

Peter Franklin, managing director,
Enstra Consulting



Distributed gas generation would be more sustainable

Energy policy is trying to find the right balance between affordability, security of supply, and mitigating climate change. The Department of Energy and Climate Change's request for evidence on the future of gas-fired generation, which closed in June, represents one of the significant elements in this policy debate.

The UK might need six times as much electricity generation if heating and transport are switched from fossil fuels to electricity. It will also need flexible back-up generation to support significantly increased wind generation, which as evidenced in recent years, can drop to virtually zero during a winter cold snap.

Gas generation looks a strong candidate to fill the gap given its low capital cost (relative to nuclear), its rapid build cycle, and its inherent operating flexibility.

But centralised generation is an intrinsically wasteful solution. Burning gas in a combined cycle gas turbine and then transporting the electricity to homes and businesses loses 50-65 per cent of the energy input to the power station due to the 40-50 per cent losses in the power station, and the 10-15 per cent in the transmission and distribution networks. A recent review by BBC magazine *Focus* cited overall system losses at 65 per cent. These it compared to losses of 10-20 per cent from solutions that bring the energy as gas directly to the community, where it is transformed into heat and electricity locally.

The burning issue (literally) is that when centralised generation converts hydrocarbon resources to electricity, waste heat spills into the environment. A distributed energy solution avoids this waste by using the heat during the electricity generation process to provide hot water and heat, rather than heat up the outside world.

So what should be done with gas generation in the UK? **The UK should adopt a primarily distributed gas generation architecture, supplemented by centralised gas generation, in order to achieve its sustainability goals.** There are four reasons for this. First, it would dramatically reduce short- and medium-term carbon emissions. Moving from a centralised to a distributed architecture reduces energy use and associated carbon emissions by 30-50 per cent. This could be achieved within

a very short timeframe given the maturity of combined heat and power technology, and indeed some of the gas-fired fuel cell technologies.

This 30-50 per cent range comes about because the benefits of distributed generation only come into play when the waste heat can be usefully used. If it can't, then the centralised solution is on a par from a carbon emissions perspective, and itself benefits from economies of scale.

There is a balance to be struck – and that balance is not the centralised design we have today.

Second, it would deliver a zero-carbon solution in the long term. If the endgame is the reforming of natural gas to hydrogen, with carbon capture and storage in turn converted to electricity and water, the gas infrastructure can develop into a zero-carbon solution in the long term.

Third, it would significantly enhance security of supply. Removing as much energy waste in the system as possible would dramatically reduce the need for gas imports and strengthen the UK's security of supply.

Lastly, it would provide the most affordable solution. The UK faces two major price risks. One is that the move to a global low-carbon economy brings with it a high carbon price, which looks inevitable. The other is that hydrocarbon prices could rise significantly themselves. In my career I have seen gas prices go from 8p/therm to above 60p/therm.

Moving to a more distributed architecture mitigates these risks in two ways. First, removing energy waste reduces the amount of gas needed to meet UK energy demand – and hence reduces the total cost of gas used and the carbon charge associated with it. Second, reducing the amount of gas needed reduces demand, which in itself will drive down gas prices in the marketplace.

Therefore, moving to a more distributed architecture for gas generation will enable the UK to better meet its climate change, security of supply and affordability aspirations.

Enstra's full response to Decc can be downloaded from the publications section of www.enstra.com

Soapbox is an open platform for comment and opinion. If you would like to contribute, please email brendan.coyne@fav-house.com