What's wrong with building new nuclear reactors?

1 Nuclear power is expensive

The Times reported that the two new reactors planned for Hinkley Point C in Somerset will cost £14bn. (1)

The UK Government is planning to table a new Energy Bill (see NuClear News No.41) to introduce so-called Electricity Market Reform including the introduction of a complicated support mechanism for low carbon electricity called "Contract for Difference" (CfD). Basically renewable and nuclear electricity will be given a guaranteed "strike price". If the market price for electricity falls below the strike price the operator would be paid the difference, but would also have to pay money back if the electricity price goes above the strike price.

Citi Bank analyst, Peter Atherton, estimates that £7bn per reactor means a strike price of £166/MWh for new nuclear reactors. (2) This is almost four times the average price of electricity. This would amount to a subsidy of around £2.8bn every year for 25 years.

EDF Energy – the company that is planning to build new reactors at Hinkley and Sizewell in Suffolk – claims it will be asking for a strike price of less than £140/MWh – but this is still much higher than the £100/MWh target for offshore wind by 2020.

When the UK Coalition Agreement was signed between the Conservatives and Liberal Democrats in May 2010 the government gave a firm and unequivocal commitment: it would promote the construction of new nuclear reactors provided they received "no public subsidy". But almost everyone agrees the Energy Bill is about exactly that - setting up a complicated series of support mechanisms behind the veil of market reform – in order to subsidise new nuclear reactors without appearing to do so.

Resources

"UK Nuclear Programme – not dead yet as Government tries to save face". NuClear News No. 43 August/September 2012 http://www.no2nuclearpower.org.uk/nuclearnews/NuClearNewsNo43.pdf

"When is a subsidy not a subsidy?" by Pete Roche, Spinwatch 22 May 2012 http://www.spinwatch.org/articles-by-category-mainmenu-8/67-nuclear/5501-when-is-a-subsidy-not-a-subsidy

"Subsidising the Nuclear Industry" by Tom Burke, Tony Juniper, Jonathon Porritt, Charles Secrett, 26 March 2012 http://tomburke.co.uk/wp-content/uploads/2012/03/subsidising_nuclear_26March.pdf

"Investing in Nuclear Power: Current Concerns" by Tom Burke, Tony Juniper, Jonathon Porritt, Charles Secrett, 4 April 2012 http://tomburke.co.uk/wp-content/uploads/2012/04/Investing_in_nuclear_4April.pdf

"The wider economic impacts of nuclear power", by Tom Burke, Tony Juniper, Jonathon Porritt, Charles Secrett, 20 April 2012
http://tomburke.co.uk/wp-content/uploads/2012/04/Wider_economic_impacts_20_April.pdf

Energy Fair website: Risks for Investors: http://www.energyfair.org.uk/financial-risks

"Nuclear Power Subsidies or how to impoverish the nation" by Pete Roche, May 2011
http://www.no2nuclearpower.org.uk/reports/Nuclear_power_subsidies.pdf

The Cost of Nuclear Power: Why nuclear will cost us more than the alternatives, No2nuclear power Briefing February 2011. http://www.no2nuclearpower.org.uk/reports/EconomicsBriefing.pdf

References

1. Times 15th July 2012 http://www.thetimes.co.uk/tto/business/industries/utilities/article3476326.ece
2. Reuters 8th May 2012
http://www.reuters.com/article/2012/05/08/nuclear-britain-edf-idUSL5E8G8FQ620120508

2 Nuclear power diverts resources from better ways of tackling climate change

Replacing existing nuclear power stations would displace only around 5% of the UK's carbon dioxide emissions. (Electricity generation only accounts for about 18% of the UK's carbon dioxide emissions – we also need to tackle emissions caused by heating and transport.) Similar emissions reductions could be made easily, more quickly and much more cost effectively, without any of the nasty side effects, by implementing a few additional energy efficiency measures. The danger is that investment in new reactors will crowd out investment in renewables and undermine energy efficiency. (1) 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.

Tackling climate change is urgent, so we need to spend our limited resources as effectively as possible and maximize carbon reductions achieved with every pound spent. Investing in expensive nuclear power is just about the worst thing we can do. Energy efficiency is at least three 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. (2)

One of the most disconcerting things about the Government's new Energy Bill is that it doesn't include a binding commitment to decarbonising electricity supply by 2030, which the Climate Change Committee described as essential to ensure the UK meets its 2050 carbon targets. Friends of the Earth Senior Energy Campaigner Paul Steedman said: "After 18 months of dithering, this Bill doesn't even set out a clear purpose, when it should make a simple commitment to decarbonising our electricity supply by 2030. All the Bill contains is a desperate attempt to prop up the dying

nuclear industry and a way of letting in dirty gas by the back door, even though soaring gas prices have led to rocketing bills. More gas and new nukes will only add to bill payers' pain." (3)

Resources

"Climate Change and Energy Security: Why nuclear power is not the answer to the problems of climate change and energy security" by Tom Burke, Tony Juniper, Jonathon Porritt, Charles Secrett, 27th April 2012
http://tomburke.co.uk/wp-content/uploads/2012/04/Climate_and-energy_27_April.pdf

"Building New Reactors Damages Attempts to Tackle Climate Change", Pete Roche, June 2009
http://www.no2nuclearpower.org.uk/reports/NewNuclearDamagesClimate.pdf

References

1. Leading Article: There is still time to avoid this nuclear folly. Independent 24th May 2007
2. http://comment.independent.co.uk/leading_articles/article2578450.ece
3. More Profit with less carbon, by Amory Lovins, Scientific American, September 2005. http://www.scientificamerican.com/media/pdf/Lovinsforweb.pdf
4. "Energy Bill: Not even sufficiently climate friendly" NuClear News No.41 June 2012 http://www.no2nuclearpower.org.uk/nuclearnews/NuClearNewsNo41.pdf

3 Nuclear Power is Dirty

After more than 60 years of a civil nuclear power programme, the UK is still seeking a long-term solution for dealing with its higher activity radioactive waste. The February 2003 Energy White Paper said the Government would not be bringing forward proposals to build new nuclear power stations because "*there were important issues of nuclear waste to be resolved*". It would be difficult to argue there had been sufficient progress over the last decade to justify a change in the 2003 policy.

In June 2008 the Government published a White Paper on the framework for implementing geological disposal which set out detailed policy and was accompanied by a call for communities to express an interest in discussing with Government the possibility of hosting a geological disposal facility. So far, the only Councils who have committed to talking to the Government are the three covering West Cumbria - Allerdale Borough Council, Copeland Borough Council and Cumbria County Council. At the time of writing (October 2012) the three Councils have postponed any decision about moving forward with a search for a site until January 2013. Geologists Professor Stuart Haszeldine of Edinburgh University and Emeritus Professor David Smythe of Glasgow University contend that there is already sufficient information to rule out West Cumbria as a possible site. (3)

Nuclear Waste Advisory Associates, a group of independent consultants, have published a Register of 101 Outstanding Issues relating to the production of a robust safety case for deep geological disposal of radioactive waste. (4)

The DVD which accompanied the West Cumbrian consultation document claimed that 70% of the waste by volume destined for the repository is already at Sellafield. This is put forward as a reason why West Cumbria should accept building of a repository within its borders. In fact if there were to

be a new reactor programme with ten new reactors all expecting to send waste to Cumbria, then only about 36% of the waste by volume is already in Cumbria. In fact, volume is not the most important measure to use in the waste inventory, but the amount of space taken up by the packaged waste or the waste "footprint" is more important. Waste from existing reactor life extensions and new reactors would occupy between about a half to two thirds of the repository footprint. According to CoRWM wastes from 10 new reactors would contain three times the amount of radioactivity of the wastes and nuclear materials created over the past 60 years of nuclear activity. (5)

All activities, even generating electricity with nuclear power, result in the emission of carbon dioxide due to the combustion of fossil fuels. So, although nuclear power does not emit carbon dioxide directly, associated emissions occur during construction, the manufacture of components and the operation of the nuclear fuel cycle. As the grade of uranium ore falls, the amount of energy used in mining and processing rises, and hence the amount of carbon dioxide released. Consequently if the grade of ore being mined falls below a certain level we could find the nuclear power cycle releasing almost as much carbon dioxide as a fossil fuelled power station. (6)

Resources

Radioactive Waste Search Could Hit Buffers, nuClear News No. 44 October 2012
http://www.no2nuclearpower.org.uk/nuclearnews/NuClearNewsNo44.pdf

Nuclear Free Local Authorities Response to the West Cumbria Managing Radioactive Waste Safely Consultation March 2012,
http://www.nuclearpolicy.info/docs/radwaste/NFLA_RWB_32_West_Cumbria_MRWS_consultation.pdf

References

1. Our energy future – creating a low carbon economy, Energy White Paper, February 2003. http://www.decc.gov.uk/assets/decc/publications/white_paper_03/file10719.pdf
2. Managing Radioactive Waste Safely: A Framework for Implementing Geological Disposal, DEFRA et al, June 2008. http://mrws.decc.gov.uk/assets/decc/mrws/white-paper-final.pdf
3. Presentations given in September 2012 in Cumbria by Profs Smythe, Haszeldine and Blowers. University of Edinburgh, School of Geo Sciences. http://www.geos.ed.ac.uk/homes/rsh/Allerdale_and_Copeland.html
4. NWAA Issues Register, March 2010 http://www.nuclearwasteadvisory.co.uk/wp-content/uploads/2011/06/NWAA-ISSUES-REGISTER-COMMENTARY.pdf
5. Inventory Summary Information, CoRWM Doc 1531, 17th January 2006 http://corwm.decc.gov.uk/assets/corwm/pre-nov%202007%20doc%20archive/doc%20archive/tier%202%20(6)%20-%20reporting/tier%203%20-%20corwm%20inventory/1531%20-%20inventory%20summary%20information,%20including%20new%20build%20(the%20one%20pager).pdf
6. Dr Nigel Mortimer (1989), Proof of Evidence to the Hinkley C Inquiry (FoE9), "Aspects of the Greenhouse Effect". See also Dr Nigel Mortimer, World warms to nuclear power" SCRAM Safe Energy Journal December 1989/January 1990 http://www.no2nuclearpower.org.uk/articles/mortimer_se74.php and Jan-Willem Storm van Leeuwen, Energy Security and Uranium Reserves, Oxford Research Group, July 2006. http://www.oxfordresearchgroup.org.uk/sites/default/files/energyfactsheet4.pdf

4 Nuclear Power is Risky

A major study of reactor hazards by two leading scientists and an international energy specialist, published by Greenpeace in April 2005, concluded that risks from reactors in the West have been significantly increasing over the last few years and the likelihood of accidents occurring is now higher than ever. (1)

The Union of Concerned Scientists (UCS) described the profile of risk over the lifetime of a reactor as a 'bathtub' curve. New reactors start out as a high-risk as they are 'broken-in'. In the middle of their life, reactors should be in peak health where the risks are at their lowest. Then as reactors get older they enter a 'wear-out' phase with a high risk that components will wear out and fail. (2)

Probabilistic Risk Assessment is a widely used method of quantifying the probability of a major nuclear accident. The flawed logic behind PRA is highlighted by the prediction that a Three Mile Island type accident would occur once every 100,000 years – made only five years before the partial meltdown in 1979. But even if these risk levels are correct, the global growth in reactor numbers, for example as proposed in one scenario by MIT to 1000GW in 2050 (from almost 400GW today) would produce an unacceptable accident frequency – with 4 core damage accidents by 2055. (3)

There have been over 60 scientific studies carried out around the world on increased **childhood cancers** near nuclear facilities. Most of these have found cancer increases. The findings of all these studies have been discussed by Fairlie and Körblein who concluded that "*the copious evidence indicating increased leukaemia rates near nuclear facilities, specifically in young children, is quite convincing, at least to independent observers*." (4)

You might think after 9/11 that new reactors would be designed to withstand the impact of a jumbo jet being crashed into them, but a leaked document by Electricite de France (EdF) on the vulnerability to terrorist attack of the new European Pressurised water Reactor (EPR) - being considered or already under construction in several countries including UK, France and Finland - reveals a dangerously flawed approach to security. A successful attack on a nuclear reactor or nuclear waste store could have widespread and catastrophic consequences for both the environment and public health. (5)

Resources

Nuclear Reactor Safety, No2NuclearPower Briefing, January 2007.
http://www.no2nuclearpower.org.uk/reports/Nuclear_Safety.pdf

COMARE 14th Annual Report on low-level radiation and response to the KIKK report – a critical analysis by Dr Ian Fairlie, NFLA Briefing 16th May 2011
http://www.nuclearpolicy.info/docs/briefings/A196_(NB82)_COMARE_report.pdf

Nuclear Power and Security Threats, No2nuclearpower Briefing, January 2007.
http://www.no2nuclearpower.org.uk/reports/Security.pdf

References

1. Nuclear Reactor Hazards: Ongoing Dangers of Operating Nuclear Technology in the 21st Century, by Helmut Hirsch, Oda Becker, Mycle Schneider, Antony Froggatt, Greenpeace International April 2005. http://www.greenpeace.org/international/Global/international/planet-2/report/2006/8/nuclearreactorhazards.pdf
2. US Nuclear Plants in the 21st Century: The Risk of a Lifetime, David Lochbaum, Union of Concerned Scientists, May 2004 http://www.ucsusa.org/assets/documents/nuclear_power/nuclear04fnl.pdf
3. Insurmountable Risks, by Brice Smith, IEER, 2006, pages 207 and 224 http://www.no2nuclearpower.org.uk/reviews/review01.php
4. Fairlie I and Körblein A. A Review of epidemiology studies of childhood leukaemia near nuclear facilities: commentary on Laurier et al. Radiat Prot Dosimetry. 2010 Feb;138(2):194-5; author reply 195-7.
5. Greenpeace International Press Release 19th May 2006 http://www.greenpeace.org/international/en/press/releases/secret-document-reveals-new-br/

5 We don't need more nuclear reactors

The Overarching National Policy Statement for Energy (EN-1) states that the UK Government expects electricity consumption to double or even triple by 2050 as a result of the electrification of demand (such as for heating and transport). (1) But the Government's own evidence shows something quite different. In March 2011 the Coalition Government published Pathways 2011 (2) presenting 16 different scenarios, detailing various ways forward regarding energy policy in order to both keep the lights on and achieve 80% CO_2 reductions by 2050. Six of the 16 pathways showed there is no need for new reactors. And only nine of the pathways showed anything like a doubling of electricity demand.

A major independent study **published in 2011** shows we can produce 100% of the energy we need globally from renewable sources. (3)

Resources

A Corruption of Governance? How Ministers and Parliament were Misled. ACE and Unlock Democracy, January 2012 http://www.ukace.org/publications/ACE%20Campaigns%20(2012-01)%20-%20Corruption%20of%20Governance%20-%20Jan%202012

Corruption of Governance, nuClear News No.37 February 2012
http://www.no2nuclearpower.org.uk/nuclearnews/NuClearNewsNo37.pdf

Corruption of Governance, nuClear News No.40 May 2012
http://www.no2nuclearpower.org.uk/nuclearnews/NuClearNewsNo40.pdf

Zero Carbon Britain 2030: Britain can create a carbon-free, electricity-based energy system by 2030, using renewable energy and biomass alone, and without recourse to nuclear power.
http://www.zerocarbonbritain.org/index.php/zcbreportmenu/category/1?download=1%3A2030

The Energy [R]evolution 2012 provides a consistent fundamental pathway for protecting our climate through investment in renewable energy. Greenpeace International.
http://www.greenpeace.org/international/en/campaigns/climate-change/energyrevolution/

http://www.greenpeace.org/international/en/publications/Campaign-reports/Climate-Reports/Energy-Revolution-2012/

Energy [R]evolution 2012 Briefing.
http://www.greenpeace.org/international/Global/international/publications/climate/2012/Energy%20Revolution%202012/ER2012-Briefing.pdf

A list of other useful reports can be found here: http://www.energyfair.org.uk/pren

References

1. Overarching National Policy Statement for Energy (EN-1), DECC, July 2011 para 3.3.14
2. http://www.decc.gov.uk/assets/decc/11/meeting-energy-demand/consents-planning/nps2011/1938-overarching-nps-for-energy-en1.pdf
3. 2050 Pathways, 2011, DECC March 2011. http://www.decc.gov.uk/assets/decc/Consultations/2050/1343-2050-pathways-analysis-responsept1.pdf
4. The Energy Report: 100% Renewable by 2050, WWF, Ecofys and OMA 2011 http://www.ecofys.com/files/files/wwf_ecofys_2011_theenergyreport.pdf

6 Promoting 'peaceful' nuclear power is likely to accelerate nuclear weapons proliferation

A global expansion of nuclear power will require a proportional expansion of uranium enrichment capacity. Brice Smith looks at a scenario which involves nuclear power capacity expanding to 1000 GW (compared with almost 400GW now) by 2050. If just one percent of the enrichment capacity required to power a nuclear programme this size were diverted to weapons, this would be enough to make between 175 and 310 bombs every year. (1)

Nuclear expansion would probably also lead to an expansion of reprocessing too. The scenario looked at by Brice Smith would require 17 new plants the size of the THORP reprocessing plant at Sellafield. 155.3 tonnes of plutonium would be separated annually. If just one percent of this plutonium were diverted it would be enough to make 194 bombs every year.

Resources

Civil Nuclear Power and Weapons Proliferation, No2NuclearPower Briefing August 2012
http://www.no2nuclearpower.org.uk/reports/CivilNukesandproliferation%5bAug2012%5dv2.pdf

Civil Nuclear Power Revival and Nuclear Proliferation, May 2008
http://www.no2nuclearpower.org.uk/reports/ProliferationBriefMay08.pdf

References

1. "Insurmountable Risks" by Brice Smith, IEER, 2006. (Section 3.1)
2. http://www.no2nuclearpower.org.uk/reviews/review01.php