The Foreign Policy Centre

The European Think Tank with a Global Outlook

Should Environmentalists Learn to Love Nuclear?

Monday 27 September 2004
Labour Party Conference, Brighton
Transcript of Speeches

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About the Speakers:

Rod Liddle is Associate Editor of the Spectator and a former editor of the Today programme on BBC Radio Four. In 2004 he caused controversy with an article in the Spectator arguing that nuclear power was the solution to Britain's energy problems.

Michael Meacher MP is one of Labour's longest-serving MPs and a long-time campaigner for the environment within party and government. A staunch advocate of renewable energy, he was Minister of State for the Environment between 1997 and 2003. During this time, he played an important role in international negotiations over the Kyoto Treaty and helped pass the Countryside and Rights of Way Act 2000, which secured greater protection for Britain's wildlife areas.

Vuvu Msutwana-Qupe is a Manager at Necsa, the public South African nuclear energy company, and is responsible for technical cooperation with the International Atomic Energy Agency (IAEA). She also works with the African Regional Technical Agreement for research, training and development of nuclear science (AFRA), and is a member of the Board of Directors of Nuclear Technology Products (NTP).

Martin O'Neill MP is the MP for Ochil and the chairman of the Select Committee on trade and industry. He was first elected to the Commons in 1979 and played a major part in shaping Labour's return to electoral appeal, acting as Shadow Defence Secretary for four years between 1988 and 1992.

Acknowledgements:

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Preface by Rob Liddle

Back in the late 1970s and early 1980s, most of my weekends were spent marching against things: racists, large corporations, remnants of the British Empire and, most frequently, nuclear weapons. If you were left-wing in those days, you didn't like nuclear weapons one bit, especially British and American ones. Russian nuclear weapons were quite bad but because they were "defensive", as we dutifully told ourselves, they were morally a cut above ours. And all of the people I marched with felt the same about nuclear power as they did about weapons. The mere linguistic proximity somehow convinced us that nuclear power was an inherently malevolent thing which progressive people shouldn't get involved with. This was silly of us, I know – but hell, we'd all been to see The China Syndrome and we'd watched, wide-eyed and terrified, as the events at Three Mile Island unfolded. Nuclear power, no thanks.

But nobody died or was even injured at Three Mile Island. Come to think of it, nukes didn't actually hurt anyone in The China Syndrome, either. Later, the weekends got even busier because we had to start marching for the miners. And here was another reason to hate nuclear power. We had to keep the coal mines open, and anything which threatened their survival was to be condemned and vilified. Plus, there was now a green lobby with plenty of things to march about and one of those, again, was nuclear power. Back then, if we could have wiped from history the births of Marie Curie and Ernest Rutherford we would assuredly have done so.

This errant stupidity has decayed a good deal since the mid-1980s; but some of it is still with us – otherwise the British government would most certainly have a viable and expanding nuclear programme in order to cope with the forthcoming oil peak and a potential crisis in our gas supplies. The old stupidity possesses, if you like, a half-life. These days we are not so terrified that we would go out and march because of it, and the primacy of coal is, thankfully, long gone, but there is a general dark suspicion about nuclear power, something reinforced by Chernobyl. It's still scary.

My own conversion to the cause of nuclear power came as a result of studying the facts, allied with a burgeoning antipathy to our use of hydrocarbons – the most environmentally damaging substances ever to have been utilised by mankind – and, in the end, a growing conviction that as far as the medium term future is concerned, and to quote an old enemy, There Is No Alternative.

The last great oil crisis will be with us within ten to fifteen years. By that time there will be, according to most impartial observers, an inevitable and permanent oil shock; demand will outstrip not merely supply, but potential supply. Gas reserves are less of a known quantity: most experts suspect that their exhaustion is even closer than that of the world's oil reserves. Certainly, we know that by 2020 some 80 per cent of our gas supplies will come from abroad – which means a political and economic dependency on Russia.

These days, then, we pin our colours to the cause of "renewable energy" – which, in this country, means wind farms. All well and good. But wind farms and other renewables currently provide three per cent of our energy requirements and, as even its most vociferous advocates admit, have the capacity to provide a total of only 20 per cent. Where's the rest of our power supply going to come from? And not just that, the latest study from The Royal Academy of Engineering suggests that wind power is by far the most expensive option – even when you factor in the environmental impact (see Table 1).

It is about time the left and the green lobbies came around to nuclear power: There are signs, at last, that they are doing so. The high priest of Gaia, James Lovelock, has already called for a massive expansion of the nuclear industry in order to counter the appalling environmental effects of a world-wide dependency upon hydrocarbons. Every new nuclear power station built in this country would be the equivalent of two car-free days each month.

Nor are nukes quite so dangerous as we thought them to be all those years ago. Even with Chernobyl, the nuclear industry has seen many fewer deaths than in any other comparable sector of the

power-generating industry. And a European Union study recently concluded that there was a greater discharge of radioactive materials into the seas around Britain from our oil and gas industries than from BNFL. It's an irony: that the old fear of nukes has made our nuclear industry safer and cleaner than any industry you care to mention. Cheap, safe, reliable – and with 97 per cent of uranium capable of being recycled, not far off renewable.

Table 1: Price of energy by source (pence per kilowatt/hour)

	Base Generating Cost	Cost incl. allowance for carbon emissions[1]	Cost incl. allowance for backup capacity
Nuclear	**2.3**	n/a	n/a
Gas	**2.2**	**3.4**	n/a
Coal	**2.5**	**5.0**	n/a
Onshore wind	**3.7**	n/a	**5.4**
Offshore wind	**5.5**	n/a	**7.2**

Source: The Royal Academy of Engineering

[1] Based on a nominal assumption of a value of £30 per tonne CO2

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Introduction: Rob Blackhurst

The background to the nuclear debate is well known. Nuclear energy currently provides 20% of our energy needs in Britain, but under current plans, by 2030 there will only be one nuclear power station left. Some countries around the world are building more stations: in China, Japan, India and South Korea, there has either been a re-birth of nuclear, or it has never stopped being developed. Others, particularly in Europe, have decided to get out of nuclear altogether, so the lessons taken around the world vary. The British government is putting a lot of faith in renewable power; but it has also committed itself to some very tough targets, such as the 70% reduction in carbon emissions by 2050, and the window for nuclear is still being kept open. Today we will discuss whether nuclear energy can allow us to meet these targets, or whether the government is right to rely on renewable power predominantly.

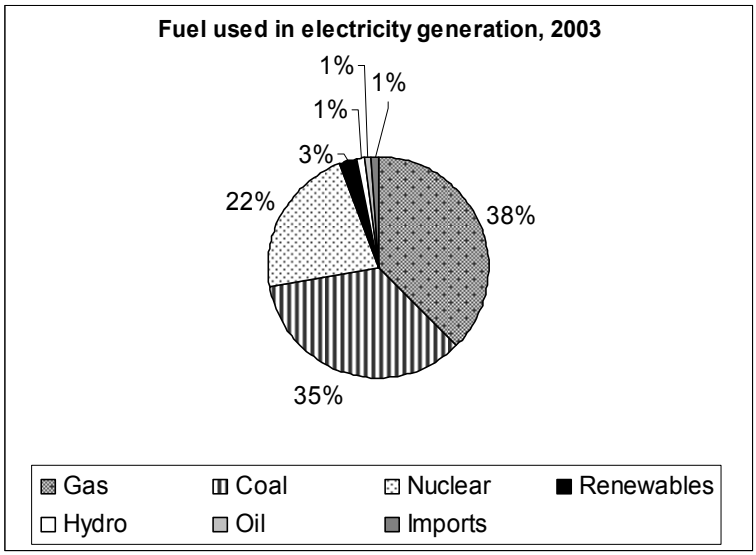
The debate has really taken off this year in a way it hasn't previously, largely because of an article by James Lovelock, the founder of the environmental movement, in *The Independent*. Long in favour of nuclear energy, he brought to the attention of a wide audience the question of why environmentalists were not changing their mind, given the pressing need to tackle climate change. The Prime Minister, in some less well-reported comments to the Commons Liaison Committee, has also suggested that he might be in favour of looking at nuclear energy again in the medium to longer term.

The forces ranged against nuclear power remain formidable. All the major environmental groups in the UK remain opposed (from

Greenpeace to Friends of the Earth) for a myriad of reasons: from what to do with the long-term problem of waste, to the safety of the industry, and the public subsidy that they believe should instead be ploughed into renewables. So I think today the questions we need to answer are: Do we need nuclear power to meet our carbon reduction targets? Is the environmental movement right to oppose it? And how are other countries tackling the same issues?

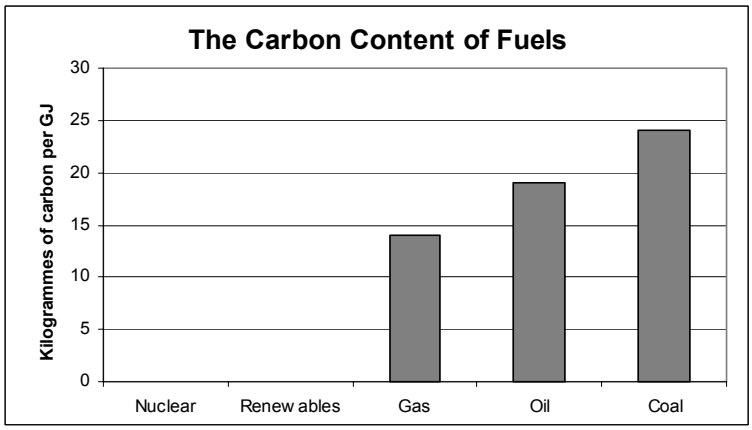
Rob Blackhurst, Editorial Director, the Foreign Policy Centre

Chart 1:



Source: Digest of United Kingdom Energy Statistics, 2004 (DTI)

Chart 2:



Source: DTI (2001a)

Section 1: Martin O'Neill MP

I'm not quite sure what we're supposed to be discussing here. It's quite simple when you have trade unions and pressure groups because you know where you stand; they want you to speak either for or against something. A think-tank is all over the place! So I will start by saying that the problem with the nuclear question is that we know what we don't like, and we know what we are no longer able to use in the ways we might have done in the past.

For example, coal we know to be dirty; we know that clean coal technologies are not yet mature, we know that supplies of coal are plentiful, that across the world, they are being exploited and that in respect of our power stations, there is a mixed view of it. This certainly comes out of Europe: the Large Plant Directive suggests that it will become increasingly expensive to use coal and certainly with the question of emissions (and it's not just CO2 but also SOX and NOX), you have the requirement to bolt Flue Gas Desulphurisation equipment on to the back of a lot of our power stations, which is extremely expensive and which is likely to be too expensive given the remaining life of many of our viable power stations.

Having said that, the beauty of coal, and as someone who has represented a mining constituency all the years I've been in Parliament (although sadly there are only retired miners now), the fact is that power stations that use coal can be switched on very quickly after being idle and can meet short-term demand quite quickly. The problem is, of course, that they are expensive to sustain when they are not running.

Gas was the fuel of the 1990s and was going to be the answer to a lot of people's problems. It is now in comparatively short supply in the sense that we are no longer self-sufficient, but having said that we have liquid natural gas coming from across the world. It can be brought into termini, although some of them have yet to be properly developed, and it will provide us with a kind of extra gas supply that I don't think people properly understand, because we tend to think of

gas coming from the North Sea, or perhaps from Russia or controversial pipelines from Turkey into Europe.

We also have nuclear, which gives us 20% of our energy at the present moment, a proportion that is falling. It is falling quite simply because the existing plant is reaching the end of its useful life. Some of the existing stations were never primarily designed for energy-generating purposes anyway; it was a hangover from the Cold War and weapons-grade plutonium production and the like.

We also have renewables, which some people have likened to W.C. Fields' Snake Oil - the American comedian who likened Snake Oil to a substance that no illness could withstand and that could, therefore, cure everything. Not only will it light your home but it will employ most of the people, it will get rid of all our waste, and there's no problem it cannot solve. I don't think that's quite the position. I think there is a case for energy generation from waste, although at one time Greenpeace and Friends of the Earth didn't like incineration, and the jury is still out in certain areas on certain combustion techniques which may or may not avoid the heavy metal issue.

Equally, it has to be said that the current most popular energy source, and the one which I'm very enthusiastic about getting farmers in my constituency to develop, namely wind power, has one single problem. That is that the wind does not blow all the time and that, therefore, we lose some of the capabilities. So you cannot easily, at this stage at least, translate all of the wind capability into a sustained supply. And if the wind isn't blowing, then you have got to have some kind of fallback, which may or may not be renewable depending on the size of the contribution that wind power is going to make.

I think that at the present moment there are a number of technologies which are over the horizon as far as renewables are concerned. I know Michael is going to speak about this, but I think that as far as renewables are concerned, we will probably get to the 10% target. Maybe not by 2010 but, quite frankly, I don't think it matters if we reach it by 2011 or 2012; and I say that because I want renewables to work. What I don't want is for those who are against

renewables to be able to crow that we haven't achieved it. There are however still a number of technologies that have to become more economically viable before we can reach 20%. So, I think there are problems with renewables and we may not reach 20% by 2020, but equally the technologies which are, at the moment, in their infancy may well be sufficiently mature by then to make the necessary contribution.

Now what of nuclear? I am not opposed to nuclear; I would say that the history of nuclear power is the classic guide of how not to do something in Britain. After Concorde, we as a country spent more on the AGR (Advanced Gas Cooled Reactors) system than on any other single public work outside defence in the post-war period. Equally, it has to be said, that as an icon of entrepreneurial acumen and managing style, British Energy leaves a wee drop to be desired. If the managing director of British Energy was given the task of running a raffle, we would have some doubts as to whether or not the prizes would be there, the money would be collected and, if the money was collected, if it would go to the right person or whatever. I'm not pillorying Mike Alexander, but I'm merely making the point that his predecessors were not the most aware entrepreneurs on the British scene.

So firstly, we have a problem with economics as far as nuclear is concerned. The European Commission last week said that state aid to British Energy in a time of difficulty was not unacceptable. But frankly, we've got a long way to go before financial confidence in that institution will be sufficiently broad for people to put serious money into it. If we were to have a new nuclear drive in the UK, I suspect we might have to finance it with some new-style consortium, something perhaps along the lines of the Finns. They secure the equipment suppliers, retention customers and people prepared to take a punt, with serious financial institutions coming together in a consortium but not necessarily under the umbrella of British Energy. So if we're going to have new nuclear power stations, we might be looking at a different type of structure.

But to do that we must have a technology which is proven and acceptable and, at the moment, there are none. There is a Canadian

one, there is an American one and there is a South African one, all of which are still either being built or are at the prototype stage. But none of these technologies are really sufficiently mature for us to give them the nod, because if anything goes wrong, even if it's some neat and tidy consortia of business, it will be us as taxpayers who will have to pick up the tab - just as we had to do two years ago when British Energy went pear-shaped.

If we manage to choose a technology with confidence and if we can then decide that we want to build a sufficient number of nuclear power stations, my own view is that we should go for two initially and then another three and then five. I think that we have the sites; one of the paradoxes is that, despite the unpopularity of nuclear power, in those parts of the country where nuclear power is generated, it is not necessarily unpopular. The people who work there, the communities who are around them are not frightened of emissions or of terrorist attacks anymore than anybody else is; and certainly not my constituents who live next to petro-chemical plants at Grangemouth.

So you have a kind of paradox here, that it might not be difficult to build nuclear power stations on the site of existing ones and, equally important, and which has to be borne in mind, that the wires business is already there. One of the difficulties with renewables is that we're going to have to rewire the UK to bring their disparate and diffuse contribution into the National Grid.

Equally, we have to recognise that we can get the technology, we can secure the money, we can have the sense, but if we don't get planning permission, then we're sunk. The lesson of Sizewell is that you can write off very long periods under the present planning legislation before getting to the point of cutting the first sod. Exactly the same planning legislation applies to wind farms as to some of the more controversial renewable plants, and we need to address this issue in a far more constructive and positive way than we have done before. It is one thing to give people the right to object; I think it's quite another to afford people the opportunity to keep reheating the objections at every stage in the planning procedure, and this is as relevant here for renewables as it is for the nuclear question.

So what can I say? It is my belief that we are going to have a generating gap, that the 20% target, modest and achievable though it is, will not necessarily lead on to bigger amounts of renewables, at least in a short enough period to remove the requirement to look for other sources of energy. We don't want to be over-dependent on gas; and we probably can't tolerate more than about 10% coal kept and subsidised on the reserve basis, because of the emissions taxes that are, quite correctly, going to be in place.

But it might be possible, with a nuclear decommissioning agency, to consider a new generation of nuclear power stations. The one thing that I haven't considered and that we now have to look at is that part of the objection to nuclear was the mismanagement of the industry and its past waste. A nuclear decommissioning agency would take the historic legacy of the nuclear industry and put it in a separate compartment. Now I'm not sure if there is any other form of energy generation where the sins of the fathers have been visited upon the children in quite the same way that some would have us believe that the new fleet of nuclear stations should necessarily carry the burdens of the past. It's something I find quite frustrating, because in very few other industries does this happen. I'm going to another meeting tonight to say that there is probably a place, not a big place but a place, for coal to continue because of its facility to switch on quickly and give a boost to the system quite speedily. Now if you have that, frankly we're going to have to start looking at the coal waste problem, and the phenomenal sums which our government has been quite correctly prepared to pay by way of compensation for black lung disease and the like.

So the economics of energy are not so simple, and at times in the Labour party we are in danger of paying too much attention not just to the economics but to the politics as well. To quote George Orwell, we categorise nuclear as "two legs bad", and somehow green issues and renewables as "four legs good". I think that this is a complex issue, I don't have too many of the answers, I've spent most of my time tonight asking questions. But I do think that we have to recognise that nuclear offers a generating capacity which can fill, within the next fifteen years, a sizable gap to take us through to

2050. It was recognised by the Royal Commission on Environmental Pollution, it was recognised by the Royal Society of Engineering, it has been recognised, I think, by a number of groups who have been looking at this quite dispassionately, and who are not necessarily part of the nuclear club.

And let's not forget that the nuclear club has got us into a hell of a mess in the past. Nuclear physics is very complicated: folks like you and I shouldn't be allowed to understand it, we should leave it to them, they know the answers. (Although in fairness to the nuclear lobby it wasn't them that said that it would be too cheap to meter, it was a civil servant). The truth of the matter is that we have been bedevilled by the arrogance of very clever men - much like the graduate centre forward who played for a football team in my constituency, and who was told by his coach, one of my councillors: "Son, I want players with brains in their feet not their head".

I believe there is a lack of commercial awareness amongst the whole of the generating industry. If you looked at electricity in all its forms; coal, gas in the past, and others, we would be bedevilled by this. We have a chance now, because of the need not just to get things right technically but to get them right environmentally, to be more dispassionate, to be more rigorous. And if we do, it would be foolhardy not to consider that a chastened, renewed and perhaps reinvigorated nuclear industry might have a contribution to make. Thank you.

Section 2: Michael Meacher MP

Martin has presented a very fair and balanced case. I agree it is extremely complex and I think he mentioned very fairly both the pros and cons of virtually all the solutions. There are no easy answers to this, and he made a very strong case in saying that we shouldn't be bedevilled, as we have been regarding energy policy in the past, by over-relying on one particular source rather than another. That's a very powerful lesson which we need to learn.

Surprisingly, he didn't say what I suspect is the strongest argument of the nuclear industry at the present time, namely that climate change is intensifying, and that the only way of tackling global warming is through nuclear. Okay, nuclear has got lots of problems; we know about that from the past, but in the end you need it because there aren't any alternatives. That I think, though Martin didn't say this (maybe he didn't say it advisedly) but that, certainly from what I've heard, is the argument. I disagree with that argument, and I want to spell out an alternative scenario.

Let us start with global warming because it is *the* overwhelming challenge that the world is facing. I won't go into the details because I'm sure everyone here realises it, but we are talking about a threat to our planet which could make parts of the planet uninhabitable within a period of two to three hundred years. It is a threat such as we have never faced before in human history, and what of course makes it worse is that it is almost certainly of our own doing.

Now the Kyoto Protocol was a remarkable achievement, probably the most complex international agreement in modern times. The problem is that the United States won't ratify it, neither will Australia. It would be effective if Russia would sign up but, up to now, for whatever Machiavellian, Putin-like reason, they've not been willing to. [Editor's note: This was before the Russian parliament ratified the treaty in October 2004]

But even if it were ratified, the most that we could achieve by 2010 is probably a reduction of something in the order of 2% in greenhouse gas emissions compared to 1990. Now you might think that's extremely modest; actually, if we didn't have the Kyoto Protocol, we'd probably be at plus 20 or plus 25. So minus two is not bad, but it is nowhere near enough, because Kyoto applies to 32 industrialised countries but not to all the rest. They are saying: "Well you're the ones that caused it, you went through the industrial revolution, and you produced the prosperity and the high standard of living for yourselves that we all want. Don't expect us to take action until you've done so for what you're primarily responsible for".

That's the double bind we're in because the Americans, of course, take the opposite view. "Why should we, we're only responsible for 25% (only 25%!) of the world's emissions, what about the other 75%?" So there is a double bind, a chicken and egg situation, which is very difficult. The important point is that there are 190 countries in the world, some very small but some extremely large (China and India for example). If those countries do not sign up, and they haven't, then by 2030 we will not have, as you've said, the 70% cut required by the scientists by 2050 - I thought it was 60%, but let's not worry about it.

It's huge, it's mind-blowingly great, and the fact is that instead of being minus 60 by the middle of this century, we're probably going to be at plus 75%. Now these are figures that roll off the tongue, but when you think of what they actually mean in terms of the climatic phenomenon - the ferocity of the damage and its increasing frequency - the change which is required of us in our economy and our whole way of life to meet this is enormous and almost mind-blowing.

That's the situation we face. The nuclear industry says in reply: "We don't produce any CO2". That's not entirely true because you do produce carbon in mining uranium, but it's pretty tiny so let's ignore that. So, they argue that they don't really produce CO2 and that if we're going to meet those targets, which are going to be ratcheted up, because they are going to have to be in the next two or three decades, then nuclear is the only way to do it. Oil and gas and coal

are the causes of the problem, they are the fossil fuels, and what tackling global warming is about is switching away from fossil fuels to alternative ways of generating electricity, which does not produce greenhouse gases. Now, I think that is the best case they can put. The problem, and I think this is the problem, is that there are four key issues that nuclear hasn't yet met. Until it does so, and does so convincingly, I don't think the case is going to be as decisive as perhaps the nuclear industry would like.

None of these issues are ideological - people I know take strong ideological views, but I'm trying to avoid that. The first is the question of price. The Performance and Innovation Unit (PIU) within Number 10 carried out an analysis of energy policy looking over the next 20 years, and worked out as best it could what would be the price of generating electricity by 2020. For onshore wind it was 1.5 to 2.5 pence per kilowatt hour; for offshore wind 2 to 3 pence per; for gas it's 2 to 2.3 pence and for nuclear 2.5 to 4 pence per kilowatt hour - a significant increase above the others.

Now that isn't to say that the price won't come down. Martin was very fair about the potential for improvements in technology, and that will apply of course to nuclear as well as other forms of generating energy. But the cost of nuclear overwhelmingly consists in the capital construction cost, discounted forward. Perhaps a new range, the AP 1000 if I remember or the AP 600, will be able to improve on those figures. But of course those figures were produced by the PIU taking account only of what is known of technology. That's the first problem.

Secondly, there is a problem of waste. This is often raised but it's very significant. If I were to ask you how many tonnes of intermediate- and sub-high level waste (though that's fairly small, it's far and away the most toxic) is currently stored at this present time in this country, what would you say? There may be people here from the nuclear industry who know only too well. The answer is about 10,000 tonnes. That's pretty big given that all the governments of the last 20 years have tried to find a way of dealing with it. In all honesty the Tories did in the 1980s; they did so at Sellafield just before the 1997 election, and John Gummer felt obliged to say that the safety

case had not been made, because the volcanic rock around the Sellafield area is not an ideal form of sediment or protection for nuclear waste over a very long period of time, when it has a half-life running into six figures.

But what staggers me about nuclear waste is that that even if there is no new nuclear Bill, the results of decommissioning waste mean that by 2100 - within the lifetime of our children and grandchildren - there will be not 10,000 tonnes but half a million tonnes – a fifty fold increase. This is contained in the Energy White Paper and the separate DTI White Paper, which concern our responsibilities for dealing with nuclear and some other of our international obligations in terms of the North-East Atlantic (And if it's in a government white paper, it must be true!).

Now, I simply say, is it sensible to have a new round of nuclear legislation when it is going to create waste over and above half a million tonnes, when we haven't yet discovered how nuclear waste can be safely stored for eons - because we're talking about a period from now as long as the human race has been on this planet. That's the second point.

The third is the obvious problem of security. I often say, without any advice to Al-Qaeda, or without any secrets for them, that if you wanted to do damage to this country, don't bother flying a plane into Parliament - it would probably be 2 or 3 days before anyone noticed anyway. But if you flew it into Sellafield or a major nuclear station, possibly into Grangemouth, the consequences would be absolutely drastic. Again, that is not a conclusive reason for not building more nuclear power stations; maybe one can build them in a way to defend them against the risk of rocket or plane attack or another powerful missile. However it's pretty difficult to do in engineering terms, and it would certainly increase costs.

The fourth is the question of health. This is much disputed, and to that extent I don't want to lay too much emphasis on it. However there is certainly a view that chronic exposure to low levels of nuclear radiation can cause morbidity and illness and, in unknown quantities, be lethal. There is currently a cancer epidemic in our

country and in Western Europe. It's certainly not all the fault of the nuclear industry, and that would be a very foolish thing to say, but it would, I think, be equally difficult to deny that the nuclear industry has made some contribution to it, and I don't think that it is wearing a white shroud. It is a serious issue but it does depend on whose view you take: that of the National Radiological Protection Board, or that presented by the green lobby. I'm not a scientist and I cannot judge between them.

That's the easy bit. The difficult bit of course is to say: "Well okay, if you don't go for nuclear, what are you going to do?" Nuclear is responsible, as we've heard, for about 20% of our energy. If that is phased out, as the Magnox and AGRs come to the end of their life by 2020, what are we going to put in their place? A fifth of electricity generated is a hell of a lot. Renewables aren't the only answer, it could be gas. The problem with gas is that we are likely, within five to 10 years, to be subject to the risks of importing gas on an increasing scale from extremely unstable areas like Russia, Algeria or the Middle East, and we haven't got very much storage capacity compared to France and Germany.

The government does, I think, want, perhaps apart from Tony Blair, to switch to renewables. The whole of the rest of the government and Tony Blair will wait in the balance. I'm not certain who will win, but Tony Blair obviously remains to be persuaded. Yet he also recognises that the problems, or at least some of the problems about nuclear that I've referred to, have to be met.

I think Martin very fairly - perhaps he was too fair - did not mention that there's a lot of opposition to renewables. Some of them have been sited in very unwise places, on the top of hills, and a simple requirement is that they should be sited sensitively. Secondly, they're often imposed by developers without consulting local communities. Again I think that's wrong, and that there's an arrogance among the renewables industry that needs to change.

However, the capital costs are indeed falling. Of course the fuel is free, that's the whole point about renewable energy sources; and the government has brought into play the renewables obligation, which

requires those who generate electricity either to use renewables as a source, or to face an additional charge. Currently, the major argument against renewable energy is that it has promise but at the moment it accounts for just 2% of the electricity generated, and are you serious about it?

This is a real source for concern. Contrary to what Martin said, I doubt whether we'll reach 10% by 2010. If we reach it by 2011 or 2012 I'll be quite pleased. So we're a long way off 20% by 2020, which is the EU goal. But what is significant is that oil companies like BP and Shell - not just these trendy green Euro-governments - are looking to a world in which, by 2050, half of the electricity generated will come from renewable sources. That's something to bear in mind, and I think it's feasible.

We have more potential for wind power in these islands. Those who came to earlier conferences (I can remember them in Brighton and Blackpool) and have nearly been blown over just walking down the sea front will agree that the wind is strong here, and of course it covers nearly all of the area round our islands. Germany for instance uses 40 times more wind power, even though the capacity is far, far greater for us, so it is a distinct possibility.

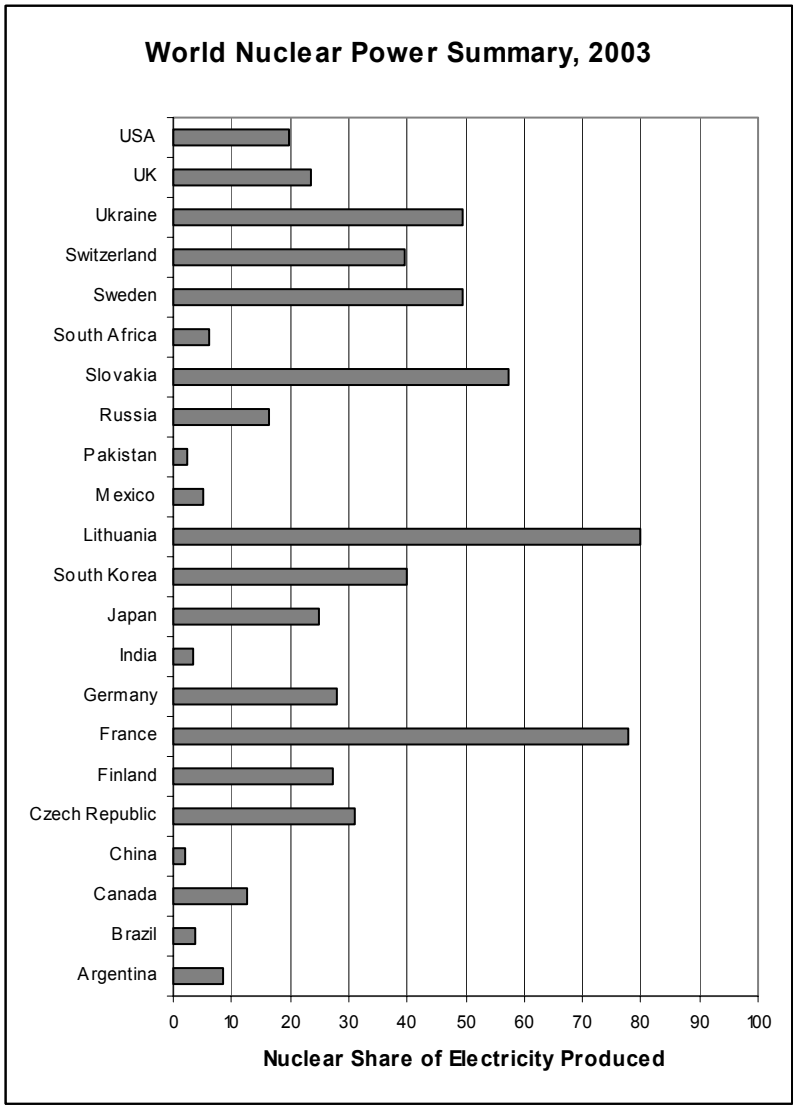
My final point is that whether you go for nuclear or whether you go for renewables, you will not generate greenhouse gases. And how are we actually going to produce that massive reduction in greenhouse gases? Certainly by moving away from fossil fuels, which we need to do more of. A huge improvement in energy efficiency is also absolutely central to the equation; this is scarcely talked about, but it is the obvious answer. It's why the present government introduced the Climate Change Levy, in order to bring energy efficiency under the radar screen of senior management.

By and large, and despite all the whingeing of industry, I think it has actually managed to do that to a degree, but there is still enormous energy inefficiency in the domestic sector. Again a whole range of measures such as a move to condensing boilers, tighter building standards and the energy efficiency commitment the government has put in place, should all have an impact.

The key point I think is this. Energy think-tanks - and I have the same rather sceptical regard for them that perhaps Martin does – have calculated that feasible and practicable improvements in energy efficiency by industry and by domestic households can match the extra electricity that could be generated by building seven new nuclear power stations. Now, that is not to say that we should not go nuclear. It's saying that energy efficiency, something that most of us hardly ever talk about, ought to be absolutely at the forefront of policy analysis.

We shouldn't rule out any possibility. But nuclear energy, in my view, has not solved its problems and perhaps cannot solve its problems. And we won't solve ours until we put far more resources into renewables. If you ask where's the money going to come from, my answer is by steadily ratcheting down the colossal subsidies that are given to oil, gas and coal. Yes, I'm in favour, perhaps partly for ideological reasons, for continuing coal production, but it will be on a declining basis. I simply don't think that, in a world experiencing rapid climate change, we can justify continuing massive subsidies to industries which are actually causing the problem. If we pump them into renewables instead, we would have part of the solution. Thank you.

Chart 3:



Source: International Atomic Energy Agency (IAEA)

Section 3: Vuvu Msutwana-Qupe

Without taking you through other forms of energy, I will quickly zoom into nuclear. We have a power station in South Africa in Cape Town called the Koeberg Nuclear Power Station, which at the moment is consuming 6% of its capacity. The nuclear industry in South Africa accounts for 5.2% of total power.

We are currently piloting a pebble-bed modular reactor (PBMR) project. Let me take you through it. This was launched in 1983 and uses German technology. We presently have 400 engineers and scientists working on it, and if things go well, we plan to build a pilot plant at Koeberg. A study conducted in 1998 concluded that the pebble-bed modular reactor was one of the best on the market, and could be deployed world-wide without safety or proliferation fears. It confirmed that the PBMR was appropriate for us, because of its inherent safety feature. We looked at it as well as something that could rejuvenate the nuclear industry and as a niche market. It also meant job creation, because it's been found that at least 10,000 new jobs will be created from it, as well as 20 billion rand in export earnings.

Now, having said that, everybody will be asking: "What about the environmentalists?" The South African constitution confers "the right to insist on an environment that is not detrimental to the citizens' well-being", as well as the right to be heard. Also, an Act by the Department of Environment provides for the participation of all interested and affected parties in environmental governance. All people must have the opportunity to develop their understanding, skills and capacity for equitable and effective participation. It furthermore states that participation by vulnerable and disadvantaged people must be ensured.

Now having said that, a full environmental impact assessment was conducted on this, and once completed, the public was required to have a say. So there's constructive engagement of the public and the public actively participates in the process all the time. But what is

important in the process is the language that you use: remember, most of the time, as scientists, we tend to use scientific language, which the common man doesn't understand, and it is very important for people to understand what you are saying for them to engage meaningfully.

What we did was to identify interested and affected people. Background and other information inquiries were launched; we conducted structured interviews in a focus group of individual format. Discussions were held outside the focus group; we asked for written submissions, which were reviewed regularly, as well as capacity-building workshops, public meetings, road-shows along the proposed transportation routes and public assessments of the draft scoping reports. All concerns were registered.

Once this was done the consortia involved approved the PBMR project, and recommended that environmental management plans be implemented. Financial provision for decontamination, decommissioning and long-term radio-management waste policies must be in place, and an information process established to inform the public objectively on nuclear matters. As I'm speaking, there is extensive engagement on improving nuclear waste policy; there are anti-nuclear groups in South Africa and we engage with them constructively, because the reality is that resources are dwindling and we have to find an alternative.

Having said that, I do wish to emphasise that while we've been doing all this, the safety and the health of the general public have been our major concern. Rightfully, anti-nuclear groups have also been consulted and, as I've alluded to already, we engage in dialogue with them.

Section 4: Questions and Answers

Rob Blackhurst: What you didn't really talk about was whether governments are going to have the political will to bring about a new generation of nuclear power stations, because I think that's the big issue. I'd like to know whether you think a government that's renowned for looking at the opinion polls is likely to take a political risk, on an issue which has quite low salience for people but which could have quite a damaging effect.

Martin O'Neill MP: You quoted the exchanges that some of us had with Tony at the Liaison Committee Meeting in the House. It is, and Michael alluded to this as well, the case that if the boss wants something, by and large he gets it. If Rod Liddle were here he, or his previous incarnation, could probably lead a long debate as to whether or not Mr Blair will be in the position to make this decision, assuming that we win the next election and that everything is for the best of all possible worlds**.**

I'm not sure. I think that after the general election, this issue will come seriously onto the agenda and if the kind of moves that I suggested take place, then I think it will be perhaps less contentious. There will be an irreconcilable minority, perhaps over 30%, who would say we don't want anything to do with nuclear, the plutonophobes and others, but I think that at the present moment it's not an issue. After the general election, however, it'll have to be addressed and a number of these issues sorted out, I would think within the first 2 or 3 years of Parliament. I don't think anybody can be any clearer on the issue than that. It's a call of political judgment. If Blair wants it, he's got the guts to go for it - whether it's a sensible thing is a different matter.

Michael Meacher MP: What the Prime Minister said is that he does believe that the nuclear option should be kept open, but I thought he also added at the Liaison Committee the kind of things that I was saying: there are a number of fundamental problems that the nuclear

industry has got to overcome in terms of public opinion before it can proceed.

Eddie Dougal, Campaign for Nuclear Disarmament (CND): I think Michael was very fair in describing Martin's contributions, almost as a neutral on nuclear. I gathered from what he said that there's a very good chance of nuclear going ahead, but I think snake oil would be a better alternative to nuclear power than renewables. The obvious reason being not just cost but also that nuclear materials are needed to make nuclear weapons. Now we hear that snake oil is extremely clean - well it is clean. I guess that Martin is closer to Tony Blair than Michael but secondly, I just wonder whether in fact we will end up with more nuclear, if there is a slightly non-committal view on nuclear until then.

Martin O'Neill MP: Michael can bear this out for me, but I think that we have sufficient plutonium to keep us going in whatever we need in the way of nuclear weapons, if we do need subsequent generations of them. So we don't need to have a nuclear generating industry in order to provide us with a feedstock. That was the historical thing, but it needn't necessarily be relevant in the future and that's the point I think that has to be got across. There are countries in the world which are prepared to use nuclear power, but to use it for civil purposes rather than military ones.

We're going to hear about this when I finish speaking, but we can also recognise that there is a treaty in Latin America between Brazil and Argentina - it's virtually unpronounceable and should only be used in spelling competitions - but the point is that this treaty was an agreement between two countries which for the daftest of reasons had been at daggers drawn throughout a large part of the 20th century. Both of them had a nuclear capability, ultimately designed, if they needed it, to produce nuclear weapons. But when they resolved their difficulties at The Hague, they set aside the military development of nuclear power to replace it with civil nuclear power. South Africa did the same.

I appreciate that there are countries who masquerade behind the generation of civil nuclear power in order to acquire nuclear

weapons but, as well as the bad examples, there are others which I think deserve consideration. I'm not saying that they hold good in every last jot, dot and comma, but I think that we have got to get out of the Cold War mindset in relation to nuclear. In particular, the next generation of nuclear reactors and stations will have to be created for purposes other than military. I may be wrong, I may just be over-optimistic, but I do think there is something there that we can work on, and I think the point you make about that is important.

The last thing I would say is that Michael is quite correct to talk about the legacy of existing stations; but my understanding is that the new reactors would produce far, far less waste and would be far easier to dismantle and dispose of than their predecessors. We don't talk about the pollution produced by cars made in the 1960s in the context of the new cars that are being built today. And we shouldn't compare Chernobyl to the next generation of nuclear stations. We're always a wee bit guilty, and politicians are worst of all, of choosing the historical analogy that suits our purposes best, regardless of whether or not it's particularly relevant.

Eddie Dougal: However, we still haven't got rid of it and solved the problem of the nuclear waste we already have.

Martin O'Neill MP: We haven't, and Michael was a lot closer to that than I was. He set people targets, I think of seven years, that they're getting rather near to now, in terms of a consultation to produce policy. The difficulty we have in the UK is the topography of the island. In some countries you can store it in relatively discrete areas and it is not controversial. In the UK, one thing everybody knows is they don't want nuclear waste near their homes.

The only person who was in favour of having nuclear waste near his home in any constituency because he was so confident of its safety was Tam Dalyell. His constituency Labour Party, as well as the good electors of Linlithgow, put him right on that one. Nevertheless Tam's faith in the nuclear industry knows no bounds, and he was prepared for it. But I agree that with regard to waste, what we have at the present moment is one issue, what we're going to have in the future, I'm led to believe, and we'll hear about it in the context of South

Africa, is another, because my understanding of it is that emerging nuclear technologies produce far less waste than their predecessors. If we were going to be arguing for another generation of Magnox, frankly, I would not be here even countenancing the issue of nuclear power.

Labour Constituent: Like about 40,000 other people in this country, I do work in the nuclear industry. I can't let go of the crack you made about health and cancer and you quoted these reports. A typical example of these is one bloke going round the country saying cancer is caused by nuclear power and trying to prove it with all these figures. In 6 months, it gets knocked down by every single health authority and the Department for Health knock down each and every single one of those reports and says there is no scientific basis for it, the sums are wrong and the way it was conducted was questionable. Don't you think the people who live and work around those sites deserve an apology because of the fact that you're raising an unfounded fear, and secondly if we're going to have a debate, we need to stick to the facts, and not mix them up with myths?

Rob Blackhurst: In your four different reasons why you ruled out nuclear at the moment, price, waste, security and health, I just wondered if there was a solution to the waste issue. I know it's a very big if, and it's difficult to deal with hypotheses, but since politics is the language of priorities, and climate change is such a huge and present issue, could you see yourself maybe changing your mind if in 5 or 10 years if we find a solution to the waste issue.

Michael Meacher MP: Let me take the question about health, which is a very important one, and I'm sorry if I offended you. The question of what the facts are, I entirely agree with your last statement that we should act or we should speak and make policy on the basis of facts so far as we understand them. The real problem here is that what is factually correct is hugely disputed.

I think you're referring to what I set up, which is the CERRIE Report, or Committee Examining Radiation Risks of Internal Emitters. That's the important point, because the impact of radiation on human

health is judged on the basis of our experience after the Second World War. The explosion of two atomic bombs in Hiroshima and Nagasaki killed a horrendous number of people on impact, and many people long after as a result of the impact of radiation. No one disputes that, we've got approximate figures. But that of course is the external impact of radiation. What, in terms of this enormous blast over two cities, we've never taken account of at the time and has increasingly become an issue, is that there is an issue of people inhaling or ingesting radionuclides, obviously inadvertently as they are absolutely microscopic and you do not know when this happens, and of course there is an issue about how it happens.

They don't float down from a nuclear reactor, no one's suggesting that, but one theory, and it is no more than theory, is that there are discharges because nearly all the nuclear power stations around the edge of the country are on the coast and there are discharges in the sea. On days when the tide recedes, when it's dry and there's a wind, some of these radionuclides, which can gather in tiny quantities on the silt, can be blown inland. Now that is only a theory and of course again it is much disputed, but what is not in dispute is that there are leukaemia clusters around Seascale and to the south of Sellafield and around a number of other nuclear power stations.

What again is disputed is of course what is the cause of it. COMARE, which is the committee for the medical aspects of radioactive emissions, has looked at it, and does not accept the theory that I have just put forward. It believes that there is some alternative explanation; the best explanation that they have so far come up with is that this is a result of high levels of immigration and population mix. I leave it to you to judge; do you find it plausible that significant leukaemia clusters around the edge of nuclear power-stations, particularly Sellafield, are caused by that? I must say I find that a rather implausible explanation

Labour Constituent: My fiancée is the funding director of a charity in Britain and that's their view as well, so I think if that's what the experts say, I'm going to agree with them.

Michael Meacher MP: You can do but again, this is where it gets very controversial. A lot of people declare that the National Radiological Protection Board is not sufficiently independent of the nuclear industry. I'm simply declaring a view, and there is a lot of feeling that genuinely, and this is very genuine, this is not conspiratorial at all, that the International Commission on Radiological Protection, the ICRP model, is severely defective because it does not take account of internal emitters as well as gamma radiation from external blasts, and the model needs to be modified.

I set up the CERRIE committee to get representatives of both sides together in a room and cross-examine each other in detail and at length until they tried to reach a consensus as to the better model. I think it worked a bit but it didn't work as much as I would have liked. This area remains intensely controversial, all that I can say is that I think you're taking quite a risk in saying that exposure to nuclear radiation, even in chronically low doses, is completely safe - that would seem to be your position. In my mind, there's no doubt that exposure to low-level radiation does occur, but the view of the industry is that it is below the safety level and therefore not a worry. All I'm saying is that this view, at this time, until we know more about the incidence and impact of internal emitters, is questionable.

You made me wish I hadn't mentioned the fourth point but I did and on the second question, I'll be very brief. If the problems of waste could be solved, I think that would make a big difference. I don't think it will be the decisive difference because you've still got the problem of cost and I think actually it is price and it is economics which in the end are more influential than anything. I happen to think that safety and protection of human beings and protection of the environment is more important, but that's not the way the international economy works. It works on the basis of price, and if nuclear is not competitive, it will not be used, and that I still think is the key factor.

But the problem with waste is it's not just us who are doing it. How many countries in the world have nuclear power, 20-30, or something like that? As far as I know, no country in the world feels it

has an appropriate answer. Finland recently had deep-level repositories as was proposed at Sellafield, the Americans bury it I think in the Yucca Mountain, but the problem is no one can say what will be the consequences over a period of time like 10, 20, 50, 100,000 years. You'll completely leave me when I say this, but I actually do believe this is true: we are living, the human race, in a very, unusually balmy time – it's an interglacial period. If you look at the history of our planet over the last two million years, the ice ebbs and flows every 100,000 years or so, and we have ice which comes down from the North.

This has happened 18 times and it reaches somewhere around the middle of America, it reaches about where we are in the UK, it reaches across the Siberia plain, it is an ice sheet between 2 and 3 kilometres thick. The impact of that, quite apart from the fact that it would bury our civilisation, the impact of that in crushing the earth and preventing whatever the sedimentary or protective face, radioactive material of this degree of toxicity is an unsolved problem. You may think I'm mad to talk about that, all I can say is the last ice age ended about 11,000 years ago and the best scientific view is that it'll return in about 4,000 years. When I said that at an away day in front of John Prescott, when we were having a DTLR ministers' meeting, I could see his neck began to bulge, his eyes went black and he finally couldn't stand it anymore and got up out of his chair to say: "For Christ's sake Michael, what about the next election?!" But it is a problem.

Question: I think when we're discussing this we should also be aware that the chemical industry has as big an impact on the environment as fossil fuels. Also, I do not think this is a question of nuclear or renewables, surely we need both.

Michael Meacher MP: I did say at the end of my remarks that it is not a question of either/or. I actually said that myself, partly because energy efficiency, which is far and away the least painful and relatively easiest, can actually have the most dramatic effect and, I think, that's the first thing we ought to do before having to take a plunge into one or the other.

I don't think it's one or the other. Energy policy has always been mixed and diversified and I think you are taking a great risk if you close off an option. But I repeat that until my three, let's make it three rather than four, objections to nuclear are met it is very difficult to see a real future for it. With regard to your first point, I entirely accept that, you're absolutely right. Actually, I think the chemical industry is probably responsible for a good deal more.

As for the chemical industry, for all that chemicals are so essential to our way of life, we're gradually finding out the effects of PBT (Persistent Bio-cumulative and Toxic Chemicals) and CMRs (Carcinogenic, Mutagenic and Reprotoxic). They are extremely nasty, red-alert chemicals and endocrine-destructive. All of these unquestionably do have an impact. When tests have been done on us as guinea pigs in society, we all have, albeit in very, very small traces, 500 chemicals in our bodies - at this time we probably all have that, in a cocktail formation, the effects of which cannot be known. So I'm not saying this is all down to nuclear's fault, that would be very foolish and there are other industries which actually I think are probably potentially much more dangerous.

Rory O'Neill, British Nuclear Fuels (BNFL): I'd like to ask, Vuvu, what's the impact on the project of Germany turning its back on nuclear energy? Given that you use German technology, has this had any consequences for you?

Vuvu Msutwana-Qupe: Not at all, there has been no impact; everything is going according to plan.

Question: I'd just like to know what technology you're using, is it a brand new one or is it one of the PWRs or something like that?

Vuvu Msutwana-Qupe: I'm not sure about that, I'm not an engineer; I've been more involved in the environmental impact assessment processes.

Adrian Bull, British Nuclear Fuels: I might be able to answer a little bit of that question. It's not a new technology, it's not a water-cooled reactor, it's a reactor that has pebbles of fuel round about the

size of a tennis ball rather than long, thin fuel rod assemblies, and it's a gas-cooled reactor rather than water-cooled. So it's not the same as PWR technology because, as Vuvu pointed out, the technology originated in Germany quite a few years ago, and has now been adopted by South Africa in partnership with others to take it forward as a reactor. It is actually very well suited to a lot of the market frameworks that nuclear is being considered for, both in South Africa and around the world.

Question: Does it run in the pipeline, as Martin mentioned, and produce less waste?

Adrian Bull: It certainly produces less waste than some of the reactors in the UK and other countries, and it's also got passively safe features that rely on natural forces such as gravity to ensure safety, rather than very sophisticated control systems.

Rob Blackhurst: I was interested to hear about politics in South Africa. Is there a political consensus around nuclear entirely amongst politicians or are there serious voices saying: "We should look at wind power or sea power or any of the other renewable types"?

Vuvu Msutwana-Qupe: Yes, some people do raise the fact that we need to look at other alternatives but there are limiting factors to each one of them, so it's an open debate, and we're looking at the possible and the affordable.

Question: Has the government itself been supportive of the project?

Vuvu Msutwana-Qupe: The government has been very supportive; in fact it's taking part in this in a major way.

Question: So it's a government project rather than just a private company project?

Vuvu Msutwana-Qupe: It is a government project.

Question: Is there any debate in South Africa about waste?

Vuvu Msutwana-Qupe: There is a big debate about waste. We are weighing options, we are looking at many things to make sure that something is done about it, and as I've said, presently we are reviewing the nuclear waste management policy.

Adrian Bull: Just one more observation really on Michael Meacher's comments. Surprisingly for one who I suppose is in the pro-nuclear lobby, I agree with an awful lot of what Michael said, right up until he got to the punch line - which was that given that we're facing an increasingly difficult situation and that the scale of the challenge is huge, we should, therefore, rely on energy efficiency to get us out of this big hole. Energy efficiency is not new, energy efficiency measures have been around in this country for decades and they do deliver improvements but the time scale is slow because it takes time (sometimes decades) for new technologies to replace the old ones. They will make a contribution, but we can't rely on energy efficiency to close that big gap between what our demand is going to be for high-emitting carbon energy sources, and those that are much lower.

Rob Blackhurst: Thank you. It is interesting that we're only talking about electricity generation, but we must bear in mind that transport itself is also a cause of rising carbon emissions, and may well be compensating for the reductions we are making in electricity production.

I would like to express our appreciation to the speakers and thank all of you who came.

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