nuclear power – a flawed case

part 2: why we should say 'no' to nuclear now

In the second instalment of a two-part article arguing the case against nuclear energy, Andrew Blowers sets out economic and ethical reasons for rejecting nuclear power as part of our future energy mix

In Part 1 of this article,[1] I argued that there really is no need for nuclear power, which is inherently an unreliable, inflexible and insecure technology. There are other ways forward, in being and developing, which will provide for our long-term energy and environmental security. In this concluding part, I turn to the economic and ethical reasons why we *should* reject nuclear energy as part of our future energy mix.

Nuclear is unaffordable

Economics will be the decisive factor in deciding the future of nuclear energy in the UK. Economic considerations encompass the whole panoply of concerns – safety, legacy, environment – which surround nuclear power. Taken together, all these suggest that nuclear's cost is incalculable and consequently unaffordable.

By any reckoning nuclear energy is expensive. The basic costs include construction, transmission, decommissioning and waste management. As indicated in Part 1, the nuclear industry routinely suffers from 'appraisal optimism', leading to cost escalation. For instance, the French-built Finnish reactor at Olkiluoto has doubled in costs to comfortably exceed euro 7 billion, with claims and counterclaims passing between the Finnish utility and the French designer. The careworn idea that larger reactors will prove to be cheaper has yet to be realised in practice.

Even so, a persistent claim by the nuclear industry and the UK Government is that nuclear is cheaper than most of its (subsidised) rivals. The Nuclear Power White Paper[2] of 2008 certainly argues that nuclear power would yield economic benefits in terms of reduced carbon dioxide emissions and security of supply and that nuclear power is likely to prove an attractive economic proposition. In truth, it is extremely difficult to make valid cost comparisons.

It is generally agreed that nuclear's costs are well above those for fossil fuels, and nuclear would appear to be more expensive than onshore wind but cheaper than offshore. But it is also clear that nuclear's costs tend to be rising, while those for renewables are falling. As newer technologies, renewables are likely to enter their 'sweet spot' where innovation is rapid and matched by falls in cost. By contrast, nuclear is an older technology with long lead times and a pay-back period of 40 years. Committing to nuclear means that we will be liable to 'lock in' an increasingly expensive source of energy into the far future.

Costs unknown and subsidies necessary

Nuclear energy has other long-term and largely unknowable costs, too. The most obvious is the cost of decommissioning and the long-term management of wastes. It is proposed for new-build wastes to fix a unit price based on a reasonable assessment of costs, but, of course, there is no way of knowing what the costs may ultimately be so far into the future.

Nuclear waste management and clean-up of the existing nuclear legacy has been estimated to cost £6.9 billion a year, amounting to 86% of the total budget of the Department of Energy and Climate Change, 'meaning that DECC is spending over eight times as much on cleaning up the nuclear past as it is on securing our future energy and climate security'.[3] The total liability of the Nuclear Decommissioning Authority (NDA) is currently estimated to stand at £73.4 billion.[4] And this, of course, is simply the cost of clearing up the wastes we already have, not any that might arise from new build. Given the infinite and unknowable variables into the far future (methods of management, sea level change, location of sites, cost of a repository, quite aside from issues of societal stability and institutional continuity), the idea of fixing a cost now, as the Government has proposed,[5] on future liabilities can only be described as heroically impractical and irresponsible.

It is also quite impossible to provide against the consequences of a disastrous accident. If the liability was capped at £1 billion per plant as is proposed, this could be a drop in the ocean of total costs which, although unknown, could exceed £300 billion. Nuclear energy absorbs the lion's share of the energy R&D budget, is provided with administrative and training facilities and has an unknown but presumably not modest budget for security. All this is paid for by public money, a subsidy by any other name.

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And a subsidy is exactly what is being proposed in the 2012-13 Energy Bill. Although the Coalition Government continues to proclaim a 'no subsidy to nuclear' policy, its latest proposals for electricity market reform intend to offer long-term 'contracts for difference' to electricity suppliers, backed by a guaranteed 'strike price' fixed at a level sufficient to attract investors.

This should be especially attractive to nuclear operators who need assurance of a good rate of return over at least 40 years. What it may also do is give nuclear operators the upper hand in negotiating a price with a government desperate for nuclear investment, thereby providing a comfortable and handsome subsidy to the French state-owned EDF in the first instance as the only nuclear game in town at present. Nonetheless, there is a limit to the price the Government is prepared to pay, and, at the time of writing it is difficult to know which way the negotiations will go. But it is clear that the outcome will have a significant bearing on the future of nuclear energy in this country.

Nuclear represents a very-long-term financial commitment. It involves being locked into a technology which is subject to delays, long lead times, failures and accidents and which requires a manipulated market and subsidies which stretch into the far future.

The costs of the existing nuclear legacy are unavoidable; it makes no sense to embark on a new nuclear programme whose costs are incalculable and unaffordable and which diverts so much time, political commitment and resources away from more cost-effective ways of energy production and conservation that do not leave so heavy a burden on the future.

Nuclear accidents are normal

While the economic reasons should be enough in themselves for not embarking on a further nuclear crusade, there are even more profound moral reasons why we should say no to nuclear now. Nuclear is capable of catastrophic impacts on human health and environments. The Fukushima disaster gave an awful demonstration of the potential destructiveness. Although the possible health consequences will never be fully known, the partial meltdown of three reactors at the plant caused nearly 100,000 people to leave their homes and livelihoods, some unlikely ever to return. At one point the whole Japanese nuclear power system was shut down and few plants will be operating in the near future. The economic and psychological costs will be long-lasting and widespread.

In the aftermath it was argued that Fukushima was a one-off; it couldn't happen again. Across the world, reviews and 'stress tests' were undertaken to ensure that nuclear power stations could not suffer a similar fate. Of course, it may be possible to eliminate the specific causes of the Fukushima accident. But accidents at nuclear power plants can

Above

The Chernobyl nuclear power plant sarcophagus – 'Accidents at nuclear power plants can and do happen... Accidents need not be replicated but can occur through failures impossible to foresee and often difficult to comprehend'

and do happen. Indeed, it may be stated that accidents are inevitable and not infrequent. One calculation attributes 76 substantial accidents (with either loss of life or over $50,000 worth of damage) to nuclear power stations to date.[6] Three Mile Island (1979), Chernobyl (1986) and Fukushima (2011), the most serious accidents, have all occurred within a generation or so.

In his book, *Normal Accidents,* Charles Perrow argues that, far from being exceptional, nuclear accidents are 'normal accidents' caused by the 'tight coupling' of complex and interacting technical and organisational systems.[7] Accidents need not be replicated but can occur through failures impossible to foresee and often difficult to comprehend. Perrow argues that the chances of nuclear plant meltdown is not 'one chance in a million a year, but more like one chance in the next decade'. As the number of reactors on multi-plant sites increases, so the chance of another serious accident increases.

No matter how small the risk appears, is it worth taking? Given the possibility of a serious accident, no matter how remote it seems, we must ask: is it worth taking the risk of having one or more mega-reactors on vulnerable coastal sites in England and Wales?

Well, it might be if, by going nuclear, it would help to avoid a bigger and more pressing risk of devastation from the consequences of climate change. Indeed, the Government regards this as a moral issue, arguing that 'the balance of ethical considerations does not require ruling out the option of new nuclear power'.[8]

Let us examine this. Nuclear energy is unlikely to make a really significant contribution to carbon reduction. Nuclear achieves just over 5% of global energy supply and roughly the same amount of carbon saving. Worth having, yes, but with two caveats. One is that the failure of nuclear to meet cost and time targets means it may struggle to sustain even its present modest level of contribution to the climate change problem. The other is that any attempt vastly to increase nuclear's contribution might result in uranium ore shortage and increasing use of lower-grade ores. If that were to happen, the energy required to mine, mill and enrich uranium and fabricate nuclear fuel would rise. If it came from fossil fuels, conceivably a point

might be reached when the amount of carbon dioxide produced in fuel preparation might equal that saved in producing nuclear energy. An alternative would be to use renewable energy to ensure carbon saving in the production of nuclear fuel, which makes no sense at all.

Nuclear is a moral issue

In any case the issue is largely theoretical. If, as I tried to show in Part 1 of this article, nuclear is not necessary, certainly not in the long term, what possible justification can there be for the risks it involves? Indeed, far from nuclear energy being

To bring the point nearer home, think of the possible consequences of an accident at Bradwell, Essex with, perhaps, 300,000 people evacuated, including a town the size of Colchester and the anxiety and fear of health and environmental consequences throughout the region extending over decades. It becomes impossible to place social, spatial and temporal limits on the consequences of a nuclear accident and so, in the sober but sufficient words of Germany's Ethics Commission on Nuclear Energy, 'the conclusion drawn is that, if adverse events are to be ruled out, nuclear technology must no longer be used'.[12]

Andrew Blowers

Above

A protest against the proposal for a new nuclear plant at Bradwell in Essex, one of the eight sites identified as 'potentially suitable' for new nuclear plant

ethically subordinate to climate change or its consequences being comparatively insignificant, I have argued in an earlier article that nuclear energy is a moral issue in its own right.[9]

In the first place, nuclear energy is known to be capable of far-reaching regional and even global destructiveness. The impacts of the Chernobyl accident are much disputed and may never be fully known. Figures for excess cancers resulting range from as low as 4,000[10] to as many as 270,000, of which 97,000 will be fatal.[11] What is indisputable is the economic disruption, widespread environmental contamination, psychological trauma and irrevocable and ongoing loss experienced by thousands of people.

A second moral issue is nuclear's long-term legacy – the radioactive wastes that are left and must be managed for thousands of years. At present the idea is to bury the wastes deep underground in a repository, and a lot of effort has been put into trying to find a host community willing to volunteer to enter a siting process. A three-year effort to encourage voluntary participation in the most obviously pro-nuclear area of West Cumbria came to a halt when Cumbria County Council refused to continue despite the willingness of the two district councils (Copeland and Allerdale) most strongly linked to the Sellafield nuclear economy. This halt to the process in its most

promising location demonstrated just how difficult it will be to secure a publicly acceptable and safe long-term solution. So, despite the Government's claim that 'effective arrangements will exist to manage and dispose of the waste that will be produced from new nuclear power stations',[13] the fact is that there is as yet no site nor agreed method for the long-term management of highly active solid wastes in the UK. So far, only in Scandinavia has substantial progress towards deep disposal been made.

Already wastes are lying scattered around the country, where existing and decommissioned reactors are effectively waste dumps which may not be cleared this century. If new power stations are built, the much more dangerous spent fuel, as well as other wastes, will be stored indefinitely on coastal sites that are increasingly vulnerable to the consequences of climate change.

This insoluble, inevitable, irreversible and unending problem of wastes raises a third moral issue: the burden of cost, effort and risk imposed on specific communities and future generations. The burden of existing wastes is inescapable, and we must hope that in the future there will be social stability, commitment and sufficient resources for our successors to look after the dangerous legacy we have left them. We surely cannot contemplate the moral hazard of imposing yet more wastes on the future from a new nuclear power programme. Yet the implication of present plans is that the future can and must take care of itself.

Finally comes the most awesome moral issue of all – the link between nuclear energy and nuclear weapons. Although efforts have been made to segregate the civil and military sectors, the separation in the UK has been more functional and institutional than physical and geographical. In any case, the dangers of diversion can only increase as more states seek or attain nuclear weapons capability or materials fall into the hands of terrorist organisations.

It would be disingenuous to suggest that by abandoning nuclear power nuclear disarmament might follow. But at least it might curb the dangers of proliferation and provide moral impetus to the efforts to dissuade countries like Iran from taking up the nuclear weapons option. The destructive capability of nuclear weapons poses a threat of global proportions, one that, if it escalated, would be utterly catastrophic. Climate change threatens the world with incremental environmental disaster; nuclear weapons with instantaneous obliteration.

Nuclear power is a matter of power

These broader, ethical and societal questions have scarcely touched the debate about whether the UK should embark upon a new nuclear programme. Indeed, it is extraordinary how muted and suppressed the debate has been. It is a matter of power, where a pro-nuclear discourse has composed and structured a set of relationships including government, political parties and the nuclear industry able to drive forward a process of policy-making favourable to new nuclear. It is a process founded on centralised and closed decision-making, privileged access and subordination, and subversion of alternative (anti-nuclear) discourses. As was suggested in Part 1 of this article, a set of parallel decisions, on 'Justification', on 'Generic Design Assessment', on waste management, on finance and on National Policy Statements for Energy, have all been constructed to facilitate and legitimate the development of a new nuclear programme as quickly as possible.

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The consequence has been that potentially opposing forces – notably those in civil society, environmental groups, NGOs, local government, and local communities – have either been marginalised or appropriated.

Under the Infrastructure Planning Commission (IPC) process, it was commissioners who made recommendations to the Secretary of State; local planning authorities were merely significant consultees. Following the Localism Act 2011 and the abolition of the IPC, most of the procedures for decision-making through the Major Infrastructure Planning Unit within the Planning Inspectorate have been retained. Although supposedly 'with a role woven into the system at all stages',[14] in practice local authorities only really become seriously involved once the nuclear operator begins consulting on a specific site. All the key decisions, including where the new power stations will be and the criteria which have to be satisfied, have already been taken through the Strategic Siting Assessments and National Policy Statements.

Local planning authorities with sites identified 'potentially suitable' for new nuclear plant, already mostly inclined towards nuclear energy, become

engaged in a negotiation about what economic and social benefits they can wrest from nuclear operators. The debate at the local level is about bypasses, community centres, business development and jobs rather than environmental protection, emergency planning, coastal processes or radioactive waste. In any case, the IPC and its successor were invited to apply the catch-all 'Imperative Reasons of Overriding Public Interest' (IROPI) to justify a presumption in favour of nuclear energy over local or even international environmental concerns.

Local attention is directed towards immediate benefits rather than long-term impacts. Nowhere is this more clear than on the issue of radioactive waste management. It is proposed to leave highly active spent fuel and other wastes stored on the eight coastal sites, certainly until well into the next century and, if there is no repository, perhaps indefinitely. In truth, the conditions in the farther future, both natural and social, are unknown, probably unknowable, yet the Nuclear Power National Policy Statement airily proclaims that it is 'potentially reasonable to conclude' that a nuclear power station 'could potentially be protected against flood risks throughout its lifetime, including the potential effects of climate change, storm surge and tsunami, taking into account possible countermeasures'.[15] Thus in such casual amoral language is the power of the present asserted over the claims of the future.

In the course of these two articles I have tried to show that the arguments against continuing with nuclear energy are overwhelming. Nuclear accidents can and will occur, with terrible consequences. Nuclear wastes place a difficult, indeterminate and dangerous burden on future generations. And nuclear energy is expensive and unreliable and diverts energy and resources from developing sustainable and benign alternative forms of energy which are ready to take off and cure the carbon problem.

A careful appraisal of the issues leads to three clear conclusions: that we do not need nuclear energy; that we cannot afford it; and that we cannot risk it. For these reasons we should say 'No' to nuclear power now.

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Notes

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13 *National Policy Statement for Nuclear Power Generation (EN-6). Vol. II of II – Annexes*. Department of Energy and Climate Change, Jul. 2011, p.18. www.decc.gov.uk/assets/decc/11/meeting-energy-demand/consents-planning/nps2011/1943-nps-nuclear-power-annex-volII.pdf

14 *Introducing the Infrastructure Planning Commission. A Guide to its Role*. Infrastructure Planning Commission, 2009, p.8. http://mmetag.files.wordpress.com/2009/11/introducing-the-ipc-guide-to-our-role-for-senior-stakeholders1.pdf

15 *Draft National Policy Statement for Nuclear Power Generation (EN-6)*. Department of Energy and Climate Change, 2009, p.66. www.official-documents.gov.uk/document/other/9780108508332/9780108508332.pdf. Similar formulations have been carried over into the sites assessments in the final version of the Nuclear Power NPS (Vol. II – Annexes)