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Oral Paper

Coventry City Council Peace Month 2005

Action on Global Warming Panel Debate and Public Meeting

17th November 2005, 7.30-9.00pm, Council House, Coventry, UK

Chair	Cllr Dave Chator	Coventry City Council
Panel members	Ian Jackson	Nuclear Consultant
	Roger Higman	Director, Friends of the Earth
	Tony McNally	Climate Change Solutions

Speech on Nuclear Energy and Climate Change

Firstly, please may I thank Coventry City Council and the British Nuclear Energy Society (BNES) for inviting me to speak tonight in my hometown of Coventry.

Within the next 20 years nearly all of Britain's nuclear power stations will be permanently shut-down. Britain will lose 20% of its electricity supply. The hope is that renewable energy - mainly wind and wave power - will take over. But last year renewables delivered just 3%.

Can renewables catch-up and fill the energy gap? Many people think the answer is probably not. Replacement nuclear stations may be needed as an insurance policy. Insurance to help keep the lights on, to heat homes, and to keep industry working.

Yet tomorrow's Britain could be much different from today's. The earth's atmosphere is heating-up, changing the world's climate. Carbon dioxide emissions from burning oil and gas are the prime suspect. We are just beginning to see the early warning signs. Melting glaciers, rising sea levels, flooding, hurricanes. Nuclear and renewables working together could - quite literally - save the planet.

Climate change is a political problem, needing a political solution. But nuclear is not a magic bullet. The technology uniquely captures governments in a cycle of investment decisions that once started will take about 100 years - a person's lifetime - to exit. Typically 10 years to build a reactor, 60 years to operate it and 30 years to decommission it. No other technology has the capacity to bind future governments for 100 years.

And the nuclear waste - some radioactive for thousands of years - will effectively require almost perpetual storage in deep underground mines or inside mountains.

Clearly we need a stepping-stone to help get to a better future. Where cleaner renewable energy is generated without carbon emissions, without heating the planet's atmosphere and without generating harmful wastes. And that - in my view - is where nuclear power can really help. Nuclear power is a stepping-stone to help buy time for renewable energy sources to fully develop and mature, while slowing down the worst effects of global warming.

Nuclear is what today's managers call an enabling technology - something which helps you achieve something else more important. Like preventing climate change.

What will a low carbon future look like? Probably much the same as today.

Most people will probably be doing the same things in 20 and 40 years time as they do now - raising families, working, travelling - but the enabling technologies - the technologies they use to do these things - will be different and better.

Take maths homework for example. In 1940s school children used slide rules. By the 1980s they used electronic calculators. Yet the basic computer technology already existed in the 1940s - it helped the British to crack the German wartime Enigma code - but it took 40 years for computer technology to become widely available.

The same thing happened with telephones. In the 1940s most government offices had telephone lines. By the 1980s most households had telephones. And in the 2000s the mobile telephone has become the fashion accessory of choice for school children everywhere. Yet basic telephone technology existed in the 1940s, although it took another 40 years for phones to become widely accessible.

We are seeing much the same trend in the evolution of television technology. Regular BBC Television broadcasts began in the 1940s. By the mid 1960s viewers were watching 3 channels in black and white. Today in 2005 many people are watching over 100 channels by digital satellite (an enabling technology invented some 20 years after the BBC began regular TV broadcasting). And you can be sure that in another 40 years children everywhere will still be watching too much TV.

What is the point of these comparisons?

The point is that the advanced energy technologies that will be widely used 40 years ahead almost certainly *already exist today* in prototype form. But they are presently either too expensive or need further development to make them work better.

My guess is that wind, wave and hydrogen power are the low carbon energy technologies of tomorrow. And nuclear is an enabler to help get there.

But nuclear is only one part of the energy jigsaw and there are many practical problems to be solved if we are to achieve a low carbon future. The first hurdle is cost. Ironically both nuclear and renewables share the same basic problem - market economics.

In 1982 Margaret Thatcher's government fundamentally changed the way energy is supplied in the UK. Instead of government taking responsibility for supplying electricity and gas, Energy Minister Nigel Lawson began liberalising - and eventually privatising - energy supply in Britain. Today we have a competitive energy market with a choice of energy supplier for most people. In many ways this has been a great success, helping to reduce energy prices and in turn reducing fuel poverty - helping poorer families to heat their homes.

Over the last 10 years gas power has generally been cheaper than coal power, nuclear power or wind power. The result has been a dash-for-gas during the 1990s. By 2010 about 60% of energy generated in the UK will probably be from gas.

Gas plants are the most economic choice because they are cheap to build and they are flexible - they can be turned on easily to meet temporary increases in electricity demand - and they can be shut down again when electricity demand lowers.

Nuclear plants are about 4 times more expensive to build. They are inflexible and cannot easily be powered-up or shut-down to meet changes in electricity demand. But they do generate large amounts of baseload electricity very reliably.

Renewable plants are cheaper but unreliable. They produce electricity intermittently depending on local winds and tidal conditions. They are inflexible and cannot meet changes in energy demand. At present only about 10% of renewable energy can be safely added to the national electricity grid before the grid becomes too unstable.

Grid operation with increasing quantities of wind power is a major problem, risking the collapse of electricity grids and knocking-out power over a wide area as happened in North America in August 2003 affecting 50 million American people.

Britain's ageing coal power stations - which once generated almost 70% of electricity in the early 1990s - have now declined to around 35% of UK generation and are expected to carry on reducing to about 17% by 2010. This picture has changed quite dramatically over the past 15 years, with new European environmental measures expected to further hasten the closure of old coal plants.

Despite gas's economic dominance, gas has a serious down-side - when natural gas is burnt it produces carbon dioxide thought to be the main cause of global warming. Meanwhile nuclear and renewable energy produce almost no carbon dioxide.

And this raises a fundamental question about Mrs Thatcher's energy markets.

Markets always deliver the best economic outcome - the ebay effect - where the best price wins. But they can't always deliver what is in the best national interests of a country. Only governments can do that. If left on their own, Britain's energy markets won't shift toward low carbon supplies. They are simply too expensive.

Fortunately markets do respond to government incentives. Incentives are simply a means of urging people to do more of a good thing and less of a bad thing.

Governments can rebalance the energy markets by setting carbon incentives for both nuclear energy and renewable energy production. If the incentives are fixed over a long enough time period - bringing stability and certainty to the energy markets - then this should give investors enough confidence to invest in nuclear and renewable power.

Given enough time hopefully this will offer a breathing space, slowing down the rate of climate change, and helping today's prototype renewable technologies to mature into tomorrow's advanced low carbon energy supplies.

But some key strategic and practical questions remain.

Firstly, re-wiring Britain. The existing national grid energy network has been designed around big centralised electricity generation from a few large power stations. If we are to continue using the national grid but with greater penetration of very many small renewable energy sources then energy storage technologies must be developed to help balance the network and smooth-out intermittent peaks and troughs in generation from wind and tide energy. Large capacity energy storage technology is needed as a key enabler to help make renewables viable for the national grid.

Secondly, there is the question of whether we even need a national grid at all.
In its present centralised form the grid is vulnerable to supply disruption from fluctuations in electricity generation and also from terrorist attack. Decentralising electricity supply using local electricity generation could be an answer.

For example, micro combined heat and power plants can be installed in people's homes powered by natural gas or hydrogen piped through the gas network. Micro CHP technology already exists today that allows householders to generate their own heating and electricity from a gas supply. In this case the national electricity grid simply becomes a back-up network in case CHP in your home should fail for some reason. Micro CHP can be bought today, although it is very expensive. But 40 years ahead, the technology will probably be much more affordable.

In reality there is probably some truth in both visions of the future.

My own guess is that nuclear power plants will be used to generate large amounts of baseload electricity needed for big power consumers in industry. Indeed this is just what is happening in Finland today, where construction has began on a new nuclear reactor in 2005 paid for by advance electricity contracts with big energy users.

Meanwhile I suspect that local generation - perhaps using hydrogen gas which produces water when burned instead of carbon dioxide from natural gas - will probably become much more important for domestic electricity supply in homes.

And when the intermittent supply problems of renewable energy can be overcome through better energy storage technology, renewables will eventually grow to play a leading role in low carbon energy supply throughout the UK.

Well, that completes our whirlwind tour of global warming, nuclear power, technology innovation, market economics, and energy supply models. I hope that you find tonight's panel discussion thought provoking and enjoyable.

Thank you

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