What is this?

Introduction

In 2006, I was part of a team of the International Futures Forum that had been asked by the British government to survey the four departments of government who were leaders in climate change and energy policy: Treasury, Department for Environment, Food & Rural Affairs (Defra), Foreign Office, and Dept of Trade and Industry. (DTI).

Our IFF's job was to interview two energy company executives and the 15 top civil servants in each of the departments who held the climate and energy portfolios of the government four deparments. The interviews focused on how the government was handling these issues. The Blair governmenthad had made climate as one of its two prioority issues for its hosting of the Glenneagles Big 8 Summit so it was important to see how the bureaucracy was dealing with this issue.

Synthesizer and visualizer

My role was synthesizer and visualizer of the data collected from the interviews. The interviews revealed that the top people in charge of these issues for the Blair administration were in significant stuckness and uncertainty about how to handle the issues.

Engineering the ideal mix for power generation

One of our assumptions about large, messy problems like the climateenergy problematique is that one must be able to view them from different points of view to more fully understand them. Our second infomural in the UK project on climate change was a large diagram addressed the engineering questions of what was essential to keep the lights on in the UK while energy policy was being transformed.

Most of the parts of the diagram arose from a single interview about what the technical constraints of the electric grid were. The chief engineer about to retire, who understood the whole electricity system of the

His overview of the choices facing the government and the rationale for different choices provided this info-map. It is important to notice that it refers mostly to how the government needs to keep the nationwide electric generating and transmission system working. It does not address future transitions to 2050. That illustrates one of the major axioms of visual info-murals: You can't put everything on a single diagram or mural

Argumentation mapping

For this I used one of several types of the argumentation mapping approach. It is intended to provide a clear exposition of the rationale for the claims provided in the box in the upper right and also to provide the rebuttals and counter-rebuttals to those claims.

Labyrinths of climate change policy

This ideal mix for power generation mural should be viewed in conjunction with another mural in that series called "Laybyrinths of UK climate change policy."

How do I get updates	& revisions a	nd other info-r	naps in the
series?			

Notes

Because Great Britain is an island* and has a national grid for the generation and distribution of

An ideal mix for power generation for the UK over

the next 20 years is

- 30% Gas
- 30% Nuclear

- 30% Coal

"This is a mix that will work and has the requisite diversity."

BUT

UK is currently relying on the market to determine the energy mix. That favours the cheapest plant and the cheapest fuel. Had the market not corrected, in Jan 2006 we were heading for an energy mix of 80% Gas and 20% Wind.

If gas prices had not risen, the market would have delivered 80% gas in our energy mix. That would have led the system to collapse. Gas turbines are not very flexible. They do not like to be part loaded to meet variable demand."

for that."

AND IF

Four plants in or near Scotland are ecommissioned and if large wind farms are built in the North of Scotland that will produce system collapse by about 2012 or after.



There is probably under-investment in the distribution network but we don't know because nobody is in charge

"GB is an island. An island power system cannot rely on interconnectors to provide nronising and damping torques. We are reliant wholly on the characteristics of the generating plants in GB." (Other things possible in a power system that is connected to their grids) "Electrical power systems are one of the most complex systems devised by man. We are constrained by what they can or cannot do."

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"Nobody is taking responsibility for how individual decisions about generation impact the stability and workability of the power system overall. We have separated the responsibility for generating electricity from network and distribution."

ermany thought it could get 24% from wind. In practice it can only get 14% n GB wind contributed 20% could it pick up the load demand? The answer ' and "Other European member states are beginning to see the case for ore central control of the market. Germany and Denmark are beginning to ive problems with voltage support. The wind farms in Schleswig Holstein ar eginning to drag the European power system down."

China and India will determine the outcome of clean coal At present, it is not on the agenda of the plant anufacturers like GEC Althstom as they have a full order book for normal coal fired power stations for those

tland could be our wake up call. It could be the first demonstration the lunacy of separating the network and the generators. To keep the system running we need a new coal plant in central Scotland. But the market won't eliver that, and it will take time. If we left it to the market we would have a gas plant in Lincolnshire, not a coal plant in Scotland."



the UK has no adequate storage because capacity (currently only a few days compared with France's 90 days).

> the UK has *no market for* storage of gas.

> > And the cost of carbon may not be large enough to incentivize investments for nuclear

"We need some coal plants now. Otherwise we will be left sitting in the dark." But the market alone will not deliver this. For example: "We need a new coal plant in Scotland soon to keep the system running. But the market will deliver a new gas plant in Lincolnshire!"

Some implications

otland may go dark by 2010 – if owners of n central Scotland choose not to invest tting existing coal fired powered stations nply with new EU directives in 2008. The s grid as a result of inadequate voltage Apport from the remaining conventional plant In Scotland for the proposed renewable generation in the north.



The UK power system has come close to black out four times during the winter of 2005/2006 due to inadequate gas imports and in gas storage facilities to meet overall Norway, suggests an increasing probability of interruptions in the future as UK gas reserves further deplete leading to power blackouts for anything from one to four weeks.



There is no way that the market alone can ensure that we meet our Kyoto commitments and at the same time maintain the stability and security of the grid.

The UK cannot predict when a breakdown in the electrical power system might happen, because as things stand nobody has sufficient information to model the system. There is no framework within Government or elsewhere either to model the system or to handle the implications of not being able to do so.

There is only 5 days of gas storage for all of the **5 days** UK - and only one large gas storage field. If that breaks down or becomes inoperable, as was the case during the 2005/06 winter, there will inevitably be severe problems.



Kyoto



