Five Parameters - Nuclear Power

By Phil Hutchinson and Rupert Read

Is it only anti-progress, anti-science environmentalists that oppose nuclear power? You could get that impression if you read tweets and longer reflections by authors such as Mark Lynas. For Lynas is one of the prominent British environmentalists that has sought to embrace nuclear and criticise those who still oppose it. On this he is in good company: Monbiot also thinks nuclear an essential part of our future, though his arguments are more qualified. Add to these two James Lovelock, the father of Gaia theory and one might think that the debate is over. Surely if such prominent figures in the British environmental movement support nuclear there is little rational opposition to the technology. Right?

Well. Let's not get ahead of ourselves. Instead we'll work through our five parameters – the five parameters on which, so we argued in the last issue of TPM, any policy or intervention should be judged -- and see where that leads us…

1) Precaution

Nuclear accidents are a big deal. However, they are relatively rare and often directly result in very few deaths. So what we seem to have here is an example of what is often depicted as the risk versus hazard distinction. Their rarity, the low statistical probability of nuclear meltdown, means that risk of catastrophe is small. But what of the hazard posed by the catastrophe? Well, the defenders want us to believe that even this, the hazard posed by meltdown, is no longer significant enough to count against the technology. The devastation caused by Chernobyl is a symptom of its times, more than a symptom of nuclear technology, is how the story is played out. But in making such arguments, these defenders often talk of the hazard posed by nuclear catastrophe purely in terms of deaths caused directly at the time of accident. But what of, well, everything else?

The hazard posed by a nuclear catastrophe, such as reactor meltdown, leads to long term destruction of ecosystems via the pollution of food chains, it leads to mass evacuations of human populations and exposure to dangerous levels of radiation for non-evacuable animal populations, often leading to death and long term genetic defects.

Furthermore, there are other hazards that could be posed by nuclear that are still harder to perceive or to get into focus. Take 'the China syndrome', of mass-water-contamination: it's never occurred, but it is possible, and indeed it might be underway in Fukushima. Or think of human beings alive 100000 years from now, who encounter vast amounts of nuclear waste underground, and who (because of linguistic drift; because of civilisational breakdown; or what-have-you) have no idea what it is that they are encountering. Or think of nuclear power plants overwhelmed by rising sea levels and storm surges consequent upon human-influenced global over-heat.

The Precautionary Principle would surely counsel against nuclear power, on these kinds of bases, provided that there are alternatives available to it. (We will come to the latter point, in considering the 3rd and 5th parameters, below.)

2) Evidence

Considered as, or as an important part of, the solution to the energy crisis and climate change what is the evidence in support of nuclear? Is nuclear a low carbon technology, that can provide for our future energy needs? If so — if, based on the evidence, we conclude that nuclear is a low carbon

technology — then we need to look at other factors, too. We might, for example, see the hazard posed by nuclear, through its production of radioactive waste which remains dangerous for millennia, the catastrophic effects of nuclear accidents, and the like as side effects. Does the evidence suggest that these 'side effects' are significant enough to render nuclear non-viable?

There is obviously far more to assess and to say here than we have compass for in this column. Let's just index the basics. In terms of the evidence against nuclear power, there clearly is some, already gestured at. If we compare nuclear to (say) GM food, the evidence against nuclear is stronger: it has caused more serious problems than GM has, to date. In terms of the evidence *for* nuclear power, however, there clearly is some, too. Nuclear power works. It is unambiguously successful on its own terms, in a way that (say) GM food is not: for, while there are few unambiguously successful applications of GM crops (even Golden Rice' is contested as a success-story), nuclear energy is powering chunks of the electricity systems of many countries, on a day-to-day basis.

Assessing this second, evidentiary, parameter is a time-consuming job that requires an aversion to dogma as well as a good degree of patience. Clearly, there is real evidence on both sides of the tally.

3) Political Economy

There is little prospect of DIY, personal, or even crowd-funded nuclear power generation. The up-front investment required to build 'safe' (low-risk) nuclear power stations is huge. If the companies that built the plants also had to guarantee the safe storage of the waste for the length of time it remains hazardous to human and ecosystem health this would make it even more expensive. There are therefore certain conditions that need to be in place if nuclear power is to be viable from the economic perspective.

First the companies that build the power plants must be very large corporate entities that have the means of raising the huge amounts of capital required for building a nuclear reactor and putting in place the infrastructure required.

In addition, their returns on their investment must be guaranteed: our political representatives must guarantee that the power produced by the plant will be purchased for the life of the plant, so that the company investing in the building of the plant gets a profit return on the huge up-front investment, and so that it will not dump its responsibilities, which, in the case of nuclear infrastructure, are necessarily weighted. (Consider in this context the troubling case of Tepco, in Japan, which appears to have fallen some way short of upholding such responsibilities adequately, in the case of Fukushima.)

All this rigs the market for decades and hobbles the investment in and therefore growth of alternative technologies.

Third, the politicians must also agree to write-off the costs (externalities) such as long-term waste management, by agreeing that these costs in the long-term will be the responsibility of the polis as a whole and not the power generation company. If this is not the case, then the business plan at the outset would have to include budgeting for millennia-worth of nuclear waste management.

Imagine (just for a moment) a Green government coming to power in a future election, or simply a Green energy minister in a coalition government. Nothing they can do. The contracts have been signed. Imagine a cultural sea-change, where consumers en masse shift to renewable energy suppliers, such as Good Energy in the UK, and the market, the demand, for nuclear disappears. You

don’t have to think such large-scale consumer change is likely, just imagine, for it is an underlying principle of markets that such shifts are possible and in being so drive the efficiencies of the market. Ultimately both democratic political change and market change would leave nuclear untouched, because the nuclear power suppliers are guaranteed a market for the power they generate in to the future, even where we might have cheaper, cleaner, safer alternative sources. If they weren’t guaranteed such, then the up-front investment would simply not make economic sense. The political economy of nuclear serves to concentrate power (in all senses) in the hands of a few very large corporations, whose returns are protected from political and market changes, and which are inextricably tied in with the security-state. Whether you want to or not, whether your children want to or not, and whether their children want to or not, you and they will be buying energy from nuclear power plants commissioned now.

4) Asymmetry

We’ve already mentioned a few times the long-term problem of waste management. This accumulates the more nuclear power we have. We’re storing up toxic waste for future generations, for millennia. Those future generations don’t have a voice.

Similarly, above we touched on the hazard of nuclear catastrophe, whereby while deaths directly resulting from the initial accident have recently been small in number, the effects of radiation on the flora and fauna around the site of the accident is long term and dramatic. Existing ecosystems do not have a voice, yet they will pay the highest price for a catastrophe of humanity’s making.

In contrast, consider the voice of the nuclear power companies. Their political power, their ability to influence policy, their ability to guarantee their financial returns in to the future irrespective of changes in the market and changes of government and their ability to simply avoid costs directly related to the technology they use (such as the full, long-term cost of waste, such as the full cost of an accident) demonstrates their voice is heard loudly, listened to and acted on. Considered this way, therefore, discussions of asymmetry would be incomplete if one did not mention the rendering relatively quiet of non-corporate voices, whether those who live in an area where a plant is proposed or those who would very much appreciate the influence enjoyed by the nuclear power lobby for their renewable energy generation.

5) Framing

Of course, a defender of nuclear might respond to our asymmetry problem by suggesting that we are presenting a somewhat biased picture here. We talk of asymmetry purely in terms of nuclear’s possible impacts on the politically voiceless and powerless. They might retort that we could talk of human-triggered climate-change’s impact on the politically voiceless future generations of humans and ecosystems. We could talk of the asymmetry inherent in the burning of coal for energy generation. True, we could and this raises the question of framing. Those authors we began by mentioning — Lynas, Monbiot and Lovelock — all made the move to qualified backing of nuclear by operating within certain frames. The choice was presented as between on the one hand: nuclear and coal and oil, where nuclear wins because it is less dirty and less carbon intense. And on the other hand between nuclear and renewable energy, such as wind and solar, where we are told nuclear is ready to go, and can therefore solve the crisis in a way that renewable simply isn’t yet ready and won’t be for some time.

Perhaps.

In the background here, framing this, is an assumption about what is politically possible, and this in turn is based on certain further assumptions.

One of the problems is that the nuclear power industry is well established and there are, therefore, powerful lobbying interests. What if there was similar lobbying power for renewables. What if renewables had their returns guaranteed for generations into the future, what if renewables had their long-term costs offset or written-off? (Though in comparison to nuclear with the ever present waste issue, it is hard to think of anything comparable in the context of renewables). If these frames were not in place, would it be so clear cut that nuclear was a better prospect than renewables?

Think also of the framing we hinted at earlier in the section on precaution and then again in the section on asymmetry: the hazard posed by nuclear is all too often framed in terms of the numbers of deaths directly attributable to the initial accident. But the discussion of the hazard posed by nuclear, when thinking precautiously, should not be framed so narrowly in terms of directly attributable deaths of human beings. It should be about the long term damage to ecosystems of waste, long term damage to ecosystems caused by nuclear accidents, long term damage to ecosystems caused by investing in nuclear when we could be using that same money to invest in renewables, battery technology and more efficient forms energy use and transfer, and the long term damage caused by concentrating power in the hands of large corporations rather than dispersing nor devolving power generation. Framed in this more expansive way the positions of Lynas, Monbiot and Lovelock seem weaker. If one assumes current contingencies then nuclear might look good. But we have the power to change these contingencies: we could invest in battery technology, power efficiency technology and seek to genuinely effect social change so that we might reduce energy use.

Nuclear: Evaluating the five parameters

Where does all this leave us? Where do the five parameters take us to, in the case of nuclear power?

There is a precautionary case against nuclear power. It is not a decisive case: the risk of complete and utter ruin to civilization or to life on Earth from nuclear power is probably negligible. But it is a non-negligible case, nevertheless: the risk of very very damaging events occurring cannot be ruled out. Events like Chernobyl or Fukushima give only a tiny taste of what is possible: imagine, for instance, radioactive fires burning for centuries, if cooling-ponds are ever allowed to go dry…

There is an evidentiary case against nuclear power (e.g. Fukushima, which was supposed to be at worst a one in a million years event, recall). But there is also an evidentiary case for nuclear power (e.g. successful contribution to baseload electricity around the world; France's experience).

The case against nuclear power based around considerations of political economy seems to us strong. In Ivan Illich's terms, nuclear is not a 'convivial' technology. It is not well-suited to building a society with a non-authoritarian decentralised state; it is well-suited to militarism; and so on. Moreover, nuclear power has never been economic: it has always required open-ended government subsidy. The simple case in support of this point is Britain's deregulated energy market, since the 1990s. That market has not seen the initiation of any new nuclear power, until the recent deal at Hinckley Point – a deal which commits the UK to paying more than twice the going rate for electricity for the next 35 years, and to dealing with pretty-much all the nuclear waste forever. …However, the 'political economy' parameter may change in years to come. There is some reason to believe that smaller-scale nuclear power facilities are likely to become viable within the next decade or two. And

if thorium reactors are proven to be viable to scale and economically, then they will be a non-militarisable form of nuclear power. …However, these points amount as yet only to a good argument in favour of ongoing research into nuclear power, not for its full-scale roll-out: thorium is not yet viable at scale or economically, any more than fusion is.

There is a powerful case against nuclear in terms of the 'asymmetry' argument. For the sake of a short-term techno-fix, we are committing thousands of future generations to having to deal with a useless mass of toxic waste that we have basically no idea how to make safe.

The final parameter, of framing, appears to us hard to 'call'. The pervasive framing of nuclear power in recent years as 'green' – on the grounds of its alleged low-carbon-status (we say 'alleged' because, absent a rock-solid solution for what to do with nuclear waste, the jury seems to us out on nuclear's carbon-status) – is not only debateable but also could be displaced by alternative very different framings, as indicated above.

Conclusion

So, the scales seem reasonably balanced when it comes to evidence and framing. In precautionary terms and political economy terms, the scales tilt against nuclear. When it comes to asymmetry, the tilt is overwhelming.

We think that assessing nuclear power in terms of our five parameters is revealing. There is no clear on-balance positive case emerging from the thinking through of the parameters; whereas there is a good negative case emerging from at least one of them and probably three of them.

Our provisional conclusion is that nuclear power ends up rejected by thinking carefully through all the parameters.

We'd now welcome your views…