

Understanding the Value of Natural Gas

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From 1968 until 1976, all users gas appliances were converted from 'town gas' to what was proclaimed to be a cleaner and cheaper alternative, 'natural', North Sea gas. Significantly, it's interesting to note that in 1970, central heating was still regarded by many as a luxury item. The percentage of households with central heating systems in the UK was 30% though would double by 1980 and rise steadily to 96% by 2010-2015, dipping very slightly since (Statista, 2022).

Natural didn't appear to the majority of people didn't represent much of a difference. For homeowners, all that matters is there's a steady supply and, crucially, it's relatively inexpensive. Supply was, until the formation of British Gas following the passing of the Gas Act in 1972, the responsibility of a local provider, one of the twelve gas boards. These board, had been come into being in 1948 when Labour, under leader Clement Atlee, passed a previous Gas Act to consolidate the dizzying number – well in excess of a thousand – of private companies and entities operated by local councils involved in producing and supplying town gas to consumers.

Town gas, manufactured mainly from coal, was achieved by the process of heating coal in the absence of air. Also sometimes called 'coal gas', it contained a mixture of calorific gases including hydrogen, carbon monoxide, methane, ethylene and volatile hydrocarbons together with small quantities of non-calorific gases such as carbon dioxide and nitrogen. Unsurprisingly, producing town gas created vast amounts of harmful emissions which, as we now recognise, are bad for the environment and were dreadfully harmful for local residents' health.

In the 1960s, the North Sea was being actively explored by companies for what some call 'black gold', oil. Previously impossible for workers, rigs capable of economic deep-water extraction of oil had been developed. North Sea oil consists of mixture of hydrocarbons, formed from the accumulation of massive amounts of tiny marine organisms, such as algae and phytoplankton, over many millions of years and subject to enormous pressure. A product of this process is gas.

Natural gas differs from town gas in that it largely consists of methane, typically up to 90%, but also including varying amounts of other higher alkanes as well as relatively small amounts of carbon dioxide, nitrogen, hydrogen sulphide, or helium. Crucially, in order to combust, natural gas requires to be mixed with air in the proportion of 5-15%.

To ensure such combustion, the burners of every existing appliance using town gas, over 40 million, had to be altered by thousands of engineers. Sir Denis Rooke, chair of British Gas, from 1976 until 1989, regarded this as "perhaps the greatest peacetime operation in the nation's history" (Resilience, 2022).

Because of its composition, natural gas has a higher calorific value (CV), the measure of energy released when the gas is completely combusted, it's potentially very explosive if it leaks in sufficient quantities. Virtually anything can ignite it, a mobile phone or even turning on a light switch. Detecting its presence early is essential.

However, town gas and its replacement, natural gas, is colourless and odourless. Therefore, an artificial smell is added, mercaptan, ensuring the distinctive rotting egg smell is present if there's a leak which will, it's hoped, provide adequate warning.

Once the changeover of appliances had been complete, there was a collective sense of the availability of a fuel serving the nation's needs for many decades. However, the need to reduce greenhouse gases may mean the end of the use of gas.

Natural gas is a fossil fuel. Though significantly cleaner than the burning of coal and production of town gas it replaced, in the half century since we first started using it, the wisdom of using widely as a fuel has shifted. There is the question of what might replace it?

Heat pumps, it is suggested, could provide a way of heating out homes, hot water achieved by electricity. However, as many point out, heat pumps are expensive to install, not cheap to run, and don't produce the almost instant thermal effect possible using gas boilers. Indeed, at present, they tend to be bulky, noisy and won't be suitable for many properties (Gatten, 2021).

Hydrogen, produced from water H₂O is considered by many as a viable replacement for natural gas. However, the problem in producing hydrogen is that in order to do this, you need energy. As we become acquainted with hydrogen, we'll hear various colours used to describe it (Clifford, 2022):

- Green hydrogen achieved by electrolysis through using renewable power fuel created by wind, water or solar
- Blue hydrogen produced from natural gas by a process of 'steam methane reforming' in which it is mixed with very hot steam and a catalyst.
- Grey hydrogen made from natural gas reforming, similar to blue hydrogen, but without capturing any carbon dioxide by-products
- Pink hydrogen created using electrolysis powered by nuclear energy, but not producing carbon dioxide emissions
- Yellow hydrogen created from energy from the grid which will, depending on the fuel, will vary in the amount of carbon emissions
- Turquoise hydrogen created by methane pyrolysis involving splitting methane into hydrogen and solid carbon using heat
- Black or brown hydrogen in which black coal or lignite (brown coal), hence the colours, are burnt and, as a consequence, are the most environmentally damaging

As is suggested in all of these, there are various environmental issues associated with all but green hydrogen which, as advocates acknowledge, is currently far more expensive than other variations (at least three times) but, as investment in renewable energy technology ramps up, may decline (Chugh and Taibi, 2021). Additionally, the network to carry hydrogen gas to consumers safely would require significant investment, likely to be tens of billions of pounds (Dodds and Demoullin, 2013).

Production of hydrogen would also require significant investment, also likely to be tens of billions of pounds. Moreover, switching every home to hydrogen, currently some 28 million, to achieve net zero by 2050, is estimated to be cost over half a trillion pounds, almost £19,000 per home (Johnston, 2021).

Unsurprisingly, given the magnitude of investment needed, many are already bulking at how expensive a transition to hydrogen would be though, to be fair, this would be over the next quarter of a century or so. It's therefore understandable that natural gas will be around for quite some time.

One aspect of gas that may make many reconsider its use is its current wholesale price of around £2.00 per therm which, eventually, will impact all consumers. For reference, in December 2020, the price was 44 pence. Though this represents well over an eye-watering fourfold increase, bear in mind the wholesale price of gas reached whopping £4.53 per therm just before Christmas.

Whilst the increase in gas is contributing to the emerging 'cost of living' crisis' and has become a political issue, leading some to argue nationalisation of the sector is needed, rejected by the government and Labour opposition, its recent spike in price has increased the incentive for investment in alternatives forms of energy (Bradshaw, 2022). Any belief that privatising nationalised utility providers such as British Gas would ensure greater competition has created the circumstances which has led to market chaos of recent months and, unless government intervention is forthcoming, will potentially result in more companies going bust (Thomas, 2022).

This is not in the interest of hard-pressed families which, according to the Resolution Foundation, face, on average, paying up to £1,200 extra a year because of increased energy prices combined with tax rises this year (Whiteside, 2021). Many analysts contend that high gas prices are certainly something we will have to get used to for the rest of this winter and possibly for the rest of the year (Earl, 2022). Much depends on how cold the winter is in Europe and, as we've discovered the inclination of Russian President whose country supplies much of Western Europe.

Though consumers will not welcome the bills they will be receiving when the price cap ends in April, the increase in the price of gas may eventually be seen as a 'tipping point' which ensures a greener future.

In the meantime, the prospect of ensuring medium-term self-sufficiency by extracting more gas from the North Sea looks alluring to some. Reports that at the Cop26 Conference held in Glasgow, energy secretary, Kwasi Kwarteng, encouraged oil company executives over dinner to keep drilling in the North Sea would suggest as much (Gosden, 2022).

In defence of gas from the North Sea, it ensured the transition from the coal burning country we used to be. As such natural gas ended the burning of coal, the dirtiest of fuels, in this country as well as production of town/coal gas, both of which were destructive to the environment.

To borrow from the quote mistakenly attributed to Mark Twain, rumours of the demise of natural gas may be premature. Though it's hard to say what role, if any, gas will play in 2050 when it's hoped we'll have reached 'net zero', for the foreseeable future, and though its cost will increase significantly, we should remain grateful it continues to provide the fuel keeping us warm and powering industry.

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