

The Forces of Change in the Energy Market

Change, particularly in a market as complex and multilayered as that for energy, rarely occurs in a straightforward or linear way.

A simple analysis of the question of climate change would suggest that the mounting evidence, the increasing public awareness of that evidence and the broad acceptance that precautionary action is necessary to manage the risks involved will all lead to a shift in the mix of fuels in favour of those with a lower carbon content. The only question in that straightforward assessment concerns the speed of change. Can it come quickly enough to avoid an increase in temperature which could be seriously disruptive to low lying territories, to water supplies and to human health.

For many the logic of this analysis is so obvious that the failure of policy makers around the world to respond and to develop a collective solution is a source of frustration and anger. To understand the reality of the current situation, however, one must understand the full context.

Every element of the simple analysis laid out above is correct. The evidence is certainly mounting - the fact that 23 of the 24 warmest years in recorded history have occurred since 1980; the increased incidence of extreme weather; the reality of the melting ice in the Arctic regions around Canada and Greenland - the list could go on. Public awareness has indeed increased and across large parts of the world the idea that some form of action is necessary has begun to influence policy.

But climate change is not the only factor influencing the energy market and stimulating changes in the mix of fuels consumed.

The other two major factors which for the moment are even more important are price and security.

Let's start with the bad news. The energy mix has indeed changed in the last five years. It has become progressively more carbon intensive. The fuel which has gained most in terms of global market share is coal. Coal demand has risen worldwide by over 4 per cent a year in the last three years, and by almost double that in China. With nuclear's contribution plateauing as the old, 1950s generation of stations are retired coal has become the dominant source of new power generation - supplying the dramatic rates of growth of electricity demand.

The increase in coal use is centred in China and to a lesser extent India but demand is also up in Europe, and the United States. Though little noticed there is even a chance that the UK will develop new coal fired stations to meet the growing demand for power in the South East including London. In relative terms coal is cheap and readily available.

The third factor shaping the market is, however, a source of greater hope for those who hope to see a transition to a lower carbon economy is the sense of energy insecurity which has come to play such a large part in the policy debate in so many countries.

A few facts set the scene.

Energy demand continues to grow year by year, driven on by population growth and by the spread of prosperity. More and more of the world's citizens can afford to buy the energy they need for the basics of life - heat, light and mobility. Demand is growing by between one and two per cent a year.

Demand and supply are not co-located. The US, Europe, Japan, China and now India are net energy importers. In Europe and the US domestic supplies of oil and in Europe's case natural gas as well are falling year by year. All five areas face increased import requirements over the next decade and beyond. At the moment around 50 per cent of all the oil consumed in the world each day

crosses an international border to reach the end user. Within a decade that figure is likely to be 70 per cent

The sources of those imports are limited and narrowing. Three areas account for the bulk of supplies and their share of the market is growing year by year. The three are West Africa, which means Angola, Nigeria and the other coastal states; Russia; and the five states which are clustered around the Persian Gulf-Abu Dhabi, Kuwait, Iran, Iraq and Saudi Arabia.

This concentration, focused on the Middle East is already strong and set to grow. For consuming countries who watch the uncertain politics of Nigeria, the resurgence of centralisation and state control in Russia and the unfinished series of conflicts in the Middle East the prospect of greater and greater dependence is uncomfortable and to an increasing degree unacceptable.

In Europe, the US, China and Japan measures are being taken to extend the role of domestically produced supplies in a number of different forms. Policy and public spending commitments are supporting research and development across the range of alternatives and in some cases giving protected shares of the energy market to particular home produced fuels. In the UK there is special protection for the nuclear industry; in Europe biofuels are to enjoy a mandated 10 per cent share of the gasoline market - creating a boom for farmers reminiscent of the Common Agricultural Policy at its most lavish. In many countries including parts of the United States planning controls are being relaxed in order to permit the development of wind farms.

National security is a powerful driver and the realisation from events in Iraq in particular that energy security cannot be guaranteed by military means is giving the alternative and renewables sector a classic market boost, and stimulating a boom in investments. Another scare - a loss of significant volumes of supply which drove world prices for oil above \$ 100 for instance would drive this still further.

What remains to be seen is how science responds to this mixture of need and opportunity. Few renewables are yet economic at scale without some form of subsidy and market protection. The other enduring source of change in the energy market is technology - whether it is the technology which allowed drilling in the North Sea and other regions previously inaccessible to producers, or the technology which created the initial opportunity for nuclear power to be made available to ordinary consumers. The options now are wide ranging - from carbon sequestration to tidal power - and the breadth of possibility is a source of confusion to policy makers seeking a simple answer on which to focus their efforts. The winners are likely to be those sources of supply which provide energy which is simultaneously cleaner, more secure and *lower* in cost. In the end economics, driven by technology, is a powerful force in any market place.

If we are fortunate the combination of security concerns, prices, and technical progress will come together to offer viable answers to the challenge of climate change. The answer will not be simple, nor, in all probability, will it be singular. The hope must be that these multiple forces for change will produce answers which avert the greatest risks associated with climate change before it is too late.

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