

Building New Reactors Damages Attempts to Tackle Climate Change

“We concentrated so much on nuclear that we lost sight of everything else ... And nuclear has failed to deliver. It has turned out to be a costly gamble for Finland, and for the planet.”
Oras Tynkynnen, a climate policy adviser, Finnish prime minister’s office. (1)

Introduction

Jurgen Trittin – Former German Federal Minister for the Environment – describes calls for more nuclear power to tackle the problem of climate change as “*fighting one risk with an even bigger one*”. (2) And Environment Ministers from Ireland, Norway, Iceland and Austria agree saying the current debate about the use of nuclear energy as a solution to climate change is downplaying the environmental, waste, proliferation, nuclear liability and safety issues. (3)

But, in fact the risk associated with building new reactors is much worse than simply increasing the risks associated with nuclear power. As *The Independent* highlighted in an editorial after the 2007 Energy White Paper, the danger is that nuclear investment will crowd out investment in renewables and undermine energy efficiency. (4) If we divert attention political effort and resources from the urgent programmes needed to effectively tackle climate change not only will we miss our targets, but as past experience suggests we could end up with carbon emissions still rising in 2025 because the nuclear programme has been hit by the problems and delays we have seen in the past and by then it will be too late to start implementing alternative strategies.

In February 2003 the Government itself had similar concerns. After the 2003 Energy White Paper (5) was published, Patricia Hewitt, the Secretary of State for Trade and Industry at the time, said:

“It would have been foolish to announce ...a new generation of nuclear power stations, because that would have guaranteed we would not make the necessary investments in energy efficiency and renewables.” (6)

The White Paper promised a "step change" in policies and programmes to deliver energy efficiency. (7) Six years later we are still waiting for that step change.

The trouble is that electricity only provides around 18% of UK energy demand. (8) Transport and most space heating are provided by other sources of energy. Nuclear power provides around 20% of UK electricity, which only amounts to about 8% of total energy. Allowing for losses at the power station, nuclear power’s current contribution to the UK’s final energy consumption is only 3.6 % (80 TWh/y out of a final consumption of about 2,250 TWh/y). (9) So it is absolutely essential that we make sure building new reactors does not hinder efforts to reduce carbon emissions from the rest of the UK energy system providing the other 96% of final energy consumption.

The Domestic Sector

For example the domestic sector uses around 30% of the final energy consumed in the UK. If the UK Government is to meet its target to reduce carbon emissions by 80% by 2050, it will need to implement a set of policies which can cut emissions from the domestic sector by 80% by 2050. It should be doing this anyway to meet its legal obligations on fuel poverty. Every house will need excellent insulation and some form of Low and Zero Carbon Technology – microgeneration or community heating schemes. This means carrying out installations in all of the UK's 25 million dwellings over the next 40 years or 625,000 dwellings every year between now and 2050. (10)

A long-awaited government consultation on energy efficiency published in February 2009 (11) – the Heat and Energy Saving Strategy (HESS) – sets out the need to reduce household carbon emissions to almost zero, in order for the UK to achieve its ambitious targets. It plans for reductions from households of a third by 2020, and by 2030 aims is for whole-house improvements to be available to every householder. Unfortunately, while the targets are ambitious, the document fails spell out a coherent strategy for achieving them. And much of what is planned won't start until 2013. Friends of the Earth says targets won't be achieved if we wait four years to begin. (12) It is difficult to avoid the conclusion the Government wants to get the nuclear programme started before it turns its attention to implementing a long overdue energy efficiency and microgeneration strategy. (13)

The contrast between the amount of Government effort, energy and funding which goes into promoting new nuclear reactors compared with energy efficiency and renewable energy is staggering. In June 2008, for example, the Government created the Office of Nuclear Development (OND), to build more effective cross-Government working on nuclear energy, and facilitate new nuclear investment in the UK. The OND has staff drawn from both the civil service and from industry, bringing together the relevant Government teams and resources to achieve its objectives. (14)

Opportunity Costs

Advocates of nuclear power argue that, because climate change is serious we need to promote renewables, energy efficiency *and* nuclear power. This suggests we have infinite sources of finance to spend on energy projects, which is obviously nonsense. A scarcity of resources means anything we spend on nuclear power will not be available to spend on other projects.

If nuclear power diverts attention and resources from renewables and energy efficiency you might think this wouldn't be too serious for the climate, as long as we are reducing carbon emissions somehow. Unfortunately, nothing could be further from the truth, because nuclear power has such a high "opportunity cost". The opportunity cost of any investment is the cost of forgoing the alternative outcomes that could have been purchased with the same money. So, of course all investments will forego other opportunities.

Tackling climate change is urgent, so we need to spend our limited resources as effectively as possible. In other words we need to maximize the carbon reductions we can achieve with every pound we spend. Investing in expensive nuclear power is just about the worst thing we can do. Energy efficiency can be up to seven times more cost effective. So investment in new reactors effectively worsens climate change because each pound spent is buying so much less 'solution' than if it were spent it on energy efficiency measures. (15)

Amory Lovins of the Rocky Mountain Institute says:-

"Each dollar invested in electric efficiency displaces nearly seven times as much carbon dioxide as a dollar invested in nuclear power, without any nasty side effects. If climate

change is the problem, nuclear power isn't the solution. It's an expensive, one-size-fits-all technology that diverts money and time from cheaper, safer, more resilient alternatives." (16)

As a consequence investment in nuclear power will, in effect, worsen climate change because each pound spent is buying less solution than it would do if it were spent it on efficiency. (17)

Nuclear damages alternative carbon abatement techniques.

OK, you might think, nuclear power might not be the most effective way to reduce carbon emissions, but as long as we spend enough we should still be able to tackle climate change. Unfortunately, this also turns out to be wrong. Nuclear power's contribution can only ever be really small, so we are going to have to develop energy efficiency and renewables, but we will be in real trouble if reactor construction programmes damage our efforts to develop alternative carbon abatement programmes. With nuclear power only providing around 4% of the UK's final energy consumption, (18) we need to make absolutely sure that spending on building new reactors is not going to hinder our efforts to reduce carbon emissions from the rest of the UK energy system providing the other 96% of final energy consumption.

The UK Government's Sustainable Development Commission (SDC), (19) Warwick Business School (WBS) (20) and the Environment Agency (21) have all warned that a decision to proceed with new reactors could seriously undermine the development of a low carbon energy system.

Warwick Business School (WBS) argues that, far from complementing the necessary shift to a low carbon economy, the scale of the financial and institutional arrangements needed for new nuclear stations means they would fatally undermine the implementation of low carbon technologies and measures such as demand management, and therefore will ultimately undermine the shift to a true low carbon economy. (22) Dr Catherine Mitchell (23) of WBS, who was a member of the previous Energy Review team, says the 2007 White Paper has nothing to do with placing the UK on a path for carbon reductions that might meet the challenge of climate change. It has sealed the fate of the UK in not being able to meet its future carbon dioxide reduction targets. Nor will UK businesses be able to benefit from the enormous opportunities a sustainable non-nuclear future offers. (24)

"Britain has visionary goals", says Mitchell. We have made commitments to the European Union to provide 15% of our total energy from renewable sources by 2020, and to cut projected energy demand by 20%. "If the UK meets these legally binding targets, there is no need for new nuclear or coal plants. Why does government - ie Treasury - policy seem to concentrate on technologies we don't need?" (25)

The UK Government's Sustainable Development Commission (SDC) points out that, even with a doubling of nuclear capacity from current levels, cuts of at least 50% would still be needed from other measures if the UK is to meet its climate targets for 2050. (26) So it is important that our capacity to implement other carbon abatement measures is not damaged by any decision to go ahead with the construction of new reactors. SDC says a new nuclear programme would give out the wrong signal to consumers and businesses, implying that a major technological fix is all that's required, weakening the urgent action needed on energy efficiency. The Commission says a decision to proceed with a new reactor programme will require *"a substantial slice of political leadership ... political attention would shift, and in all likelihood undermine efforts to pursue a strategy based on energy efficiency, renewables and more CHP."* (27) Sir Jonathon Porritt, chair of the Commission, says nuclear power is already seriously diverting attention from the hard decisions required to solve the UK's energy challenges. (28)

Jeremy Leggett of Solar Century believes there has already been a deliberate focus on nuclear to the detriment of renewables. He was a member of the Renewables Advisory Board established in November 2002 to advise ministers on how to implement a plan, based on renewables and energy efficiency. By September 2003 the board's industry members were already troubled by slow progress and issued a statement of concern. Leggett says he was warned that DTI officials would deliberately go slowly to keep hopes for nuclear alive and renewables would be teed up to fail. The slow-motion UK treatment of renewables since then, while renewables markets abroad have grown explosively, now makes it clear they were successful. (29)

In a memo to the House of Commons Trade and Industry Committee the Environment Agency expressed concern about the impact of investing billions of pounds in a new generation of reactors because it could siphon away resources from greener alternatives. Officials at the agency fear the energy review is biased towards the nuclear option. The Agency's Energy Review submission says it is "...concerned about the displacement effect that a large programme of investment in one capital-intensive technology like nuclear may have on energy efficiency, CHP and renewable technologies ... There is a danger that an excessive focus on nuclear power and electricity supply will mean an insufficiently robust approach to all primary energy, including heat and transport". (30)

And globally, decisions taken in the UK and the West can impact negatively on efforts to reduce carbon emissions around the globe. Vijay Vaitheeswaran, *The Economist's* environment and energy correspondent (31), says:-

"Decisions taken in the next few years about energy in rich countries like Britain and the United States will shape investments made in energy infrastructure around the world for a generation or more. After all, nuclear and coal plants and oil refineries last for decades – and that sunk investment displaces or discourages nimbler, cleaner, and more distributed options like micropower. If we want to shift to a clean, secure, low-carbon energy system during this century, the time to start is now". (32)

What if reactors fail?

If reactor construction fails to result in the replacement of existing capacity because of construction delays or public opposition, we could end up in a worse position than we are today. (33) Gordon MacKerron, former Chair of the Committee on Radioactive Waste Management (CoRWM), puts forward a worst-case scenario that following a commitment to nuclear new-build there is a sterilisation of non-nuclear investment and then the nuclear programme itself stalls. Such a scenario is far from a remote chance - the last time a UK government committed to 10 nuclear stations (Margaret Thatcher's in 1979) only one station was built, Sizewell, and then only after 15 years. If that were to happen again, carbon dioxide emissions would continue to increase. (34) Similarly, Bridget Woodman of Warwick Business School suggests a "nightmare scenario" in which a commitment to new reactors leads to a stalling of renewables and combined heat and power stations, but nuclear power fails too leading to an inevitable rise in carbon emissions. (35)

Another former CoRWM member, Professor Andrew Blowers of the Open University, warns that nuclear power provides the illusion of a solution. He says: *"It is this business-as-usual aspect of nuclear that is its most insidious characteristic. ... The danger is that by focusing on nuclear we refrain from recognizing the scale of the challenge we face and shirk our responsibility for dealing with it".* (36)

So nuclear power is probably the most expensive way of reducing carbon emissions, but, because its contribution can only ever be small, we need other carbon abatement techniques if we are going to tackle climate change effectively. The trouble is, nuclear power could well

damage our prospects of implementing those alternative carbon abatement techniques, and then, experience tells us there is a high risk that nuclear might not even be able to deliver the small contribution to reducing carbon emissions expected of it.

The Finnish experience

Very soon after the Finnish Parliament voted in 2002 to build a new reactor, Olkiluoto 3, according to Finland's former environment minister, Satu Hassi MEP, the country lost interest in alternative energy sources. (37) Measures promised in the climate report of 2001 were not implemented. Under the Kyoto Protocol, Finland agreed to keep its greenhouse gas emissions at 1990 levels during the target period 2008-2012. After falling in 2001 and 2002, Finland's carbon emissions have been rising. Emissions were around 9% above 1990 levels in 2002. Measures will have to be implemented to address this issue given that business-as-usual projections by the government indicate further increases in greenhouse gases, reaching 15% above 1990 levels during the first target window. Now many people – industry and trade union leaders - who had argued that because of Finland's Climate Change commitments a new nuclear power station was necessary, have been saying that the commitments Finland had signed up to at Kyoto were a big mistake, unfair to Finland, far too costly and, in practice, impossible to achieve. (38)

The International Energy Agency has highlighted the risk to Finland of relying on the new reactor to meet its climate commitments in case the operation of the plant is in any way delayed. (39) In fact construction of Olkiluoto 3 is now three years behind schedule and 50% over budget. (40) Its original target date for completion was 2009, so there is a danger that it will not be available in time to contribute to meeting Finland's target.

A Finnish Government climate policy advisor now admits that Finland has “*concentrated so much on nuclear [that it has] lost sight of everything else.*”(41) It is beginning to look like we may be heading for exactly the same problem here in the UK.

Pete Roche, June 2009

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