than housecoal

The price of coal is affected by several factors such as supply and demand for domestic and industrial purposes; transportation cost; the price of oil; severe weather may affect the ability to mine and deliver coal and environmental concerns such as CO₂ emissions associated with it.

On the average, the price of smokeless fuel is 25% higher than coal; this is probably due to its environmental benefits and hence, higher demands.

Over the past year, the price of smokeless fuel had increased by 2.28% while that of coal had increased by 8%. Smokeless fuel appeared to be increasing gradually whereas coal is increasing rapidly. During this period, oil price saw an increase of 33.79%.



4.6 Electricity

Electricity is a vital part of modern life. In our homes we use it for lighting, running appliances and electronics, and often for heating and cooling. Most people don't think much about their electricity until when they get a high utility bill.

Electricity is expected to remain the fastest growing form of end-use energy worldwide through 2030, as it has been over the past several decades².

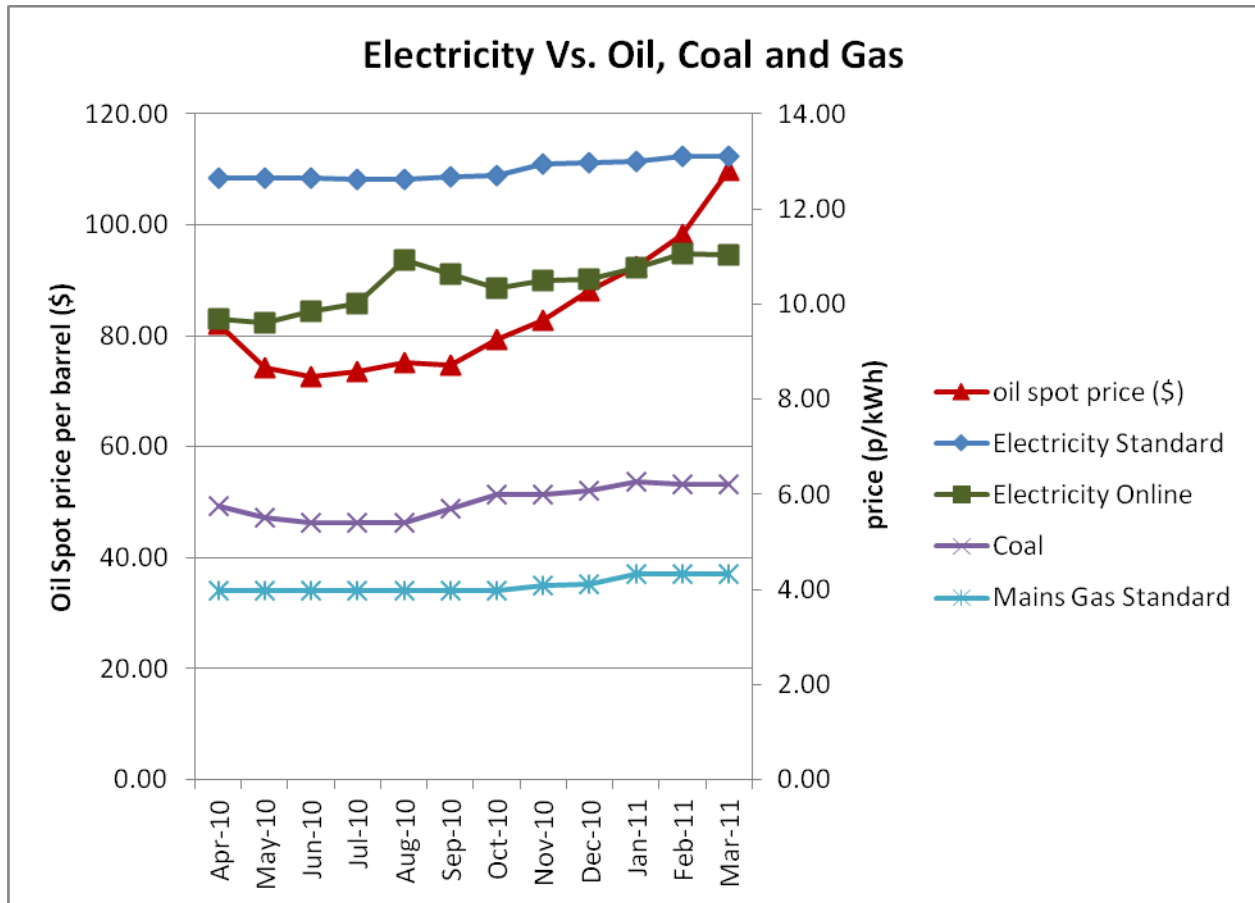
Electricity prices generally reflect the costs to build, finance, maintain, manage and operate power plants and the electricity grid, and to operate and administer the utilities that supply electricity to consumers. Some utilities are for-profit, and their prices include a return for the owners and shareholders. Factors that affect the price of electricity are: fuels i.e. the price of coal and natural gas; construction and maintenance costs of power plants; the cost of maintaining and using the transmission system to deliver electricity and weather conditions.

Electricity prices vary by customer and tariff type chosen and method of payment. In this report, only standard and online tariff are being considered and these incorporate all the methods of payment (Direct debit, prepayment and monthly cash).

Electricity's main dependency is on natural gas and coal used in electricity generation. However, as natural gas is dependent on crude oil, therefore electricity prices are indirectly dependent on crude oil prices.

In the past year, Electricity price (standard tariff) had appeared to be a bit stable with an increase of 3.64% while its online counterpart had been fluctuating and had shown a huge increase of 13.93%.

² http://www.eia.gov/energyexplained/index.cfm?page=electricity_use

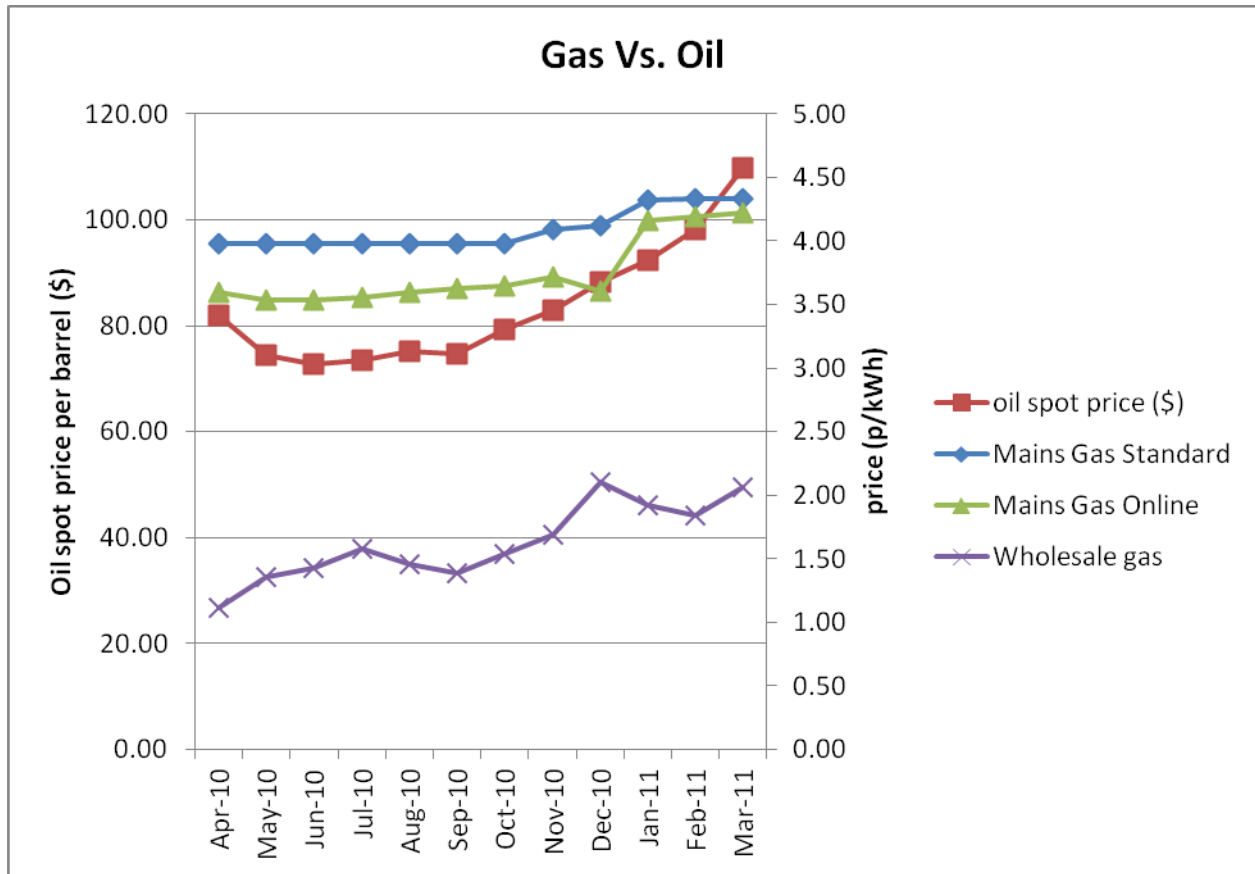


4.7 Gas

Natural gas is a versatile source of energy, which can be used for various purposes. Heating and electricity generation have been the main traditional use of gas.

Its price is mainly influenced by the price of oil and other factors such as supply/demand concerns, market sentiment and price of carbon dioxide emissions and even weather.

In the last year, the wholesale price for gas had increased by 84.96% and this had led the domestic prices to increase by 8.88% for standard rate and 17.12% for online rate, whereas oil price had increased by 33.79%. Though the price is increasing daily, main gas remains one of the cheapest fuels for heating purposes and also has low CO₂ emission factor compared to other heating oil such as Kerosene and Gas oil and even LPG.

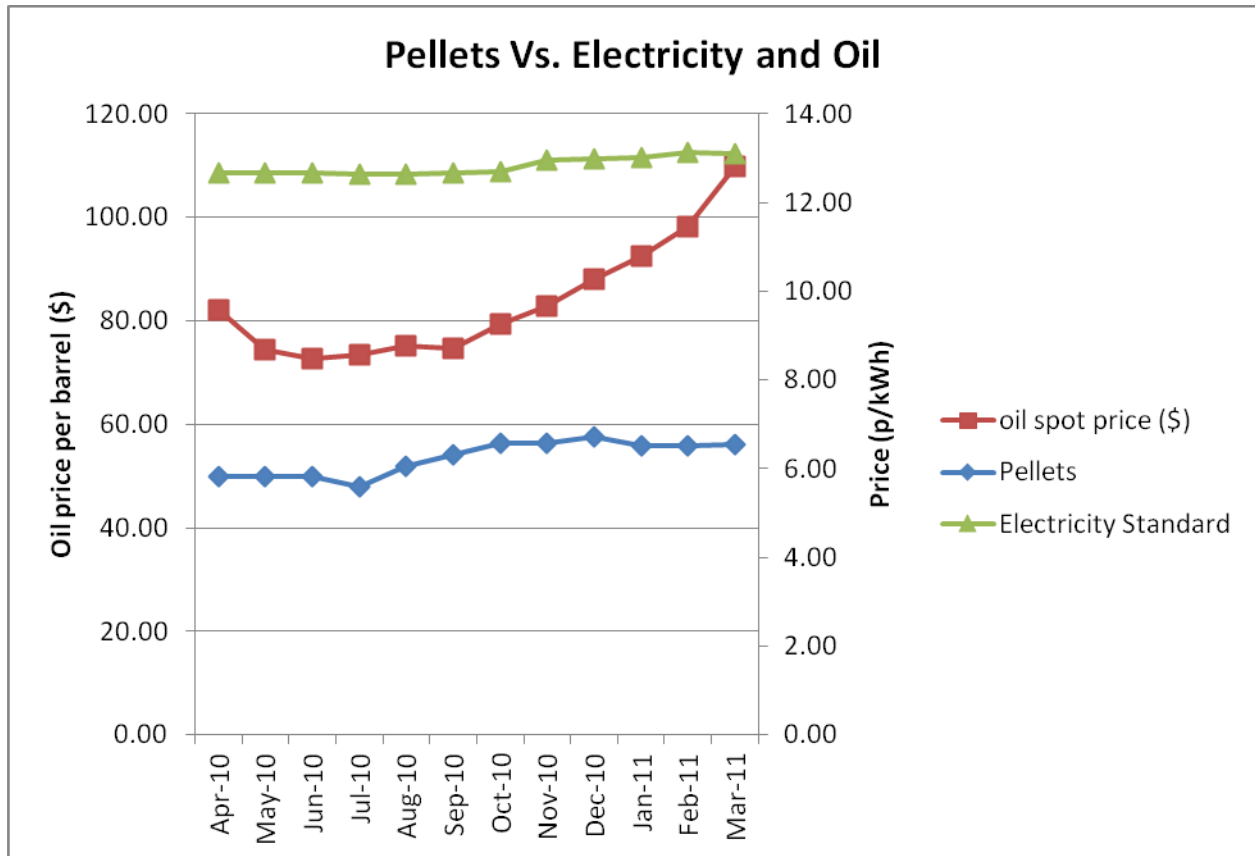


4.8 Pellets

Pellet fuel is a renewable, clean-burning and cost stable home heating alternative. Wood pellets are a type of wood fuel, generally made from compacted sawdust. They are usually produced as a byproduct of sawmilling and other wood transformation activities. The pellets are extremely dense and can be produced with a low humidity content (below 10%) that allows them to be burned with very high combustion efficiency.

The main factors affecting the price of pellets are: supply and demand (high demand during winter months); electricity price (as it is an energy-intensive process) which is influenced by oil price; its form and quantity (bulk or bagged), delivery distance, feedstock and supply chain and quality. Wood pellet are used for heating purposes and has a lot of benefits such as: environmentally friendly, clean and efficient fuel, minimal ash, low moisture content resulting in high use of energy value and extremely easy to use.

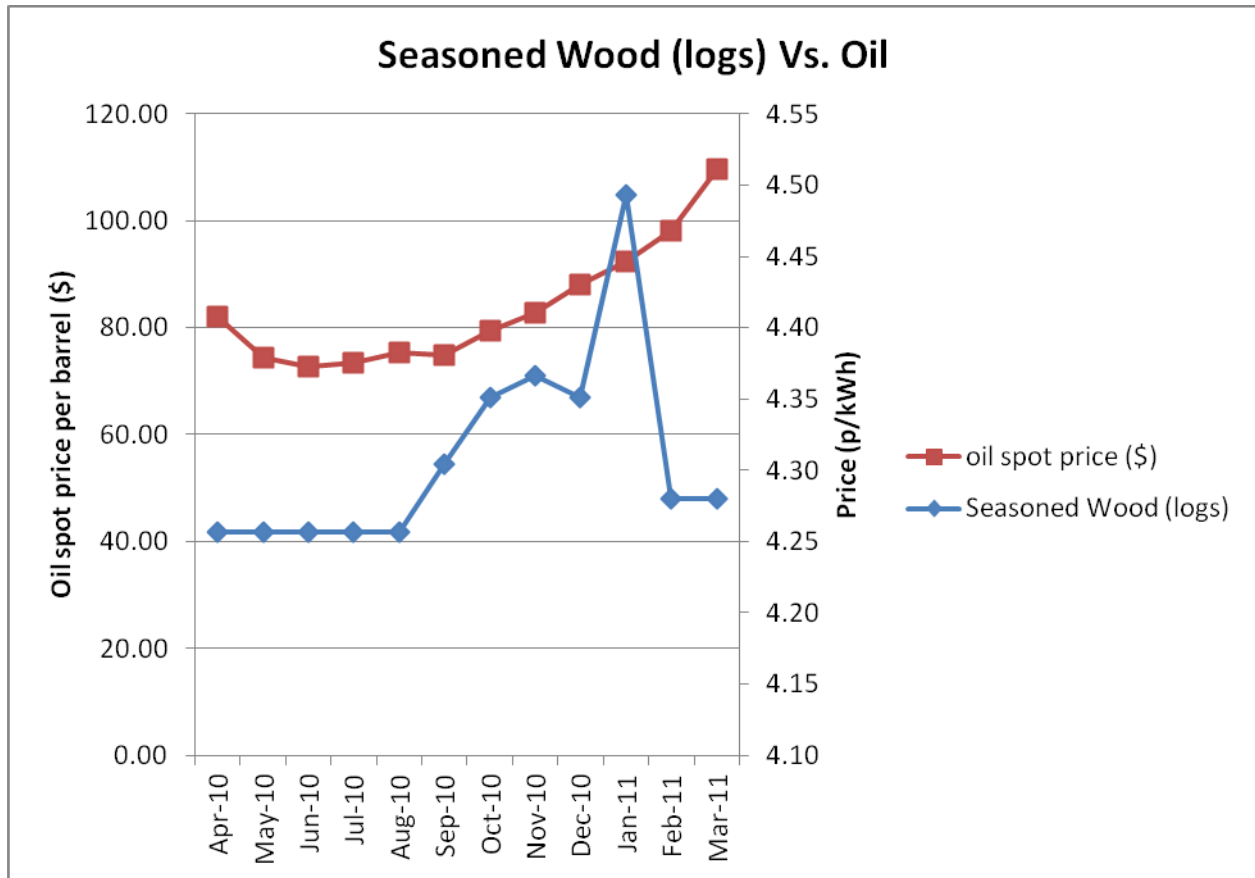
In the last year, wood pellets had increased by 12.54% and still on the increase probably due to high demand; its popularity nowadays as many people are switching fuels and rising cost of electricity.



4.9 Seasoned wood (logs)

Seasoned wood (log) is wood made fit for burning by reducing its water content to less than 30%. Well seasoned wood is dry, easier to light, produce more heat, and burns cleaner. This can be used in our fire places for heating purposes.

Factors that affect the prices are the quantity ordered; the size of the wood that is delivered; the delivery distance; market conditions such as fluctuations in oil prices and demand. Over the year, the price of seasoned logs had appeared to be stable with a small increase of 0.55%. The spikes in the chart shown below can be attributed mostly to demand during the cold periods beginning from September.



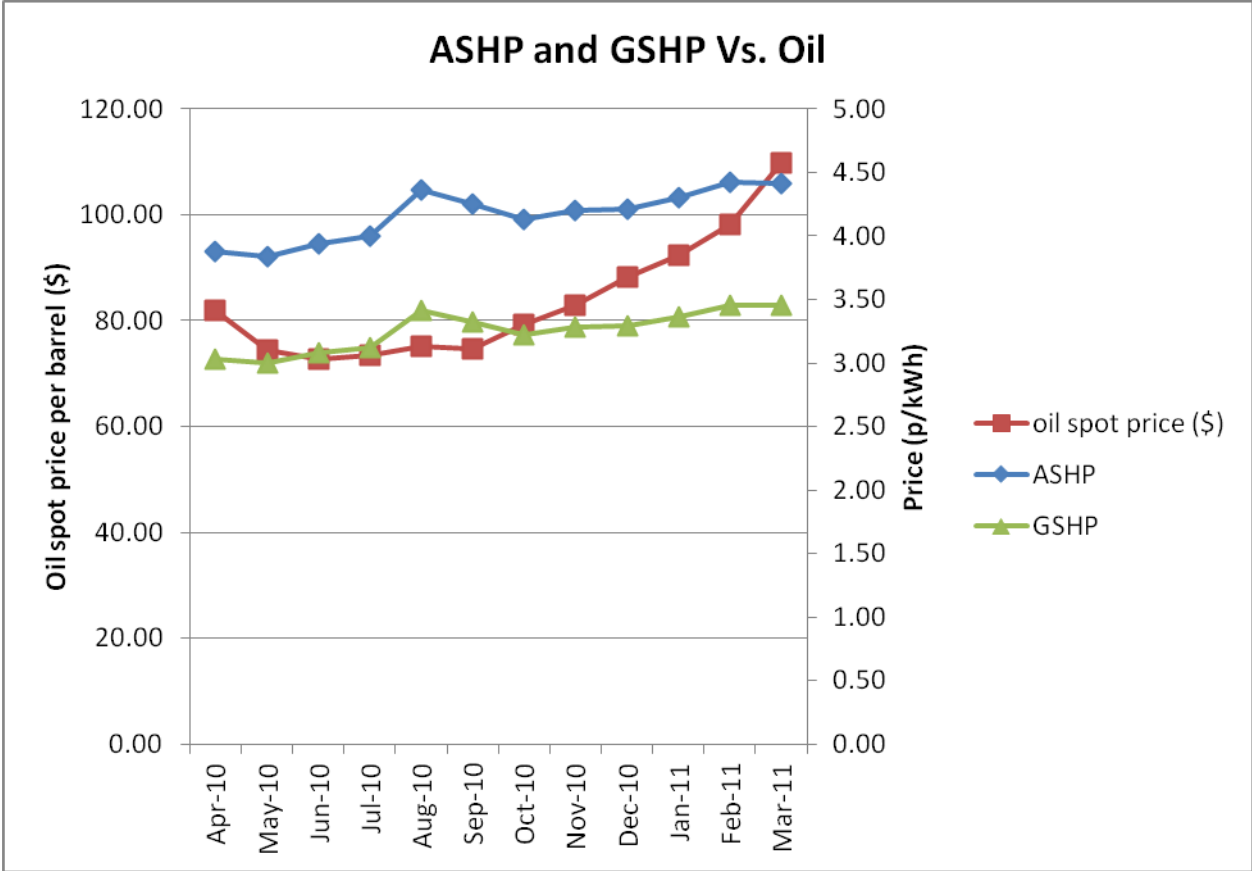
4.10 Air-source Heat pump (ASHP) and Ground-source Heat Pump (GSHP)

Energy absorbed from the ground can be used to heat the home. GSHP use pipes buried in the garden to extract heat from the ground. This is usually used to heat radiators or underfloor heating systems and hot water. It has boiler efficiency up to 320%.

Air source heat pumps absorb heat from the outside air. This is usually used to heat radiators, underfloor heating systems, or warm air convectors and hot water in our home. It has boiler efficiency of up to 250%.

The energy cost associated with the heat pumps are derived from applying the boiler efficiency to Electricity online tariff prices.

Over the year, ASHP and GSHP have had an increase of 13.93% each.



References

Big K – Solid fuel
Biomass pellet mill
Coals2u – Solid fuels
Economy watch – Heating Oil
Ecowood fuels
Energy Information Administration – Electricity use
Energy Information Administration – Energy Explained
Energy Information Administration – Heating Oil explained
Energy Information Administration Brochures - Propane
Energy Savings Trust - Air source heat pump
Energy Savings Trust - Ground source heat pump
Factors on coal prices
Firewood prices
Ilexenergy - UKOOAReport2004
LPG: clean energy for a low-carbon world
LPGenius FAQ - Propane
Nottingham Energy Partnership Energy Cost Comparison Data
Oil Heating News
Pellet heat
Rhincensive – biomass prices
Short-Term Energy Outlook
The price of fuel
Wild eye - Firewood